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# Correspondence Directory

## Campus Directory Information

(619) 534-2230

### UNDERGRADUATE

<b>Admissions</b>	Registrar & Admissions	Building 301, University Center, 0021A, (619) 534-3160
<b>Educational Opportunity Program (EOP)</b>	Student Outreach and Recruitment Office	Student Center, Building B, 0337, 534-4831
<b>Financial Aids</b> (Loans and Grants)	Student Financial Services	Building 201, University Center, 0013, 534-4480
<b>Foreign Students' Affairs</b>	Office of International Education	International Center, 0018, 534-3730
<b>Housing</b>		
On-Campus	Housing Administration	Trailer 310, University Center, 0041, 534-4010
Off-Campus	Office of Housing Services	Student Center Building B, 0309, 534-3670
<b>Part-Time Employment</b>	Career Services Center	Career Services Center, 0330, 534-4500
On-Campus		
Off-Campus		
<b>Provosts</b>		
Eleanor Roosevelt College	Building 412	University Center, 0069, 534-2235
Muir College	H&SS Building, Room 2126	Muir Campus, 0106, 534-3583
Revelle College	Revelle Provost Building	Revelle Campus, 0321, 534-3262
Thurgood Marshall College	Thurgood Marshall College Admin. Building	Marshall Campus, 0509, 534-4002
Earl Warren College	Literature Building, Room 3210	Warren Campus, 0422, 534-4350
<b>Registration</b>	Registrar & Admissions	Building 301, University Center, 0021R, 534-3150
<b>Residence Status</b>	Registrar & Admissions	Building 301, University Center, 0021R, 534-4586
<b>Scholarships</b>	Student Financial Services	Building 201, University Center, 0013, 534-4480
<b>Student Activities</b>	University Events Office	Price Center, 0078, 534-4090

### GRADUATE

<b>Dean of Graduate Studies and Research</b>	Office of Graduate Studies and Research	Building 518, Eleanor Roosevelt College, 0003, 534-3555
<b>Admissions</b>	(Address the appropriate department of instruction.)	
<b>Affirmative Action</b>	Office of Graduate Studies and Research	Building 518, Eleanor Roosevelt College, 0003, 534-3871
<b>Fellowships</b>	Office of Graduate Studies and Research	Building 518, Eleanor Roosevelt College, 0003, 534-3556
<b>Financial Aids</b> (Loans and Grants)	Student Financial Services	Building 201, University Center, 0013, 534-3807
<b>Graduate Women's Program</b>	Office of Graduate Studies and Research	Building 518, Eleanor Roosevelt College, 0003, 534-355
<b>Housing</b>	Graduate Apartments, Residential Apartments Office	9224 B Regents Road, 0907, 534-2952
<b>Teaching and Research Assistantships</b>	(Address the appropriate department of instruction.)	

### SCHOOL OF MEDICINE

<b>Admissions</b>	Admissions Office	162 Medical Teaching Facility, 0621, 534-3880
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**NOTE:**

While efforts have been made to assure the accuracy of statements in this catalog, it must be understood that all courses, course descriptions, designations of instructors, and all curricular and degree requirements contained herein are subject to change or elimination without notice. Students should consult the appropriate department, school, college, or graduate division for current information, as well as for any special rules or requirements imposed by the department, school, college, or graduate division.

UCSD on the World Wide Web:  
<<http://www.ucsd.edu>>

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# Academic and Administrative Calendar, 1998–1999

## Fall Quarter, 1998

Fall quarter begins .....	Monday, September 21
Instruction begins .....	Thursday, September 24
Thanksgiving holiday .....	Thursday–Friday, November 26–27
Instruction ends .....	Friday, December 4
Final exams .....	Monday–Saturday, December 7–12
Fall quarter ends .....	Saturday, December 12
Christmas holidays .....	Thursday–Friday, December 24–25
New Year holidays .....	Thursday–Friday, December 31–January 1

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## Winter Quarter, 1999

Winter quarter begins .....	Monday, January 4
Instruction begins .....	Monday, January 4
Martin Luther King, Jr. holiday .....	Monday, January 18
Presidents' Day holiday .....	Monday, February 15
Instruction ends .....	Friday, March 12
Final exams .....	Monday–Saturday, March 15–20
Winter quarter ends .....	Saturday, March 20
Academic and administrative holiday .....	Monday, March 22

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## Spring Quarter, 1999

Spring quarter begins .....	Friday, March 26
Instruction begins .....	Monday, March 29
Memorial Day holiday observance .....	Monday, May 31
Instruction ends .....	Friday, June 4
Final exams .....	Monday–Friday, June 7–11
Spring quarter ends .....	Friday, June 11
Commencement .....	Saturday/Sunday, June 12/13
Independence Day holiday .....	Monday, July 5
Labor Day holiday .....	Monday, September 6

### Catalog Evaluation

Please help us evaluate the effectiveness of the *General Catalog* by answering the following questions:

1. I find the catalog to be visually pleasing. \_\_\_\_\_ yes \_\_\_\_\_ no
2. The information in the catalog is clearly presented. \_\_\_\_\_ yes \_\_\_\_\_ no
3. The index seems to be complete. \_\_\_\_\_ yes \_\_\_\_\_ no
4. The UCSD *General Catalog* attracts me to the institution. \_\_\_\_\_ yes \_\_\_\_\_ no
5. Were any catalog sections confusing? If so, which ones? \_\_\_\_\_  
\_\_\_\_\_
6. Did you have trouble finding any information you needed? If so, what information was this? \_\_\_\_\_  
\_\_\_\_\_
7. Please list any additional information you would like to have included in the catalog, or any additional comments you have.  
\_\_\_\_\_  
\_\_\_\_\_

Please check all applicable categories to describe yourself:

- \_\_\_\_\_ I am a potential UCSD applicant.
- \_\_\_\_\_ I have applied or definitely plan to apply to UCSD.
- \_\_\_\_\_ I have been accepted at UCSD.
- \_\_\_\_\_ I am a high school student: \_\_\_\_\_ freshman \_\_\_\_\_ sophomore  
\_\_\_\_\_ junior \_\_\_\_\_ senior
- \_\_\_\_\_ I am a two-year college student, contemplating transfer to UCSD.
- \_\_\_\_\_ I am a four-year college student, contemplating transfer to UCSD.
- \_\_\_\_\_ I am in college, contemplating graduate study in \_\_\_\_\_ (subject).
- \_\_\_\_\_ I am a UCSD student: \_\_\_\_\_ freshman \_\_\_\_\_ sophomore \_\_\_\_\_ junior  
\_\_\_\_\_ senior \_\_\_\_\_ medical student  
\_\_\_\_\_ graduate student in \_\_\_\_\_ (dept.)
- \_\_\_\_\_ I am a junior high school counselor.
- \_\_\_\_\_ I am a senior high school counselor.
- \_\_\_\_\_ I am a community college counselor.
- \_\_\_\_\_ I am a parent of a UCSD applicant or prospective applicant.
- \_\_\_\_\_ I am a UCSD faculty member.
- \_\_\_\_\_ I am a UCSD staff member.
- \_\_\_\_\_ I am a \_\_\_\_\_ faculty \_\_\_\_\_ staff member at \_\_\_\_\_
- \_\_\_\_\_ I reside in California.
- \_\_\_\_\_ I reside in another state or country.
- \_\_\_\_\_ Other (describe) \_\_\_\_\_

Please detach this page from the catalog, fold and staple as indicated, and send to address on reverse side.  
To express our appreciation for your cooperation, a UCSD decal will be sent to participants in this survey.

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STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_

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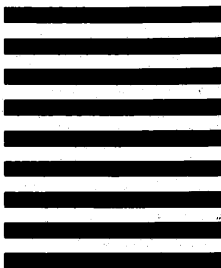
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# Undergraduate Admission Information and Enrollment Deadlines

	<b>FALL QUARTER 1998</b>	<b>WINTER QUARTER 1999</b>	<b>SPRING QUARTER 1999</b>
<b>ADMISSION</b>	<b>Nov. 1-30, '97</b>	<b>*July 1-31, '98</b>	<b>*Oct. 1-31, '98</b>
Filing period for application materials			
PRIORITY DEADLINE FOR APPLICATIONS FOR FINANCIAL AID	March 2, '98	March 2, '98	March 2, '98
PRIORITY TELEPHONE ENROLLMENT	May 6-26	Nov. 4-24	Feb. 10-Mar. 2
Students may enroll by telephone.			
Students may use add cards to enroll in restricted courses during or after their priority appointment time.			
Students may pay fees in person at Cashier's Office after enrolling.			
BILLING STATEMENTS MAILED TO ENROLLED STUDENTS	Aug. 14	Nov. 30	March 4
OPEN ENROLLMENT	May 27-Sept. 18	Nov. 25-Dec. 18	March 3-19
Students may enroll by telephone without appointments.			
Students may add, drop, or change grading option and variable units by telephone.			
Students may use add cards to enroll in restricted courses.			
NEW STUDENT ENROLLMENT	June 15-Sept. 18	Dec. 7-11	March 15-19
DEADLINE DAY TO ENROLL WITHOUT LATE FEES	Sept. 11	Dec. 18	March 19
Students who have not enrolled will be assessed \$100 in late fees. ( \$50 late enrollment fee and \$50 late payment fee)			
<b>QUARTER BEGINS</b>	<b>Sept. 21</b>	<b>Jan. 4</b>	<b>March 26</b>
LAST DAY FOR STUDENTS WHO MET ENROLLMENT DEADLINE TO PAY REGISTRATION FEES WITHOUT \$50 LATE PAYMENT FEE	Sept. 11	Dec. 18	March 19
LAST DAY FOR STUDENTS ON FINANCIAL AID, SCHOLARSHIPS, AND FULL FEE WAIVERS TO NOTIFY THE CAMPUS IF NOT ATTENDING	Sept. 11	Dec. 18	March 19
LATE REGISTRATION PERIOD	Sept. 12-Oct. 9	Jan. 4-15	March 29-Apr. 9
<b>INSTRUCTION BEGINS</b>	<b>Sept. 24</b>	<b>Jan. 4</b>	<b>March 29</b>
ADD/CHANGE/DROP PERIOD	Sept. 24-Oct. 9	Jan. 4-15	March 29-Apr. 9
DEADLINE DAY TO PAY REGISTRATION FEES TO AVOID CANCELLATION OF CLASSES	Oct. 9	Jan. 15	April 9
FINAL DAY TO ADD COURSES	Oct. 9	Jan. 15	April 9
LAST DAY TO APPLY FOR PART-TIME STATUS	Oct. 9	Jan. 15	April 9
CHANGE/DROP PERIOD CONTINUES	Oct. 10-Nov. 30	Jan. 16-Mar. 5	Apr. 10-May 28
Last day to drop without "W"	Oct. 23	Jan. 29	April 23
Last day to change grading option, change variable units	Oct. 23	Jan. 29	April 23
Last day to drop with "W" or final grade must be assigned	Nov. 30	March 5	May 28
<b>INSTRUCTION ENDS</b>	<b>Dec. 4</b>	<b>March 12</b>	<b>June 4</b>
FINAL EXAMINATIONS	Dec. 7-12	March 15-20	June 7-11
FINAL DAY TO FILE "REQUEST TO RECEIVE GRADE INCOMPLETE"	Dec. 14	March 23	June 14
<b>QUARTER ENDS</b>	<b>Dec. 12</b>	<b>March 20</b>	<b>June 11</b>
COMMENCEMENT			June 12/13

\* Winter and spring quarter admission is only open to participants in the Transfer Admission Guarantee (TAG) Program. Call the Office of Admissions and Outreach for details (619) 534-4831. Students applying for winter or spring quarter admission and also applying for financial aid are urged to apply early as mid-year funds for winter and spring applicants may be limited to only bank loans, Federal Pell Grant, and/or Renewal Cal Grant.

# Graduate Admission Information and Enrollment Deadlines

## FALL QUARTER 1999

### ADMISSION

Applicants should check with their prospective departments for deadline dates, although most have January 15, 1999, deadlines.

#### APPLICATIONS FOR FELLOWSHIPS

Deadline date for filing application materials	Jan. 15 '99
Notice of awards	April 1 '99
Acceptance of awards	April 15 '99

#### DEADLINE FOR APPLICATIONS FOR FINANCIAL AID

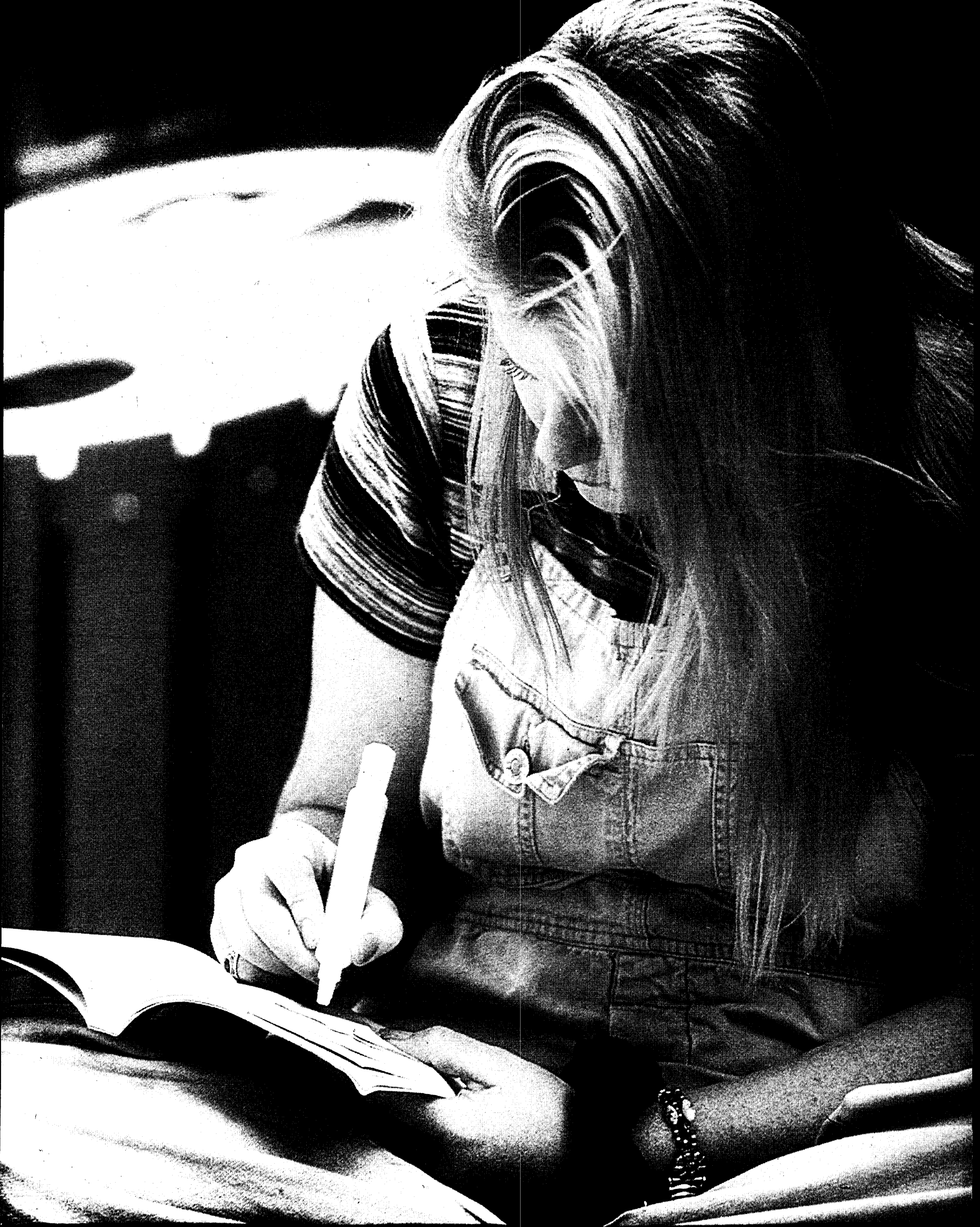
March 2 '99

### GRADUATE ENROLLMENT DEADLINES

	<b>FALL QUARTER 1998</b>	<b>WINTER QUARTER 1999</b>	<b>SPRING QUARTER 1999</b>
OPEN ENROLLMENT: CONTINUING STUDENTS	May 27–Sept. 18	Nov. 25–Dec. 18	Mar. 3–19
NEW STUDENT ENROLLMENT	June 15–Sept. 18	Dec. 7–11	Mar. 15–19
APPLICATION FOR INTERCAMPUS EXCHANGE PROGRAM	Aug. 24	Dec. 7	Feb. 26
FILING APPROVED LEAVE OF ABSENCE	Oct. 9	Jan. 18	April 9
DEADLINE DAY TO ENROLL WITHOUT LATE FEES	Sept. 11	Dec. 18	March 19
Students who have not enrolled will be assessed \$100. (\$50 late enrollment fee and \$50 late payment fee)			
<b>QUARTER BEGINS</b>	<b>Sept. 21</b>	<b>Jan. 4</b>	<b>March 26</b>
<b>INSTRUCTION BEGINS</b>			
New and Readmitted Graduate Deadline to enroll and pay registration fees without payment of late fees	<b>Sept. 24</b>	<b>Jan. 4</b>	<b>March 29</b>
	<b>Oct. 2</b>	<b>Dec. 18</b>	<b>March 19</b>
LATE REGISTRATION			
Last day for students who met enrollment deadline to pay registration fees without \$50 late payment fee.	Sept. 11	Dec. 18	March 19
Enrollment and payment of fees after this date requires payment of \$50 for late enrollment and \$50 for late payment of fees, totaling \$100.			
DEADLINE FOR ADDING OR DROPPING A CLASS	Oct. 9	Jan. 15	April 9
DEADLINE TO CHANGE GRADING OPTION	Oct. 23	Jan. 29	April 23
DEADLINE FOR DROPPING CLASSES WITHOUT "W" APPEARING ON THE TRANSCRIPT	Oct. 23	Jan. 29	April 23
MASTER'S DEGREE			
Filing for advancement to candidacy with completion in same quarter	Oct. 9	Jan. 15	April 9
Filing approved thesis	Dec. 11	March 19	June 11
DOCTOR OF PHILOSOPHY DEGREE			
Filing draft dissertation with doctoral committee	Nov. 13	Feb. 19	May 7
Filing approved dissertation and related materials	Dec. 11	March 19	June 4
DROPPING CLASSES WITHOUT PENALTY OF "F" GRADE	Nov. 30	March 5	May 28
<b>INSTRUCTION ENDS</b>	<b>Dec. 4</b>	<b>March 12</b>	<b>June 4</b>
FINAL EXAMINATIONS	Dec. 7–12	March 15–20	June 7–11
REMOVING INCOMPLETE GRADES (I) ASSIGNED IN PRIOR QUARTER	Dec. 14	March 22	June 14
<b>QUARTER ENDS</b>	<b>Dec. 14</b>	<b>March 20</b>	<b>June 11</b>
COMMENCEMENT			June 13
COMPLETION OF REQUIREMENTS			
Final date for completion of all requirements for degrees to be awarded at end of quarter	Dec. 14	March 19	June 11

Dates are subject to change, see quarterly schedule of classes for changes.







# Introduction

## History

UCSD, one of the newest of the nine campuses which make up the University of California system, marked its thirty-fifth anniversary during the 1995-96 academic year. The other campuses of the University of California are located in Berkeley, Davis, San Francisco, Santa Cruz, Santa Barbara, Riverside, Los Angeles, and Irvine. Each campus has its own distinct academic and social character. And each offers programs and facilities which set it off from the others.

As a member of the nine-campus family of the University of California, UCSD is a university in scale and scope. Graduate and undergraduate programs, offered in a wide range of disciplines, lead to the bachelor's, master's, M.D., and Ph.D. degrees. UCSD's Scripps Institution of Oceanography is internationally renowned, and UCSD's School of Medicine has won national acclaim for excellence. UCSD's Graduate School of International Relations and Pacific Studies, approved by the Regents in 1986, is the only school of international affairs in the UC system. At both the undergraduate and graduate levels, UCSD's curricula and programs have been highly ranked in recent surveys of American higher education.

UCSD enrolled its first undergraduates in 1964. Nevertheless, the campus can trace its origins in this area as far back as the late 1800s. At that time, zoologists on the Berkeley campus, seeking a suitable location for a marine field station, found La Jolla a very desirable site. The facility they established became a part of the University of California in 1912 and was eventually named the Scripps Institution of Oceanography. When, in the late 1950s, the Regents of the University of California decided to situate a general campus in the San Diego region, the Scripps Institution formed the nucleus of the new campus.

Today UCSD is recognized throughout the academic world for its faculty and for its graduate and undergraduate programs. The history of its growth may help to explain how,

in some three decades, UCSD has been able to match institutions which were founded a century or more ago.

The faculty of UCSD now includes five Nobel laureates (four of whom hold joint appointments with the nearby Salk Institute); one winner of the Fields Medal in mathematics; five recipients of the National Medal of Science; one winner of the Pulitzer Prize; sixty members of the National Academy of Sciences; seventy-seven Fellows of the American Academy of Arts and Sciences; twelve Fellows of the American Philosophical Society; eight fellows of the Econometric Society; eleven members of the National Academy of Engineering; six members of the International Academy of Astronautics; fifteen members of the Institute of Medicine; and two members of the National Academy of Education.

UCSD houses a chapter of Phi Beta Kappa, the best-known honor society for the liberal arts and sciences in America. The campus is one of 240 four-year institutions selected for this distinction since the society was founded in 1776, and more than 200 current faculty and staff are members.

In addition, UCSD is officially accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges.

## University and Community

There are certain facts about UCSD which you should consider in making your choice. Among them are:

- UCSD, a four-year undergraduate campus, is also a full-fledged graduate and research institution. UCSD faculty and scholars are continually involved in research and developmental projects that put this campus on the cutting edge of science, technology, and the arts and humanities.
- San Diego has become one of America's major centers for high-technology electronics and biomedical industries. Students concentrating on sciences or engineering are ac-

tively sought by these industries for summer jobs and career positions. Off-campus internships also are available to UCSD students in a wide range of fields of study, with opportunities to serve at local television stations, in charity organizations, and in local, state, and federal government agencies as well as in a diverse array of local businesses.

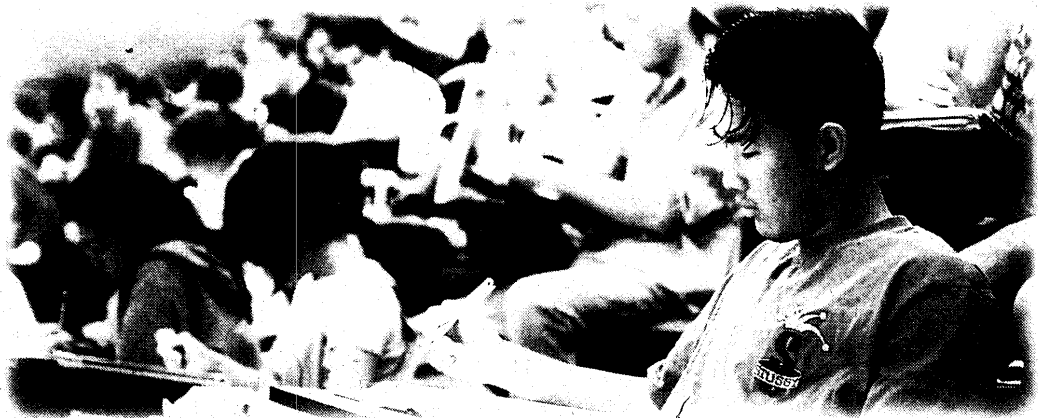
- UCSD is recognized nationally as a major center for the arts and humanities, including music and theater.
- Undergraduates are offered opportunities to participate in certain research projects conducted by UCSD faculty. An example is UCSD's PASCAL program, which was developed by a group of undergraduate students in UCSD's computer laboratories. PASCAL is credited by leaders in the microcomputer field with revolutionizing the writing of computer programs. A number of UCSD undergraduates have developed computer skills that have led to their employment by leading computer manufacturers, and still others have gone on to form their own software enterprises as a direct result of their UCSD training.
- UCSD's unique small-college structure encourages undergraduates to play a more active role in student government, social life, and athletics than is generally open to them in other major universities. Opportunities for involvement in student governance are especially strong as there are student governing bodies at the campus-wide level as well as within the five separate colleges.
- UCSD fields twenty-three men's and women's intercollegiate athletic teams. Campus athletic facilities include the Recreational and Intramural Athletic Center (RIAC), two gymnasiums, two swimming pools (one twenty-five yard, one fifty-meter), and numerous tennis and handball courts. The university's recreational and intramural athletic programs are among the most varied and extensive in the nation today.

### Major Fields of Study

UCSD offers a wide variety of nationally recognized majors in a broad array of fields, summarized in the list below. For a listing of graduate programs, refer to the section of this catalog titled, "Graduate Studies." New programs with strong emphasis on fundamentals have also been developed. Increasing numbers of qualified students are being attracted to these innovative programs.

The academic departments of UCSD are listed below. Details and requirements of the various individual courses are found in the "Courses, Curricula, and Programs of Instruction" section of the catalog.

UCSD has limited the number of its academic departments. For example, there is only one Department of Literature, and the major subareas of biology are not fragmented into separate departments. This system has proved especially valuable to undergraduates who choose to avoid overspecialization early in their studies.



A number of special, individually oriented programs utilize the combined resources of two or more departments. Among these are Chinese Studies, Classical Studies, Computing and the Arts, Earth Sciences, Human Development, Italian Studies, Japanese Studies, Judaic Studies, Latin American Studies, Study of Religion, Russian and Soviet Studies, the Teacher Education Program, Third World Studies, Urban Studies and Planning, and Women's Studies.

Engineering students may choose from a number of majors in the Department of Applied Mechanics and Engineering Sciences (AMES), the Department of Bioengineering (BE), the Department of Computer Science and Engineering (CSE), or the Department of Electrical and Computer Engineering (ECE). All four departments seek to educate the engineer of tomorrow, with increased emphasis on computer methods and systems science.

Undergraduates interested in **premedicine** and **prelaw** majors should note that a variety of departments can serve their needs. For **premed** students, the common choices are biology, chemistry, psychology, and bioengineering. However, more and more students are electing double majors or are combining nontraditional majors with science majors. For **prelaw** students, nearly any undergraduate major will qualify a student for admission to a law school.

Should you need help in deciding upon a major, many UCSD professionals are available to aid you. Among them are the academic advisers in the provost's offices of the various colleges, faculty members, and departmental advisers (who can help you to select an appropriate curriculum). Additional specialists in the Career Services Center and in Psychological and Counseling Services are available to help you appraise your personal aptitudes.

### Undergraduate Departments

#### ARTS

- Music
- Theatre and Dance
- Visual Arts

#### SCHOOL OF ENGINEERING

- AMES (Applied Mechanics and Engineering Sciences)
- BE (Bioengineering)
- CSE (Computer Science and Engineering)
- ECE (Electrical and Computer Engineering)

#### HUMANITIES

- History
- Literature
- Philosophy

#### SCIENCE AND MATHEMATICS

- Biology
- Chemistry and Biochemistry
- Mathematics
- Physics

#### SOCIAL SCIENCE

- Anthropology
- Cognitive Science
- Communication
- Economics
- Ethnic Studies
- Linguistics
- Political Science
- Psychology
- Sociology



## Departmental Undergraduate Majors

<b>ANTHROPOLOGY</b>		<b>ECONOMICS</b>		<b>PHYSICS</b> (continued)	
Anthropological (Archaeology)	B.A.	Economics	B.A.	General Physics/Secondary Education	B.A.
Anthropology	B.A.	Management Science	B.S.	Physics	B.S.
Anthropology (Biological Anthropology)	B.A.	Economics-Mathematics	B.A.	Physics/Biophysics	B.S.
<b>APPLIED MECHANICS AND ENGINEERING SCIENCES (AMES)</b>		<b>EDUCATION</b> (see Footnote 1)		Physics/Biophysics/Pre-medical	B.S.
Aerospace Engineering	B.S.	<b>ELECTRICAL AND COMPUTER ENGINEERING (ECE)</b>		Physics with Specialization in Earth Sciences	B.S.
Chemical Engineering	B.S.	Computer Engineering	B.S.	<b>POLITICAL SCIENCE</b>	
Engineering Sciences	B.S.	Electrical Engineering	B.S.	Political Science	B.A.
Mechanical Engineering	B.S.	Engineering/Physics	B.S.	<b>PRELAW</b> (see Footnote 2)	
Structural Engineering	B.S.	<b>ENGINEERING</b> (see AMES, BE, CSE, and ECE)		<b>PREMEDICAL</b> (see Footnote 3)	
<b>BIOENGINEERING (BE)</b>		<b>ENGLISH</b> (see Literature)		<b>PSYCHOLOGY</b>	
Bioengineering	B.S.	<b>ETHNIC STUDIES</b>		Psychology	B.A./B.S.
Bioengineering-Premedical	B.A./B.S.	Ethnic Studies		<b>SOCIOLOGY</b>	
Bioengineering-Biotechnology	B.S.	History		Sociology	B.A.
<b>BIOLOGY</b>		<b>HISTORY</b>		<b>TEACHER EDUCATION</b> (see Footnote 1)	
General Biology	B.S.	History	B.A.	<b>THEATRE</b>	
Animal Physiology and Neuroscience	B.S.	<b>LINGUISTICS</b>		Dance	B.A.
Biochemistry and Cell Biology	B.S.	Linguistics	B.A.	Theatre	B.A.
Ecology, Behavior, and Evolution	B.S.	<b>LITERATURE</b>		<b>VISUAL ARTS</b>	
Microbiology	B.S.	Literatures in English	B.A.	Art History/Criticism	B.A.
Molecular Biology	B.S.	French Literature	B.A.	Media	B.A.
<b>CHEMICAL ENGINEERING (see AMES)</b>		German Literature	B.A.	Studio	B.A.
<b>CHEMISTRY AND BIOCHEMISTRY</b>		Italian Literature	B.A.	<b>INTERDISCIPLINARY MAJORS</b>	
Chemistry	B.S.	Italian Literature	B.A.	(see Footnote 4)	
Biochemistry/Chemistry	B.S.	Russian Literature	B.A.	Chinese Studies	B.A.
Chemical Education	B.S.	Spanish Literature	B.A.	Classical Studies	B.A.
Chemical Physics	B.S.	Literature/Writing	B.A.	College Special Individual Majors	B.A.
Chemistry/Earth Sciences	B.S.	Literatures of the World	B.A.	Computing and the Arts	B.A.
Environmental Chemistry	B.A.	<b>MATHEMATICS</b>		Earth Sciences	B.S.
Pharmacological Chemistry	B.S.	Mathematics	B.A.	Human Development	B.A.
<b>COGNITIVE SCIENCE</b>		Applied Mathematics	B.A.	Italian Studies	B.A.
Cognitive Science	B.A./B.S.	Applied Mathematics (Scientific Programming)	B.A.	Japanese Studies	B.A.
Cognitive Science/Clinical Aspects of Cognition	B.S.	Mathematics-Computer Science	B.A.	Judaic Studies	B.A.
Cognitive Science/Computation	B.S.	Mathematics-Applied Science	B.A.	Latin American Studies	B.A.
Cognitive Science/Human Cognition	B.S.	Mathematics-Economics	B.A.	Religion Studies in	B.A.
Cognitive Science/Neuroscience	B.S.	Mathematics-Secondary Education	B.A.	Russian and Soviet Studies	B.A.
<b>COMMUNICATION</b>		<b>MUSIC</b>		Third World Studies	B.A.
Communication	B.A.	Music	B.A.	Urban Studies and Planning	B.A.
<b>COMPUTER SCIENCE AND ENGINEERING (CSE)</b>		Music/Humanities	B.A.	Women's Studies	B.A.
Computer Science	B.A./B.S.	<b>PHILOSOPHY</b>			
Computer Engineering	B.S.	Philosophy	B.A.		
<b>COMPUTER SCIENCE AND ENGINEERING (CSE)</b>		<b>PHYSICS</b>			
Computer Science	B.A./B.S.	General Physics	B.A.		
Computer Engineering	B.S.				

Footnote 1: The teaching credential in California requires an academic major, plus professional preparation courses in education (an approved program of practice teaching or an internship, and a full year of college work beyond the baccalaureate. The UCSD Teacher Education Program (TEP) leads to a single subject (secondary) or multiple-subjects (elementary) credential.

Footnote 2: Law schools do not require any particular major, but they do require evidence of good scholarship in demanding subjects. Almost any undergraduate major can qualify a student for consideration by a law school. The UCSD staff includes professional prelaw advisers.

Footnote 3: Like law schools, medical schools do not generally demand a particular major but ask for a solid background in the sciences upon which medicine is built. Most premed students major in biology, chemistry, physics, or bioengineering, but a substantial number major in the humanities and social sciences. The UCSD staff includes professional premedical advisers.

Footnote 4: Interdisciplinary majors usually consist of a prescribed collection of courses from two or more departments. Students interested in such majors should consult the "Courses, Curricula, and Programs of Instruction" section at the back of this catalog.

## Major Fields of Study

UCSD offers a wide variety of nationally recognized majors in a broad array of fields, summarized in the list below. For a listing of graduate programs, refer to the section of this catalog titled "Graduate Studies." New programs with strong emphasis on fundamentals have also been developed. Increasing numbers of qualified students are being attracted to these innovative programs.

The academic departments of UCSD are listed below. Details and requirements of the various individual courses are found in the "Courses, Curricula, and Programs of Instruction" section of the catalog.

UCSD has limited the number of its academic departments. For example, there is only one Department of Literature, and the major subareas of biology are not fragmented into separate departments. This system has proved especially valuable to undergraduates who choose to avoid overspecialization early in their studies.



A number of special, individually oriented programs utilize the combined resources of two or more departments. Among these are Chinese Studies, Classical Studies, Computing and the Arts, Earth Sciences, Human Development, Italian Studies, Japanese Studies, Judaic Studies, Latin American Studies, Study of Religion, Russian and Soviet Studies, the Teacher Education Program, Third World Studies, Urban Studies and Planning, and Women's Studies.

Engineering students may choose from a number of majors in the Department of Applied Mechanics and Engineering Sciences (AMES), the Department of Bioengineering (BE), the Department of Computer Science and Engineering (CSE), or the Department of Electrical and Computer Engineering (ECE). All four departments seek to educate the engineer of tomorrow, with increased emphasis on computer methods and systems science.

Undergraduates interested in **premedicine** and **prelaw** majors should note that a variety of departments can serve their needs. For **premed** students, the common choices are biology, chemistry, psychology, and bioengineering. However, more and more students are electing double majors or are combining nontraditional majors with science majors. For **prelaw** students, nearly any undergraduate major will qualify a student for admission to a law school.

Should you need help in deciding upon a major, many UCSD professionals are available to aid you. Among them are the academic advisers in the provosts' offices of the various colleges, faculty members, and departmental advisers (who can help you to select an appropriate curriculum). Additional specialists in the Career Services Center and in Psychological and Counseling Services are available to help you appraise your personal aptitudes.

### Undergraduate Departments

#### ARTS

Music  
Theatre and Dance  
Visual Arts

#### SCHOOL OF ENGINEERING

AMES (Applied Mechanics and Engineering Sciences)  
BE (Bioengineering)  
CSE (Computer Science and Engineering)  
ECE (Electrical and Computer Engineering)

#### HUMANITIES

History  
Literature  
Philosophy

#### SCIENCE AND MATHEMATICS

Biology  
Chemistry and Biochemistry  
Mathematics  
Physics

#### SOCIAL SCIENCE

Anthropology  
Cognitive Science  
Communication  
Economics  
Ethnic Studies  
Linguistics  
Political Science  
Psychology  
Sociology

## Departmental Undergraduate Majors

<b>ANTHROPOLOGY</b>		<b>ECONOMICS</b>		<b>PHYSICS <i>continued</i></b>	
Anthropological (Archaeology) .....	B.A.	Economics .....	B.A.	General Physics/Secondary	
Anthropology .....	B.A.	Management Science .....	B.S.	Education .....	B.A.
Anthropology (Biological		Economics-Mathematics .....	B.A.	Physics .....	B.S.
Anthropology) .....	B.A.	<b>EDUCATION (see Footnote 1)</b>		Physics/Biophysics .....	B.S.
<b>APPLIED MECHANICS AND</b>		<b>ELECTRICAL AND COMPUTER</b>		Physics/Biophysics (Pre-medical) .....	B.S.
<b>ENGINEERING SCIENCES (AMES)</b>		<b>ENGINEERING (ECE)</b>		Physics with Specialization in	
Aerospace Engineering .....	B.S.	Computer Engineering .....	B.S.	Earth Sciences .....	B.S.
Chemical Engineering .....	B.S.	Electrical Engineering .....	B.S.	<b>POLITICAL SCIENCE</b>	
Engineering Sciences .....	B.S.	Engineering Physics .....	B.S.	Political Science .....	B.A.
Mechanical Engineering .....	B.S.	<b>ENGINEERING (see AMES, BE, CSE, and ECE)</b>		<b>PRELAW (see Footnote 2)</b>	
Structural Engineering .....	B.S.	<b>ENGLISH (see Literature)</b>		<b>PREMEDICAL (see Footnote 3)</b>	
<b>BIOENGINEERING (BE)</b>		<b>ETHNIC STUDIES</b>		<b>PSYCHOLOGY</b>	
Bioengineering .....	B.S.	Ethnic Studies .....	B.A.	Psychology .....	B.A./B.S.
Bioengineering: Premedical .....	B.A./B.S.	<b>HISTORY</b>		<b>SOCIOLOGY</b>	
Bioengineering: Biotechnology .....	B.S.	History .....	B.A.	Sociology .....	B.A.
<b>BIOLOGY</b>		<b>LINGUISTICS</b>		<b>TEACHER EDUCATION (see Footnote 1)</b>	
General Biology .....	B.S.	Linguistics .....	B.A.	<b>THEATRE</b>	
Animal Physiology and		<b>LITERATURE</b>		Dance .....	B.A.
Neuroscience .....	B.S.	Literatures in English .....	B.A.	Theatre .....	B.A.
Biochemistry and Cell Biology .....	B.S.	French Literature .....	B.A.	<b>VISUAL ARTS</b>	
Ecology, Behavior, and Evolution .....	B.S.	German Literature .....	B.A.	Art History/Criticism .....	B.A.
Microbiology .....	B.S.	Italian Literature .....	B.A.	Media .....	B.A.
Molecular Biology .....	B.S.	Russian Literature .....	B.A.	Studio .....	B.A.
<b>CHEMICAL ENGINEERING (see AMES)</b>		Spanish Literature .....	B.A.	<b>INTERDISCIPLINARY MAJORS</b>	
<b>CHEMISTRY AND BIOCHEMISTRY</b>		Literature/Writing .....	B.A.	(see Footnote 4)	
Chemistry .....	B.S.	Literatures of the World .....	B.A.	Chinese Studies .....	B.A.
Biochemistry/Chemistry .....	B.S.	<b>MATHEMATICS</b>		Classical Studies .....	B.A.
Chemical Education .....	B.S.	Mathematics .....	B.A.	College Special Individual	
Chemical Physics .....	B.S.	Applied Mathematics .....	B.A.	Majors .....	B.A.
Chemistry/Earth Sciences .....	B.S.	Applied Mathematics (Scientific		Computing and the Arts .....	B.A.
Environmental Chemistry .....	B.A.	Programming) .....	B.A.	Earth Sciences .....	B.S.
Pharmacological Chemistry .....	B.S.	Mathematics-Computer Science .....	B.A.	Human Development .....	B.A.
<b>COGNITIVE SCIENCE</b>		Mathematics-Applied Science .....	B.A.	Italian Studies .....	B.A.
Cognitive Science .....	B.A./B.S.	Mathematics-Economics .....	B.A.	Japanese Studies .....	B.A.
Cognitive Science/Clinical Aspects		Mathematics-Secondary Education .....	B.A.	Judaic Studies .....	B.A.
of Cognition .....	B.S.	<b>MUSIC</b>		Latin American Studies .....	B.A.
Cognitive Science/Computation .....	B.S.	Music .....	B.A.	Religion, Studies in .....	B.A.
Cognitive Science/Human Cognition .....	B.S.	Music/Humanities .....	B.A.	Russian and Soviet Studies .....	B.A.
Cognitive Science/Neuroscience .....	B.S.	<b>PHILOSOPHY</b>		Third World Studies .....	B.A.
<b>COMMUNICATION</b>		Philosophy .....	B.A.	Urban Studies and Planning .....	B.A.
Communication .....	B.A.	<b>PHYSICS</b>		Women's Studies .....	B.A.
<b>COMPUTER SCIENCE AND ENGINEERING (CSE)</b>		General Physics .....	B.A.		
Computer Science .....	B.A./B.S.				
Computer Engineering .....	B.S.				

Footnote 1: The teaching credential in California requires an academic major, plus professional preparation courses in education, an approved program of practice teaching or an internship, and a full year of college work beyond the baccalaureate. The UCSD Teacher Education Program (TEP) leads to a single subject (secondary) or multiple-subjects (elementary) credential.

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## Summer Session

UCSD offers a Summer Session consisting of courses selected from the regular undergraduate curriculum and taught by UCSD faculty. In addition, Summer Session provides special educational opportunities not easily available during the regular school year.

The Summer Session Program is open to UCSD students, students of other colleges and universities, qualified high school seniors, and the general public. Credit courses for selected professionals, such as teachers and engineers, are also offered.

Summer Session catalogs and registration forms are available in mid-March of each year. For free copies write to UCSD Summer Session, 9500 Gilman Dr., Dept. 0179, La Jolla, CA 92093-0179; or call (619) 534-4364; or send email to: [ss2@sdcc12.ucsd.edu](mailto:ss2@sdcc12.ucsd.edu).

## What UCSD Does NOT Offer

Although the range and variety of programs offered at UCSD are very wide, there are certain disciplines which are not available on this campus. In some instances, the absence of a particular program reflects the academic philosophy of the UCSD campus and its faculty. In others, the absence of a curriculum is temporary, awaiting the availability of funds, personnel, or facilities before a program can be offered. In still others, programs have not been included which would, in the university's judgment, unnecessarily duplicate comparable offerings on other UC campuses or at other institutions.

Among undergraduate majors currently not available at UCSD are:

1. Business.
2. Oceanography. Although UCSD does not offer an undergraduate major in oceanography, some marine science courses are offered in the Department of Biology. Students planning to pursue oceanography at the graduate level may select from a large number of undergraduate courses in the physical, biological, and earth sciences to build a firm foundation for later graduate work. Graduate-level work in oceanography is offered by the Scripps Institution of Oceanography, which is part of UCSD.
3. Nursing.
4. Industrial Arts.
5. Journalism. Although no major in journalism is offered, the Department of Literature offers a major in writing that can emphasize journalistic writing, and the development of writing skills is stressed in many disciplines. Many courses offered in the humanities and social sciences will provide the kind of broad-based preparation needed by practicing journalists. Several student newspapers are published on campus, providing ample "laboratory" opportunities for students to practice journalism.
6. Geography.
7. Physical Education. Note: UCSD does not offer athletic scholarships, and there is no intercollegiate football team at UCSD.

## The Colleges of UCSD

UCSD undergraduates enjoy the benefits of a great university without the disadvantages of bigness found in many of today's mega-universities. The master plan conceived by UCSD's planners borrowed from the Oxford and Cambridge concept to provide a family of colleges, each with its own special academic and social flavor. UCSD's students thus gain a sense of belonging through affiliation with one of the campus's semiautonomous colleges.

Currently there are five colleges: Revelle, John Muir, Thurgood Marshall, Earl Warren,

and Eleanor Roosevelt. Each of the five is independent, yet all are interrelated: all university academic and support facilities are available to all students, regardless of their college affiliation.

Each college is designed to accommodate up to 2,500-3,000 students. Each has its own residence halls, commons (which include dining facilities and meeting rooms), and classrooms. Each college has its own educational philosophies and traditions, its own set of general-education requirements, and its own administrative and advising staff. The objective is to give students and faculty the advantages of a small, liberal-arts college combined with the best features of a major university.

Students applying to UCSD should select a college in order of their preference.

Details regarding the individual colleges are given in the "Choosing a College at UCSD" section of the catalog.

## Recreation at UCSD

UCSD's undergraduate colleges are situated on a parklike, 1,200-acre site high on the bluffs overlooking the Pacific Ocean at La Jolla. La Jolla has some of the finest beaches and coves, art galleries, and other attractions in the nation.

Much of UCSD's recreational and social life centers on the waterfront, with surfing, SCUBA diving, and beach activities among the favorite diversions of UCSD students. Throughout the area, students find a variety of amusements,



ranging from the small-town atmosphere of waterfront Del Mar southward to the open-air markets of Tijuana and the primitive wilderness of Mexico's Baja California peninsula.

The city of San Diego, some twelve miles south of the campus, offers a wide range of recreational opportunities, including Old Town (California's birthplace), Sea World on Mission Bay, and the world-famous San Diego Zoo and Wild Animal Park. A year-round calendar of major league sporting events is offered in the city's Sports Arena and in San Diego Qualcomm Stadium, home of the Padres and the Chargers.

There are numerous theaters in San Diego, including the Old Globe Theatre in Balboa Park, site of the National Shakespeare Festival every summer. A year-round program of contemporary and classical professional theater may be enjoyed in the Old Globe and the adjacent Cassius Carter Centre Stage, and special summer theater fare is featured on the park's outdoor Festival Stage.

On-campus entertainment includes a year-round series of movies and cultural programs, dances, chamber music, and rock-band concerts sponsored by the University Events Office. The Department of Theatre and Dance presents plays in both the 500-seat Mandell Weiss Theatre and the new 500-seat Forum Theatre. The Department of Visual Arts offers a continuing series of art shows in the Mandeville Art Gallery and displays of student art in other campus galleries.

Informal meeting places on campus are hubs of student activity throughout the day and evening, among them the Muir Rathskeller, Marshall College Mountain View Lounge, and the Price Center.

### *Mountains, Deserts, and Beaches*

Many Southern Californians enjoy the outdoors year-round. The San Diego metropolitan area enjoys the most comfortable climate in the United States, twelve months of the year.

Fishing opportunities are plentiful offshore in kelp beds west of La Jolla and surrounding the Coronado Islands in Mexican waters. Bass and trout fishing are available in nearby lakes. An hour's drive to the east, the Laguna Mountains provide pleasure during all seasons for campers and hikers. Beyond the Lagunas lies the vast Anza-Borrego Desert with its breathtaking display of wildflowers every spring.



The peninsula of Baja California, one of the world's last great wilderness areas, stretches for 900 miles southward from the international gateway at Tijuana. The peninsula—a mecca for lovers of unspoiled beaches and untouched mountains and deserts—is the site every year of the grueling Baja cross-country auto race.

### *Sports at UCSD*

Through its intercollegiate athletic and intramural programs, UCSD provides its students with one of the more extensive and competitive sports programs in the United States. UCSD fields many intercollegiate athletic teams along with several club sports teams, while the intramural program provides for student competition in twenty-two sports in three categories of play: men, women, and coed.

Intramural sports are highly popular with UCSD students. An estimated 60 percent of all students take part in one or more of the more than 1,500 teams involved in various sports during the course of the academic year.

### *Need More Information? Check the Following:*

- How do I apply for admission? See page 41. (See also "Note," below.)
- How much does a UCSD education cost? See "Fees and Expenses," page 54.

- What's the grading system at UCSD? See page 68.
- How should I decide which college to choose at UCSD? See page 15.
- What services and facilities are available to students at UCSD? See page 99.
- Where do I write for more information? See inside front cover.

**Note:** An admissions packet for students interested in applying to UCSD can be obtained from any California high school or junior college counselor's office. Out-of-state students may request a packet by writing to the Office of Admissions on any University of California campus.







# Choosing a College at UCSD

One of the features which sets UCSD apart from most major universities in the United States is its family of small colleges: Revelle, John Muir, Thurgood Marshall, Earl Warren, and Eleanor Roosevelt.

The division of UCSD's campus community into small undergraduate colleges was purposeful, and not a chance event. Planners of the new campus examined the various alternatives available and decided upon the small-college concept which has served Oxford and Cambridge so successfully for centuries. The planners were convinced that many—if not most—students learn more, and find greater fulfillment in their personal lives, when they are joined academically and socially with a relatively small group of students and faculty. But the planners also understood that there are many advantages to "bigness" in a university: a faculty of international renown, first-rank teaching and research facilities, laboratories, libraries, and other amenities of size.

These planners wisely determined, therefore, to create an arrangement which would combine the best aspects of a large research university with the finest features of a small liberal arts college. The answer was—and is—the UCSD collegiate system, a series of semiautonomous undergraduate colleges, each with its own faculty, residential and academic facilities, and distinctive educational philosophy. The system was inaugurated with the opening of Revelle in 1964. In the intervening years, four more colleges—John Muir, Thurgood Marshall, Earl Warren, and Eleanor Roosevelt—have been established. The separate college structure may be found today on many American university campuses. In most cases, however, these colleges are designed to serve specific disciplines—engineering, agriculture, and business administration, as examples. This is not the case at UCSD. Instead, at UCSD, any undergraduate may select a major from the full range of majors available. The choice of a college is based, therefore, not on one's major, but upon one's preferences in terms of the various educational philosophies and environments offered by the various colleges.

UCSD's college system allows undergraduates to choose among five distinct general-education curricula supplementing their major requirements. These curricula range from a very structured liberal-arts program to a program with a broad range of electives. By contrast, most universities offer only one general-education curriculum.

Students must rank the colleges in order of preference when applying for admission. Brief summaries of the various college curricula and philosophies follow. Later in this section, these variations are spelled out in considerable detail, college by college.

## *Revelle College* *Educational Philosophy*

Revelle College stresses the broad character of general education. A structured liberal arts curriculum establishes a strong educational foundation for any major. All students complete a highly respected core humanities sequence and courses in the arts and social sciences. Students either meet proficiency in a foreign language or complete the fourth quarter of college level instruction. All students also complete sequences in mathematics and science, with separate courses available for science and non-science majors. Throughout the final two years, students concentrate on developing professional competence in one academic discipline and a basic understanding of another unrelated academic field.

This curriculum develops three main skills which are essential for a well-rounded education: learning to use the language of scholarship and science, learning how to think creatively, and learning how to learn.

Revelle College is distinguished by its emphasis on academics and student leadership. Its structured and well-rounded curriculum has been acclaimed nationally. Individual academic advising, honors programs at all levels, and programs that foster student-faculty interaction, are all hallmarks of UCSD's first college.

## *John Muir College* *Educational Philosophy*

The faculty of John Muir College has established a flexible set of general-education and graduation requirements that ensures breadth and depth of learning and encourages the students of the college to take an active role in their own intellectual development. Students complete four year-long sequences drawn from the social sciences; the natural sciences or mathematics; and the humanities, fine arts, or foreign languages. Many choices are available for each of the four year-long sequences. Effective fall 1993 Muir has a U.S. cultural diversity graduation requirement. Students also complete two expository writing courses. Muir's requirements accommodate a wide range of interests and aptitudes. The relative openness and flexibility of its curriculum make Muir College particularly attractive to exceptionally able and well-prepared students with well-defined or developing academic interests.

John Muir College is distinguished by its atmosphere of friendliness and informality and a deep concern for the rights and welfare of others. Concern for one's fellow students goes well with Muir's educational philosophy, which stresses individual choice and development. The environment thus created fosters independence and responsibility.

## *Thurgood Marshall College* *Educational Philosophy*

Thurgood Marshall College is a liberal arts and sciences college dedicated to the development of the scholar and citizen. Students pursue majors in the social sciences, natural and physical sciences, mathematics, engineering, humanities, and fine arts.

The college's educational philosophy is guided by the belief that regardless of a student's major, a broad liberal arts education must include an awareness and understanding of the diversity of cultures and the variety of ways culture enables people to fashion lives of dignity. Therefore, the distinctive general-edu-

cation program allows students course choices that emphasize a critical examination of the human condition in society.

The three-quarter core sequence, "Dimensions of Culture – Diversity, Justice and Imagination" is designed as an interdisciplinary, issues-oriented curricular experience that seeks to balance an exploration of uniquely American, Western, and non-Western culture. Students also choose courses in mathematics, natural/physical sciences, writing, humanities, and fine arts.

In addition to the strong academic program, Thurgood Marshall College is proud of its emphasis on the student as citizen. The Student Leadership Program is especially designed to encourage active participation in the governance of the college and in community public service.

### ***Earl Warren College Educational Philosophy***

Earl Warren College emphasizes curricula and programs that assist students in making a close connection between their undergraduate education and their personal and professional goals for their postbaccalaureate years. This approach applies to all students, whether their career aspirations lie in the professions, the arts, or the sciences. As a means of supplementing curricular requirements, the college encourages students to take advantage of academic internships and career-life planning programs to sharpen their skills and test their career choices.

Each student enrolled at Earl Warren College has the opportunity to develop an educational program best suited to his or her individual interests, but within a sound framework that ensures significant exposure in three disciplinary areas: humanities/arts, social sciences, and natural sciences. All students are required to take two focused collections of courses outside the general area of their major which, in the majority of cases, will include upper-division work, as well as introductory courses.

In addition, Warren College stresses the importance of the following attributes: student leadership development, an appreciation of diverse cultures, the importance of individual responsibility, and awareness of ethical issues and their application in contemporary society.

### ***Eleanor Roosevelt College Educational Philosophy***

Eleanor Roosevelt College (ERC) emphasizes a comprehensive general education designed to prepare students to compete successfully in the global and multicultural economy of the twenty-first century. Successful professional people will need to understand their own cultural heritage as well as those of people from other societies with whom they will be interacting in their workplaces and communities.

The perspectives gained at ERC prepare students well for the future, whatever their goals and their major field of study, and whether they plan to go on to graduate school, professional school, or the worlds of science and technology, business, or the arts.

At the core of the curriculum are six courses comprising The Making of the Modern World (MMW). This interdisciplinary sequence was developed by faculty from anthropology, history, literature, political science, and sociology. It teaches students to think historically and analytically, as well as across disciplines, about both Western and non-Western societies, and the ways humans have organized their experience in different places and times.

ERC students receive exposure to natural science, quantitative methods, foreign language, and fine arts, and each selects a geographic region for in-depth study. Interested students are encouraged and assisted in finding ways to study, work, or travel in other countries to expand their horizons.

A friendly and supportive campus community, ERC is also distinguished by its emphasis on helping each individual reach his or her full potential intellectually, and in those skills contributing to effective participation and leadership.

As Eleanor Roosevelt wrote, "Whether or not they have made the world they live in, the young must learn to be at home in it, to be familiar with it. They must understand its history, its peoples, their customs and ideas and problems and aspirations." ERC students and graduates find themselves as much "at home" in the world as any of their generation, and more than most!

### ***College Administration***

The provost is a faculty member who acts as chief administrative officer and academic dean. In addition to the provost, each college has a director of academic advising and a dean of student life.

The academic departments and the college academic advising offices are designated campus units responsible for providing official academic advice and direction to undergraduate students. The college academic advising staff have primary responsibility for providing academic advice and services that assist new and continuing students in developing educational plans and course schedules which are compatible with their interests, academic preparation, and career goals.

The academic advising offices conduct academic orientation/enrollment programs for all new students and advise continuing students about college general-education and graduation requirements. The advising staff of each college provides general academic and curricular information, clarifies academic rules and regulations, reviews all aspects of academic probation, monitors academic progress, assists students with decision-making strategies, and gives information about prerequisites and screening criteria for majors. In conjunction with the academic departments and the Office of the Registrar, the advising offices certify students for graduation and generally facilitate their academic adjustment to the university.

Moreover, academic advisers are available to counsel students about educational alternatives; selection of courses and majors; program changes; new academic opportunities; and special programs such as exchange programs, honors programs, outreach programs, etc.

With a central concern for student development, dean's staff members provide a variety of nonacademic services such as coordinating both educational and social programs; overseeing residential programs; assisting students with decisions and procedures regarding withdrawal from school; coordinating disciplinary procedures, both academic and social; and making referrals to other student services on campus. (See also section on "Student Services and Programs.")

## GRADUATION REQUIREMENTS IN THE UCSD COLLEGES

Unless otherwise indicated, the figures in this chart refer to the number of COURSES rather than the number of units. Most UCSD courses carry four quarter-units of credit, and a student usually takes four courses each quarter. Academic disciplines are classified as humanities/fine arts, social sciences, and mathematics/natural sciences/engineering. The term "noncontiguous" refers to a discipline that is different from that of the major. Students must meet the Subject A requirement prior to enrolling in the writing courses of their respective college. Each college's cultural diversity requirement can be fulfilled as noted by an asterisk (\*) below.

### GENERAL EDUCATION

REVELLE COLLEGE	JOHN MUIR COLLEGE	THURGOOD MARSHALL COLLEGE	EARL WARREN COLLEGE	ELEANOR ROOSEVELT COLLEGE
<b>HUMANITIES</b> ..... 5 Includes intensive instruction in university-level writing. <b>FOREIGN LANGUAGE</b> ..... 0-4 Proficiency exam or number of courses. <b>FINE ARTS</b> ..... 1 Art, music, theatre <b>PHYSICS AND CHEMISTRY</b> 4 At least one course from each area (Sequences available for science and non-science majors.) <b>BIOLOGY</b> ..... 1 <b>CALCULUS</b> ..... 3 (Sequences are available for science and non-science majors.) <b>SOCIAL SCIENCES</b> ..... 3 To include at least one course in American Cultures* <b>AREA OF FOCUS</b> ..... 3 Focused on one subject non-contiguous to the major.	<b>WRITING</b> ..... 2-3 <i>A Three-Course Sequence in each of TWO of the following categories:</i> ..... 6 <b>HUMANITIES</b> <b>FINE ARTS</b> <b>FOREIGN LANGUAGE</b> <b>AND</b> <i>A Three-Course Sequence</i> ..... 3 <i>IN EITHER</i> <b>MATHEMATICS (CALCULUS)</b> <b>OR</b> <b>NATURAL SCIENCE</b> (Sequences are available for science and non-science majors.) <b>AND</b> <i>A Three-Course Sequence</i> ..... 3 <b>IN</b> <b>SOCIAL SCIENCES</b>	<b>DIMENSIONS of CULTURE</b> 3 ( <i>DIVERSITY, JUSTICE and IMAGINATION</i> ) Includes two six-unit courses with intensive instruction in university-level writing <b>HUMANITIES and CULTURE</b> 2 *Includes cultural diversity <b>FINE ARTS</b> ..... 1 <b>NATURAL SCIENCES</b> ..... 3 One course each in biology, chemistry, and physics. (Courses are available for science and non-science majors.) <b>MATHEMATICS and LOGIC</b> ..... 2 <b>DISCIPLINARY BREADTH</b> ..... 4 Must be noncontiguous to the major field of study. Two of these courses must be upper-division. At least one course must include significant writing. <b>PUBLIC SERVICE ... (optional)</b> This four-unit public service option may be used to fulfill one course in the Disciplinary Breadth area.	<b>WRITING</b> ..... 2 <b>ETHICS and SOCIETY</b> ..... 1 <b>FORMAL SKILLS</b> ..... 2 Two courses to be selected from a list including calculus, symbolic logic, computer programming, and statistics. <b>PROGRAMS of CONCENTRATION*</b> ..... 12 (for B.A./B.S. degrees in arts/sciences) Two programs of concentration, each typically consisting of three lower-division and three upper-division courses. Both programs must be non-contiguous to the major and to each other. <b>OR</b> <b>AREA STUDIES</b> ..... 6 (for B.S. degrees in engineering) Two area studies each consisting of three courses. One area of study in humanities/fine arts and one in social sciences.	<b>The MAKING of the MODERN WORLD</b> ..... 6 Includes two six-unit courses with intensive instruction in university-level writing and cultural diversity*. <b>FOREIGN LANGUAGE</b> ..... 2-3 One quarter may be waived for students who are biliterate. <b>FINE ARTS</b> ..... 2 To include study of both Western and non-Western arts. <b>NATURAL SCIENCES</b> ..... 2 (Sequences are available for science and non-science majors.) <b>MATHEMATICS/ COMPUTER SCIENCE</b> ..... 2 (Sequences are available for science and non-science majors.) <b>REGIONAL SPECIALIZATION</b> ..... 3 To include at least two courses taken at the upper-division level.

### MINOR/ADDITIONAL GRADUATION REQUIREMENTS

Optional Minor	Optional Minor *One U.S. Cultural Diversity course to be chosen from an approved list as part of the major, optional minor, elective, or an appropriate general-election course.	Optional Minor	Optional Minor—Students may choose a noncontiguous minor in lieu of a Program of Concentration. *One Cultural Diversity in U.S. Society course to be chosen from an approved list as part of the major, Programs of Concentration/Area Studies, or elective.	Optional Minor—Students may combine foreign language and regional specialization course work to create a minor focusing on a particular geographic area.
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### TOTAL NUMBER OF COURSES REQUIRED FOR GRADUATION

B.A./B.S. degrees require a minimum of 46 courses (184 units); at least 15 courses (60 units) must be upper-division.	B.A./B.S. degrees require 45 courses (180 units). At least 18 courses (72 units) must be upper-division.	B.A./B.S. degrees require 45 courses (180 units). At least 15 courses (60 units) must be upper-division.	B.A./B.S. degrees require 45 courses (180 units). At least 15 courses (60 units) must be upper-division.	B.A./B.S. degrees require 45 courses (180 units). At least 15 courses (60 units) must be upper-division.
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### MAJOR

**NOTE: Students may pursue any major, regardless of the college they choose.** Majors are identical regardless of the student's chosen college. Most majors require twelve to eighteen upper-division courses based upon adequate lower-division preparation; such preparation may be part of the general-education requirements. *Majors in certain engineering programs may require as many as twenty-one upper-division courses.*

Whatever the question or the problem, the provost and his or her staff stand ready at all times to assist undergraduates.

### *Phi Beta Kappa*

The UCSD chapter of Phi Beta Kappa elects student members on the basis of high scholastic achievement in academic programs emphasizing the liberal arts and sciences. Phi Beta Kappa was founded in 1776 at the College of William and Mary in Virginia and is the oldest, most prestigious, academic honor society in America. See also "Honors" in the index.

### *Honors*

Each college awards honors to outstanding students on the basis of criteria approved by the Academic Senate. Approximately 14 percent of graduating seniors are eligible for college honors. These honors are posted on students' transcripts and noted on their diplomas. For further details, see "Honors" in the index.

### *Transfer Students*

Students transferring to any of the undergraduate colleges must complete the requirements of the chosen college. Students, especially biology, engineering, and other science majors, should also complete major prerequisites. In preparation for the New Student Orientation Program, the College Academic Advising staff will evaluate the transfer course work for each student to determine which courses are applicable to general-education requirements. Since a variety of general-education options are available, students are encouraged to carefully choose the college which best fits their general-education program or course work. See Undergraduate Admissions, Policies and Procedures, "University of California Transfer Agreement."



# Revelle College

Revelle College, the first college on the UCSD campus, was named in honor of Dr. Roger Revelle, former university-wide dean of research and for many years director of UCSD's Scripps Institution of Oceanography. Dr. Revelle is perhaps best known for his prediction of the Greenhouse Effect.

Revelle College was established in 1958. With the establishment of Revelle College, the faculty was given a rare opportunity to shape an undergraduate curriculum that would, insofar as any educational program can, prepare its students for the modern world. From the outset of planning the curriculum, the faculty asked: What sort of knowledge must students have if they are to be liberally educated? In what areas? To what depth? How specialized must that education be in the undergraduate years?

The educational philosophy of Revelle College was developed in response to such fundamental questions. Its undergraduate program is based on the assumption that students who are granted the bachelor's degree will have attained:

1. An acceptable level of general education in mathematics; foreign language; the physical, biological, and social sciences; the fine arts; and the humanities.
2. Preprofessional competence in one academic discipline.
3. An understanding of an academic area outside their major field.

To this end, a lower-division curriculum has been established which enables students to acquire an understanding of the fundamental problems, methods, and powers of the humanities and the arts, the social and behavioral sciences, mathematics, and the natural sciences.

The lower-division curriculum assumes that undergraduates should not concentrate heavily in a special field until they have had a chance to learn something about the various fields that are open to them. Their general education must, then, be thorough enough for them to

see the possibilities in those fields. Early in their careers, they should know three languages: their own, a foreign language, and the universal language of mathematics.

During the students' junior and senior years, their main efforts will be devoted to intensive work in their major fields at a level of competence that will enable them to continue their study at the graduate level. In addition to the major, students will study an area of learning distinctly different in content from the major.

Revelle College stresses the broad character of its curriculum. Every student, for example, is required to achieve a certain competence in calculus. The emphasis on calculus and physical science is in some respects a deviation from educational theory of the last hundred years. The older "general-education" theory demanded that scientists achieve a reasonable competence in the social sciences and humanities. The rising importance of science and technology justifies the application of the theory to nonscientists as well.

Four years of college can at best yield only a limited knowledge; the major task is to train students so that they can adapt quickly and effectively to the rapidly changing world.

## *General-Education Requirements*

Students are encouraged to meet the general-education requirements and the prerequisites to the major as rapidly as possible. Variations within the program will occur, of course, depending on the student's interest, prior training, and ability to make use of individual study.

Freshmen who enter with Advanced Placement credits can use many of these advanced courses to meet general-education requirements (see Advanced Placement chart in "Undergraduate Admissions, Policies and Procedures"). Transfer students may meet all general-education requirements before entering by following articulation agreements with community colleges or taking at any institution courses which Revelle College deems approximately equivalent in content to those at UCSD.

Those who demonstrate superior achievement and competence in an academic area may take advanced courses and individual study programs.

In order to fulfill the requirements in the principal fields of knowledge, the student takes a recommended set of courses, the prerequisites for which have been met by the general admission standards of the university.

The general-education requirements are:

1. Satisfaction of the general University of California requirements in Subject A and American History and Institutions.
2. A five-course sequence in an interdisciplinary humanities program including two six-unit courses with intensive instruction in university-level writing. Written work is also required in the remaining four-unit three-quarter courses.
3. One course in the fine arts.
4. Three lower-division courses in the social sciences, chosen from an approved list, to include two courses in the same social science and at least one course in American cultures.
5. Three courses in mathematics (three quarters of calculus).
6. Five courses in the physical and biological sciences to include four quarters of physics and chemistry and one quarter of biology.
7. Basic conversational and reading proficiency in a modern foreign language or advanced reading proficiency in a classical language or completion of the fourth quarter of foreign language instruction with a passing grade.
8. Three courses in an area unrelated to the major and focused in one department, subject area, or topic.

## **1. SUBJECT A AND AMERICAN HISTORY AND INSTITUTIONS**

Satisfaction of the university requirements in Subject A and American History and Institutions. (See "Subject A," "Undergraduate Registration," "Academic Regulations," "Hu-

mentees, and Undergraduate Admissions Policies and Procedures, American History, and Institutions.

## 2. HUMANITIES

The purposes of the general education requirement in humanities are two-fold: (a) to confront students with significant humanistic issues in the context of a rigorous course which can serve as an introduction to the academic disciplines of history, literature, and philosophy; (b) to provide training and practice in rhetorical skills, especially persuasive written expression. Students may meet this requirement by satisfactorily completing five courses of the interdisciplinary humanities program offered by the Departments of History, Literature, and Philosophy, which focus on some of the great documents of civilization. The sequence of courses, Humanities 1 through 5, is designed to meet the humanities and writing requirement of Revelle College. Students must have satisfied the university's Subject A requirement before registering for this sequence.

In connection with learning about the Western tradition, students in Humanities 1 and 2 (six units each) will receive intensive instruction in university-level writing instruction. In writing is provided in discussion sections, and frequent writing exercises are required. Written work is also required in the remaining three quarters of the sequence, Humanities 3-4-5, four units each.

For course descriptions, see "Courses, Curricula, and Programs of Instruction: Humanities."

## 3. FINE ARTS

One course is required to provide an introduction to the fundamental experience in the interpretation of creativity in theatre, music, or visual arts. (See "Courses, Curricula, and Programs of Instruction: Theatre, Music, and Visual Arts.")

## 4. SOCIAL SCIENCES

Three lower-division courses offered by the Departments of Anthropology, Cognitive Science, Cultural Traditions (Women's Studies), Economics, Ethnic Studies, History, Linguistics, Political Science, Psychology, Sociology, or Urban Studies and Planning, from an approved list available at the Provost's Office. Effective

for transfer students entering fall 1994, TAG students exempt from at least one of these courses must be from a list approved as meeting the requirement in American Cultures.

## 5. MATHEMATICS

As an integral part of their liberal education, students will be brought into contact with a significant area of mathematics. Furthermore, they will gain the faculty to apply mathematics in their studies of the physical, biological, and behavioral sciences.

There are two beginning-year sequences which meet the Revelle College mathematics requirement. Both sequences include integral and differential calculus. Freshman placement in these sequences is dependent upon the student's high school or college preparation in mathematics (as evidenced by a placement examination) as well as future plans. Students are urged to keep their mathematical skills at a high level by taking mathematics during their senior year in high school. (See "Courses, Curricula, and Programs of Instruction: Mathematics.")

## 6. NATURAL SCIENCES

The natural science courses, including the physical and biological sciences, present the fundamental concepts of modern physics, chemistry, and biology. For the student who may major in one of these disciplines, the courses provide a background and preparation for further study; for those students who will continue their studies outside the natural sciences, they offer an opportunity to gain a certain understanding and appreciation of current developments in these fields.

Students choose their five required physical and biological science courses from the following sequences depending upon their interests, prior preparation, and intended majors. The Department of Chemistry offers Chemistry 11, 12, 13 (for non-science majors), and 6AH-BH-CH (honors). The Department of Physics offers four acceptable sequences: Physics 1A-B-C, 2A-B-C-D, and 4A-B-C-D-E, and 11A-11B (for non-science majors). The Department of Biology offers Biology 1 or 3 to meet the Revelle biology requirement. (See "Chemistry," "Physics," and "Biology" in the "Courses, Curricula, and Programs of Instruction" section of this catalog.)

*Students planning to major in a science must consult the appropriate departmental listing under "Courses, Curricula, and Programs of Instruction" to find the additional preparation needed for their major.*

## 7. FOREIGN LANGUAGE

Revelle College students are required to demonstrate basic conversational and reading proficiency in any modern foreign language, or advanced reading proficiency in a classical language or complete the fourth quarter of foreign language instruction with a passing grade.

Modern foreign language programs are currently offered in Chinese, French, German, Hebrew, Italian, Japanese, Korean, Russian, Spanish, and Vietnamese, and classical language programs are offered in Greek, Latin, and Hebrew. Students who have preparation in other languages should see the Office of the Revelle Provost to arrange a proficiency examination. This exam may also be taken by native speakers of any foreign language without further course study.

## 8. AREA OF FOCUS

Three courses in an area noncontiguous to the major. The three courses must be interrelated and should focus on some discipline, subject area, or topic. For the purposes of this requirement, the humanities/arts, the social sciences, and the natural sciences/engineering/mathematics are considered three different areas. Courses from a single department will be considered focused. Courses from more than one department should be approved prior to enrolling. The area of focus is not posted to the degree or transcript.

These three courses may not be used on any other requirements; they may be upper-division or lower-division courses. (Graduation requirements stipulate that at least sixty units of all work must be from upper-division courses.) The courses may be taken pass/not pass and Advanced Placement or International Baccalaureate credits may be used.

Students may complete an optional noncontiguous minor to replace this requirement, if they wish to do so.

## Sample Program

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Foreign Language	Humanities 1	Humanities 2
Mathematics	Foreign Language	Foreign Language
Natural Science	Mathematics	Mathematics
Subject A or Fine Arts	Natural Science	Natural Science
<b>SOPHOMORE YEAR</b>		
Natural Science	Natural Science	Fine Arts or elective
Social Science	Social Science	Social Science
Humanities 3	Humanities 4	Humanities 5
Foreign Language	Elective	Elective

\*Science majors may want to take part of the social science requirement in the junior year to allow time for additional science laboratories and/or mathematics.

## The Major

All undergraduate majors offered at UCSD are available to Revelle College students. An exceptional student who has some unusual but definite academic interest for which a suitable major is not offered on the San Diego campus may, with the consent of the provost of the college and with the assistance of a faculty adviser, plan his or her own major. The Revelle Individual Major must be submitted no later than three quarters before the student's intended graduation and be approved by the Executive Committee of the college before it may be accepted in lieu of a departmental or interdepartmental major. The faculty adviser will supervise the student's work, and the provost must certify that the student has completed the requirements of the individual major before the degree is granted.

Students who fail to attain a grade-point average of at least 2.0 in work taken in the prerequisites for the major, or in the courses in the major, may, at the option of the department, be denied the privilege of entering or of continuing in that major. Students majoring in AMES, bioengineering, CSE, ECE, or math/computer science need to be aware of additional screening for acceptance into the major.

## Optional Minor

A minor is no longer required in Revelle College. However, if a student wishes to complete a Department Minor or a Project Minor and have it posted to the transcript, he or she may do so. If a student completes either of these types of minors in a field noncontiguous to that



of the major, it will replace the three-course noncontiguous area of focus general education requirement.

There are two types of minors from which to choose in Revelle College:

1. Department Minor—All courses for the minor are taken in one department and they are chosen with the advice and approval of a minor adviser in that department.
2. Project Minor—A project minor centers on a topic or period chosen by the student. The project is often interdepartmental and interdisciplinary. The program must have the approval of a minor adviser. (See Academic Regulations: Undergraduate Minors and Programs of Concentrations.)

The current university guidelines for the minor require six courses (twenty-four units), three of which must be upper-division; for students entering after January 1, 1998, seven courses (twenty-eight units) will be required, five of which must be upper-division.

## Pass/Not Pass Grading Option

1. No more than one-fourth of an undergraduate student's total course units taken at UCSD and counted in satisfaction of degree requirements may be graded on a Pass/Not Pass basis.

2. Courses used to satisfy the noncontiguous area of focus or the optional minor may be taken on a Pass/Not Pass basis unless otherwise stipulated by the department or program.
3. Courses taken as electives may be taken on a Pass/Not Pass basis.
4. The following general education courses may be taken Pass/Not Pass: American cultures, fine arts, language and area of focus. Social Science and Humanities majors may take courses only from the Chemistry 6 sequence, the Physics 1, 2, or 4 sequence, and Biology 1 or 3 for a Pass/Not pass grading option.
5. Upper-division courses to be counted toward a departmental major may not be taken on a Pass/Not Pass basis. Individual departments and/or advisers may authorize exceptions to this regulation.

## The Graduation Requirements

In order to graduate from Revelle College, a student must:

1. Satisfy the University of California requirements in Subject A and American History and Institutions.
2. Satisfy the general-education requirements.
3. Successfully complete a major consisting of at least twelve upper-division courses as stipulated by the department and meet the



- department's major residence requirement, if applicable.
4. Complete minimum of fifteen upper-division courses (60 units).
  5. Pass at least 184 units for the B.A./B.S. degree. No more than 30 units of physical education, whether earned at UCSD or transferred from another institution, may be counted towards graduation.
  6. Attain a C average (2.0) or better in all work attempted at the University of California (exclusive of University Extension). Departments may require a C average in all upper-division courses used for the major and/or at least C- grades in each course used for the major.
  7. Meet the senior residence requirement. (See "Academic Regulations: Senior Residence.")
- Upon satisfaction of the graduation requirements, Revelle College will recommend that the

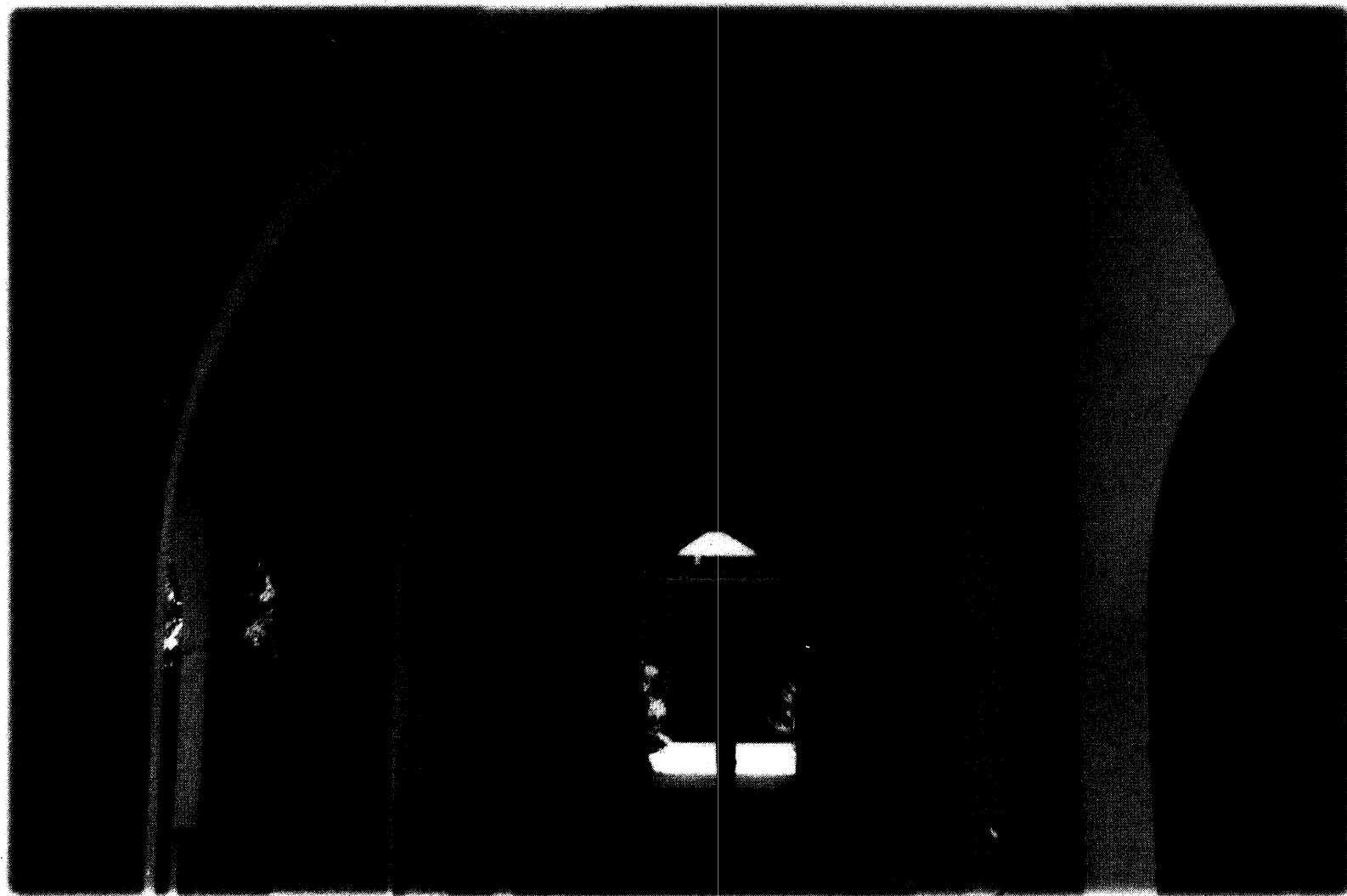
student be awarded the bachelor of science degree in biology, physics, cognitive science, chemistry, earth sciences, and in designated engineering programs, or the bachelor of arts degree in all other majors.

### Honors

Particularly well-prepared students are invited to join the Freshman Honors Program. Students not eligible at admission will be invited to join the Freshman Honors Program upon obtaining a 3.7 GPA with at least fourteen graded units during their first quarter. The program includes weekly participation in small faculty seminars, and a variety of other perquisites. Outstanding students are individually advised to join honors classes in mathematics and social science.

Quarterly provost's honors, honors at graduation, departmental honors, and Phi Beta Kappa honors are awarded. At least five out-

standing graduating seniors are honored at graduation each year with a monetary honorarium. An honors banquet is given for the top one hundred students in Revelle each spring. Seniors are selected for participation in honors seminars. For additional information, see "Revelle Honors Program" and "Honors" in the index.





# John Muir College

John Muir College admitted its first students in the fall of 1967 and moved to its present quarters in 1970. The college was named for John Muir (1838-1914), a Scottish immigrant who became a famous California naturalist, conservationist, and author. Muir explored the Sierra Nevada and Alaska, and worked for many years for the cause of conservation and the establishment of national parks and forests.

## *The Character of the College*

Naming a college affirms certain ideas and values. John Muir was committed to learning, self-sufficiency, and the betterment of humankind. Throughout his life he was open to new ideas and experiences which he shared with others through his many books. In keeping with his example, the college has, through its interdisciplinary studies programs, developed courses covering such areas as contemporary issues and environmental studies. It has established an individualized major called the Muir Special Project. And it has inaugurated an exchange program with Dartmouth College, one of the most distinguished undergraduate institutions in the United States. Each quarter about fifteen UCSD students attend Dartmouth, while a similar number come from Dartmouth to Muir. By these and other means, the college maintains at UCSD the heritage of the remarkable man for whom it was named.

## *The General-Education Philosophy and Requirements*

The general-education program was established by the faculty of John Muir College to guide students toward a broad and liberal education while allowing them substantial choice in the development of that education. In addition to two expository-writing courses, students must select year-long sequences (three courses in the same department) from four different academic areas. One of the sequences must be from the social sciences area, the second from the natural sciences or mathematics (calculus), and the remaining two sequences from the humanities, fine arts, or foreign lan-

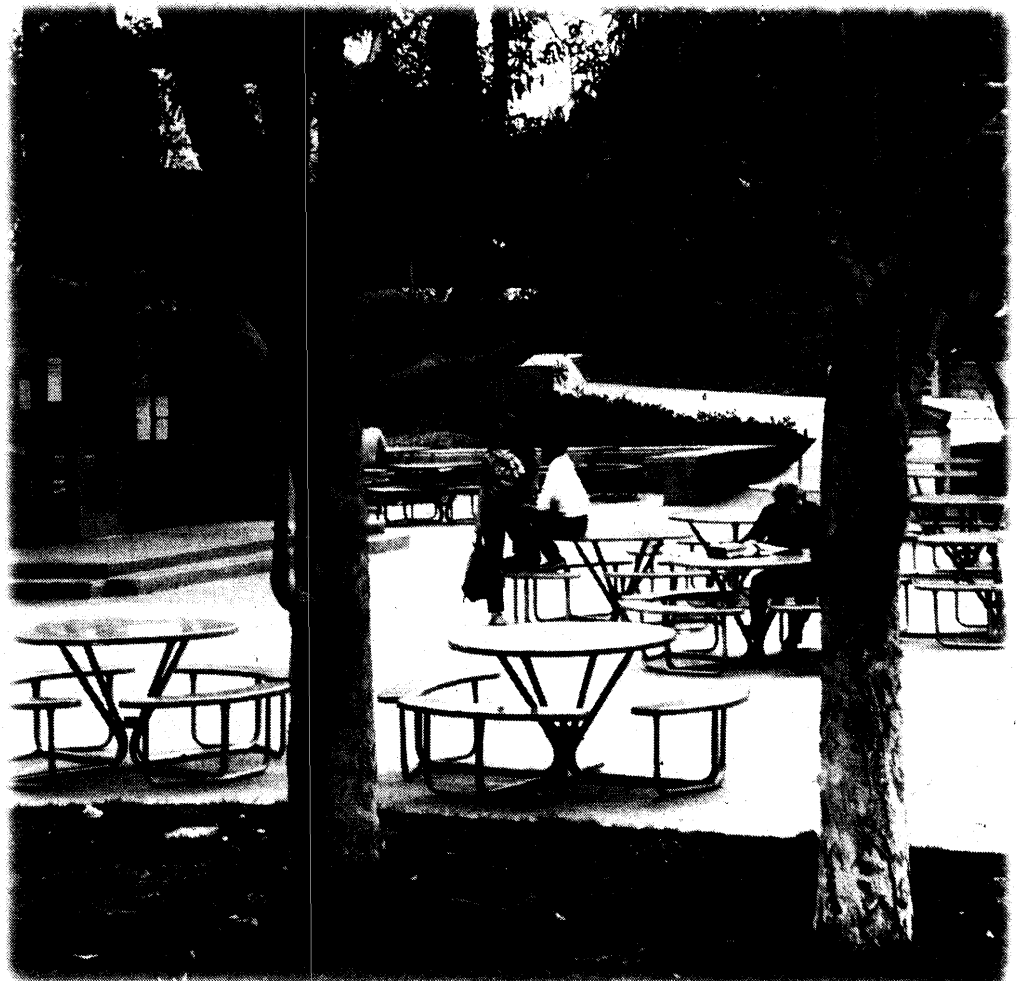
guages. Students choose sequences from several alternatives.

It should be understood that this freedom carries with it certain responsibilities on the part of the student for careful planning. Some of these are:

1. Students should request from the Academic Advising unit of the Office of the Provost a list of general-education requirements before making their final selection of courses.
2. Only complete sequences may be applied to the general-education requirement. Ordinarily an entire sequence from one department is taken in one academic year.
3. Courses taken to satisfy only the general-education requirements may, in general, be taken for a letter grade or Pass/Not Pass.

4. Units obtained from advanced placement may be applied toward the 180 units needed for graduation; such units may be used to fulfill partially the general-education requirements.

For students who transfer to Muir College from another institution, the general-education requirements will be interpreted in this way: two semester-courses or three quarter-courses in one subject represented on the approved list normally will be accepted as completing one of the four required sequences. After the Office of Admissions evaluates a student's transcript, the Academic Advising unit of the Office of the Provost makes an evaluation of prior work for each student at the time of his or her first enrollment.



### Pass/Not Pass Grading Option

Muir students are reminded that to take a course Pass/Not Pass, they must be in good standing (2.0 GPA). No more than one-fourth of an undergraduate student's total UCSD course units counted in satisfaction of degree requirements may be in courses taken on a Pass/Not Pass basis with the exception of all major-related courses and most minor courses. It is advised that students check with their major or minor department regarding restrictions or exceptions.

### Major Programs and Special Projects

Almost all of the major programs at UCSD have a pattern of prerequisites, some of them quite extensive. Students must declare a major upon accumulating ninety units. Students who do not plan well could find, in their junior year, that they have access to few majors without doing additional lower-division work. With careful planning, they may have access to a wide range of majors. Muir College students are encouraged to consult regularly with the academic advisers of the Office of the Provost as well as with their major department advisers concerning the selection of appropriate courses so as to graduate by the 200 maximum unit limitation.

Each academic department has, in its section of this catalog, a paragraph entitled "The Major Program." Students are encouraged to read these sections carefully, for they indicate both the extent and the nature of the upper-division program. The following points are useful to keep in mind:

1. A substantial command of at least one foreign language is required by some departments (e.g., linguistics, literature).
2. Specific science courses are required by many departments. For example, the Department of Computer Science and Engineering and the Department of Electrical and Computer Engineering require Physics 2A-B-C-D or Physics 4A-B-C-D-E; the Department of Chemistry and Biochemistry requires Physics 1A-B-C, Physics 2A-B and C or D, or Physics 4A-B-C-D-E.
3. The physical and life sciences, applied sciences (the Department of Computer Sci-



ence and Engineering, Electrical and Computer Engineering, Bioengineering, and Applied Mechanics and Engineering Sciences) together with certain social sciences (including economics), require at least one year of calculus.

The Muir Special Project (MSP) major is a B.A. degree only and is intended for students who have specific talents and interests which are not accommodated by one of the departmental majors. The MSP normally includes regular course work and independent study representing up to fifteen upper-division four-unit courses as well as a project or thesis. The project may be one of two kinds: creative work of some sort (e.g., a book of poetry, a collection of musical compositions), or a detailed program of study and research in a particular area. The latter results in a long paper representing a synthesis of knowledge and skill acquired. In either case, a regular member of the faculty must serve as an adviser to a student doing the project. It should be understood that the demands of a special project major are great, and a project is not appropriate for a student who simply does not want the discipline of a normal major. For a course to be included as part of a Muir Special Project, the student must earn in it

a grade of C- or better. Further information may be obtained from the Muir Academic Advising Office.

### Graduation Requirements

To receive a degree of bachelor of arts or bachelor of science a John Muir College student must:

1. Declare graduation by obtaining, completing, and returning the Degree and Diploma Application packet to the Academic Advising Office. This must be done by **Friday of the ninth week** of the quarter preceding the quarter of anticipated graduation. Students who plan to graduate at the end of a summer session must complete the above-mentioned process by the **Friday of the ninth week of spring quarter**. Fees may be assessed if students miss these deadlines. **Degrees are not automatically granted: students must file their intention to graduate.**
2. Meet the general university requirement in Subject A, English Composition. (See "Undergraduate Admissions, Policies and Procedures.")
3. Satisfy the University of California requirement in American History and Institutions (See "Undergraduate Admissions, Policies and Procedures.")
4. Meet the Muir College requirement in writing proficiency. This requirement asks that the student demonstrate an ability to write English according to standards appropriate for all college work. (See Muir College course listings: "The Writing Program.")
5. Fulfill the general-education requirements.
6. Fulfill the U.S. diversity requirement
7. To receive a B.A. or B.S. degree\*, students must complete a minimum of forty-five four-unit courses (180 units) which includes a minimum of eighteen upper division courses (72 units).
8. Show some form of concentration and focus of study. Ordinarily this is accomplished by completing a department major. Students in the college may attempt any major upon completion of the prerequisites. (Presently, the Departments of AMES, Bioengineering, Biology, CSE, ECE, Mathematics-Computer Science and Literature/

Writing require students to attain a minimum GPA in prerequisite courses and apply for admission to majors in the departments.) Students who do not choose to meet this requirement by means of a departmental or interdisciplinary major and who qualify may propose a special project major. As the name implies, this is a specialized form of concentration. It normally consists of a combination of regular course work, independent study, and a senior thesis or project. Each proposal and senior thesis or project must be approved by the provost. (See the section, "Major Programs and Special Projects," above.)

9. Satisfy the residency requirement which stipulates that 36 of the last 45 units passed be taken at UCSD as a registered Muir College student. Students planning to study abroad during the senior year should be aware that they must return to complete a minimum number of twenty-four units at UCSD. Such students should see their college Academic Adviser for clarification.
10. Accumulate a grade-point average of at least 2.0 overall and in the major. Departments may require a C average in all upper-division courses used for the major or C-grades in each course used for the major. Students should consult with their department to determine which grading regulation applies.
11. Make up all incomplete grades. Students may not graduate with "NRs", "IPs", or "Incomplete" entries on their transcript. Therefore, they should be sure that all Incompletes have been cleared and final grades have been properly recorded by the end of the quarter in which they plan to graduate.
12. Complete all requirements for the degree during the quarter in which students file to graduate. If the degree requirements are completed after the expiration of the deadline in a quarter, but before the beginning of the next quarter, students must refile to graduate for the subsequent quarter.
13. Refile the Degree and Diploma Application form if unable to satisfy all graduation requirements, including grade changes, by the end of the proposed graduating quarter.

Students will graduate at the end of the quarter in which deficiencies are satisfied.

14. **It is the students' responsibility to contact their department adviser to verify that they have satisfied departmental requirements for graduation.**

While John Muir College does not call for the completion of a minor to fulfill its requirements for the degree of bachelor of arts or bachelor of science, it does acknowledge such completion of an approved departmental minor on a student's transcript. **No upper-division courses may be used to satisfy both a major and a minor.**

Students entering UCSD **after** January 1, 1998 are required to complete **twenty-eight units** of interrelated work, of which at least **twenty units** must be upper-division. Students entering UCSD **before** January 1, 1998 must complete a minimum of six courses or twenty-four units of interrelated course work. A minimum of three upper-division courses must be completed. Departments or programs may establish more stringent criteria than the minimum. **A formal request for the minor must be approved by the department or program and college by the quarter before graduation.**

Upon satisfaction of the graduation requirements, Muir College will recommend that the students be awarded the degree of bachelor of arts or bachelor of science (180 units, of which at least seventy-two must be upper-division).

### Honors

Quarterly provost's honors, departmental honors, college honors, membership in the Caledonian Society of John Muir College, and Phi Beta Kappa honors are awarded. **Please note that graduating seniors must have letter grades for eighty units of work completed at the University of California for college honors.** For additional information, see "Honors" in the Index.

### Honorary Fellows of Muir College

Hannes Alfvén, Scientist and Nobel laureate  
 \*Georg von Bekesy, Psychologist and Nobel laureate  
 Oscar (Budd) Boetticher, Filmmaker  
 David Brower, Conservationist

Francis H.C. Crick, Scientist and Nobel laureate

- \*Ernst Krenek, Composer
- \*Ernest Mandeville, Philanthropist
- \*William J. McGill, Educator
- \*Jonas Salk, Scientist
- \*Claude E. Shannon, Mathematician
- John L. Stewart, Founding Provost
- \*Earl Warren, Jurist and Statesman
- \*Robert Penn Warren, Poet and Novelist
- \*Mandell Weiss, Philanthropist

\*Deceased





# Thurgood Marshall College

Thurgood Marshall College, formerly known as Third College, was founded in 1970. From its inception, the college has enriched the lives of undergraduates with its intellectual and philosophic commitment to the development of students as both scholars and citizens. In July of 1993, the college was renamed in honor of the famous lawyer and Supreme Court Justice, Thurgood Marshall. Justice Marshall was widely known and recognized for his historic contributions to American life and dedication to breaking down barriers to education, civil rights, freedom of speech, women's rights, and the right to privacy. Thurgood Marshall College, its faculty, staff and students are committed to furthering the ideals and dreams of Justice Marshall.

Thurgood Marshall's 3,000 students pursue majors in a variety of disciplines. About 30 percent choose majors in biology, the physical sciences, mathematics, and engineering; 45 percent select majors in the social sciences; and 25 percent pursue majors in the humanities and fine arts areas. One of the primary aims of the college is to prepare its students for the pursuit of a rigorous academic curriculum which in turn promotes entry into graduate/professional schools or into the career of one's choice.

## *Educational Philosophy*

The educational philosophy of Thurgood Marshall College is guided by the belief that regardless of a student's major, a broad liberal arts education must include an awareness and understanding of one's role in society. Therefore, the distinctive core sequence, which serves as the center-piece of the general-education requirements, emphasizes a critical examination of the human condition in our diverse American society. This three-quarter core sequence, "Dimensions of Culture—Diversity, Justice, and Imagination," challenges students to develop an informed awareness of the many cultural perspectives that have shaped civilization. The core sequence is designed as an interdisciplinary, contemporary

issues-oriented curricular experience that seeks to balance an exploration of uniquely American, Western, and non-Western cultures. Other general-education requirements include courses in mathematics, the physical and biological sciences, humanities, and the arts.

Wishing to uphold the ideals set forth by the college's namesake, Thurgood Marshall students are encouraged to develop their skills as scholars and citizens. Therefore, it is our belief that scholarship and social responsibility are mutually compatible. In this regard, our students receive academic credit for participating in the Partners-at-Learning Program (PAL) by taking courses which train and place them in local inner city elementary schools as tutors and mentors. Because this activity shares importance with other academic experiences, completion of the PAL program satisfies an upper-division general-education requirement.

Further underpinning the educational philosophy of Thurgood Marshall College is the belief that the best preparation for a complex, interdependent, and rapidly changing world is a broad liberal arts education, complemented by in-depth study in areas of the student's choice. This educational approach has several major advantages:

1. It guarantees a basic understanding of the principle branches of knowledge: the humanities and arts, social sciences, the natural sciences, and mathematics.
2. It enables students with well-defined interests and goals to begin work in their chosen field of study as first-year students.
3. It allows students who have not decided on a major to sample an array of potential majors while simultaneously satisfying the general-education requirements of the college.

## *General-Education Requirements*

General-education requirements are established by Thurgood Marshall College faculty to be broad and flexible enough to encourage students to integrate other alternatives, such as public service, internships, study abroad, re-

search, special studies, etc., into their academic program. This permits students flexibility in pursuit of their academic goals and in the practical application of their liberal arts degree, whether they wish to enter the work force or continue their education in graduate or professional school. These courses are designed to introduce students to the academic focus of the college, provide a broad liberal arts and science background, and furnish students with the academic skills and the basic knowledge necessary to pursue any departmental or interdisciplinary major.

The general-education requirements for first-year students are composed of a core sequence and a menu of choices within a liberal arts framework:

1. **DIMENSIONS OF CULTURE:** This three-course interdisciplinary sequence is entitled "Diversity, Justice and Imagination." Two of the three courses are six-units and include intensive instruction in university-level writing. This is a required sequence for all first-year students. All courses must be completed at UCSD and taken on a letter-grade basis only. (See "Dimensions of Culture" in the departmental listings.)
2. **PUBLIC SERVICE (optional):** This four-unit public service option may be used to fulfill one course in Disciplinary Breadth for any major and fulfills the upper-division writing requirement.
3. **NATURAL SCIENCES:** Three courses. Choose one course each in biology, chemistry, and physics. Courses are available for science and non-science students.
4. **COMPUTATIONAL SKILLS:** Choose two courses in mathematics or one course in mathematics or statistics and one in computing or logic.
5. **HUMANITIES AND CULTURE:** Two courses. Choose one course each from ethnic studies and Third World studies.
6. **DISCIPLINARY BREADTH:** Four courses. Students choose four courses (three for students graduating with a B.S. degree in

engineering from a variety of disciplinary breadth areas: humanities (or language, social sciences, natural sciences, math/engineering). Courses used to satisfy the disciplinary breadth requirement come from fields outside the major field of study. Two of these courses must be upper-division. At least one upper-division course must include significant writing.

7. FINE ARTS: One course in either music, theatre, or visual arts.

The Thurgood Marshall College Curriculum and Academic Affairs Committee publishes an annual fact sheet with specific course choices which may be used to meet these requirements. Contact the college academic advising office for additional information.

### Graduation Requirements

To receive a bachelor's degree from Thurgood Marshall College, a student must:

1. Satisfy the university Subject A requirement. (See "Undergraduate Admissions, Policies and Procedures.")
2. Satisfy the university requirement in American History and institutions. (See "Undergraduate Admissions, Policies and Procedures.")
3. Fulfill the general-education requirements as described.
4. Complete a departmental or interdisciplinary major.
5. Satisfy the college residency requirement (thirty-six of the last forty-five units must be completed as a registered Thurgood Marshall College student).
6. Successfully complete a minimum of 180 units for the B.A./B.S. degree. At least 60 of these units must be completed at the upper-division level. All students must complete a minimum of fifteen four-unit upper-division courses.
7. A 2.0 or better GPA is required for graduation.

### Transfer Students

Since transfer students have a variety of academic options, specific details regarding appropriate general-education requirements will be discussed during the New Student Orientation/Registration Program.



### Majors and Minors

**Majors:** Thurgood Marshall College students may pursue any of the departmental or interdisciplinary majors offered at UCSD. The majority of the academic departments have established lower-division prerequisites. Generally, these prerequisites must be completed prior to entry into upper-division major courses. Many of these courses may be counted for general-education credit as well. Students are strongly encouraged to work closely with department faculty and college advisers. For details on the specific major departments, refer to the "Courses, Curricula, and Programs of Instruction" section of this catalog.

**Minors** are optional. However, students are encouraged to keep as many options open as possible. A minor provides an excellent opportunity to complement the major field of study.

Students are required to complete twenty-eight units of interrelated work, of which at least twenty units must be upper-division. See your college or department for further information.

### Pass/Not Pass Grading Option

1. Courses to be counted toward a departmental major or as prerequisites to the major must be taken on a letter-grade basis.

2. Only one upper-division course to be counted toward a college minor may be taken on a Pass/Not Pass basis.
3. Courses taken toward completion of the college general-education requirements, with the exception of *Dimensions of Culture* (Diversity, Justice and Imagination), may be taken on a Pass/Not Pass basis, while at the same time the restrictions for prerequisites to majors and courses counted toward a minor must be observed.
4. Courses taken as electives may be taken on a Pass/Not Pass basis, while at the same time the restrictions on the majors and minors must be observed.
5. No more than one-fourth of the total University of California, San Diego units may be completed on a Pass/Not Pass basis.

### Honors

Quarterly provost's honors, honors at graduation, departmental honors, and Phi Beta Kappa are awarded to Thurgood Marshall College students. For additional information see "Honors" in the Index or speak with the Academic Honors Program adviser in the academic advising office.



## College-Sponsored Programs

### Individual Studies Major

The Individual Studies major allows students to pursue a coherent course of study not formally offered at UCSD. To apply for the major, students must have a 3.25 grade point average. A written proposal with supporting documentation from a faculty adviser, a list of prerequisite courses, and a proposed curriculum plan are required. Students pursuing this major must be goal-oriented and self-directed.

### Partners-at-Learning Program (PAL)

Students may participate in the Partners-at-Learning Program (PAL) by taking courses which train and place them in local elementary schools as tutors and mentors. Participation in the PAL program can be counted toward satisfying the Public Service option at Thurgood Marshall College. This campuswide program is open to all students meeting the established criteria of 3.0 or better and junior standing. (See TEP 130 in the department listing).

### Price Public Affairs Forum

The Price Public Affairs Forum invites leading public figures to speak on important contemporary issues. Such wide-ranging topics as "Race and Justice in America," "Women's Role in the Workplace," and "The Modern American Family" have been presented. These forums are open to the general public.

### Thurgood Marshall College Honors Program

The Thurgood Marshall College Honors Program sponsors activities and events designed to introduce students to the excitement of pioneering research and innovative scholarship in all disciplines at UCSD and to create opportunities for discussion on public issues with locally and nationally known figures. (See Thurgood Marshall College Honors Program in the department listings.)

### Thurgood Marshall Institute

The Thurgood Marshall Institute is heavily devoted to undergraduate research. The institute will organize and support faculty and student group research projects in the area of education and public law; host annual conferences and symposia on related issues; and train junior and senior high school instructors in the teaching of the United States Constitution and its amendments.

### UCSD-Morehouse/Spelman Student Exchange Program

The UCSD-Morehouse/Spelman Student Exchange Program was established in the fall quarter of 1989. This formal exchange program was developed by Thurgood Marshall College and is open to all UCSD undergraduates. Morehouse and Spelman Colleges are located in Atlanta, Georgia.

The purpose of the program is to provide a unique opportunity for students to live and study at important institutions of higher learning that are significantly different from the social and educational environment typical of

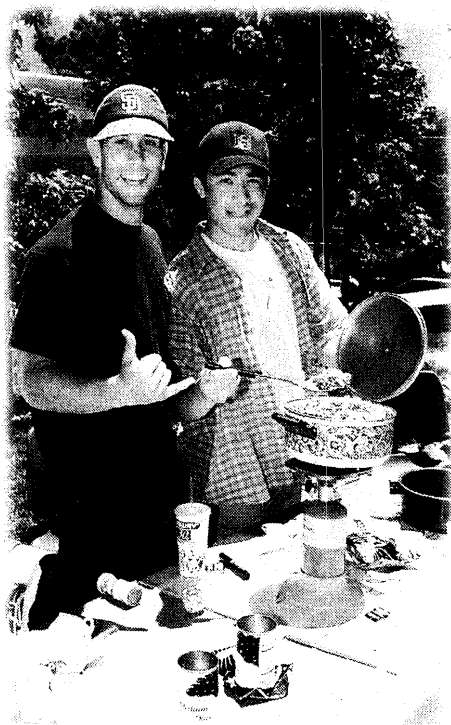
California state colleges and universities. Similarly, the exchange students coming to UCSD from Morehouse and Spelman will have an opportunity to experience an exciting and very different educational environment. See the program coordinator in the college academic advising office for additional information.

### Student Leadership Program

Complementary to the strong academic programs, Thurgood Marshall College is proud of its emphasis on the student as citizen. The Student Leadership Program is especially designed to encourage active involvement in the governance of the college and participation in community and public service programs. College life outside of the classroom and laboratory is a vital part of each student's undergraduate experience. The college offers a wide variety of opportunities for students to shape the nature and character of student life. This active participation allows students to develop self-confidence and strong interpersonal, organizational, and leadership skills. The friendly and outgoing manner of Thurgood Marshall students contributes to a sense of community and mutual respect. This spirit of cooperation is a college hallmark.

### Honorary Fellows of the College

Maryann Callery, College Activist  
Cesar Chavez, Civil Rights Activist  
Ernesto Galarza, Novelist and Educator  
Joseph W. Watson, Educator, Professor,  
Vice Chancellor  
Marian Wright Edelman, President, Children's  
Defense Fund







# Earl Warren College

Earl Warren College opened in the fall of 1974, and currently enrolls 3,500 students. The college is named after Earl Warren, former chief justice of the United States Supreme Court and the only three-term governor of California. Mr. Warren, a native Californian, earned his college and law school degrees at the University of California (B.L. 1912; J.D. 1914). During his governorship, he was an ex-officio member of the UC Board of Regents for eleven years. Mr. Warren also saw public service as district attorney of Alameda County, and as attorney general of California.

As governor during an era of lightning growth for California, he developed the State Department of Mental Hygiene, and led in reforms of the prison system in California by establishing the Board of Corrections and the Prisoner Rehabilitation Act. In his final role as a public servant, Mr. Warren was chief justice of the United States Supreme Court, which under his leadership elaborated a doctrine of fairness in such areas as criminal justice, voting rights, legislative districting, employment, housing, transportation, and education.

Earl Warren College is committed to preparing its students for an active role in society in their postbaccalaureate years. Whether students wish to continue their education in graduate or professional school, to seek an immediate career or to pursue other options, the college stands ready to assist. Students are encouraged to identify their abilities and interests, examine career possibilities, and prepare for the future.

The college's students and faculty represent all disciplines offered at UCSD. Graduation requirements, which consist primarily of one major and two secondary areas of study, enable a student to develop a program covering a wide range of material while also focusing on particular areas in depth. The diversity of its academic program has made Warren College an exciting home for students who seek maximum flexibility in designing their own education.



## General-Education Requirements

Warren College faculty has a firm belief that each student should have the opportunity to develop a program best suited to his or her individual interests, within a framework that ensures both depth and breadth of study. All students are required to have a significant exposure to the humanities and fine arts, the social sciences, and the natural sciences. The faculty and staff of the college provide extensive advising on individual academic programs and their possible career implications. Students who enroll at Earl Warren College are required to work within the following academic plan:

1. Each student must complete a two-course sequence in writing: Warren College 10A-B, within four quarters following successful completion of the Subject A requirement.  
**Note:** Effective fall quarter 2000, all new and continuing students will be required to complete Warren writing courses only at UCSD.
2. The college also requires that all students complete a course entitled "Ethics and Society," offered jointly by the political science and philosophy departments (Philosophy 27/Political Science 27). Upon completion of Warren 10A-B, this course should be taken by the end of the second year at UCSD.
3. All students must satisfy the formal skills requirement by completing two courses chosen from an approved list that includes calculus, computer programming, statistics, and symbolic logic.
4. To ensure a significant exposure to the three disciplinary areas: humanities/arts, social sciences, and natural sciences, all students are required to complete two focused collections of courses outside the areas of their major. For all students other than B.S. engineering majors, two **focused collections of courses (programs of concentration)** each of which require six courses outside of the major. A student may choose to declare an optional minor in a department or interdisciplinary program. These areas of study must cover the two disciplines outside the student's major. A few programs of concentration require more than six courses.



For B.S. engineering majors, each student must complete an area study in the humanities/arts and an area study in the social sciences. Each of these area studies consists of three courses of which at least one must be in the upper-division.

All programs of concentration and area studies must be approved by Earl Warren College Academic Advising. A brochure entitled "Earl Warren College General Education and Graduation Requirements" will be provided to entering Warren students. All minors must be approved by academic departments or programs.

## Majors

Earl Warren College students may pursue any of the departmental or interdisciplinary majors offered at UCSD. The majority of the academic departments have established lower-division prerequisites which must be completed prior to entry into upper-division major courses. Students are strongly encouraged to work closely with departmental faculty, staff advisers, and college academic counselors. For details on the specific major department requirements, refer to the "Course, Curricula, and Programs of Instruction" section of this catalog.

A student may declare a double major upon the approval of both departments and the college provost office. If the two majors are from noncontiguous discipline areas, one program of concentration or area study from the third noncontiguous discipline area will be required. If the two majors are from the same discipline area, two programs of concentration or area studies will be required from each of the remaining noncontiguous discipline areas.

The Earl Warren College Individual Studies Major is designed to meet the needs of students who have a definite academic interest for which a suitable major is not offered at UCSD. The student must submit a written proposal explaining the merit of the program and why it cannot be accommodated within the existing majors. The proposal must first be approved by a faculty adviser and then approved by the College Executive Committee.

## Minors

In lieu of a program of concentration, Earl Warren students may pursue a departmental minor beyond the general education requirements. A program of concentration applied toward the general education requirement may not be listed as a minor. Upper-division courses taken for the departmental minor may not overlap with courses in the major, the program of concentration or the area studies.

## Pass/Not Pass Grading Option

Some general education requirements may be fulfilled by courses taken on the Pass/Not Pass basis. Earl Warren students are reminded that major requirements and prerequisites must be taken on the graded basis. The total number of Pass/Not Pass units may not exceed one-fourth of a student's total UCSD units.

## Graduation Requirements

To receive a B.A. or B.S. degree from Earl Warren College a student must:

1. Satisfy the University of California requirements in American History and Institutions, and in Subject A. (See "Undergraduate Admissions, Policies and Procedures.")
2. Fulfill the general education requirements described above.

3. Complete one course in Cultural Diversity in U.S. Society to be chosen from an approved list. This course can be part of the major, the general-education, or the electives.
4. Complete a major chosen from those regularly offered at UCSD. Each department determines the courses and grades required for its major; generally this will include a set of twelve to twenty-two upper-division courses. In addition, most majors require a certain amount of introductory course work, and the beginning student is urged to plan a program that will permit a wide choice of major fields. For example, calculus is required for a significant number of majors; a student who does not take this subject excludes all these majors from further consideration.
5. Attain a C average (2.0) or better in all work attempted at the University of California.
6. Satisfy the college residency requirement that thirty-six of the last forty-five units passed must be taken as a student in the college.
7. Pass a minimum of forty-five four-unit academic courses or their equivalent (180 units). At least fifteen four-unit courses (60 units) must be successfully completed at the upper-division level. No more than 3 units of physical education (activity), whether earned at UCSD or elsewhere, may be used towards degree requirements.

### *Transfer Students*

For students who have completed their lower-division general education requirements at an accredited four-year college and for students who have completed a systemwide or campuswide approved core curriculum in a California community college prior to entering UCSD, the only additional general education requirements are two upper-division courses noncontiguous to the discipline area of the major (graduation requirement 3 [above] is waived). All other transfer students must complete the same general education requirements above. (See "Earl Warren College" in the section "General Education Requirements.")

### *The Warren College Honors Program*

The Warren College Honors Program is offered to students with a broad range of interests and a history of outstanding scholastic achievement. The program offers students the opportunity to work closely with faculty throughout their academic career at UCSD. High school seniors with a GPA of 3.8 or above, SAT I scores of 710 verbal/650 mathematics, SAT II writing score of 710, or are National Merit Scholars or Regents Fellows, are eligible for admission to the program. Students remain in the program until thirty-six units of UCSD credit are completed. After that, a cumulative GPA of 3.5 on all units completed at UCSD must be maintained to remain in the program. Entering transfer students with a GPA of 3.8 based on at least thirty-six units of college work are also eligible. Other students with strong academic credentials may also apply. (For more information, see "Warren College" in the section "Courses, Curricula, and Programs of Instruction.")

### *Academic Internship*

Warren College administers an Academic Internship Program available to students from all five colleges. The program is based on the

conviction that quality education results from a combination of classroom theory and practical experience. Participants work full- or part-time for a public or private organization. Placements match students' major areas of academic study and correlate with their career goals. Students may enroll in the program for a maximum of sixteen units in increments of four, eight, or twelve units per quarter. Although most placements are in the San Diego area, the Academic Internship Program is national in scope and varied in offerings. Students might work for a senator in Washington; a legal-aid office in Los Angeles; a business, a T.V. station, research lab or social service agency in San Diego; or any number of other possibilities. Working closely with faculty advisers, students write research papers that integrate their academic backgrounds and internship experience. For more information, see listing under "Academic Internship."

### *Honors*

Quarterly provost's honors, honors at graduation, departmental honors, and Phi Beta Kappa honors are awarded. For additional information see "Honors" in the Index.

### *Honorary Fellow of the College*

Harry N. Scheiber, Historian





# Eleanor Roosevelt College

Eleanor Roosevelt is widely regarded as one of the most visionary and effective American public figures of the twentieth century, and her life and achievements continue to inspire men and women everywhere. She was one of the first to champion human and civil rights for all Americans during the Great Depression and the Second World War. After the war, she was the architect of the United Nations Universal Declaration of Human Rights. In the decades that followed, her tireless efforts to promote international understanding and human rights earned her worldwide respect and the title "First Lady of the World."

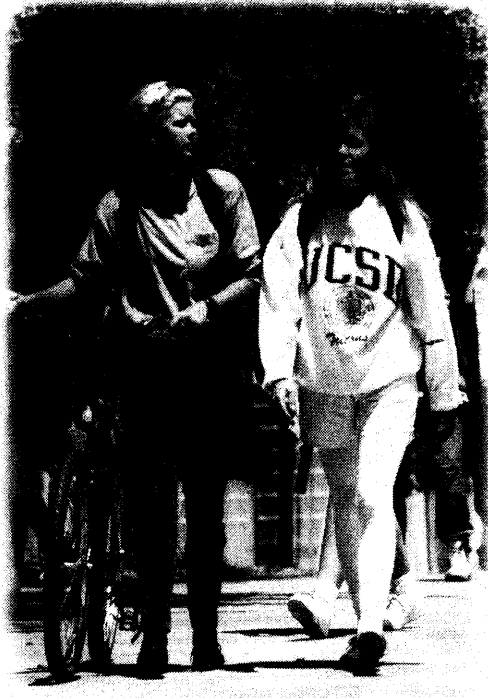
## *The College*

Eleanor Roosevelt College (ERC) was established in 1988, and its current enrollment of about 2000 men and women will grow gradually to approximately 3000. The college serves students interested in pursuing academic excellence, establishing the groundwork for future success, and becoming lifelong learners and effective citizens.

ERC fosters the ideal of a comprehensive education that develops intellectual capacities and expands general knowledge. The core curriculum exposes students to a variety of academic disciplines, providing a foundation that is suitable for all majors, whether in the natural or applied sciences, the social sciences, or the humanities and the arts. It prepares students for opportunities to study and conduct research with UCSD faculty and scholars.

The world in which today's students will make their careers is one of rapid scientific and technological change, rich cultural diversity, and intense social and political interactions. ERC's general-education curriculum and co-curricular programs build knowledge of other cultures and skills for working in such an environment. Students seeking careers in fields as diverse as business, law, medicine, public policy, engineering, the sciences, and the arts or humanities find ERC's programs equally valuable.

At ERC, shared educational goals are pursued in a supportive community where stu-



dents are valued and respected, where they are challenged and helped to succeed, and where they can develop independence and confidence about their roles in society.

## *General Education*

The requirements for general education at ERC are designed to provide all students with a broad intellectual foundation. The curriculum offers undergraduates opportunities to learn about the various fields that may be open to them, thus assuring that their choices in selecting a major, pursuing graduate study, or seeking employment will be based on clear understandings about the nature of the work and their own interests and talents.

## **Advanced Placement Credits**

University credit may be granted for College Board Advanced Placement Tests on which a student scores 3 or higher. The credit may be applied toward general-education requirements, elective units for graduation, or as subject credit for use in a minor or as a prerequisite

to a major. For further details, see the advanced placement chart in "Undergraduate Admissions, Policies and Procedures."

ERC academic counselors provide information about courses that meet the general-education requirements of the college. Students should take advantage of the counseling available in the Academic Advising Office to help them incorporate effectively the college general-education requirements into their academic program.

## *ERC General-Education Requirements for Students Entering as Freshmen*

### **The Making of the Modern World (six quarters)**

This interdisciplinary sequence of six courses incorporates humanities (literature, history, and philosophy) and social sciences as well as writing. It is usually taken in the freshman and sophomore years. The courses examine Western and non-Western societies, cultures, and state systems both historically and comparatively. The Making of the Modern World (MMW) is taught by faculty from the disciplines of anthropology, history, literature, political science, and sociology.

MMW is designed to help students search for connections—between past and present, among the societies and civilizations that have inhabited the earth, and among the ways that humans have used to make sense of their experience.

At ERC, the university writing requirement is met through MMW and relies on those courses for its content. Instruction and practice in writing, in turn, help students master the course content and analyze and synthesize the material. In all fields, written communication skills are among the most important qualifications graduates take to the job market and graduate school. Writing is assigned in MMW 2-6; the second and third quarters include intensive writing instruction and carry two additional units of credit. For more details, see "The Mak-

ing of the Modern World. In the department  
strings.

### **Natural Sciences & Quantitative Methods (four quarters)**

Two courses are to be chosen from selected offerings in biology, chemistry, biochemistry, physics, and/or earth sciences. In addition, two courses are to be chosen from selected offerings in pre-calculus, calculus, statistics, symbolic logic, or computer sciences.

For students majoring in scientific fields, these courses are preparation for major study; for students who will continue their studies outside the sciences, they provide appreciation and some basic understanding of methods and developments in the fields. Many of the selected courses are designed for non-science majors.

### **Foreign Language (three quarters)**

ERC requires three quarters of college-level study in a language other than English. This requirement is applicable to all students except those who can demonstrate a high level of proficiency in a foreign language, who continue study in that language. Three quarters are always required if one begins study in a new language.

Students who place into advanced level course work are required to take only two quarters of continuing study in the same language; this high level of proficiency may be demonstrated through particular AP scores in Language or Literature, IB scores in Language, placement testing upon entrance to UCSD, or placement in advanced course work by a UCSD department or program that teaches language. Students who are biliterate and bilingual in a language not taught at UCSD may, after demonstrating proficiency by passing a special exam, take two quarter courses from UCSD's "Literatures in English" offerings. Further details may be obtained from the ERC Academic Advising Office.

College-level study of the language is a prerequisite for study abroad in most non-English speaking countries and enhances understanding of those societies. It is also well recognized that familiarity with other languages is one of the best ways to become highly proficient in using English.

### **Fine Arts (two quarters)**

Two courses from selected offerings are required, to include study of both Western and non-Western music, theatre, and/or visual arts. These courses help students appreciate the rich range of human expression to be found in cultures and ages other than their own.

### **Regional Specialization (three quarters)**

Each ERC student selects three courses dealing with a single geographic region of the world. The college has defined regions broadly enough to assure course availability and narrowly enough to ensure coherence of subject matter. These courses may be chosen from offerings in humanities, social sciences, and fine arts. At least two of the three must be taken at the upper-division level. See "Minors" below about application of this course work to an optional ERC minor.

### **Upper-Division Writing Requirement**

To demonstrate competency in English writing at the upper-division level, students submit to the Academic Advising Office a paper or papers of specified lengths that were written for one or more upper-division courses and graded C- or higher. Papers are returned to students after Academic Advising Office staff certify that they meet the upper-division writing requirement.

### **Sample Program**

A program like the sample one shown here would lead to completion of most general-education requirements during the first two years of college. Some variation will occur depending upon a student's academic preparation, choice of major, and individual interests and priorities. For example, students planning to major in science, math, or engineering will





be taking many prerequisite courses for their major.

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
MMW 1 foreign language fine arts Subject A, major or elective	MMW 2 foreign language quantitative methods fine arts	MMW 3 foreign language quantitative methods major or elective
<b>SOPHOMORE YEAR</b>		
MMW 4 natural science major or elective major or elective	MMW 5 natural science major or elective major or elective	MMW 6 major or elective major or elective elective or regional specialization
<b>JUNIOR AND SENIOR YEARS</b>		
regional specialization major course work electives		

### Transferring to ERC

Transfer students may meet most ERC general-education requirements before entering UCSD if they have followed articulation agreements with community colleges or taken at other institutions courses that ERC deems equivalent in content to courses at UCSD which meet the college's requirements.

All transfer students must take three quarters of MMW, and it is recommended that the three courses be taken in sequence. Students who have not met their freshman writing requirement elsewhere must complete it by taking MMW 2 and/or MMW 3 as part of this three-course requirement.

All transfer students must also take two upper division regional specialization courses and satisfy the upper-division writing requirement. See "Graduation Requirements" below.

### Grading Options

1. No more than 25% of total UCSD units counted in satisfaction of degree requirements may be taken on a Pass/Not Pass basis.
2. Electives may be taken on a Pass/Not Pass basis except if they are to be applied to majors or minors. Check with the department or college for rules applying to specific majors or minors.
3. Courses that meet ERC general-education requirements in the following areas may be taken Pass/Not Pass: fine arts, natural

sciences, quantitative methods, and one regional specialization course. All other general-education courses must be taken for letter grades.

### Leadership and Community

ERC students are recognized for their strong sense of community. These bonds are created in part by common classroom experiences in MMW. They also grow from shared explorations in a variety of college programs in which students take active roles: college and campus-wide student government, service to the campus and the larger community, the acquisition of leadership skills, and sports and social activities.

The college is home to UCSD's International House, which offers informative and dynamic discussions for the campus community at its weekly International Affairs Group meetings. ERC also hosts a retreat each fall to welcome study-abroad returnees from all five colleges and assist with their re-integration into the UCSD community.

### Expanding Horizons

Students whose interests extend beyond our borders are encouraged and assisted in finding opportunities to spend part of their college career in another country. There are many options, including short-term or year-long academic programs, work opportunities, and career-related internships.

At one time or another, men and women from ERC have studied in more than forty different lands in Europe, Africa, Latin America, the Middle East, and Asia.

Students on University financial aid who participate in the UC Education Abroad Program pay UCSD fees and retain their financial aid packages, which are budgeted to include study-abroad expenses. For a fraction of their normal UCSD fees, students who participate in approved academic study programs sponsored by other universities may apply their UCSD financial aid to the cost of such programs. In addition, there are several sources for scholarship aid designated for study abroad.

### Majors

An ERC student may pursue any of the approximately eighty undergraduate majors of-

fered at UCSD. Students may complete more than one major, provided they comply with all Academic Senate regulations concerning double majors. To declare a double major, a student must have accrued at least ninety but no more than 135 units, have at least a 2.50 GPA, and meet university requirements regarding total maximum number of units earned and quarters attended at UCSD.

Most majors require the completion of specified "pre-major" or prerequisite courses at the lower-division level before enrollment in upper-division major courses. For some majors, admission to upper-division course work is contingent upon a satisfactory GPA in certain pre-major courses. Students are strongly encouraged to work closely with department advisers as well as college academic counselors to assure adequate and timely preparation for their majors.

Completion of certain majors may take more than four years or the minimum 180 units for graduation. Time-to-graduation in other instances may be affected by a student's level of preparation for upper-division work in the major or by a decision to change the major. See "The Undergraduate Program(s)" in respective department listings.



### **ERC Individual Studies Major**

ERC offers an Individual Studies major to meet the needs of students who have defined academic interests for which suitable majors are not offered at UCSD. Students who find themselves in this situation should consult a college academic counselor at the first opportunity.

This major normally includes regular course work plus independent study representing a maximum of twelve upper-division four-unit courses. A regular member of the faculty serves as adviser to the student. Students admitted to the Individual Studies major may enroll in ERC 199, an independent study course supervised by a faculty member who tailors the content to fit the major.

Qualifying seniors pursuing an Individual Studies major may undertake an honors thesis research project (ERC 196) under the tutelage of their faculty mentor. See "Eleanor Roosevelt College" in the department listings.

Further information about an Individual Studies major may be obtained from the ERC Academic Advising Office.

### **Minors and ERC Special Minors**

ERC does not require a minor. However, completion of a minor can be an educational or pre-professional asset. All students have the option of completing any approved departmental or inter-departmental minor.

Alternatively, students may wish to combine foreign language course work with an associated regional specialization to earn an ERC Special Minor in, for example, Asian Studies or Middle Eastern Studies. Such minors must conform to Academic Senate policies: For students entering the University before January 1998, this means completion of at least six courses (twenty-four units), of which at least three (twelve units) must be at the upper-division level. Students entering in January 1998 or later must complete at least seven courses (twenty-eight units) for a minor, of which at least four (sixteen units) must be at the upper-division level. Upper-division courses applied toward a minor may not be used to meet the requirements of the major.

### **Internships**

As a way to combine classroom theory and practical experience, juniors and seniors are encouraged to consider internships under programs available to any UCSD student and administered by the Academic Internship Program, Career Services, or UCSD Associated Students.

Participants work for various lengths of time in enterprises that match their major interests and career goals. Most placements are local, but some are in such places as Washington, D.C. or Los Angeles.

Working with faculty advisers, students in academic internships write research papers integrating their work experience with their formal studies, and they can earn up to sixteen units of credit in increments of four, eight, or twelve per quarter.

### **Graduation Requirements**

To graduate with a baccalaureate degree from the University of California, an Eleanor Roosevelt College student must:

1. Satisfy two University of California requirements: the Subject A requirement in English composition and the requirement in American History and Institutions. See "Undergraduate Admissions, Policies and Procedures."
2. Fulfill the ERC general-education requirements as described.
3. Complete an approved departmental or inter-departmental major, meeting all requirements as specified by the major department or program.
4. Satisfy the senior residency requirement that thirty-six of the final forty-five units passed must be completed as a student registered at ERC. Students studying abroad in their senior year may petition to have this requirement waived.
5. Complete and pass a minimum of 180 units for the Bachelor of Arts or Bachelor of Science degree. At least sixty of those (fifteen courses) must be at the upper-division level. The B.S. degree is awarded in biology, physics, cognitive science, chemistry, earth sciences, and designated engineering and

psychology programs; the B.A. is awarded in all other majors.

6. Earn a cumulative GPA of 2.0 or higher.

### **Honors Recognition**

Students who earn a quarter GPA of 3.5 or higher are cited by letter as having achieved Provost's Honors. Students who maintain GPAs of 3.5 or higher for a full academic year are awarded certificates of Provost's Honors.

Every spring, ERC holds an academic honors recognition event to which high achieving students are encouraged to invite individual faculty as their guests.

Also each spring, UCSD's chapter of the Phi Beta Kappa Society invites to membership seniors who have demonstrated outstanding academic achievement (3.65 GPA), breadth in their academic programs (including humanities, language, and quantitative methods), and good character, among other criteria. See "Phi Beta Kappa" in the index.

At Commencement, ERC graduates with extraordinarily outstanding academic records overall are named Provost's Scholars. Graduates with final cumulative GPAs equivalent to approximately the top 14 percent of UCSD graduates become eligible for College Honors and receive their degrees Cum Laude (with honors), Magna Cum Laude (with high honors), or Summa Cum Laude (with highest honors).

### **ERC Honors Program**

The Freshman and Sophomore Honors programs at ERC have been established to provide exceptionally motivated and capable students with enhanced educational experiences in association with faculty and other honors students.

Selected new students are invited to enroll in the Freshman Honors Seminar. During fall quarter, students meet with a variety of faculty members to learn more about their research and about academic enrichment opportunities at UCSD. Seminar members also participate in other enriching academic and cultural events.

The Freshman Honors Seminar continues during winter quarter (and some years through spring quarter) with faculty speakers who focus on international themes. In winter and spring



quarters, these seminars carry one unit of credit each (ERC 20). See "Eleanor Roosevelt College" in the department listings.

Sophomores who have earned cumulative grade-point averages (GPAs) of 3.5 or higher have opportunities to pursue independent study with individual faculty for credit (ERC 92). See "Eleanor Roosevelt College" in the department listings.

Additional honors opportunities are offered in MMW. Students with excellent grades in MMW 1, 2, and 3 and high cumulative GPAs are eligible to take MMW 4H, 5H, and 6H. These students attend regular MMW lectures and meet in separate honors discussion sections. They also attend special guest lectures and enrichment activities related to course content.

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# Undergraduate Admissions, Policies and Procedures

All communications concerning pre-applicant undergraduate admission for U.S. citizens should be addressed to Office of Admissions and Outreach, University of California, San Diego, 9500 Gilman Drive, Dept. 0337, La Jolla, California 92093-0337.

## Definitions

An application to the University of California, San Diego is processed and evaluated as a freshman or transfer, California resident; freshman or transfer, nonresident; or freshman or transfer, international applicant. See definitions below:

### *An Undergraduate Applicant*

A student who wishes to complete a program of studies leading to a bachelor of arts or a bachelor of science degree.

### *A Freshman Applicant*

A student who has graduated from high school but who has not enrolled since then in a regular session in any accredited college-level institution. This does not include attendance at a summer session immediately following high school graduation.

### *A Transfer Applicant*

A high school graduate who has been a registered student in another accredited college or university or in college-level extension classes other than a summer session immediately following high school graduation. A transfer applicant may not disregard his or her college record and apply for admission as a new freshman.

An undergraduate student can earn transfer credit upon successful completion of college-level work which the university considers consistent with courses it offers. Such credit may be earned either before or after high school graduation. The acceptability of courses for transfer credit is determined by the Office of Admissions and Outreach.

### *A Nonresident Applicant*

A student who lives outside the state of California and who is required to present a higher scholarship average than is required of California residents to be eligible for admission to the university, in addition to paying the nonresident tuition fees.

### *An International Applicant*

A student who claims citizenship in another country and has a nonimmigrant visa.

### *Early Admission Honors*

Through this program, a very few specially qualified students in local high schools are admitted to UCSD. Beginning in the fall, they attend one or two classes at UCSD during their senior year in high school at reduced cost. For additional information call or write:

University of California, San Diego  
EAH Coordinator  
Office of Admissions and Outreach  
9500 Gilman Drive, Dept. 0337  
La Jolla, California 92093-0337  
(619) 534-4831.

## Educational Opportunity Programs

The Educational Opportunity Program (EOP) is a recruitment and academic support program established by the university to increase the enrollment of educationally disadvantaged and low-income students. Students are provided with pre-admission counseling, and academic and personal support services. EOP eligibility is based on family income level.

Services available to EOP students cover a broad range of needs. Recruitment and application-related services include pre-admission counseling, application fee waivers, application follow-up, and deferral of the Statement of Intention to Register fee. Academic support for EOP students is offered through the Office of Academic Support and Instructional Services (OASIS). OASIS sponsors Summer Bridge (a summer residential program); the Mathematics,

Science, and Writing Enrichment Program; and peer counseling. OASIS also gives priority for individual tutoring to EOP students and offers a variety of academic skills workshops and cross-cultural programming.

Prospective EOP students should obtain a UC undergraduate application packet from any high school or community college counselor or directly from UCSD. All EOP applicants must be California residents. To apply for EOP, check the box in Section VI of the UC application designated for Educational Opportunity Program application. Fill in the information requested in Section V of the application pertaining to family size and income, parental education level and occupation. This information is used in conjunction with other information from the admission application in determining eligibility for EOP.

Financial aid is available to eligible EOP students from the regular state, federal, and university sources administered through the UCSD Student Financial Services Office. Although EOP eligibility does not guarantee financial aid, the low income ceilings for EOP eligibility mean that most EOP applicants should qualify for substantial financial assistance. Financial aid information is available from the UCSD Student Financial Services Office. Admissions information should be sought from your high school or community college counselor as well as from the Office of Admissions and Outreach. For additional information about EOP eligibility requirements, program services, or general information regarding UCSD, call or write:

University of California, San Diego  
Office of Admissions and Outreach  
9500 Gilman Drive, Dept. 0337  
La Jolla, California 92093-0337  
(619) 534-4831.

## Undergraduate Colleges and Majors

### COLLEGES

Even though you may be uncertain about your major, your application for admission must include the name of the UCSD college with



which you plan to affiliate (Revelle, John Muir, Thurgood Marshall, Earl Warren, or Eleanor Roosevelt). You must indicate a second and third choice in the event your first choice college closes early. Applicants may be reassigned to another college by the Office of Admissions and Outreach if enrollment quotas prohibit first choice. Applicants who do not indicate a UCSD college preference will be assigned a college.

In the "Choosing a College" section, which describes the educational philosophies of the five colleges at UCSD, you will find information concerning the requirements of each college. It is very important that you read that section of the catalog carefully, and that you decide which of the colleges is the right one for you.

You can also find information about UCSD's five colleges, and much more, on the World Wide Web home page of the Office of Admissions and Outreach (<http://admissions.ucsd.edu/>).

## **MAJORS**

The Departments of Biology, Applied Mechanics and Engineering Sciences, Computer Science and Engineering, Electrical and Computer Engineering, and Bioengineering screen admissions to the major, and some students may be admitted to pre-major status only. The literature/writing major also admits to pre-major status only. As a pre-major you must satisfy all prerequisites before admission to the major.

If openings are available, you may have to pass specific courses with grades of a given level to become a degree candidate in your preferred major. This set of conditions, determined on a department-by-department basis, and approved by the San Diego Committee on Educational Policy, is explained in detail under the department listing in this catalog.

Other departments, however, may be approved to offer pre-majors by the Committee on Educational Policy subsequent to this publication. Please refer to "Major Fields of Study" in the introduction to the catalog.

## *Undergraduate Admissions*

### **MINIMUM REQUIREMENTS**

The university's minimum undergraduate admission requirements, which are the same on all University of California campuses, are based on three principles. Simply stated, they are: (1) the best predictor of success in the university is high



scholarship in previous work; (2) the study of certain subjects in high school gives a student good preparation for university work and reasonable freedom in choosing an area for specialized study; and (3) standardized assessment tests provide a broad base for comparison, and mitigate the effects of differing grading practices.

You should understand that the academic requirements for admission are minimum entrance standards. Completing the required high school courses with satisfactory grades will not automatically determine whether you will be selected for admission to UCSD, as students are chosen from a large number of highly competitive applicants. Most of these applicants will have greatly exceeded the minimum requirements; therefore, selection depends on additional factors.

For example, you should take as many honors and advanced placement courses as possible and should try to exceed the minimum academic requirements in all subjects, particularly the a-f requirements and/or courses in English, mathematics, laboratory sciences, and foreign languages. High test scores are necessary in conjunction with strong performance in classes and a consistent pattern of courses. Overall performance must be well above minimum requirements in order to admit you to the campus and major of your choice.

### **UCSD Admission Policy and Selection Criteria**

The undergraduate admission policy at the University of California, San Diego is designed to select a highly qualified and diverse student body. As a major public institution of higher education serving the teaching, research, and public service needs of California, UCSD strives to reflect the diversity of the population of the state. This undergraduate admission policy has been developed by the San Diego campus in compliance with the University of California Policy on Undergraduate Admissions that "seeks to enroll a student body that, beyond meeting the University's eligibility requirements, demonstrates high academic achievement or exceptional personal talent, and that encompasses the broad diversity of California."

### *Freshman Selection*

In recent years, the number of applicants has far exceeded the number of spaces available, and it has become necessary to adopt standards which are much more demanding than the minimum requirements to admit students. The San Diego campus has developed the following procedures for the selection of applicants to be admitted from its pool of eligible candidates:



## **ACADEMIC ASSESSMENT**

Approximately 60 percent of all admitted applicants are selected on the basis of the high school grade-point average calculated on academic courses completed in subject areas specified in the university's eligibility requirements (a-f subjects), performance on required tests—the Scholastic Aptitude Test I (SAT I) or American College Test (ACT), SAT II Tests, the number of courses successfully completed in academic subjects beyond the minimum specified in the university's eligibility requirements, and the number of university-approved advanced placement and honors courses enrolled in and/or completed in the twelfth grade. Freshman applicants will be ranked using an academic index based on the above.

## **COMPREHENSIVE ASSESSMENT**

For the remaining applicants, California residents are considered in the context of the applicant's academic assessment, leadership, awards/special talents/skills, community/volunteer service, special projects/performances, residency, special circumstances and/or personal challenges, and social and educational environment. Those applicants with a combination of strong academic and supplemental factors will be considered for admission.

## *Advanced-Standing Selection*

The admission of transfer applicants will be limited to those who have satisfactorily completed minimum admission requirements as well as sixty transferable semester-units (ninety quarter-units) one term prior to entrance and will be on a priority basis. In priority order, the following will be admitted: Transfer Admission Guarantee (TAG) applicants satisfying the admission criteria; California community college applicants with sixty transferable units completed one term prior to entrance and a GPA of 2.80 or better; Intercampus Transfers (ICTs) with sixty transferable units (ninety quarter-units) completed one term prior to entrance; California residents attending public or private four-year institutions (in or out of state) with sixty transferable units completed one term prior to entrance; and non-California residents attending public or private four-year institutions with sixty transferable units completed one term prior to entrance.

## *Admission as a Freshman Applicant*

### **MINIMUM REQUIREMENTS**

To be eligible for admission to the university as a freshman you must meet the high school diploma requirement, the subject requirement, the scholarship requirement, and the examination requirement, which are described below.

### **HIGH SCHOOL DIPLOMA REQUIREMENT**

You must earn a diploma from a high school in order to enter the university as a freshman. The Certificate of Proficiency, awarded by the California State Department of Education upon successful completion of the High School Proficiency Examination, proficiency tests from other states, and the General Education Development (GED) certificate, will be accepted in lieu of the regular high school diploma. Subject, scholarship, and examination requirements discussed below must also be met.

### **SUBJECT REQUIREMENT**

A student applying for admission as a freshman to the University of California must have completed a minimum of fifteen units of high school work during grades nine through twelve. At least seven of the fifteen units must have been earned in courses taken during the last two years of high school. (A one-year course is equal to one unit; a one-semester course is equal to one-half unit.)

These units must have been earned in academic or college preparatory courses, as specified below. Lists of approved courses are compiled by the UC Office of the President for high schools in California. Lists are specific to each high school and are available through your high school's counseling office, and on the World Wide Web ([www.assist.org](http://www.assist.org)). Applicants from high schools outside California may find the following guidelines helpful in determining acceptability of courses.

### **Specific "a-f" Course Requirements**

#### a. **History/Social Science: 2 units**

Two years of history/social science, including one year of United States history or one-half year of United States history and one-half year of civics or American government, and one year of world his-

tory, cultures, and geography, taken in the ninth grade or later.

#### b. **English: 4 units**

Four years of college preparatory English—composition and literature. (All English courses must require frequent and regular practice in writing expository prose compositions of some length. Also, not more than two semesters of ninth-grade English will be accepted for this requirement.)

#### c. **Mathematics: 3 units**

Three years of mathematics—elementary algebra, geometry, and intermediate algebra. (Mathematics courses taken in grades seven and eight may be used to meet part of this requirement if they are accepted by the high school as equivalent to its own courses.)

#### d. **Laboratory Science: 2 units**

Two years of laboratory science providing fundamental knowledge in at least two of these three areas: biology, chemistry, and physics. Laboratory courses in earth/space sciences are acceptable if they have as prerequisites or provide basic knowledge in biology, chemistry, or phys-



ics. Not more than one year of ninth-grade laboratory science can be used to meet this requirement.

**e. Language Other than English: 2 units**

Two years of one language other than English in courses that provide instruction in grammar, vocabulary, reading, and composition, and that emphasize the development of aural and oral skills.

**f. College Preparatory Electives: 2 units**

Two units in addition to those required in a. through e. above, to be chosen from the following subject areas: history, English, advanced mathematics, laboratory science, language other than English (a third year in the language used for the "e" requirement or two years of another language), social science, and fine arts. (In general, elective courses should involve considerable reading and should

aim to develop a student's analytical and reasoning ability and skill with written and oral exposition.)

**Courses Satisfying the "f" Requirement**

**History and English** Elective courses that fit the general description in "f" above are acceptable.

**Advanced Mathematics** Trigonometry, linear algebra, precalculus (mathematical analysis), calculus, statistics, computer science, and similar courses are acceptable. Courses containing significant amounts of material from arithmetic or from shop, consumer, or business mathematics are not acceptable.

**Laboratory Science** Courses in the biological and physical sciences are acceptable.

**Language Other than English** Elective courses may be in either the same language

used to satisfy the "e" requirement or in a second language. If a second language is chosen, however, at least two years of work in that language must be completed.

**Social Science** Elective courses that fit the general description in "f" above are acceptable. In addition, these courses should serve as preparation for lower-division work in social science at the university. Courses of an applied, service, or vocational nature are not acceptable.

**Fine Arts** Elective courses in fine arts should enable students to understand and appreciate artistic expression, and to talk and write with discrimination about the artistic material studied. Courses devoted to developing creative artistic ability and courses devoted to artistic performance are acceptable. Courses that are primarily recreational or are offered under physical education are not acceptable.

**ELIGIBILITY INDEX**

"a-f" GPA	ACT <sup>1</sup>	SAT I TOTAL <sup>2</sup>	"a-f" GPA	ACT <sup>1</sup>	SAT I TOTAL <sup>2</sup>
2.82	36	1600/1590	3.06	25	1150/1030
2.83	36	1590/1570	3.07	24	1130/1010
2.84	35	1580/1540	3.08	23	1110/980
2.85	35	1570/1520	3.09	23	1090/960
2.86	35	1560/1500	3.10	22	1070/940
2.87	34	1550/1470	3.11	22	1050/910
2.88	34	1530/1450	3.12	21	1030/890
2.89	33	1510/1430	3.13	21	1010/870
2.90	33	1490/1400	3.14	20	980/840
2.91	33	1470/1380	3.15	20	960/820
2.92	32	1450/1360	3.16	19	940/800
2.93	31	1430/1330	3.17	19	920/770
2.94	31	1400/1310	3.18	18	900/750
2.95	31	1370/1290	3.19	18	870/730
2.96	30	1350/1260	3.20	17	840/700
2.97	30	1330/1240	3.21	17	810/680
2.98	29	1310/1220	3.22	16	780/660
2.99	28	1290/1190	3.23	16	750/630
3.00	28	1270/1170	3.24	15	720/610
3.01	27	1250/1150	3.25	15	690/590
3.02	27	1230/1120	3.26	14	660/560
3.03	26	1210/1100	3.27	14	630/540
3.04	26	1190/1080	3.28	13	600/520
3.05	25	1170/1050	3.29	12	570/490

<sup>1</sup> ACT composite, scored in intervals of 1 point, from a minimum of 1 to a maximum of 36.

<sup>2</sup> SAT I total, scored in intervals of 10 points, from a minimum of 400 to a maximum of 1600. Use the first score listed if you took the test in April 1995 or later. Use the second score if you took the test prior to April 1995.

## HONORS LEVEL COURSES

The University of California encourages students to take demanding advanced academic courses in all fields. Accordingly, the grades in up to four units of eleventh and twelfth grade honors courses will be counted on a scale A=5, B=4, C=3, if these courses are certified by the high school and the University of California as offered at an honors level. Honors credit will also be given for up to two of these four units taken in tenth grade. Grades lower than C do not earn honors credit.

## EXAMINATION REQUIREMENT

All freshman applicants must take and submit scores from tests specified below. If you are applying for admission to the fall term, you must take the tests no later than December of your senior year.

1. One assessment test, either a or b:
  - a. Scholastic Assessment Test (SAT I: Reasoning Test)  
Your verbal and mathematics scores on this test must be from the same sitting.
  - b. American College Test (ACT)  
The composite score will be reported.

### 2. Three Subject Tests (SAT II)

These must include (a) writing;\* (b) Mathematics, Level 1 or 2; and (c) one from English literature, foreign languages, sciences, or social studies.

If tests are repeated, the university will accept the highest score received. The best SAT I score is a total of the math and verbal sections taken at the same sitting. See your counselor for information and registration forms or write to the College Board ATP, P.O. Box 6200, Princeton, New Jersey 08541-6200. For ACT information, write to the ACT Program, P.O. Box 168, Iowa City, Iowa 52240.

\*The SAT II Subject test in literature may not be substituted.

## SUBJECT A EXAMINATION

If the Subject A requirement is not satisfied prior to April 1, admitted students are required to take the university-wide Subject A Examination in mid-May. Notice of this examination will be sent to all admitted students. There will be a \$55 fee.

## Freshman Eligibility

### CALIFORNIA RESIDENTS (MINIMUM REQUIREMENTS)

(Refer also to "Admission as a Freshman Applicant.")

Please be advised that these are minimum eligibility requirements. The San Diego campus has been unable to accommodate all eligible applicants. You must exceed these requirements in order to be considered for admission. See "UCSD Admission Policy and Selection Criteria."

**Eligibility Index:** An "Eligibility Index" is used to determine minimum eligibility for California applicants. If you make a perfect score on the SAT I (1600) or the ACT (36) you need a GPA of only 2.82 to be eligible for admission. On the other hand, if you have a GPA of 3.30 or better, you are eligible even with the lowest test scores. Between these extremes, the Eligibility Index table is used. If you know your GPA (using the grades earned in grades ten, eleven, and twelve to meet minimum requirements in the "a through f" pattern) the table will show the required test score; conversely, if you know your SAT I total or your ACT composite, the table will show the required GPA.

### NON-CALIFORNIA RESIDENTS (MINIMUM REQUIREMENTS)

(Refer also to "Admission as a Freshman Applicant" and "Freshman Eligibility: California Residents.")

Please be advised that these are minimum eligibility requirements. The San Diego campus has been unable to accommodate all eligible applicants. You must exceed these requirements in order to be considered for admission. See "UCSD Admission Policy and Selection Criteria."

**Scholarship:** An applicant who is not a resident of California is eligible to be considered for admission to the university with a grade-point average of 3.40 or better, calculated on the required high school subjects. These subjects, referred to as "a through f," are the same for the nonresident as for the resident. (The "Eligibility Index" applies to the California applicant only.)

## Additional Preparation for University Work: Freshman Applicants

High school courses required for admission to the university are listed at the beginning of this section. This list is in no way intended to constitute an outline for a valid high school program. The courses listed were chosen largely for their value as predictors of success in the university. These required courses add up to fifteen "Carnegie" units, while graduation from high school requires from fifteen to nineteen. Courses beyond our requirements should be chosen to broaden your experience in such fields as social sciences and the fine arts, and should fit in with your personal plans for the future.

A science major, for example, besides taking courses in chemistry, physics and biology, will find more than three years of mathematics essential. A science major without a working knowledge of trigonometry and at least intermediate algebra is likely to be delayed in getting a degree. If you have an interest in languages or plan a college program with a foreign language requirement, you should have completed more than the two years of foreign language needed for admission.

You should understand that the "a through f" requirements for admission are minimum entrance standards. Completing the required high school courses with satisfactory grades will not automatically prepare you for freshman work in every subject, much less in your major or program of study. Many entering students discover to their dismay that they are not adequately prepared for basic courses, such as English composition and calculus, which they are expected to take in their freshman year. Also, many undergraduate majors, particularly those in sciences and mathematics, require more high school preparation than that necessary for admission. This lack of preparation can cause problems for students who do not choose a major until after they enter the university, or for those who prepare for one major but later decide to change to another.

For these reasons, you should take courses that will prepare you beyond minimum levels of competence in reading, writing, and mathematics. A student who is well prepared for university work will have taken four years of English in high school, four years of mathematics, two to three years of language other than

English, three years of laboratory science, two years of history/social science, and one or more years of art or humanities.

**Reading:** Many students are not prepared for either the kinds or amounts of reading demanded of freshmen at the university. You should become proficient in reading and understanding technical materials and scholarly works. Learn to read analytically and critically, actively questioning yourself about the author's intentions, viewpoint, arguments, and conclusions. Become familiar and comfortable with the conventions of standard written English and with various writing strategies and techniques. Your reading experience should include original works in their entirety, not just textbooks and anthologies, and should encompass a wide variety of forms and topics.

**Writing:** Effective critical thinking and proficiency with the written language are closely related, and both are skills which every university student must master. By university standards, a student who is proficient in English composition is able to (a) understand the assigned topic; (b) select and develop a theme by argument and example; (c) choose words which aptly and precisely convey the intended meaning; (d) construct effective sentences, i.e., sentences that economically and successfully convey the writer's ideas and display a variety of structures; (e) demonstrate an awareness of the conventions of standard written English, avoiding such errors as sentence fragments, run-together sentences, faulty agreements, and improper pronoun references; and (f) punctuate, capitalize, and spell correctly.

If you plan to attend the university, you must take English courses in high school that require the development and practice of these skills. You must take at least four years of English composition and literature that stress expository writing: the development of persuasive critical thinking on the written page.

**Mathematics:** Many undergraduate majors require preparation in mathematics beyond that necessary for admission to the university. All majors in the natural and life sciences, engineering, and mathematics require calculus. Many majors in the social sciences require statistics or calculus, sometimes both. If you have selected a major that requires either calculus or statistics you should expect to take that course during your freshman year at the university.

Calculus is also required for undergraduates preparing for careers in environmental sciences, dentistry, medicine, optometry, pharmacy, and biostatistics. Many students are not aware of the large number of fields outside the natural and mathematical sciences which require calculus or statistics as prerequisites.

Prepare yourself for university courses in calculus while you are still in high school. In addition to the three years of mathematics required for admission, you should take a year of precalculus mathematics. These courses should include: (a) basic operations with numerical and algebraic functions; (b) operations with exponents and radicals; (c) linear equations and inequalities; (d) polynomials and polynomial equations; (e) functions and their graphs; (f) trigonometry, logarithms, and exponential functions; and (g) applications and word problems. Students who plan to enter a field which requires statistics should take at least the second year of algebra.

If you are not proficient in basic and intermediate algebra, you will be at an enormous disadvantage in the university. You will have to take one or more precalculus courses before beginning calculus and may also have to take preparatory courses before beginning statistics. The need to take these preparatory courses at UCSD could seriously delay your undergraduate studies.

### College Credit: Freshman Applicants

There are many steps you can take to earn credit which will be applicable to your graduation from college. Some of these steps may be taken even before you graduate from high school. Among them are the following:

#### College Courses

Many high schools have arrangements with nearby postsecondary institutions, allowing you to take regular courses while you are still in high school. Many of these courses are accepted by the university exactly as they would be if you were a full-time college student if courses are posted for credit on the college transcript.

No matter how many college units you earn before graduating from high school, you will still apply as a freshman.

### College Board Advanced Placement

The university grants credit for all College Board Advanced Placement Tests on which a student scores 3 or higher. The credit may be subject credit, graduation credit, or credit toward general-education or breadth requirements. Students who enter the university with AP credit do not have to declare a major earlier than other students, nor are they required to graduate earlier.

Students should be encouraged to take AP tests when appropriate. Counselors should not overlook the opportunity for a student who is fluent in a language other than English to gain AP credit. AP test scores will not adversely affect a student's chances for admission.

The university grants credit for advanced placement tests as described below. Credit is expressed in quarter-units.

Art (Studio)	
Drawing Portfolio .....	8
General Portfolio .....	8
	<i>(eight units maximum for both tests)</i>
Art History .....	8
Biology .....	8
Chemistry .....	8
Computer Science	
Computer Science A .....	2
Computer Science AB .....	4
	<i>(four units maximum for both tests)</i>
Economics	
Microeconomics .....	4
Macroeconomics .....	4
English	
English Language .....	8
English Literature .....	8
	<i>(eight units maximum for both tests)</i>
Environmental Science .....	8
Government and Politics	
United States .....	4
Comparative .....	4
History	
United States History .....	8
European History .....	8
Language Other than English	
French Language .....	8
French Literature .....	8
German Language .....	8
German Literature .....	8
Spanish Language .....	8

Spanish Literature .....	8
<i>(German Literature no longer offered)</i>	
Latin	
Latin Literature .....	4
Virgil .....	4
Mathematics	
Calculus AB .....	4
Calculus BC .....	8
<i>(eight units maximum for both tests)</i>	
Music	
Theory .....	8
Listening and Literature .....	8
<i>(eight units maximum for both tests;</i>	
<i>Listening and Literature no longer offered)</i>	
Physics	
Physics B .....	8
Physics C1 (Mechanics) .....	4
Physics C2 (Electricity and Magnetism) .....	4
<i>(eight units maximum for all three tests)</i>	
Psychology .....	4
Statistics .....	8

Requirements met by advanced placement tests are described below by college. Even if subject credit or credit toward specific requirements is not mentioned in the college lists, students receive university credit as described above for all AP tests on which they score 3 or higher. If a student is exempt from a particular course at UCSD, duplication of this course does not earn academic credit.

### Admission as a Transfer Applicant

UCSD welcomes transfer students to its campus. The university defines a transfer applicant as a high school graduate who has been a registered student in another accredited college or university or in college-level extension classes other than a summer session immediately following high school graduation. A transfer applicant may not disregard his or her college record and apply for admission as a new freshman.

Each year UCSD receives more applications from eligible transfer students than the campus can accommodate. In addition to satisfaction of UC minimum requirements, only transfer students who have completed ninety or more transferable quarter-units by the end of spring term are considered for admission. Priority is given to

students transferring from California community colleges. See "Advanced-Standing Selection."

### Transfer Eligibility

#### CALIFORNIA RESIDENTS (MINIMUM REQUIREMENTS)

As a transfer applicant you must meet one of the requirements described below to be considered for admission to the university.

1. If you completed all the "a-f" courses in high school and achieved the required score on the Eligibility Index, you are minimally eligible for admission to the university any time after you have established a grade-point average of 2.0 or better in transferable college courses.

If you have completed fewer than twelve quarter- or semester-units of transferable college credit since high school graduation, you must also satisfy the Examination Requirement for freshman applicants. See "Examination Requirement."

2. If you achieved the required score on the Eligibility Index but did not complete all the "a-f" subjects in high school, you may be minimally eligible for admission to the university after you have:
  - a. Established a college grade-point average of 2.0 or better; and
  - b. Completed, with grades of C or better, appropriate college courses in the "a-f" subjects you lacked; and
  - c. Completed twelve or more quarter- or semester-units of transferable college credit, or have met the Examination Requirement for freshman applicants.
3. If you did not achieve the required score on the Eligibility Index, or did not achieve the required score and lacked required "a-f" subjects, you may be minimally eligible for admission to the university after you have:
  - a. Completed ninety quarter-units or sixty semester-units of *transferable* college credit with a grade point average of at least 2.4, *and*;
  - b. Completed a course pattern requirement to include:
    - two transferable college courses (three semester- or four to five quarter-units each) in English composition, *and*;

- one transferable college course (three semester- or four to five quarter-units each) in mathematical concepts and quantitative reasoning, *and*;
- four transferable college courses (three semester- or four to five quarter-units each) chosen from at least two of the following subject areas: the arts and humanities, the social and behavioral sciences, the physical and biological sciences.

(Students who satisfy the Intersegmental General-Education Transfer Curriculum (see p.49) prior to transferring to UC may satisfy Option 3b above of the new transfer admission requirements.

### Transfer Eligibility

#### NON-CALIFORNIA RESIDENTS (MINIMUM REQUIREMENTS)

The minimum admission requirements for nonresident transfer applicants are the same as those for residents, except that nonresidents must have a grade point average of 2.8 or higher in all transferable college course work.

### Transfer Eligibility

#### SECOND BACCALAUREATE/LIMITED STATUS APPLICANTS

Since November 1992, UCSD has not accepted applications from students who have earned a four-year degree. Students should check with the Office of Admissions and Outreach for information on whether applications for second baccalaureate or limited status are being accepted.

If accepted, applications received by the Office of Admissions and Outreach from students who have earned a four-year degree will be reviewed by the college provost's office. Limited status (non-degree-seeking) applicants and those seeking a second B.A. or B.S. will be held to the same restrictions as are other new admits; fields that have been closed for admission (such as engineering) will be closed to these students as well. Students will be screened according to the amount of space available in the college; students will also be screened by any departments that have such screening mechanisms for entrance into the

English, three years of laboratory science, two years of history/social science, and one or more years of art or humanities.

**Reading:** Many students are not prepared for either the kinds or amounts of reading demanded of freshmen at the university. You should become proficient in reading and understanding technical materials and scholarly works. Learn to read analytically and critically, actively questioning yourself about the author's intentions, viewpoint, arguments, and conclusions. Become familiar and comfortable with the conventions of standard written English and with various writing strategies and techniques. Your reading experience should include original works in their entirety, not just textbooks and anthologies, and should encompass a wide variety of forms and topics.

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	<i>(eight units maximum for both tests)</i>
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Biology .....	8
Chemistry .....	8
Computer Science	
Computer Science A .....	2
Computer Science AB .....	4
	<i>(four units maximum for both tests)</i>
Economics	
Microeconomics .....	4
Macroeconomics .....	4
English	
English Language .....	8
English Literature .....	8
	<i>(eight units maximum for both tests)</i>
Environmental Science .....	8
Government and Politics	
United States .....	4
Comparative .....	4
History	
United States History .....	8
European History .....	8
Language Other than English	
French Language .....	8
French Literature .....	8
German Language .....	8
German Literature .....	8
Spanish Language .....	8



Spanish Literature .....	8
<i>(German Literature no longer offered)</i>	
Latin	
Latin Literature .....	4
Virgil .....	4
Mathematics	
Calculus AB .....	4
Calculus BC .....	8
<i>(eight units maximum for both tests)</i>	
Music	
Theory .....	8
Listening and Literature .....	8
<i>(eight units maximum for both tests; Listening and Literature no longer offered)</i>	
Physics	
Physics B .....	8
Physics C1 (Mechanics) .....	4
Physics C2 (Electricity and Magnetism) .....	4
<i>(eight units maximum for all three tests)</i>	
Psychology .....	4
Statistics .....	8

Requirements met by advanced placement tests are described below by college. Even if subject credit or credit toward specific requirements is not mentioned in the college lists, students receive university credit as described above for all AP tests on which they score 3 or higher. If a student is exempt from a particular course at UCSD, duplication of this course does not earn academic credit.

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2. If you achieved the required score on the Eligibility Index but did not complete all the "a-f" subjects in high school, you may be minimally eligible for admission to the university after you have:
  - a. Established a college grade-point average of 2.0 or better; and
  - b. Completed, with grades of C or better, appropriate college courses in the "a-f" subjects you lacked; and
  - c. Completed twelve or more quarter- or semester-units of transferable college credit, or have met the Examination Requirement for freshman applicants.
3. If you did not achieve the required score on the Eligibility Index, or did not achieve the required score and lacked required "a-f" subjects, you may be minimally eligible for admission to the university after you have:
  - a. Completed ninety quarter-units or sixty semester-units of transferable college credit with a grade point average of at least 2.4, and;
  - b. Completed a course pattern requirement to include:
    - two transferable college courses (three semester- or four to five quarter-units each) in English composition, and;

- one transferable college course (three semester- or four to five quarter-units each) in mathematical concepts and quantitative reasoning, and;
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### Transfer Eligibility

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If accepted, applications received by the Office of Admissions and Outreach from students who have earned a four-year degree will be reviewed by the college provost's office. Limited status (non-degree-seeking) applicants and those seeking a second B.A. or B.S. will be held to the same restrictions as are other new admits; fields that have been closed for admission (such as engineering) will be closed to these students as well. Students will be screened according to the amount of space available in the college; students will also be screened by any departments that have such screening mechanisms for entrance into the

# Advanced Placement Credit:

EXAM AND UNITS	UCSD COURSE EXEMPTIONS (OR USE ON MAJOR)	REVELLE COLLEGE
Art (Studio) • Drawing Portfolio ..... 8 • General Portfolio ..... 8 (8-unit maximum for both tests)	None	Fulfills fine arts requirement or 2 courses of the noncontiguous area of focus or may be used as 8 units of elective credit.
Art-History ..... 8	None	Fulfills fine arts requirement or 2 courses of the noncontiguous area of focus or may be used as 8 units of elective credit.
Biology ..... 8	Score of 4 or 5 = exempt from any 2 courses of Biology 1,2,3 sequence. Student allowed to take 1 course from this sequence for credit. Score of 3 = Biol. 10; may take Biol. 1, 2, 3 for credit.	Score of 3, 4, or 5 meets Revelle biology requirement even though Biol. 10 does not.
Chemistry ..... 8	Score of 3 = exempt Chem. 4 or 11. Score of 4 = exempt Chem. 4, 11 or 6A; may take Chem. 6AH,6BH,6CH for credit Score of 5 = exempt Chem. 6A,6B,6C or Chem. 11; may take Chem. 6BH,6CH for credit	Partial completion of natural science requirement.
Computer Science • Computer Science A ..... 2 • Computer Science AB ..... 4 (4-unit maximum for both tests)	Score of 5 only on AB exam may possibly be equivalent to CSE 10. Score of 3 or 4 on A or AB exam = elective units. Students must see faculty adviser.	1 course on noncontiguous area of focus.
Economics • Microeconomics ..... 4 • Macroeconomics ..... 4	Score of 5 AP Micro = Econ. 1A/2A. Score of 5 AP Macro = Econ. 1B/2B. Score of 3, or 4 = elective units.	Each score of 3, 4, or 5 exempts student 1 course on social science requirement.
English • Composition and Literature ..... 8 • Language and Composition ..... 8 (8-unit maximum for both tests)	Score of 3, 4, or 5 meets Subject A requirement.	2 courses of the noncontiguous area of focus or 8 units of elective credit.
Environmental Science ..... 8	Score of 4 or 5 = exempt Earth Science 40	8 units of elective credit.
Language • French ..... 8 • German ..... 8 • Spanish ..... 8	Score of 3 = exempt Ling. 1C/1CX. Score of 4 = exempt Ling. 1D/1DX or Lit. 2A. Score of 5 = exempt Lit. 2B.	Score of 4 or 5 meets proficiency requirement.
Latin • Latin: Virgil ..... 4 • Latin: Literature ..... 4	Score of 3, 4, or 5 = exempt Latin 1, 2, 3.	Usually prepares student to pass proficiency exam: 2 courses of the noncontiguous area of focus or may be used as 8 units of elective credit.
Literature • French ..... 8 • Spanish ..... 8	Score of 3 = exempt Ling. 1D/1DX or Lit. 2A. Score of 4 = exempt Lit. 2B. Score of 5 = exempt Span. Lit. 2C or French Lit. 50.	Score of 3, 4, or 5 meets proficiency requirement.
Government and Politics • American ..... 4	Score of 3, 4, or 5 satisfies American History and Institutions. Score of 3, 4, or 5 = exempt Poli. Sci. 10.	1 course toward social science requirement or 1 course of noncontiguous area of focus.
Government and Politics • Comparative ..... 4	Score of 3, 4, or 5 = exempt Poli. Sci. 11.	1 course toward social science requirement or 1 course of noncontiguous area of focus.
History • American ..... 8	Score of 3, 4, or 5 = exempt 2 quarters U.S. History: May take HILD 2A, 2B or 2C to complete sequence. Satisfies American History and Institutions.	2 courses toward social science requirement or 2 courses of noncontiguous area of focus.
History • European ..... 8	None	2 courses of the noncontiguous area of focus.
Mathematics • Calculus AB ..... 4 • Calculus BC ..... 8 (8-unit maximum for both tests)	Score of 4 or 5 AB exam = exempt Math. 20A or 10A. Score of 3 on AB exam = may take Math. 20A for credit; or exempt Math. 10A. Score of 4 or 5 on BC exam = exempt Math. 20A, 20B or 10A, 10B. Score of 3 on BC exam = exempt Math. 20A and may take Math. 20B for credit; or = exempt Math. 10A, 10B.	AB exam = 1 course toward math requirement; BC exam = 2 courses toward math requirement.
Music • Listening and Literature ..... 8 • Theory ..... 8 (8-unit maximum for both tests)	None	Fulfills fine arts requirement and 1 course of noncontiguous area of focus.
Physics • Physics B ..... 8 • Physics C Mechanics ..... 4 • Physics C Electricity and Magnetism ..... 4 (8-unit maximum for all three tests)	B exam = elective credit and exempt Phys. 10. C exam (Mech.) score of 3 or 4 = exempt Phys. 1A and may take Phys. 2A or 4A for credit. C exam (Mech.) score of 5 = exempt Phys. 2A, 4A. C exam (E&M) score of 3 or 4 = exempt Phys. 1B and may take Phys. 2B or 4B for credit. C exam (E&M) score of 5 = exempt Phys. 2B or 4C and may take Phys. 4B for credit.	Each 4 units on C exam (Mech. or E&M) can meet 1 course of the natural science requirement.
Psychology ..... 4	Score of 4 or 5 = exempt Psych. 1.	1 course toward social science requirement or 1 course of noncontiguous area of focus.
Statistics ..... 8	Score of 4 or 5 = exempt Sociology 60, or Psychology 60	8 units of elective credit.

The University of California grants credit for all College Board Advanced Placement Tests on which a student scores 3 or higher. The credit may be subject credit for use on a minor or prerequisites to a major, or credit toward general-education requirements or elective units toward graduation.

The number of units granted for AP tests are not counted toward the maximum number of credits required for formal declaration of an undergraduate major or the maximum number of units a student may accumulate prior to graduation. Students who enter the university with AP credit do not have to declare a major earlier than other students, nor are they required to graduate earlier.

# Application to College and Major Requirements

MUIR COLLEGE	THURGOOD MARSHALL COLLEGE	WARREN COLLEGE	ELEANOR ROOSEVELT COLLEGE
8 units of elective credit.	8 units of elective credit.	8 units of elective credit.	8 units of elective credit.
8 units of elective credit.	May apply 1 course toward fine arts requirement.	8 units of elective credit.	1 course toward fine arts requirement.
Score of 3 meets one course of natural science option; score of 4 or 5 meets two courses of natural science option.	1 course of natural science requirement. May also apply 1 course toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	Score of 3, 4, or 5 meets one course of natural science requirement.
Score of 4 or 5 meets two courses of natural science option.	May apply 1 course of natural science requirement and may apply 1 course toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	Meets 1-2 courses of natural science requirement.
2-4 units elective credit.	AB exam = 1 course toward mathematics/computer/statistics requirement.	May apply toward formal skills or program of concentration. See Warren adviser for details.	Score of 5 = 1 course toward math/computer science requirement.
Each score of 5 exempts 1 course on social science requirement.	May apply 1 course toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	4-8 units of elective credit.
8 units of elective credit.	8 units of elective credit.	8 units of elective credit.	8 units of elective credit.
8 units of elective credit.	8 units of elective credit.	8 units of elective credit.	8 units of elective credit.
Determines placement in language sequence if student chooses that option.	May apply 2 courses toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	Score of 3=8 units of elective credit Score of 4 or 5 exempts 1 course of lang. reqt. if continue study in the same lang.
Meets 1 to 2 courses of foreign language option.	May apply 1-2 courses toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	Score of 3 or 4=8 units of elective credit Score of 5 exempts 1 course of lang. reqt. if continue study of Latin.
Determines placement in language sequence if student chooses that option.	May apply 2 courses toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	Score of 3=8 units of elective credit Score of 3, 4 or 5 exempts 1 course of lang. reqt. if continue study in the same lang.
1 course toward social science requirement.	May apply 1 courses toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	4 units of elective credit.
1 course toward social science requirement.	May apply 1 courses toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	4 units of elective credit.
Meets 2 courses of history 2 sequence on humanities option.	May apply 2 courses toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	8 units of elective credit.
8 units elective credit only.	May apply 2 courses toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	1 course may apply toward regional specialization. See ERC academic counselor for details
AB exam meets 1 course of math option; BC exam completes 2 courses of math option.	If AB exam may apply 1 course toward math and statistical requirement. If BC exam may apply 2 courses toward math and statistical requirement.	AB exam meets 1 course of formal skill requirement; BC exam completes 2 courses formal skills requirement.	AB exam = 1 course toward math/computer science requirement. BC exam completes math/computer science requirement.
8 units elective credit only.	1 course toward fine arts requirement and 1 course toward the disciplinary breadth requirement if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	1 course toward fine arts requirement.
Each 4 units of C exam (Mech. or E&M) can meet 1 course of the natural science option.	B exam = 1 course of natural science requirement and 1 course toward disciplinary breadth if noncontiguous to major. 4 units of C exam = 1 course of nat. sci. requirement. 8 units of C exam = 1 course of natural science requirement and 1 course toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	B exam = 1 course for natural science; C exam (E&M) = 1 course for natural science; C exam (Mech.) = 1 course for natural science for a total of 2 courses maximum.
4 units elective credit only.	May apply as 1 course toward disciplinary breadth if noncontiguous to major.	May apply toward program of concentration requirements if noncontiguous to major. See Warren adviser for details.	4 units of elective credit.
8 units of elective credit.	8 units of elective credit.	8 units of elective credit.	8 units of elective credit.

A student cannot give credit for a UCSD course which duplicates AP credit. Where the chart says "exempt" or "equal to a UCSD course number," that course may not be taken for credit. Students who are fluent in a language other than English should not overlook the opportunity to get AP credit by taking the foreign/literature exams.

**Note:** Please see college academic adviser for clarification of any questions you may have.

major. Students are accepted on an individual basis, and there is no guarantee of admission to the college or to a particular major. Applicants seeking a second B.A. or B.S. degree will be given consideration on a space-available basis with a lower priority than all other admits. Applicants for a second B.A. or B.S. will have **limited status** until such time as they have met the prerequisites to the major, filed a program approved by the major department and had their proposed program reviewed and approved or disapproved by the college. Limited status students are not awarded on-campus housing.

Limited status students are eligible to apply for a Guaranteed Student Loan if they have not exceeded the duration limit of eighteen quarters of postsecondary attendance. Academic transcripts will be required from all institutions attended prior to student financial services certifying of the application.

### ***Determining Your Grade-Point Average***

Your grade-point average for admission purposes is determined by dividing the total number of acceptable units you have attempted into the number of grade points you earned on those units. You may repeat courses that you completed with a grade lower than C.

The scholarship standard is expressed by a system of grade points and grade-point averages earned in courses accepted by the university for advanced-standing credit. Grade points are assigned as follows: for each unit of A, four points; B, three points; C, two points; D, one point; and F, no points.

### ***Credit from Another College***

The university gives unit credit to transfer students for courses they have taken at other accredited colleges and universities, including some extension courses. To be accepted for credit, the courses must be consistent with those offered at the university, as determined by the Office of Admissions and Outreach. Applications from students who have more than 135 quarter-units (ninety semester-units) of transfer credit and meet selection criteria are considered to have excess units (senior standing). Applicants in this category may be reviewed for admission if space permits.

Many students who plan to earn a degree at the university find it to their advantage to complete their freshman and sophomore years at a California community college. Each community college offers a full program of courses approved for transfer credit. The university will award *graduation credit* for up to seventy semester- (105 quarter-) units of transferable course work from a community college. Courses in excess of seventy semester-units will receive *subject credit* and may be used to satisfy university subject requirements.

The transferability of units from California community colleges and all other postsecondary institutions proceeds as follows: (1) the UC Office of the President determines unit transfer policies which are binding upon and implemented by each campus' admissions office; (2) applicability of transferred units to breadth (general-education) requirements is determined for each UCSD college by its provost (see also "Transfer Agreements" below); (3) applicability of units toward the major is determined by the appropriate UCSD department. Before applying to UCSD you may obtain more information on many of these matters from the Office of Admissions and Outreach.

Applicants who have completed courses at a postsecondary institution outside the U.S. should have these records sent to the Office of Admissions and Outreach as soon as possible. Advanced standing credit for appropriate courses will be decided on an individual basis.

**Note:** The University of California does not give credit for CLEP examinations.

### **University of California/UCSD Transfer Agreements**

UCSD strongly recommends that transfer students complete lower-division breadth and general-education (B/GE) requirements prior to transfer.

The University of California has established three transfer agreements. These agreements, UC Transfer Reciprocity, Intersegmental General-Education Transfer Curriculum Agreement (described below), and Articulation, allow students to fulfill lower-division B/GE requirements prior to transfer.

Transfer students may elect to fulfill their lower-division B/GE requirements by any of these agreements or may elect to fulfill the B/GE re-

quirements at UCSD. Completion of IGETC or UC Transfer Reciprocity agreements will satisfy the lower-division requirements of Earl Warren, Thurgood Marshall, or John Muir College only. Students who follow IGETC or UC Transfer Reciprocity are welcome to apply to Eleanor Roosevelt or Revelle College; however, they must also complete the college's general-education requirements.

### ***Transfer Admission Guarantee (TAG)***

UCSD has established a Transfer Admission Guarantee (TAG) program with fourteen California community colleges. Completing the provisions of the TAG contract will guarantee admission to the term and UCSD college of choice. TAG also allows students to fulfill lower-division B/GE requirements prior to transfer. TAG community college counselors have information regarding this program.

### ***UC Transfer Reciprocity Agreement***

Transfers who have attended any campus of the University of California and satisfied lower-division breadth and general-education (B/GE) requirements at that campus prior to transfer may consider these requirements satisfied for John Muir, Thurgood Marshall, or Earl Warren colleges only.

Transfers in this category should obtain a "certificate of completion of GE requirements" from the campus at which these requirements were satisfied. This can be in the form of a letter or memo addressed to your UCSD college academic advising office.

### ***Intersegmental General-Education Transfer Curriculum Agreement***

Transfers from California community colleges can fulfill the UC lower-division breadth and general-education (B/GE) requirements by completing the Intersegmental General-Education Transfer Curriculum (IGETC). Completion of IGETC will satisfy the lower-division B/GE requirements at UCSD for Earl Warren, Thurgood Marshall, or John Muir College only. See "Summary Outline." Students who follow IGETC or UC Transfer Reciprocity are welcome to apply to Eleanor Roosevelt or Revelle College; however, they must also complete the college's general-education requirements.

**International Applicants**

Applicants who present evidence of above-average scholarship achievement will be considered for admission.

Courses at UCSD are conducted in English, and every student must have sufficient command of that language to benefit from instruction. To demonstrate such command, students whose native language is not English will be expected to take the Test of English as a Foreign Language (TOEFL). Arrangements for taking this test may be made by writing to the Educational Testing Service, TOEFL Registration Office, P.O. Box 6151, Princeton, New Jersey 08541-6151, U.S.A. The minimum TOEFL score acceptable is 550.

The results of this test will be used to determine whether the applicant's command of English is sufficient to enable him or her to pursue studies effectively at UCSD. Foreign students whose command of English is slightly deficient will be required to take an English course and, therefore, a reduced program.

In addition to an adequate English-language background, foreign students must have sufficient funds available to cover all fees; living, and other expenses; and transportation con-

nected with their stay in the United States (see "Fees and Expenses").

Foreign students are required to obtain health insurance for themselves and dependents who accompany them. Suitable insurance policies and additional information are available at the Student Health Service and at the International Center.

All communications concerning undergraduate admission of international students should be addressed to the Office of Admissions and Outreach, 9500 Gilman Drive, Dept. 0021, University of California, San Diego, La Jolla, California 92093-0021.

**How to Apply for Admission**

Undergraduate admissions application packets are available from California high school and community college counselors or from any UC campus admissions office. Complete the Undergraduate Application form in this packet. Follow the accompanying directions carefully and mail to:

University of California,  
Undergraduate Application Processing Center  
P.O. Box 23460  
Oakland, CA 94623-0460

A preaddressed envelope is provided with the application.

You may apply to as many as eight campuses of the University of California on one application form.

**Application Fees**

The basic application fee of \$40 entitles you to be considered at one campus of the university. For each additional campus you select, you must pay an extra \$40 fee. These fees are not refundable.

**When to Apply for Admission**

To make sure that you will be considered for admission to the university campus(es) you want to attend, and to the major or program of study you want to pursue, you must file your completed application during the applicable Priority Filing Period (see below).

If you plan to apply for financial aid, university housing, or other special programs where early application is important, you must also file during this time.

**INTERSEGMENTAL GENERAL-EDUCATION TRANSFER CURRICULUM (IGETC)**

**Summary Outline**

Completion of the Intersegmental General-Education Transfer Curriculum (IGETC) will permit a student to transfer from a community college to a campus in the University of California system without the need, after transfer, to take additional lower-division, general-education courses.

It should be noted that completion of the IGETC is not a requirement for transfer to UC, nor is it the only way to fulfill the lower-division, general-education requirements of UC prior to transfer. Depending on a student's major and field of interest, the student may find it advantageous to take courses fulfilling the general-education requirements of the UC campus or college to which the student plans to transfer. IGETC is applicable at Earl Warren, Thurgood Marshall, and John Muir Colleges only. Students who follow IGETC are welcome to apply to Eleanor Roosevelt or Revelle College; however, they must also complete the college's general-education requirements.

English Communication:	One course, English Composition, three semester- (four to five quarter-) units; this course is a prerequisite to Critical Thinking. One course, Critical Thinking-English Composition, three semester- (four to five quarter-) units; strong emphasis on writing; prerequisite: English Composition.
Mathematics:	One course, Mathematics/Quantitative Reasoning, three semester- (four to five quarter-) units.
Arts and Humanities:	Three courses, at least one course in arts, and at least one course in humanities, nine semester- (twelve to fifteen quarter-) units.
Social and Behavioral Sciences:	Three courses in at least two disciplines, social and behavioral sciences, nine semester- (twelve to fifteen quarter-) units.
Physical and Biological Sciences:	One course in each area, at least one must include a laboratory, two courses, seven to nine semester- (nine to twelve quarter-) units.
Language Other than English:	Proficiency equivalent to two years' high school study.

### Priority Filing Periods

#### All UC Campuses, except Berkeley

Fall Quarter 1998:

File November 1–30, 1997

Winter Quarter 1999:

File July 1–31, 1998

Spring Quarter 1999:

File October 1–31, 1998

#### UC Berkeley Only

Fall Semester 1998:

File November 1–30, 1997

Spring Semester 1999:

File July 1–31, 1998

**Note:** Each campus of the university makes individual determinations regarding the level of transfer students who may apply to that campus. Some campuses do not accept applications for winter and spring. Inquire at the campus Office of Admissions and Outreach. UCSD accepts winter and spring applications from Transfer Admission Guarantee (TAG) students only.

After the priority period has ended, campuses will accept applications only if they still have openings for new students. This means that some campuses may be able to accept additional applications, but others may not. If a campus is closed to new students, applicants will be informed that their applications will not be forwarded to that campus. In this case, a portion of the application fee may be refunded if appropriate.

### Adding a Campus

If, after submitting your application, you wish to add a campus or campuses to the one(s) you first listed on your application, you may do so if the campus or campuses you are considering are still accepting applications. Please contact the admissions office on each of these campuses for information on which programs are still open and the procedures for adding campuses.

### Selecting Campuses and Programs of Study

You are encouraged to approach the selection of a university campus or campuses and a program of study very carefully. You may be familiar with only one or two of the university's

eight general campuses, probably those nearest to your home or mentioned more frequently in the news. You should seriously consider the many different educational alternatives and programs offered by other campuses of the university before completing your application. Your counselor and the university staff in the Office of Admissions and Outreach can provide you with insights that will help you in the selection process.

### College Choice

The application to San Diego must include a choice of college (Eleanor Roosevelt, Thurgood Marshall, Earl Warren, Revelle, or John Muir) before it can be processed. Selecting alternative college choices is also advisable since each college has enrollment quotas that limit the number of new freshmen and new transfer students. The Office of Admissions and Outreach will select an alternate college if an alternate choice is not indicated.

### Transcripts

Every applicant is responsible for requesting that the high school of graduation and each college he or she has attended send official transcripts promptly to the Office of Admissions and Outreach.

If you are still attending high school, please DO NOT send a sixth- or seventh-semester transcript; we will make a decision based on the self-reported academic data you have provided in the application. If admitted, you must arrange to send a final official transcript immediately upon completion that includes final grades and date of graduation, or, if you have passed the High School Proficiency Examination, a verification of your Certificate of Proficiency. If you have completed any college courses while in high school, you must immediately arrange to send an official transcript of course(s).

Prior to admission decisions for transfer students, the Office of Admissions and Outreach will request that you have official transcripts sent from your high school of graduation, and from each college you have attended, including an up-to-date transcript from your present college listing your work in progress.

The transcripts and other documents that you submit as part of your application become the property of the university; they cannot be

returned to you or forwarded in any form to another college or university.

### Checklist for Applicants

1. Fill out the application form completely. You must select UCSD colleges in order of preference. Be sure to sign the form.
2. Complete your personal statement and include with the application.
3. Fill in the self-reported academic data and test information carefully and accurately, as instructed in the undergraduate application packet.
4. Mail fall application or file an application on the University of California's Pathways web site ([www.ucop.edu/pathways](http://www.ucop.edu/pathways)) during the November filing period with fee (check or money order payable to The Regents of the University of California) to:  
University of California  
Undergraduate Application Processing Service  
P.O. Box 23460  
Oakland, CA 94623-0460
5. Take the SAT I or ACT test and SAT II: Subject Tests if you are a freshman applicant **no later than December of your senior year.**
6. Request that your school(s) send transcripts and other required documents directly to the UCSD Office of Admissions and Outreach. Final high school transcripts must be on file in the UCSD Office of Admissions and Outreach by July 15.

### Notification of Admission

#### Admission—Freshmen

If you are a fall-term freshman applicant and you filed during the priority filing period, UCSD will notify you whether you have been admitted beginning March 1 and no later than March 31. All offers of admission are provisional until the receipt and verification of your test results and official final high school transcript (and college transcript, if applicable). If you are offered admission based on your self-reported academic record, official documents will be used to verify the self-reported academic data you submit. Offers of admission will be re-



scinded if: a) there are discrepancies between your official transcripts and your self-reported academic record; b) you do not complete the courses listed as "in progress" or "planned"; or c) you do not complete your twelfth-grade courses at the same academic level you achieved in previous course work.

### Admission-Transfer

If you are applying to transfer, the campuses may notify you anytime between April 1 and May 1. All offers of admission are provisional until the receipt and verification of all official transcripts. If you are offered admission based on your self-reported academic record, your official high school transcript and transcripts from all colleges attended will be used to verify the self-reported academic data you submit. Offers of admission may be rescinded if: a) there are discrepancies between your official transcript and your self-reported academic record; b) any college or school attended is omitted from your application; c) you do not complete the courses listed as "in progress" or "planned;" or d) the specified GPA is not maintained in courses "in progress" or "planned."

**These notification dates apply only to applicants who file within the priority periods.** Applicants for winter and spring quar-

ters are notified as soon as possible following receipt of all appropriate documents.

After receipt of notification of admission:

1. Read the documents in your admission packet carefully, noting any special provision governing your admission.
2. Request that any outstanding transcripts be forwarded to the Office of Admissions and Outreach to ensure full matriculation.
3. Complete and return to the Office of Admissions and Outreach the Statement of Intention to Register (SIR) and the Statement of Legal Residence (SLR). Please note the deadline to return your Statement of Intention to Register. If your SIR is post-marked after this date, you may be denied enrollment due to space limitations. For fall quarter admits, the deadline for return of your SIR and SLR is May 1 for freshmen and June 1 for transfers.

### Statement of Intention to Register (SIR)

Upon receipt of your Statement of Intention to Register (SIR), the Office of Admissions and Outreach provides information to various campus offices including financial aid, housing, and your college provost. You will then receive additional information from each of these offices.

The \$100 nonrefundable fee accompanying your SIR is applied toward payment of the university registration fee for the quarter of your admission. International applicants outside the territorial United States are not required to submit the \$100 deposit with the Statement of Intention to Register.

Even though you may be admitted to more than one campus of the University of California, you can return an Intention to Register to only one campus.

### College Orientation and Registration of New Students

Prior to the quarter for which they have been admitted, new students will receive information from their colleges regarding orientation and enrollment in classes. Students admitted for the fall quarter will be invited to attend a new-student orientation on the campus during the preceding summer. Academic advising and enrollment in courses will take place during orientation sessions.

### Student Health Requirement

Entering students are required to complete a Medical History form and to send it to the Student Health Center. Forms and complete instructions are usually sent to entering students

## ESTIMATED EXPENSES FOR ON-CAMPUS UNDERGRADUATE RESIDENTS OF CALIFORNIA

Non-California residents should estimate approximately \$3,128 additional tuition fees each quarter.

	FALL QUARTER	WINTER QUARTER	SPRING QUARTER	TOTAL
University Registration Fee	\$238	\$238	\$237	\$713
Educational Fee	966	965	965	2,896
Campus Activity Fee	13.50	13.50	13.50	40.50
University Center Fee	37.50	37.50	37.50	112.50
Recreation Facility Fee	82	82	82	246
Board and Room in Residence Halls (Avg.)	2,278	2,279	2,279	6,836
Transportation (Approx.)	164	164	163	491
Books, Supplies (Approx.)	287	287	287	861
Personal Expenses (Approx.)	385	384	384	1,153
<b>Total</b>	<b>\$4,451.00</b>	<b>\$4,450.00</b>	<b>\$4,448.00</b>	<b>\$13,349.00*</b>

NOTE: Fees are subject to change by the Board of Regents.

\* Total does not include orientation fee for new students (\$105 freshmen; \$40 transfer students).

well in advance of registration, or they may be obtained at the Student Health Center. Information submitted to the Student Health Service is kept confidential and is carefully reviewed to help provide individualized health care. Students are urged also to submit a physical examination form completed by their family physician, particularly if they plan to take part in intercollegiate athletic competition. Routine physical examinations are not provided by the Student Health Service. An optional student health plan that provides additional benefits off campus may be purchased at the time registration fees are paid. Student health insurance is mandatory for all foreign and graduate level students and is a condition of enrollment.

### ***Reapplication***

An application for admission is effective only for the quarter for which it is submitted. If you are ineligible for admission, or if you are admitted and do not register, you must file a new application to be considered for a later quarter. The selection criteria in effect for the new term must be met.

If you have been admitted to the university, enrolled, and paid registration fees, but did not attend, contact the Office of the Registrar for readmission information.

### **Fees and Expenses**

The exact cost of attending the University of California, San Diego will vary according to personal tastes and financial resources of the individual. Generally, the total expense for three quarters, or a college year, is estimated at \$13,500 for California residents living away from home.

It is possible to live simply and to participate moderately in the life of the student community on a limited budget. The best that the university can do to assist the student in planning a budget is to indicate certain and probable expenses. For information regarding student employment, loans, scholarships, and other forms of financial aid at UCSD, see "Campus Services and Facilities" in this catalog.



# Undergraduate Registration

## Enrollment in Courses

Prior to the quarter for which they have been admitted, new students will receive information from their college regarding orientation dates, course enrollment, and fee-payment deadlines. Enrollment materials will be provided at the college provosts' offices on the days assigned for new students' registration. New freshman students admitted for the fall quarter will be invited to attend a new student orientation during the summer preceding fall quarter. Enrollment in courses will take place at that time.

## New Student Orientation

Orientation programs are designed to acquaint students with the nature, functions and purposes of UCSD's college system, and to show students how to deal with a variety of requirements set by the university, college, and academic departments. Although all five colleges have the same goals for students, each has developed its own distinctive program. The professional staffs of Revelle, Muir, Marshall, Warren, and Roosevelt Colleges have designed their programs for their respective students and the students' parents. During the school year, these same staff members are occupied in counseling continuing students, so they have planned these orientation sessions for the summer, when they can devote 100 percent of their time to becoming acquainted with new students and introducing them to a whole new way of doing things.

Not only will new students be made aware of the opportunities offered by their college and the UCSD community as a whole, they will also receive a great deal of guidance in selecting courses and will register in advance for their first fall quarter classes.

To prepare for the orientation session, students should spend a little time thinking about what they want from their education. If the decision of which major to pursue has not been made, students can benefit by narrowing their choices, eliminating subjects they know they don't want, and selecting areas of pos-

sible interest. Students will have a lot of help in making such choices, but anything they can do in advance will make the process easier.

All new students are required to attend an orientation/registration session, and they will be charged a fee for the program. Parents' attendance is, of course, optional, but we hope they will want to come. Parents' concerns about life at UCSD are not exactly the same as students', so they will be invited to separate meetings.

In addition to the Summer Orientation, students should attend Welcome Week—the week before the official opening of the fall quarter and the beginning of classes.

## Continuing Student Enrollment

Continuing students (those currently registered or eligible to register) should refer to the quarterly *Schedule of Classes* for enrollment information, dates, and fee-payment instructions. The *Schedule of Classes* is published prior to each quarter and may be purchased at the UCSD Bookstore.

## Definitions

Students are considered *enrolled* when they have requested space in at least one course and space in classes has been reserved. Students are not considered *registered* until they have both enrolled in courses and paid registration fees.

Priority enrollment is processed using TeSS, the Telephone Student Services system, or WebReg in StudentLink on the web. Continuing undergraduate students are assigned a start time, after which they may enroll in classes. Start times are based on the number of units completed. Students who have completed more units will receive earlier start times than students with fewer units.

Students are responsible for all courses in which they are enrolled. Students should call TeSS to confirm class enrollments. Alternately, students may go to the Registrar's Office and obtain a printout of their class schedule. Students must make any necessary changes by the Add/Change/Drop process (through TeSS or in person) or by appropriate withdrawal.

## Adding, Changing, and Dropping Courses

After telephone priority and open enrollment periods, students may make any necessary corrections to their class schedules by telephone or by submitting an Add/Change/Drop Card. Students may add courses through the second week of instruction, or through the fourth week of instruction with department approval. Please refer to the quarterly *Schedule of Classes* for appropriate approvals required.

Students may continue to change grading options to the end of the fourth week and to drop courses to the end of the ninth week of instruction. Students who wish to drop *all* their courses are required to file an Undergraduate Withdrawal form with their college academic advising or dean's office. Please see the W (Withdrawal) grade regulation that applies after the fourth week of instruction.

### Weeks

- 1-2: ADD/DROP/CHANGE Grade Option
- 2-4: DROP/CHANGE Grade Option
- 5-9: DROP ONLY—"W" recorded on transcript
- 10 and later: No changes; final grade assigned

## The Undergraduate Program

The undergraduate program consists of four four-unit courses each quarter, or sixteen units per quarter, for four years. Students must complete a minimum of thirty-six units in three consecutive quarters in order to satisfy the minimum progress requirements (see "Minimum Progress" in the "Academic Regulations" section). Undergraduate students wishing to take more than twenty-one and one-half units of credit in a quarter will need their college provost's approval.

## Approval for Enrollment for More than 200 Units

The minimum unit requirement for the bachelor's degree is 184 quarter-units in Revelle

College and 180 quarter-units in Muir, Marshall, Warren, and Roosevelt Colleges. A student is expected to complete the requirements for graduation within this minimum unit requirement. The bachelor of science degree may require satisfaction of additional units, depending upon the student's major. Candidates for B.S. degrees in engineering are permitted 230 units (240 for engineering majors in Revelle and Roosevelt colleges).

Under special circumstances, students may extend their undergraduate training beyond the minimum. Non-engineering students, who are attempting to achieve more than 200 quarter-units will not be permitted to register without their college provost's approval. Other exceptions will be granted only for compelling academic reasons and only with the approval of the college provost and the concurrence of the Committee on Educational Policy. Transfer units applicable toward general-education requirements or major requirements are included in the maximum unit calculation; all other transfer units are excluded. Advanced placement and international baccalaureate units are excluded. (See information regarding "Minimum Unit Limitation" in the "Academic Regulations" section of this catalog.)

### ***Concurrent Enrollment***

Concurrent enrollment in regular sessions at another institution or in UCSD Extension while enrolled on the San Diego campus is permitted only when approved in advance by the provost of the student's college.

### ***Enrollment and Registration Holds***

A student may have a "hold" placed on his or her enrollment or registration (payment of fees) and/or academic transcripts for the following reasons:

1. Failure to respond to official notices.
2. Failure to settle financial obligations when due or to make satisfactory arrangements with the Bursar's Office.
3. Failure to present certification of degrees and/or status on leaving previous institutions.
4. Failure to comply with admission conditions.

Each student who becomes subject to a hold action is given advance notice and ample time to deal with the situation. However, if the stu-

dent fails to respond, action will be taken without further notice, and he or she is entitled to no further services of the university, except assistance toward reinstatement.

Undergraduate students wishing to have their status restored must secure a release from the office initiating the hold action. Reinstatement is not final until the registration process is completed.

### ***Change of Address***

Students who change their local or permanent addresses are expected to notify the registrar either in writing or via StudentLink at once. Change-of-address cards are available at the Office of the Registrar, 301 University Center, and StudentLink is available through the campus web site: InfoPath, at [www.ucsd.edu](http://www.ucsd.edu). Students will be held responsible for communications from any university office sent to the last address on record and should not claim indulgence on the plea of not receiving the communication.

### ***California Residence for Tuition Purposes***

#### **TUITION FEE FOR NONRESIDENT STUDENTS**

If you have not been living in California with intent to make it your permanent home for more than one year immediately before the residence determination date for each term in which you propose to attend the university, you must pay a nonresident tuition fee in addition to all other fees. The residence determination date is the day instruction begins at the last of the University of California campuses to open for the quarter—and for schools on the semester system, the day instruction begins for the semester.

#### **LAW GOVERNING RESIDENCE**

The rules regarding residence for tuition purposes at the University of California are governed by the California Education Code and implemented by Standing Orders of the Regents of the University of California. Under these rules, adult citizens and certain classes of aliens can establish residence for tuition purposes. There are particular rules that apply to the residence classification of minors. (See below.)

#### **WHO IS A RESIDENT?**

If you are an adult student (at least eighteen years of age) you may establish residence for tuition purposes in California if: (1) you are a U.S. citizen; (2) you are a permanent resident or other immigrant; or (3) you are a nonimmigrant who is not precluded from establishing a domicile in the United States. Nonimmigrants who are not precluded from establishing domicile in the United States include those who hold valid visas of the following types: A, E, G, H-1, H-4, I, K, L, O-1, O-3, or R. To establish residence you must be physically present in California for more than one year and you must have come here with the intent to make California your home as opposed to coming to this state to go to school. Physical presence within the state solely for educational purposes does not constitute the establishment of California residence, regardless of the length of your stay. You must demonstrate your intention to make California your home by severing your residential ties with your former state of residence and establishing those ties with California. If these steps are delayed, the one-year durational period will be extended until you have demonstrated both presence and intent for one full year. Effective fall 1993, if your parents are not residents of California or you were not previously enrolled as a UC student, you will be required to be financially independent in order to be a resident for tuition purposes. Your residence cannot be derived from your spouse or your parents.

#### **REQUIREMENTS FOR FINANCIAL INDEPENDENCE**

You will be considered "financially independent" if one or more of the following applies: (1) you are at least twenty-four years of age by December 31 of the calendar year for which you are requesting residence classification; (2) you are a veteran of the U.S. Armed Forces; (3) you are a ward of the court or both parents are deceased; (4) you have legal dependents other than a spouse; (5) you are married, or a graduate student or a professional student, and you were not claimed as an income tax deduction by your parents or any other individual for the tax year immediately preceding the term for which you are requesting resident classification; or (6) you are a single undergraduate student

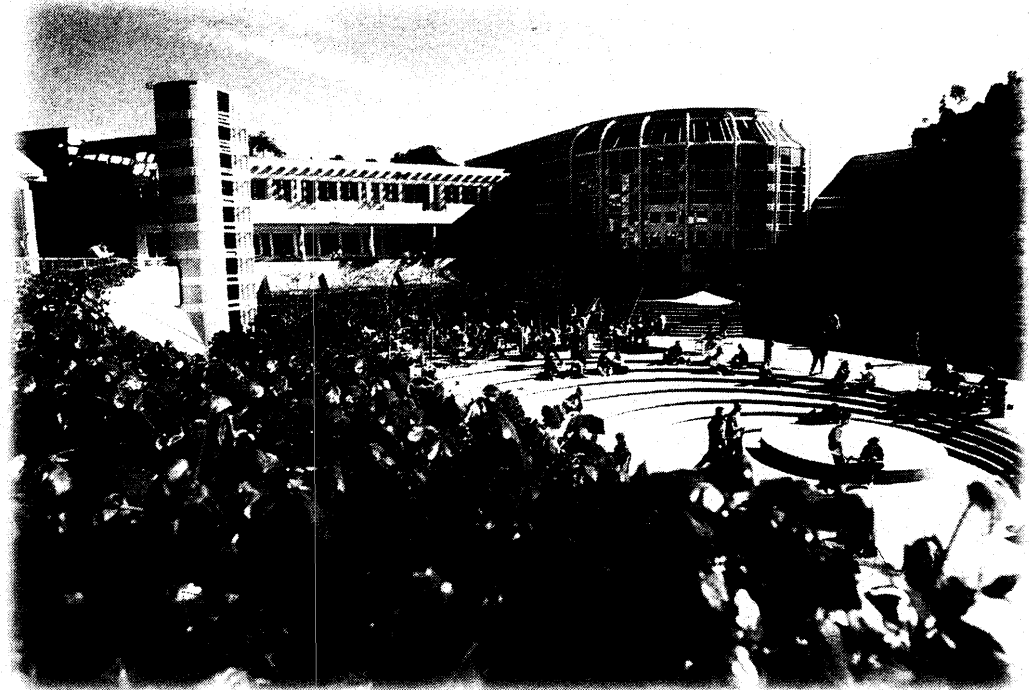
and you were not claimed as an income tax deduction by your parents or any other individual for the two tax years immediately preceding the term for which you are requesting resident classification, and you can demonstrate self-sufficiency for those years and the current year. (Note: Financial dependence will not be a factor in residence status for graduate student instructors, graduate student teaching assistants, research assistants, junior specialists, postgraduate researchers, graduate student researchers, and teaching associates who are employed 49 percent or more of full time or awarded the equivalent in University-administered funds, e.g., grants, stipends, or fellowships at the University of California in the term for which classification is sought.)

### **ESTABLISHING INTENT TO BECOME A CALIFORNIA RESIDENT**

Indications of your intent to make California your permanent residence can include the following: registering to vote and voting in California elections; designating California as your permanent address on all school and employment records, including military records if you are in the military service; obtaining a California driver's license or, if you do not drive, a California Identification Card; obtaining California vehicle registration; paying California income taxes as a resident, including taxes on income earned outside California from the date you establish residence; establishing a California residence in which you keep your personal belongings; and licensing for professional practice in California. The absence of these indicia in other states during any period for which you claim residence can also serve as an indication of your intent. Your intent will be questioned if you return to your former state of residence when the university is not in session. Documentary evidence is required, and all relevant indications will be considered in determining your classification.

### **GENERAL RULES APPLYING TO MINORS**

If you are an unmarried minor (under age 18), the residence of the parent with whom you live is considered to be your residence. If you have a parent living, you cannot change your residence by your own act, by the appointment of a legal guardian, or by the relin-



quishment of your parent's right of control. If you lived with neither parent, your residence is that of the parent with whom you last lived. Unless you are a minor alien present in the U.S. under the terms of a nonimmigrant visa that precludes you from establishing domicile in the U.S., you may establish your own residence when both your parents are deceased and a legal guardian has not been appointed. If you derive California residence from a parent, that parent must satisfy the one-year durational residence requirement.

### **SPECIFIC RULES APPLYING TO MINORS**

#### **Divorced/Separated Parents**

You may be able to derive California resident status from a California resident parent if you move to California to live with that parent on or before your eighteenth birthday. If you begin residing with your California parent after your eighteenth birthday, you will be treated like any other adult student coming to California to establish residence.

#### **Parent of Minor Moves from California**

You may be entitled to resident status and not be required to establish financial independence if you are a minor U.S. citizen or eligible

alien whose parent(s) was a resident of California who left the state within one year of the residence determination date if:

1. you remained in California after your parent(s) departed;
2. you enroll in a California public post-secondary institution within one year of your parent(s)' departure; and
3. once enrolled, you maintain continuous attendance in that institution.

#### **Two-Year Care and Control**

You may be entitled to resident status if you are a U.S. citizen or eligible alien and you have lived continuously with an adult who is not your parent for at least two years prior to the residence determination date. The adult with whom you are living must have been responsible for your care and control for the entire two-year period and must have been residing in California during the one year immediately preceding the residence determination date.

### **EXEMPTIONS FROM NONRESIDENT TUITION**

#### **Member of the Military**

If you are a member of the U.S. military stationed in California on active duty, unless you are assigned for educational purposes to a state-supported institution of higher education,

you may be exempt from the nonresident tuition fee until you have lived in California long enough to become a resident. You must provide the residence deputy on campus with a statement from your commanding officer or personnel officer stating that your assignment to active duty in California is not for educational purposes. The letter must include the dates of your assignment to the state.

### **Spouse or Other Dependents of Military Personnel**

You are exempt from payment of the nonresident tuition fee if you are a spouse or a natural or adopted child or stepchild who is a dependent of a member of the U.S. military stationed in California on active duty. The exemption is available until you have lived in California long enough to become a resident. You must petition for a waiver of the nonresident tuition fee each term you are eligible. If you are enrolled in an educational institution and the member of the military is transferred on military orders to a place outside California where he or she continues to serve in the armed forces, or

the member of the military retires from active duty immediately after having served in California on active duty, you may retain this exemption under the conditions listed above.

### **Child or Spouse of Faculty Member**

To the extent funds are available, if you are an unmarried dependent child under age twenty-one or the spouse of a member of the university faculty who is member of the Academic Senate, you may be eligible for a waiver of the nonresident tuition fee. Confirmation of the faculty member's membership on the Academic Senate must be secured each term this waiver is granted.

### **Child or Spouse of University Employee**

You may be entitled to resident classification if you are an unmarried dependent child or the spouse of a full-time university employee whose assignment is outside of California (e.g., Los Alamos Scientific Laboratory). Your parent's or spouse's employment status with the university must be ascertained each term.

### **Child of Deceased Public Law Enforcement or Fire Suppression Employee**

You may be entitled to a waiver of the nonresident tuition fee if you are the child of a deceased public law enforcement or fire suppression employee who was a California resident at the time of his or her death and who was killed in the course of fire suppression or law enforcement duties.

### **Dependent Child of a California Resident**

A student who has not been an adult resident of California for more than one year, and who is the dependent child of a California resident who has been a resident for more than one year immediately prior to the residence determination date, may be entitled to a waiver of the nonresident tuition until the student has resided in California for the minimum time necessary to become a resident so long as continuous attendance is maintained at an institution.

### **MAINTAINING RESIDENCE DURING A TEMPORARY ABSENCE**

If you are a nonresident student who is in the process of establishing a residence for tuition purposes and you return to your former home during noninstructional periods, your presence in the state will be presumed to be solely for educational purposes and only convincing evidence to the contrary will rebut this presumption. A student **who is in the state solely for educational purposes will NOT be classified as a resident for tuition purposes regardless of the length of his or her stay.**

If you are a student who has been classified as a resident for tuition purposes and you leave the state temporarily, your absence could result in the loss of your California residence. The burden will be on you (or your parents if you are a minor) to verify that you did nothing inconsistent with your claim of continuing California residence during your absence. Steps that you (or your parents) should take to retain a California residence include:

1. Continue to use a California permanent address on all records—educational, employment, military, etc.





2. Satisfy California resident income tax obligations. (Note: If you are claiming California residence, you are liable for payment of income taxes on your total income from the date you establish California residence. This includes income earned in another state or country.)
3. Retain your California voter's registration and vote by absentee ballot.
4. Maintain a California's driver's license and vehicle registration. If it is necessary to change your driver's license and/or vehicle registration while you are temporarily residing in another state, you must change them back to California within the time prescribed by law.

### PETITION FOR RESIDENT CLASSIFICATION

You must submit petition and documentation by mail or drop off at the Registrar's Office for a change of classification from nonresident to resident status. All changes of status must be initiated prior to the first day of class for the term for which you intend to be classified as a resident.

### TIME LIMITATION ON PROVIDING DOCUMENTATION

If additional documentation is required for residence classification but is not readily accessible, you will be allowed until the end of the applicable term to provide it.

### INCORRECT CLASSIFICATION

If you were incorrectly classified as a resident, you are subject to a nonresident classification and to payment of all nonresident tuition fees not paid. If you concealed information or furnished false information and were classified incorrectly as a result, you are also subject to university discipline. Resident students who become nonresidents should immediately notify the campus residence deputy.

### INQUIRIES AND APPEALS

Inquiries regarding residence requirements, determinations, and/or recognized exceptions should be directed to the Residence Deputy, Office of the Registrar, 9500 Gilman Drive, La Jolla, CA 92093-0021, or the Legal Analyst-Residence Matters, Office of the General Counsel, University of California, 300 Lakeside Drive,



7th floor, Oakland, CA 94612-3565. **No other university personnel are authorized to supply information relative to residence requirements for tuition purposes.**

You are cautioned that this summary is **not** a complete explanation of the law regarding residence. Please note that changes may be made in the residence requirements between the publication of this statement and the relevant residence determination date. Any student, following a final decision on residence classification by the residence deputy, may appeal in writing to the legal analyst within forty-five days of notification of the residence deputy's final decision.

### *Payment of Registration Fees*

### BILLING STATEMENT AND PAYMENT INFORMATION

Registration at UCSD is a two-step process: (1) enrollment in classes and (2) payment of fees. You must enroll first so that your fees can be assessed. You can pay fees anytime after you enroll in classes. A billing statement will be sent to you after enrollment; however, if you wait to enroll just prior to the enrollment deadline, you don't need a billing statement to pay your fees. Write your Social Security number on your check and mail it or drop it in the Central Cashier's drop box. Fees are due and payable by the published deadline whether or not a billing

statement is received.

Your monthly billing statement from the university will list your credits, including your payments, and your charges. This includes registration fees, housing, parking, and other indebtedness. If you are a financial aid recipient, the funds which are disbursed through UCSD, e.g., Pell Grants and Perkins Loans, will be offset against the statement's charges, and you will either pay the remaining amount on the statement or receive a remainder check if there is a credit. If you have any questions about the entries, use the phone numbers listed on the back of the statement to contact the appropriate office.

Billing statements are mailed to students' current or permanent mailing address.

To make a payment, all that is necessary is to mail the top of your statement to the Central Cashier's Office at the address provided on the statement stub (9500 Gilman Drive, La Jolla, CA 92093-0009).

**If your fees are fully paid by financial aid or other programs and you decide not to attend UCSD, it is very important that you contact your college and initiate withdrawal/leave of absence procedures immediately. Graduate students should refer to the "Graduate Studies" section of the catalog for leave of absence or withdrawal procedures. Failure to do this may result in F grades being assigned to your courses.**

### **Financial Aid/Remainder Check Disbursement**

Student financial aid, graduate support, or fee waivers awarded to pay registration fees will be directly credited to your account and appear on your statement as a credit. Financial aid will not be credited to your account until you have completed the enrollment process. Financial aid recipients are expected to be enrolled full-time. The Bursar's Office disburses all financial aid checks to students. These include remainder checks and other forms of financial aid such as outside scholarships and Stafford Loans. **All Perkins and university loan borrowers must sign their promissory notes each quarter in the Bursar's Office.** Loan funds will not be released (credited) to student accounts until the promissory notes are signed. The number of class units you are taking will be verified by the Bursar's Office staff at the time of disbursement. Additionally, prior to your check being issued it is necessary for you to sign the required legal paperwork and allow at least five working days for the check to be prepared.

### **Loan Counseling**

It is required by law and/or university policy that all students receiving Perkins, Stafford (subsidized/unsubsidized), or university loans have a pre-loan counseling session wherein they are informed of the rights, obligations, and consequences attached to the loans. These counseling sessions are called entrance interviews. At these sessions, the students sign documents acknowledging their attendance and understanding of the issues involved. It is also required that all graduating students who have received a loan have final counseling before they leave school. These sessions are called exit interviews. At this time, students are individually told how much they owe on student loans, what their repayment amounts will be, and when their repayments will begin. In both sessions, students are provided with copies of all counseling content and documentation. **You may call for an entrance interview appointment at (619) 534-2950.**

### **Registration and Other Payments through the Central Cashier's Office**

**Registration payments must be made by mail or in the Cashier's Office drop box as**

**early as possible.** The Central Cashier's Office receives payments for all university debts. It also cashes checks. The mailing address of the Cashier's Office is: Central Cashier's Office, UCSD, 9500 Gilman Drive, La Jolla, CA 92093-0009. (Make checks or money orders payable to UC Regents.)

### **Registration Stickers**

After fees have been paid, students are eligible to pick up their student registration stickers at the Central Cashier's Office or the Bursar's Office. This sticker affixes to the back of your I.D. and certifies you are a UCSD student. The quarterly validation sticker is affixed by the Cashier's Office upon payment of fees, if fees are paid in person. After you pay by mail or drop box, wait about five working days in order for your payment to be processed.

### **INDEBTEDNESS COUNSELING AND BURSAR HOLD RELEASES**

Entering college for the first time can be an overwhelming experience. And part of that experience is learning to handle your own finances. Most students have no real problem, but sometimes things can get out of control. Student Financial Services stands ready to help you with financial assistance. The Billing Services Unit of the Bursar's Office will counsel you on campus indebtedness which you have already incurred and how to prevent such conditions in the future. It is a University of California regental policy that no student can continue in the next academic quarter if that individual owes the university money. Consequently, when a student owes the university money, an automatic **hold** prevents him or her from future registration until the bill is paid. It is recognized that there are occasional problems and situations which may be taken into account. Therefore, on occasion, after counseling, the Bursar's Office may authorize a Time Payment Agreement (TPA) with a student.

### **TRITON REGISTRATION INSTALLMENT PLAN**

The UCSD Triton Registration Installment Plan (TRIP) is available for students who desire an alternative method of financing their registration fees on a short-term basis. All students in good financial and academic standing are eligible for the program, except for those students

whose financial aid or graduate support will pay their registration fees. A prerequisite to applying for the program is enrollment for the term. The Triton Registration Installment Plan allows registration fees to be paid in up to three installments each quarter. On a three-month plan, the first payment is required by the quarterly registration due date. The remaining payments are itemized on the student's next two monthly UCSD Billing Statements. There is a \$30 nonrefundable fee that must be submitted with the application to the Bursar's Office. This fee is strictly used to offset the costs of the program. Applications may be picked up at the Bursar's Office.

### **LOCATION**

The Bursar's Office is located in Building 201 in the University Center, across the street from the Office of Admissions and Registrar. The Central Cashier's Office is at the intersection of Myers and Rupertus Drives in Building 401 University Center.

### **OFFICE HOURS**

The Central Cashier's Office is open from 8:30 a.m. until 3:00 p.m.

All other bursar units are open from 9:00 a.m. until 4:00 p.m.

### **DEADLINES AND PENALTY FINES**

Students should refer to the cover of the quarterly *Schedule of Classes* for actual deadline dates.

All prior delinquent debts must also be paid. An optional student health insurance plan is available to undergraduate students and can be purchased at the time registration fees are due. (Health insurance is mandatory for all graduate students and all foreign students.) An additional charge will be made for failure to pay required fees or deposits by the dates announced in this catalog and in the quarterly *Schedule of Classes*. Please note that students who enroll in courses but fail to pay fees by the published deadline will be assessed a late payment penalty fine. Students who fail to enroll in courses prior to the enrollment deadline will be assessed a late enrollment penalty fine. Students who fail to enroll and pay fees on time will be assessed both fines. Currently these fines are \$50 each. (See "Miscellaneous Expenses" on the next page.)

With the exception of appeals to the legal analyst regarding a student's residence classification, no claim for remission of fees will be considered unless such claim is presented during the fiscal year to which the claim is applicable. Students who wish to appeal a final decision on residence classification by their campus must do so in writing within forty-five calendar days of notification of the campus's final decision. Such appeals should be addressed to the Legal Analyst-Residence, Office of the General Counsel, University of California, 300 Lakeside Drive, 7th floor, Oakland, CA 94612-3565.

Receipts are issued for all payments, and these should be carefully preserved. No student will be entitled to a refund except after surrender to the Cashier's Office of the student's original receipt, if issued, or cancelled check or money order receipt.

#### **EXEMPTION FROM FEES**

Except for miscellaneous fees and service charges, no fees of any kind are assessed any surviving child of a California resident who was an active law enforcement or active fire suppression official and who was killed in the performance of active duties or died as a result of an accident or injury caused by external violence or physical force incurred in the performance of such duties.

Students who believe themselves entitled to one of these exemptions must apply for a fee exemption at the Office of the Registrar before registering. Without this authorization, students will not be permitted to register without payment of the entire fee. Graduate students should apply to the dean of Graduate Studies.

#### **NONRESIDENT TUITION**

Students who have not established and maintained California residence for at least one year immediately prior to the residence determination date for the term during which they propose to attend the university, and who do not otherwise qualify for resident classification under California law, are charged, along with other fees, a nonresident tuition fee each quarter. The residence determination date is the day instruction begins at the last of the University of California campuses to open for the quarter. Final classifications are made by the residence deputy, who is located in the registrar's office,

on the basis of a Statement of Legal Residence completed by the student and signed under oath. Prospective students who have questions regarding their residence status should consult the *General Catalog* or contact the residence deputy.

#### **UNIVERSITY REGISTRATION FEE**

The university registration fee is \$713 per year for undergraduates and must be paid at

the time of registration. It covers services that benefit the student and are complementary to, but not a part of, the instructional program, and it includes recreational activities, student organizations, and the Student Health Service. No part of this fee is refunded to students who do not make use of these privileges. Exemption from this fee may be granted for surviving children of certain deceased California fire fighters



or law enforcement officers. Students should check with the Student Financial Services Office for full ruling.

In addition, there is a campus activity fee of \$40.50 per year for undergraduates, a university center fee of \$112.50 per year for all students to be used for the construction and operation of the student centers, a \$246 per year recreational facility fee, and college activity fees of \$6 and \$9 per year for Muir and Revelle Colleges, respectively.

### EDUCATIONAL FEE

The educational fee was established by the regents for all students beginning fall quarter 1970. The educational fee is a charge assessed against each registered student to cover part of the cost of the student's education at the University of California. The educational fee is approximately \$2,896 per year. The educational fee may be reduced by one-half for students approved on part-time status.

### MISCELLANEOUS EXPENSES, FEES, FINES, AND PENALTIES

Books and supplies average about \$200 per quarter. However, students should be aware of the following possible expenses:

Statement of Intent to Register fee (new under-graduate)	\$100
Application fee (one campus)	40
Each additional campus	40
Duplicate Photo I.D. Card	10
Transcript of record	5
Verification of Student Data/Status	4
Late filing of announcement of candidacy for B.A.	3
Revelle Activity	3
Muir Activity	2
Late enrollment	50
Return check collection	10
Late payment of fees (late registration)	50
Duplicate diploma	22
(See also "Withdrawal from the University.")	

### RETURNED CHECK POLICY

Several facilities at UCSD accept personal checks for payments and/or cash. Any individual who writes checks with insufficient funds will be subject to all legal action deemed appropriate by the university. In addition, anyone who

writes to the university three or more checks that are subsequently returned will have their check writing privileges permanently revoked.

### PARKING

Students who park motor vehicles on the campus are subject to parking fees. Parking permits are sold at the Cashier's Office. A copy of the campus parking regulations may be obtained from the cashier at the time of permit purchase.

### *Part-Time Study at the University of California*

#### GENERAL POLICY

1. Degree programs in the university may be open to part-time students wherever good educational reasons exist for so doing.
2. No majors or other degree programs will be offered only for part-time students, except as specifically authorized by the Academic Senate.
3. For the purposes of this statement of policy and procedures, the following definition applies:  
A part-time undergraduate student is one who is approved to enroll for ten units or fewer, or an equivalent number of courses, per quarter.

#### ADMISSIONS AND ENROLLMENT

1. The same admissions standards that apply to full-time students will apply to part-time students.
2. Approval for individual students to enroll on a part-time basis will be given for reasons of occupation, family responsibilities, health, or, for one time only, graduating senior status.
3. Approval to enroll as a part-time student shall be given by the appropriate dean or provost.
4. Students must apply for part-time study prior to the end of the second week of the quarter *and* must be enrolled in ten or fewer units at that time (*including* any units taken through UCSD Extension) to qualify for reduced fees.

### PROCEDURES

Students must apply for part-time status on the Part-Time Study application form available in the Office of the Registrar or colleges *prior to the end of the second week of the quarter*. Approval for part-time study is granted for one academic year only—fall through spring quarters, winter through spring quarters, or spring quarter only. Students must reapply for approval each fall quarter and substantiate reasons for request. Approval for part-time study will automatically exempt students from the thirty-six unit-per-year minimum progress requirement. Students who are receiving financial assistance should contact their college financial aid office regarding eligibility requirements.

### REDUCED FEES

Undergraduate students who have been approved for part-time study and who are enrolled in ten units or fewer at the end of the second week of classes are eligible for a reduction of one-half of the educational fee and one-half of nonresident tuition, if applicable. Students who drop to ten or fewer units after this date will receive no reduction, and any student who receives a reduction in fees will be billed for the difference if the number of units increases to ten and one-half or more anytime in the quarter.

Undergraduates enrolled in Education Abroad and other special programs are excluded from this reduced fee policy. Employees of the university enrolled as students in the Employee Program have fees reduced by waiver from the Personnel Office and are not eligible to receive this further reduction. Extension courses taken by students in the Complimentary Enrollment Program *will* be included in the unit count whether or not the credit is accepted as part of a university degree program. Questions concerning this policy may be addressed to the Office of the Registrar.

# Academic Regulations

## Undergraduate Degree Requirements

Each of the undergraduate colleges on the San Diego campus has specific requirements for a degree. (See "Choosing a College at UCSD.")

### *Changes in Requirements*

It is campus policy to introduce changes in graduation requirements so that students who began higher education (at UCSD or elsewhere) before the change will not be hindered substantially in the orderly pursuit of their degrees. This principle will have different implications for different kinds of requirement changes. To find out about the implications of particular changes, students should check with colleges, departments, or other sources of information.

Students transferring to UCSD from another UC campus who have completed their lower-division general-education requirements at a UC campus are considered to have met UCSD's lower-division general-education requirements. A letter certifying satisfaction of general education requirements under the UC reciprocity agreement must be sent to the Academic Advising Office of the Student's college. UCSD upper-division general education requirements must be satisfied. (See "Graduation Requirements" for each undergraduate UCSD college.)

Students transferring to UCSD from California State or Community College campuses may elect to satisfy their lower-division general-education and breadth requirements prior to transfer by completing the Intersegmental General Education Transfer Agreement. See "New University of California Transfer Agreements" in the "Undergraduate Admissions, Policies and Procedures" section of this catalog.

### *Requirements for the Bachelor's Degree*

All work required for a degree must be completed by the end of the quarter filed for graduation.

Every candidate for a bachelor's degree must have completed a major.

1. A major shall require the equivalent of twelve or more upper-division courses (forty-eight or more units).
2. Requirements for majors shall be determined by departments and programs, subject to the approval of the Committee on Educational Policy.

3. **Double Majors:** With the approval of both departments or programs and of the college provost, a student in good standing may declare a double major.

- a. A student with a double major must fulfill the separate requirements of each major, and the equivalent of at least ten upper-division courses (forty units) must be unique to each major. Courses taken in fulfillment of lower-division requirements may overlap to any degree.
- b. The two majors may not be within the School of Engineering, nor, except with the approval of the Committee on Educational Policy, within a single department. When a department major is combined with a major in an interdepartmental or interdisciplinary program, the ten courses counted as unique in the interdepartmental or interdisciplinary program must all be drawn from outside the departmental major.
- c. A student who has declared a double major is not subject to the maximum-unit limitations of Regulation 600.C. and may accrue up to 240 units.
- d. A student with a double major may graduate only upon completion of all requirements for both majors. Both majors will be noted on the student's transcript and diploma. If the two majors lead to different degrees (B.A. and B.S.), that fact will be noted on the transcript, and the two degree designations will appear on one diploma.

e. A student who has declared a double major may graduate in one major upon completion of all requirements for that major, but may not continue in the University for completion of the second major.

4. An undergraduate student must have declared a major or pre-major upon completion of ninety units.

Other requirements for graduation shall be determined by the colleges in conformity with universitywide regulations and subject to approval by the San Diego Division of the Academic Senate.

### *American History and Institutions*

A knowledge of American history and of the principles of American institutions under federal and state constitutions is required of all candidates for the bachelor's degree. This requirement may be met in any one of the following ways:

1. By having passed with a grade of C or better one high-school unit in American history, or one-half high-school unit in American history and one-half high-school unit in civics or American government.
2. By completing with a grade of P or C- or better any one-quarter course of instruction accepted as satisfactory by the Committee on Educational Policy and Courses. Any of the following courses are suitable for fulfilling the requirement: HILD 2A-B-C, HILD 7A-B-C; or any course listed under HIUS (other than HIUS Colloquia); and Political Science 10, 100A, 100B, 100C, 102C, 102H, 104A, 110E A&B, 110J, 142A.
3. By presenting proof of having received a score of 500 or more on the CEEB Achievement Test in American History.
4. By presenting proof of having received a grade of 3 or higher on the Advanced Placement Test in American History administered by the Educational Testing Service, Princeton, New Jersey.

5. By presenting proof of having satisfied the present requirement as administered at another collegiate institution within the state.
6. By presenting proof of successful completion of an acceptable one-quarter or one-semester course, with a grade of C or better, in either American history or American government at a community college within the state.
7. By presenting proof of successful completion of an acceptable one-quarter or one-semester course, with a grade of C or better, in either American history or American government at a recognized institution of higher education, junior college included, in another state.
8. An alien attending the university on an F-1 or J-1 student visa may, by showing proof of temporary residence in the United States, petition for exemption from this requirement through the office of his or her college provost.

#### **SUBJECT A: ENGLISH COMPOSITION**

The University of California requires all undergraduate students (including international students) to demonstrate a minimum proficiency in English composition (the Subject A requirement). This proficiency can be demonstrated by:

1. Submitting a score of 660 or better on either the Writing Test, English Composition, or the English Composition with Essay Test, SAT II Subject Tests of the College Entrance Examination Board (CEEB) (Note: not to be confused with the verbal portion of the Scholastic Assessment Test [SAT I]); or
2. Submitting a score of 3, 4, or 5 on the CEEB Advanced Placement Test in English; or
3. Submitting a score of 5 or better in the International Baccalaureate Higher Level examination in English (Language A only); or
4. Submitting proof of completion, prior to enrollment at UCSD, of an acceptable transfer-level college course of four quarter-units or three semester-units in English composition with a grade of C or better; or
5. Writing a passing essay on the Subject A Proficiency Test (which is *required* of all students who have not otherwise met the re-

quirement). This exam is administered statewide during May and on campus at the start of fall quarter. *This examination may be taken only once.*

All students who have not previously satisfied the Subject A requirement must take the Subject A Proficiency Test prior to enrollment at UCSD. Students who fail this examination must enroll each quarter in an approved Subject A course until they satisfy the Subject A requirement. Students satisfy the requirement by achieving a grade of C or better in SDCC 1 (English Composition-Subject A) and by passing the Subject A Exit Examination at the end of SDCC 1. The Exit Examination is administered by the Subject A Program office. Students whose performance on the Subject A Proficiency Test indicates they need work in English as a Second Language *must* enroll in ESL courses for three quarters (or until released by the ESL director) *before* enrolling in SDCC 1. Students must enroll in SDCC 1 (or ESL) during their first quarter of residence at UCSD. For further information on SDCC 1, refer to "Subject A" in the catalog section "Courses, Curricula, and Programs of Instruction." For further information on ESL, see "English as a Second Language" in the catalog section "Courses, Curricula, and Programs of Instruction."

The Subject A requirement must be satisfied during a student's first year of residence. Students will be barred from enrollment at the university if they fail to satisfy the Subject A requirement by the end of their third quarter of enrollment at UCSD. (Exception: Students in need of ESL course work may have up to three extra quarters of residence in which to satisfy the Subject A requirement.)

Students will not be allowed to enroll in university-level writing courses at UCSD until the Subject A requirement has been satisfied.

Students who have been barred from enrollment because of failure to satisfy Subject A will be allowed to present evidence of further work in composition. If the Subject A director approves, these students may take a Subject A examination a final time. Students performing successfully on this final examination will be eligible to apply for re-enrollment at the university.

For further information about the Subject A requirement or the Proficiency Test, please visit the Subject A Program office, 3232 Literature Building, or call (619) 534-6177.

#### **Senior Residence**

Each candidate for the bachelor's degree must complete thirty-six of the final forty-five units in residence in the college or school of the University of California in which the degree is to be earned.

Under certain circumstances exceptions may be granted by the provost, such as when a student attends classes on another UC campus as an approved visitor or participates in the UC Education Abroad, the UCSD Opportunities Abroad, Dartmouth, Spelman, Morehouse, or University of New Mexico exchange programs.

**Note:** Courses taken through the UCSD Extension Concurrent Enrollment Program will not apply toward a UCSD student's senior residency requirement. For further details see "Graduation Requirements" in the Index.

#### **Maximum Unit Limitation**

1. An undergraduate student may register for no more than 200 course units. An exception is permitted for candidates for B.S. degrees in engineering, for whom the limits are 240 units in Revelle and Roosevelt Colleges and 230 units in all other colleges. Other exceptions will be granted only for compelling academic reasons and only with the approval of the college provost and the concurrence of the Committee on Educational Policy.
2. Transfer units applicable toward general-education requirements or major requirements are included in the maximum unit calculation; all other transfer units are excluded. Advanced Placement and international baccalaureate units are excluded.

Special kinds of study—e.g., laboratories, reading programs, studio work—may be required in addition to the basic course work in given curricula.

#### **Graduation Credit for Physical Education Courses**

No more than three units of physical education, whether earned at UCSD or transferred from another institution, may be counted toward graduation.





### ***Undergraduate Minors and Programs of Concentration***

A minor curriculum—or “minor” for short—is a set of six courses on a well-defined subject, at least three (twelve units) of which must be upper-division courses. (Effective for students entering after January 1, 1998: a minor shall consist of at least twenty-eight units, of which at least twenty units must be upper-division. For sound academic reasons and with the approval of the Committee on Educational Policy, a minor may be established with fewer than twenty upper-division units.) In the case of a subject that is the responsibility of a particular department, such as literature, physics or sociology, that department specifies which courses are acceptable for a minor curriculum in its section of this *General Catalog*. All other minor curricula must be approved by the Committee on Educational Policy and be published in this *General Catalog*. A student may not apply toward the minor any upper-division course that has been used to satisfy the requirements of his or her major curriculum. A student's successful completion of a minor curriculum will be recorded on his or her transcript at graduation.

Certain colleges require their students to complete one or more “programs of concentration” before graduation, and the courses or types of courses acceptable for programs of concentration are determined by the faculty of the college or a subcommittee thereof. A program of concentration is not necessarily a minor. Indeed, a program of concentration is a minor only if it meets the criteria in the above paragraph, and only then may it be listed on a student's transcript as a minor. Otherwise it will be recorded as a concentration at graduation.

### ***Honors***

#### **COLLEGE HONORS AT GRADUATION**

The Academic Senate has established the following standards for award of college honors at graduation:

There shall be a campus-wide requirement for the award of college honors at graduation. No more than 14 percent of the graduating seniors on campus shall be eligible for college honors. Normally, no more than the top 2 percent shall be eligible for *summa cum laude* and no more than the next 4 percent for *magna cum laude*, although minor variations from year to year shall be permitted. The remaining 8

percent are eligible for *cum laude*. The ranking of students for eligibility for college honors shall be based upon the grade-point average. In addition, to be eligible for honors, a student must receive letter grades for at least eighty quarter-units of course work at the University of California. Each college may award honors at graduation only to those who are eligible to receive college honors.

#### **DEPARTMENT HONORS**

Each department or program may award honors to a student at graduation if the following two criteria are met:

1. The student has completed a *special* course of study within the department or program. The requirements for this special course of study shall be approved by CEP and published in the *General Catalog*.
2. No more than 20 percent of the seniors graduating from a department or program may be awarded departmental honors.

Honors awarded by departments may be designated on the diploma by the words “with distinction,” “with high distinction,” and “with highest distinction” after the departmental or program name. Currently the departments and majors listed below are approved to award honors to no more than 20 percent of graduating seniors: Anthropology, Biology, Chemistry, Chinese Studies, Classical Studies, Cognitive Science, Communication, Earth Sciences, Economics, Electrical and Computer Engineering, History, Human Development, Japanese Studies, Judaic Studies, Linguistics, Literature, Management Science, Muir Special Project, Music, Philosophy, Physics, Political Science, Psychology, Roosevelt Individual Studies, Sociology, Theatre, Urban Studies and Planning, and Women's Studies.

#### **PROVOST HONORS**

Provost honors are awarded quarterly based upon the completion of twelve *graded* units with a GPA of 3.5 or higher with no grade of D, F, or NP recorded for the quarter.

#### **PHI BETA KAPPA**

Phi Beta Kappa is the oldest, most prestigious honor society for the liberal arts and sciences in America. UCSD is one of only 255

four-year institutions granted chapters since the society was founded in 1776. In addition, there are fifty active PBK alumni associations in major cities around the country.

More than 200 UCSD faculty and staff were initiated at their own undergraduate colleges. Each spring the campus chapter elects student members on the basis of high scholastic achievement and breadth of academic background. Minimal criteria for consideration include:

1. Successful completion of at least 160 quarter-units by the time of consideration.
2. Cumulative GPA of 3.65 or higher: GPA's from UC and transfer work are combined.
3. A minimum of five courses in the humanities or equivalent subjects.
4. One year of college-level course credit or demonstrated proficiency in a second language.
5. One year of college-level course credits in mathematics, quantitative science, logic, or statistics.
6. Full-time enrollment at UCSD for two years.

In considering a student for membership, the reviewers consider the excellence of the academic record, the breadth and quality of the courses taken, and evidence that the student has pursued a serious line of work and is of good character. Invitations to membership are by letter, usually in late May, and initiation takes place in early June.

### *Application for Degree*

Undergraduate seniors are required to file a Degree and Diploma Application form with their college academic advising office. Students should check with their college academic advising office for exact deadlines. Advising and counseling sessions should take place well before the quarter of graduation to ensure all degree requirements will be satisfied. Applications not on file by the deadline are subject to special approval, a \$3 late filing fee, and a \$22 special-order diploma fee. Students who have not completed all degree requirements by the end of the quarter filed for graduation must file a new application. Failure to file this petition may delay the graduation date and receipt of diploma.

## **Specific Regulations**

### *Progress toward Degrees*

In order to apply the units of a course toward unit requirements for a degree, a student must receive an A, B, C, D, P, or S grade in the course. (Plus or minus suffixes (+/-) may be affixed to A, B, and C.) Further, an undergraduate student must have a 2.0 or higher grade-point average (GPA) to receive a bachelor's degree, and a graduate student must have a 3.0 or higher GPA to receive a higher degree.

### *Probation*

An undergraduate student is subject to academic probation if at the end of any term his or her GPA for that term or his or her cumulative GPA is less than 2.0.

### *Subject to Disqualification*

An undergraduate student is subject to academic disqualification from further registration if at the end of any term his or her GPA for that term is less than 1.5 or if he or she has completed two successive terms on academic probation without achieving a cumulative GPA of 2.0. Continued registration of an undergraduate who is subject to disqualification is at the discretion of the faculty of the student's college or its authorized agent (generally the provost/Office of the Provost).

If a student is not currently in scholastic good standing or has been denied registration for the next ensuing quarter on the date on which he or she left the university, a statement of his or her status shall accompany his or her transcript. A student who has been disqualified from further registration at the University of California may not register for UCSD courses through Summer Session, through UCSD Extension by way of the concurrent enrollment mechanism, or in UCSD Extension courses offered at the 100 level. Students receiving financial assistance should refer to information in the Student Financial Services section of this catalog. Unique scholarship eligibility requirements must be met.

**Note:** Veteran students receiving financial assistance from the Veterans Administration should refer to unique requirements set by state approving agencies. See veterans' information under Student Financial Services.

### *Minimum Progress*

A full-time undergraduate student is subject to disqualification from further registration if he or she does not complete thirty-six units in any three consecutive quarters of enrollment. Continued registration of an undergraduate who is subject to disqualification due to lack of minimum progress is at the discretion of the faculty of the student's college or its authorized agent (generally the provost/Office of the Provost).

Eligible students may file for an exemption from the minimum progress requirement by completing the Part-time Study application and receiving college approval *prior* to the end of the second week of the quarter. (See "Part-time Study at the University of California.")

### *Double Majors*

See "Requirements for the Bachelor's Degree" in this section.

### *Repetition of Courses*

Repetition for credit of courses not so authorized by the appropriate Committee on Courses is allowed subject to the following limitations:

1. A student may *not* repeat a course for which a grade of A, B, C, I, P, or S is recorded on his or her transcript. (Plus or minus suffixes (+/-) may be affixed to A, B, and C.)
2. Courses in which a grade of D or F has been awarded may not be repeated on a P/NP or S/U basis.
3. Undergraduate students may repeat a course in which a grade of NP has been awarded for a P/NP or letter grade, if applicable. Graduate students may repeat a course in which a grade of U has been awarded on an S/U basis only.
4. Repetition of a course for which a student's transcript bears two or more entries with grades among D, F, NP, or U requires approval of the appropriate provost or dean.
5. All grades received by a student shall be recorded on the student's transcript.
6. The first sixteen units of courses that have been repeated by an undergraduate student and for which the student received a grade of D, F, NP, or U shall not be used in grade-point calculations on a student's transcript.

**Note:** Although the University of California grade-point average will not include these repeated courses, other institutions/graduate programs, and agencies may recalculate the grade-point average to reflect all assigned grades.

### ***Special Studies Courses***

Subject to the limitations below, a student may earn credit for supervised special studies courses on topics of his or her own selection. An undergraduate taking one or more special studies courses must complete an application for each such course before the start of the course.

#### **COURSE NUMBER**

Ordinarily, special studies courses are numbered 197, 198, or 199. The 197 course is for individually arranged field studies. The 198 course is for directed group study. The 199 course is for individual independent study.

#### **LIMITATIONS**

1. Enrollment requires the prior consent of the instructor who is to supervise the study and the approval of the department chair. The applicant shall show that his or her background is adequate for the proposed study.
2. A student must have completed at least ninety units of undergraduate study and must be in good academic standing (2.5 grade-point average or better).
3. A student may enroll for no more than a total of four units of 198 and 199 Special Studies courses in one term.
4. On the advice of the instructor(s) and the department chair(s) concerned, the provost of a student's college may authorize exceptions to the limitations listed in 2. and 3. above.
5. Only a grade of P or NP is to be assigned for a 197, 198, or 199 course.
6. Subject to the approval of the CEP Subcommittee on Undergraduate Courses, a department may impose additional limitations on its supervised special studies courses.

#### **PROCEDURES**

1. Students must complete an "Application for UCSD Special Studies Course Enrollment,"

available in department offices, and secure instructor and department chair approval.

2. Students must submit an approved form to the Office of the Registrar to enroll in a special studies course.

### ***Undergraduate Assistance in Courses***

An undergraduate instructional apprentice is an undergraduate student who serves as an assistant in an undergraduate course under the supervision of a faculty member. The purpose of the apprenticeship is to learn the methodology of teaching through actual practice in a regularly scheduled course.

#### **GUIDELINES**

1. An undergraduate instructional apprentice shall be an upper-division student. He or she shall be involved only with lower-division courses.
2. Students are not permitted to assist in courses in which they are enrolled.
3. An undergraduate instructional apprentice must have a minimum grade-point average of 3.0. Departments may establish higher grade-point average requirements.
4. The faculty instructor is responsible for course content and for maintaining the overall quality of instruction, including supervision of undergraduate instructional apprentices. The faculty instructor is responsible for all grades given in the class.
5. The instructor is expected to meet regularly with the undergraduate apprentice to evaluate the student's performance and to provide the direction needed for a worthwhile educational experience.
6. An undergraduate instructional apprentice may receive credit on a Pass/Not Pass basis only (through registration in a 195 course), subject to approval by the Committee on Educational Policy.
7. A student may not be an instructional apprentice more than once for the same course for credit.
8. A student may not be an instructional apprentice in more than one course in a quarter.

9. The total credit accumulated as an apprentice shall not exceed eight units.

#### **PROCEDURE**

All departments/programs using undergraduate instructional apprentices shall submit to the CEP Subcommittee on Undergraduate Courses a description of the role of the undergraduate instructional apprentice, as part of the petition for approval. Any deviation from the guidelines above must be explained and justified in a memo accompanying the petition. Any major change in the function or duty of the apprentice in a course should also be approved by the CEP Subcommittee on Undergraduate Courses.

### ***Writing Requirements***

A student may register in an upper-division course only if the student has satisfactorily completed the writing requirement of his or her college or has obtained the consent of the instructor of the upper-division course. The requirement is waived for a student who has been admitted as a transfer student and has not completed three quarters of residence at UCSD.

### ***Final Examinations***

Final examinations are obligatory in all undergraduate courses except laboratory courses, or their equivalent, as individually determined by the Committee on Courses.

Each such examination shall be conducted in writing whenever practical and must be completed by all participants within the announced time shown in the *Schedule of Classes* for the quarter in question. These examinations may not exceed three hours in duration.

In laboratory courses, the department concerned may, at its option, require a final examination subject to prior announcement in the *Schedule of Classes* for the term.

It is the policy of the university to make reasonable efforts to accommodate students having bona fide religious conflicts with scheduled examinations by providing alternative times or methods to take such examinations. If a student anticipates that a scheduled class meeting or examination will occur at a time at which his or her religious beliefs prohibit participation in the class or examination, the student must submit to the instructor, *no later than the end of the second week of instruction of the quarter*, a

statement describing the nature of the religious conflict and specifying the days and times of conflict together with documentation of the religious proscription and of the student's adherence to this religious belief. Upon determination that a conflict with the student's religious beliefs does exist, the instructor will attempt to provide an alternative, equitable examination procedure which does not create an undue hardship for the instructor.

### Retention of Examination Papers

Instructors are required to retain examination papers for at least one full quarter following the final examination period, unless the papers have been returned to the students.

### Credit by Examination

With the instructor's approval and concurrence by the student's provost, a currently enrolled and registered undergraduate student in good standing may petition to obtain credit for some courses by examination. Credit by examination is intended for students who study the course material on their own and then petition for credit by examination when they feel they are prepared. The examination will cover work for the entire course. Except as authorized by the instructor and appropriate provost, credit by examination may not be used to repeat a grade of D, F, or W. A part-time student who, by registering to take a course credit by examination, surpasses the number of units allowed for part-time status must pay fees as a full-time student. There will be a \$5 fee for each Credit by Examination petition.

### Use of Student Petition

For exceptional circumstances, students may request approval for variances to regulations and policies. This should be done by filling out an Undergraduate Student Petition (available in the provosts' offices or the Office of the Registrar), securing the necessary approvals, and filing the petition with the appropriate department or college academic advising office.

### Grading Policy

Grades in undergraduate courses are defined as follows: A, excellent; B, good; C, fair; D,

poor; F, fail; I, incomplete (work of passing quality but incomplete for good cause); and IP (In Progress courses approved for more than a one-quarter sequence). The designations P (Pass) and NP (Not Pass) are used in reporting grades for some undergraduate courses. P denotes a letter grade of C- or better. A blank grade indicates no record or no report of grade was received from the instructor. W is recorded on the transcript indicating the student withdrew or dropped the course sometime after the beginning of the fifth week of a quarter.

**Note:** Students who drop certain laboratory courses after the second scheduled meeting period will receive a W grade. Refer to the quarterly schedule of classes for specific labs affected.

Instructors have the option of assigning plus (+) and minus (-) suffixes to the grades A, B, and C. This option became available as of fall 1983.

### Grade Points

For each student, the registrar will calculate a grade-point average (GPA) over courses taken at any campus of the University of California, not including Extension courses. Grade points per unit will be assigned as follows: A=4, B=3, C=2, D=1, F=0. When attached to the grades of B and C, plus (+) grades carry three-tenths of a grade point more per unit. The grade of A+, when awarded, represents extraordinary achievement but does not receive grade-point credit beyond that received for the grade of A. When attached to the grades of A, B and C, minus (-) grades carry three-tenths of a grade point less per unit than the unsuffixed grades. Courses in which an I, IP, P, NP, S, U, or W grade has been awarded will be disregarded in grade-point calculations. A graduate student's GPA will be calculated over courses taken while in graduate standing.

Grade	Grade Points	Grade	Grade Points
A+	4.0	C+	2.3
A	4.0	C	2.0
A-	3.7	C-	1.7
B+	3.3	D	1.0
B	3.0	F	0
B-	2.7		

The grade-point average is computed by dividing the total number of grade points earned by

the total unit value of letter-graded courses completed.

At the end of each quarter, the instructor of each course will assign a letter grade to each student who was enrolled in that course at the end of the ninth week of instruction on the basis of the work required for the entire course. An I grade may be assigned, if appropriate.

### Changes in Grades

All grades except I and IP are final when filed by instructors on end-of-term grade reports. However, a final grade may be corrected when a clerical or procedural error is discovered. *No change of a final grade may be made on the basis of revision or augmentation of a student's work in the course. No term grade except Incomplete may be revised by further examination. No grade may be changed after one calendar year from the time it was recorded. Petitions for exceptions are referred to the Committee on Educational Policy.*

### No Report/No Record

A blank entry appearing on student transcripts in lieu of a grade indicates that the student's name appeared on a grade report but no grade was assigned by the instructor. A blank entry will lapse automatically into an F, NP, or U if not replaced by a final grade by the last day of instruction of the subsequent quarter, and will be computed in the student's GPA.

### Pass/Not Pass

The Pass/Not Pass option is designed to encourage undergraduate students to venture into courses which they might otherwise hesitate to take because they are uncertain about their aptitude or preparation. Consistent with college policy, an undergraduate student in good standing may elect to be graded on a P/ NP basis in a course. No more than one-fourth of an undergraduate student's total UCSD course units may be graded on a P/NP basis. Departments may require that courses applied toward the major be taken on a letter-grade basis. Enrollment under this option must take place within the first four weeks of the course. A grade of Pass shall be awarded only for work which otherwise would receive a grade of C- or better. Units passed shall be counted in satisfaction of degree requirements, but such courses shall be disregarded in determining a

student's grade-point average. (See "Physical Education Credit toward Graduation.")

If students wish to change their selected grading option after enrolling, they may use the Telephone Student Services system (TeSS) or may complete an Add/Change/Drop card and file it at the Registrar's Office. The last day to change grading options is the end of the fourth week of instruction.

Only a grade of P or NP is to be assigned for courses numbered 195, 197, 198, and 199. Subject to the approval of the CEP Subcommittee on Undergraduate Courses, departments may impose additional limitations or restrictions.

Only a grade of P or NP is to be assigned an undergraduate student's work in a noncredit (0-unit) course.

**Note:** See "Choosing a College at UCSD" section for further information regarding the P/NP grading option.

### *The W Grade*

When a student withdraws from the university or drops a course, other than a laboratory course, between the beginning of the fifth week of instruction and the end of the ninth week of instruction of a quarter, the registrar will assign a W to the student for each course affected. Only the registrar may assign a W.

**Note:** Students who drop certain laboratory courses after the second scheduled meeting period will receive a W grade. Refer to the quarterly schedule of classes for specific labs affected.

Courses in which a W has been entered on the student's transcript will be disregarded in determining a student's grade-point average.

### **ADDING AND DROPPING COURSES AND THE W GRADE**

A student may, with the approval of the instructor (and adviser, if required), add a course to the study list before the end of the second week of instruction of a quarter.

A student may drop a course before the end of the ninth week of instruction by filing the appropriate form with the registrar, after first notifying the instructor and/or department.

A student who wishes to drop all courses is required to file an Undergraduate Request for Withdrawal form with the college academic advising or dean's office.

1. A course dropped before the end of the fourth week of instruction will not appear on the student's transcript.

**Note:** Students who drop certain laboratory courses after the second scheduled meeting period will receive a W grade. Refer to the quarterly schedule of classes for specific labs affected.

2. If a student drops a course after the end of the fourth week of instruction and before the end of the ninth week of instruction, the registrar will assign a final grade of W to the student for that course.
3. A student may not drop a course after the end of the ninth week of instruction.

When an instructor has assigned a grade in a course in accordance with the Academic Senate policy on Integrity of Scholarship prior to the end of the ninth week of instruction, that grade may not subsequently be changed by dropping the course or withdrawing from the university.

### **WITHDRAWING FROM SCHOOL AND THE W GRADE**

A student may withdraw from the university before the end of the ninth week of instruction of a quarter.

1. If a student withdraws before the end of the fourth week of instruction, no course entries will appear on the student's transcript for that quarter.

**Note:** Students who drop certain laboratory courses after the second scheduled meeting period will receive a W grade. Refer to the quarterly schedule of classes for specific labs affected.

2. If a student withdraws after the end of the fourth week of instruction and before the end of the ninth week of instruction, the registrar will assign a final grade of W to the student for each course in which the student was enrolled at the beginning of the fifth week of instruction.
3. Each student will receive a final grade for each course in which the student was enrolled at the end of the ninth week of instruction of the quarter.

When an instructor has assigned a grade in a course in accordance with the Academic Senate policy on Integrity of Scholarship prior to the

end of the ninth week of instruction, that grade may not subsequently be changed by dropping the course or withdrawing from the university.

### *The In Progress (IP) Grade*

For exceptional and compelling reasons, a course extending over more than one quarter may be authorized with the prior approval of the Committee on Educational Policy and Courses (for undergraduate courses) or the Graduate Council (for graduate courses). In such courses an evaluation of a student's performance may not be possible until the end of the final term. In such cases the instructor may assign the provisional grade IP (in progress).

IP grades shall be replaced by final grades if the student completes the full sequence. The instructor may assign final grades, grade points, and unit credit for completed terms when the student has not completed the entire sequence provided that the instructor has a basis for assigning the grades and certifies that the course was not completed for good cause. An IP not replaced by a final grade will remain on the student's record.

In calculating a student's grade-point average, grade points and units for courses graded IP shall not be counted. However, at graduation, courses still on the record as graded IP must be treated as courses attempted in computation of the student's grade-point average in assessing a student's satisfaction of Senate Regulation 634.

### *The Incomplete (I) Grade*

Academic Senate regulations state that the Incomplete grade I for undergraduates shall be disregarded in determining a student's grade-point average, except at point of graduation, when students must have an overall 2.0 (C) on all work attempted at the University of California. All work required for a degree must be completed by the end of the quarter the student filed for graduation. Students requesting an I grade the last quarter before graduation may have their graduation date delayed.

Undergraduate students whose work is of non-failing quality but incomplete for good cause, such as illness, must file a Request to Receive/Remove Grade Incomplete form.

Graduate students enrolled in graduate courses may request instructors to assign the

grade of "Incomplete" in order to be permitted to complete required work within the following quarter. If the required work is not submitted by the end of the quarter following so that the grade can be reported by the instructor, the grade will automatically be changed to one of "Failure" by the registrar. Graduate students must file a Request to Receive/Remove Grade Incomplete form.

1. Students should complete their portion of the request form, including the reason they are requesting the Incomplete. The deadline for filing an Incomplete shall be no later than the first working day after final examination week.
2. The instructor has the option to approve or disapprove the request and should state on the form *how* and *when* the I is to be completed. If approved, the instructor submits the form with term grade sheets.
3. Students must complete the work to remove the Incomplete on or before the date agreed upon with the instructor and in time for the instructor to assign a grade **before the end of finals week the following quarter**.
4. Failure to complete this work within the regulation time limit will result in the Incomplete lapsing to a *permanent* F, NP, or U grade.

### INTENDED USE OF THE INCOMPLETE

The Incomplete is intended for use when circumstances *beyond a student's control* prohibit taking the final exam or completing course work.

The Incomplete is *not* intended as a mechanism for allowing a student to retake a course. A student who has fallen substantially behind and needs to repeat a course can drop the course prior to the end of the ninth week of classes. Otherwise, the instructor should assign the appropriate final grade (D, F, NP, or U, for example).

An Incomplete may not be used simply to allow a bit more time for an undergraduate student who has fallen behind for no good reason. An I may be granted *only* to students who have a legitimate excuse. Examples of unacceptable reasons for approving an Incomplete include the need to rewrite a paper; the demands of a time-consuming job; the desire to leave town for a vacation, family gathering,

or athletic contest; the desire to do well on GRE tests; and the like.

### EXTENSION OF INCOMPLETE

For justifiable reasons, such as illness, students can petition their provost or graduate office to extend the Incomplete past one quarter. These petitions must have the prior approval of the *instructor and the department chair*. The petition must include the reasons for requesting the extension and *how* and *when* the I is to be completed. These petitions must be filed **before** the Incomplete grade lapses to an F, NP, or U grade. *The extension cannot be made retroactively.*

An I grade may be replaced upon completion of the work required by a date agreed upon with the instructor, but no later than the last day of finals week in the following quarter. If not replaced by this date, the I grade will lapse into an F, NP, or U grade, depending upon the student's initial grading option.

A student who has received an I grade should *not* re-enroll in the course to make up the missing work. If the student were to re-enroll, the course would be considered a repeat and would not remove the prior quarter's Incomplete, which would lapse to a *permanent* F, NP, or U grade.

### Student Copy of Final Grades

At the end of each quarter students should check StudentLink or call the Telephone Student Services system for grade information. Grades are usually available ten working days after the end of final examinations. Students should examine their record for accuracy and report any omissions or errors to the Office of the Registrar immediately.

### Transcript Requests

Application for an official transcript of record to be sent to another party or institution should be submitted to the registrar several days in advance of the time needed. An application for a transcript must bear the student's signature. A \$5 fee is charged per copy. Checks should be made payable to the Regents of the University of California.

### Grade Appeals

- A. 1. If a student believes that nonacademic criteria have been used in determining

his or her grade in a course, he or she may follow the procedures described in this regulation.

2. *Nonacademic criteria* means criteria not directly reflective of academic performance in this course. It includes discrimination on political grounds or for reasons of race, religion, sex, or ethnic origin.
  3. Appeals to this committee [see (B)(4)] shall be considered confidential unless both the complainant and the instructor agree otherwise. They may agree to allow the student representatives to the committee to participate in the deliberations of the committee, or they may agree to open the deliberations to members of the university community.
- B. 1. The student may attempt to resolve the grievance with the instructor within the first month of the following regular academic quarter.
  2. If the grievance is not resolved to the student's satisfaction, he or she may then attempt to resolve the grievance through written appeal to the department chair or equivalent, who shall attempt to adjudicate the case with the instructor and the student within two weeks.
  3. If the grievance still is not resolved to the student's satisfaction, he or she may then attempt to resolve the grievance through written appeal to the provost of the college, the dean of Graduate Studies, or the dean of the School of Medicine, who shall attempt to adjudicate the case with the instructor, the chair, and the student within two weeks.
  4. If the grievance is not resolved to the student's satisfaction by the provost or dean, the student may request consideration of the appeal by the CEP Subcommittee on Grade Appeals (hereinafter called the Committee) according to the procedures outlined below. This request must be submitted before the last day of instruction of the quarter following the quarter in which the course was taken.
- C. 1. The student's request for Committee consideration should include a written brief stating the nature of the grievance, including copies of any and all docu-



ments in his or her possession supporting the grievance. The submission of the brief to the Committee places the case before it and restricts any change of the challenged grade to a change initiated by the Committee, unless the Committee determines that all other avenues of adjudication have not been exhausted.

2. Upon receipt of the student's request, the Committee immediately forwards a copy of it to the instructor involved and asks the instructor, the department chair or equivalent, and the provost or dean for written reports of their attempts to resolve the complaint.
  3. The Committee, after having determined that all other avenues of adjudication have been exhausted, shall review the brief and the reports to determine if there is substantial evidence that nonacademic criteria were used.
    - a. If the Committee finds substantial evidence that nonacademic criteria were used, it shall follow the procedure in paragraph (D) below.
    - b. If the Committee decides the allegations are without substance, it shall serve written notification of its findings to the complainant and to the instructor within two weeks. Within ten days the complainant or the instructor may respond to the findings and any member of the Committee may appeal the Committee's findings to the full Committee on Educational Policy and Courses. If there are no responses, or if after consideration of such responses the Committee sustains its decision, the grade shall not be changed.
- D. 1. If the Committee determines that there is evidence that nonacademic criteria were used, it shall interview any individual whose testimony might facilitate resolution of the case. The complainant shall make available to the Committee all of his or her work in the course which has been graded and is in his or her possession. The instructor shall make available to the Committee all records of student performance in the course and graded student work in the course which is still

in his or her possession. The complainant and the instructor shall be interviewed. At the conclusion of the case each document shall be returned to the source from which it was obtained.

2. The Committee shall complete its deliberations and arrive at a decision within two weeks of its determination that evidence of the use of nonacademic criteria had been submitted. A record of the Committee's actions in the case shall be kept in the Senate Office for three years.
3. If the allegations of the complainant are not upheld by a preponderance of the evidence, the Committee shall so notify the complainant and the instructor in writing. Within one week of such notification, the complainant and the instructor shall have the opportunity to respond to the findings and the decision of the Committee. If there are no responses, or if after considering such responses the Committee sustains its decision, it shall so notify the complainant and the instructor in writing and the grade shall not be changed.
4. If the Committee determines that nonacademic criteria were significant factors in establishing the grade, it shall give the student the option of either receiving a grade of P or S in the course or retroactively dropping the course without penalty. A grade of P or S awarded in this way shall be acceptable towards satisfaction of any degree requirement, even if a minimum letter grade in the course had been required, and shall not be counted in the number of courses a student may take on a P/NP basis. If the student elects to receive a grade of P or S, the student may also elect to have a notation entered on his or her transcript indicating that the grade was awarded by the divisional grade appeals committee.
  - a. The Committee shall serve written notification of its finding and its decision to the complainant and the instructor. The complainant and the instructor may respond in writing to the findings and the decision of the Committee within one week of such notification.

b. If there are no responses, or if after considering such responses the Committee sustains its decision, the grade shall be changed; the Committee shall then instruct the registrar to change the grade to P or S or, if the student elected the drop option, to retroactively drop the course from the student's record. Copies of the Committee's instruction shall be sent to the complainant and the instructor.

- E. These procedures are designed solely to determine whether nonacademic criteria have been used in assigning a grade, and if so to effect a change of that grade.
1. No punitive actions may be taken against the instructor solely on the basis of these procedures. Neither the filing of charges nor the final disposition of the case shall, under any circumstances, become a part of the personnel file of the instructor. The use of nonacademic criteria in assigning a grade is a violation of the Faculty Code of Conduct. Sanctions against an instructor for violation of the Faculty Code may be sought by filing a complaint in accordance with San Diego Division By-Law † 230(D). A complaint may be filed by the student or by others.
  2. No punitive actions may be taken against the complainant solely on the basis of these procedures. Neither the filing of charges nor the final disposition of the case shall, under any circumstances, become a part of the complainant's file. The instructor may, if he or she feels that his or her record has been impugned by false or unfounded charges, file charges against the complainant through the office of the vice chancellor for Student Affairs, the dean of Graduate Studies, or the associate dean for Student Affairs of the School of Medicine.

**UCSD Policy on Integrity of Scholarship**

The principle of honesty must be upheld if the integrity of scholarship is to be maintained by an academic community. The university expects both faculty and students to honor this principle and in so doing protect the validity of

university grading. This means that all academic work will be done by the student to whom it is assigned without unauthorized aid of any kind. Instructors, for their part, will exercise care in planning and supervising academic work, so that honest effort will be encouraged.

The following policies apply to academic course work for both undergraduate and graduate students. A separate policy exists governing integrity of research. Medical students are governed by policies specified in the *Handbook for School of Medicine Advisers and Students*, as formulated by the School of Medicine Committee on Educational Policy.

### **INSTRUCTORS' RESPONSIBILITY**

The instructor should state the objectives and requirements of each course at the beginning of the term and clearly inform students in writing what kinds of aid and collaboration, if any, are permitted on graded assignments.

### **STUDENTS' RESPONSIBILITY**

Students are expected to complete the course in compliance with the instructor's standards. No student shall engage in any activity that involves attempting to receive a grade by means other than honest effort, for example:

No student shall knowingly procure, provide, or accept any unauthorized material that contains questions or answers to any examination or assignment to be given at a subsequent time.

No student shall complete, in part or in total, any examination or assignment for another person.

No student shall knowingly allow any examination or assignment to be completed, in part or in total, for himself or herself by another person.

No student shall plagiarize or copy the work of another person and submit it as his or her own work.

No student shall employ aids excluded by the instructor in undertaking course work.

No student shall alter graded class assignments or examinations and then resubmit them for regrading.

No student shall submit substantially the same material in more than one course without prior authorization.

A student acting in the capacity of an instructional assistant (IA), including but not limited to teaching assistants, readers, and tutors, has a special responsibility to safeguard the integrity of scholarship. In these roles the student functions as an apprentice instructor, under the tutelage of the responsible instructor. An IA shall equitably grade student work in the manner agreed upon with the course instructor. An IA shall not make any unauthorized material related to tests, exams, homeworks, etc. available to any student.

### ***Responsibility for Disposition of Cases of Academic Dishonesty***

The primary responsibility for maintaining the standards of academic honesty rests with two university authorities: the faculty and the administration. When a student has admitted to or has been found guilty of a violation of the standards of academic honesty, two separate actions shall follow. The instructor shall determine the student's grade on the assignment and in the course as a whole. The recommended academic consequence of a serious breach of academic honesty is failure in the course, although less serious consequences may be incurred in less serious circumstances. The dean of the undergraduate student's college shall impose an administrative penalty. The assistant dean of Graduate Studies shall impose administrative penalties for graduate students in consultation with the instructor and the department. [Hereinafter the college dean and the assistant dean of Graduate Studies shall be referred to as the "appropriate dean."] Under normal circumstances, the recommended minimum administrative penalties are probation for the first offense and suspension or dismissal for a subsequent offense. The transcript of a student who is dismissed for academic dishonesty shall bear a notation that readmission is contingent upon approval from the chancellor.

### ***Procedures for Disposition of Cases of Academic Dishonesty***

The instructor may contact any of the following people for advice on how to proceed or for clarification of the appropriate policy: the student conduct coordinator, the assistant dean of Graduate Studies, the college dean, or the assistant to the vice chancellor for Academic

Affairs. The procedure for disposition of cases of academic dishonesty is divided into three phases:

A. *The Initial Phase:* When an instructor has reason to believe that a student has committed a dishonest act in completing an assignment, he or she should proceed in one of two ways: (1) Call the student to a meeting to discuss the charges, the evidence, and the proposed academic consequence. Unless the instructor decides that there is no evidence for academic dishonesty, the instructor must inform the appropriate dean of the charges. The dean shall then call the student to a meeting to discuss the case and the proposed administrative penalty. (2) Meet with the student and the appropriate dean together to present the evidence and to discuss the charges and the proposed academic consequence and administrative penalty. In this case, the instructor will contact the dean and the dean will, in turn, contact the student to arrange for a meeting of the three parties. Following steps (1) or (2), the instructor will confer with the dean to decide whether to proceed with the charge. The instructor may drop the charge, but the dean may not dismiss the charge without the instructor's consent. If the instructor and the dean do not agree on whether there is sufficient evidence to proceed, the dean should communicate his or her opinion to the chair of the relevant department. The instructor shall consult with the department chair before deciding whether to proceed.

If the decision is to proceed, the student shall be notified of the charges in writing by the dean and informed of the procedures for processing cases of academic dishonesty under the UCSD Policy on Integrity of Scholarship. The dean shall also advise the student of his or her options and the availability of assistance from Student Legal Services.

The student shall have ten (10) calendar days following notification by the dean to decide whether: (a) to accept the charge of academic dishonesty and the proposed academic consequences and administrative penalties, (b) to deny the charge of dishonesty and to proceed to a formal hearing as provided in paragraph B, or (c) to accept the charge of dishonesty but to appeal the pro-

posed actions as provided in paragraph D. Unless the student informs the dean and the instructor otherwise within this ten-calendar-day period, he or she shall be presumed to have taken decision (a). If decision (a) is taken, a record of the academic consequences and administrative penalties imposed shall be maintained in the office of the appropriate dean. A copy of the final disposition of the case shall be sent to the chairperson of the department in which the violation occurred.

B. *The Hearing Phase:* If the student denies having committed the alleged act of academic dishonesty, he or she must submit a written request for a formal hearing to the appropriate dean within ten (10) calendar days of being notified of the charges. The dean shall refer the case to the student conduct coordinator (SCC), who within thirty (30) calendar days will schedule a formal hearing of the case by the Academic Dishonesty Hearing Board ("hearing board"). The SCC will provide at least ten (10) days notice to the student and the instructor of the time and location of the hearing. The SCC will also be available to advise the instructor of the procedures and options for presentation of the case.

The hearing board shall be composed of three faculty members appointed by the Academic Senate, one graduate student appointed by the assistant dean of Graduate Studies, one upper-division undergraduate student appointed by the vice chancellor of Student Affairs, and a college dean who shall serve as the presiding officer. Members shall normally serve a two-year term. The presiding officer shall conduct the hearing and advise the hearing board on procedure, but shall not vote. If the student is enrolled in the same college as the presiding dean, a dean from another college shall serve as the presiding officer. The hearing board shall be governed by the general UCSD rules of procedural due process.

When standing members are not available, the formal hearing may be conducted with the appointment of alternates from the appropriate panel as listed below. However, the hearing board must have at least two of the faculty standing members to proceed with the hearing. The student conduct coordina-

tor will select alternates as needed from the appropriate panel on a rotating basis. The panels of alternates to the hearing board will be as follows:

1. A panel of ten faculty members to be appointed by the Academic Senate Committee on Committees,
2. A panel of five upper-division (junior or senior) undergraduate students, one from each college, to be appointed by the college dean. Members of this panel must have completed at least one year on a standing judicial board at UCSD, and,
3. A panel of five graduate students to be appointed by the assistant dean, OGSR.

The hearing board shall hold a formal hearing and decide on the basis of a preponderance of the evidence whether the student did engage in academic dishonesty. In cases where the hearing board deems that expert advice is essential to a judgment on the merits of the case, such as suspected dishonesty in research, the hearing board, in consultation with the Committee on Committees, may appoint an ad hoc committee to advise it. The ad hoc committee shall consist of three faculty members with knowledge of the field in question. The members of the ad

hoc committee shall be present at the hearing and shall advise the hearing board during the board's deliberations. The final judgment on the case shall rest with the hearing board. Within five (5) calendar days from the date the hearing is completed, the presiding officer shall forward the hearing board's findings with explanations to the appropriate dean, with copies to the department chair, the instructor, and the accused student.

Within five (5) calendar days after receipt of the notice of the hearing board's final judgment in the case, the appropriate dean shall inform the student in writing of the findings of the committee and, if academic dishonesty is upheld, the administrative penalties to be imposed.

If the hearing board finds the evidence insufficient to sustain the charge of academic dishonesty, the dean and the instructor shall dismiss the matter without further action against the student, who shall be permitted to complete the course without prejudice or withdraw from it. If the student withdraws from the course, it shall not be listed on his or her transcript.

C. *The Appeals Phase:* If the hearing board sustains the charge of academic dishonesty,



an undergraduate student may appeal that judgment in writing to the appropriate college provost within fifteen (15) calendar days from the date of the notice from the dean. A graduate student or IA shall submit the appeal to the dean of Graduate Studies.

The basis for appeal of the hearing board's judgment shall be: (a) that the standards of procedural fairness were violated (e.g. that the student did not have sufficient opportunity to present his or her side of the case) or (b) that there exists newly discovered important evidence which has substantial bearing on the findings of the hearing board.

If the appeal is sustained, the case shall be referred back to the hearing board for a new hearing. Except for such appeals, the judgment of the hearing board shall be final.

**D. Modification of Academic Action and/or Administrative Penalty:** Within five (5) calendar days of receipt of the dean's letter, the student may appeal the instructor's determination of the academic action, and/or the dean's administrative penalty, as provided below.

**Request for Modification of Academic Action:** A request for review of the academic action taken under paragraph A may be directed to the CEP Subcommittee on Grade Appeals. If the case has been heard by the hearing board, the CEP Subcommittee on Grade Appeals shall receive the report of the hearing board and accept its findings as to the facts of the case.

**Request for Reduction of Administrative Penalty:** An appeal of the dean's administrative penalty under the provisions of paragraphs A or C shall be directed by an undergraduate student to the provost of his or her college, or by a graduate student or IA to the dean of Graduate Studies.

#### **OTHER POLICY**

While the case is pending, the student may not drop the course in which he or she is accused of dishonesty. If the case has not been adjudicated before the end of the quarter, the instructor shall not assign a grade in the course, but shall put a faculty hold in the memoranda column of the grade report, and

the case may be continued into the next regular academic quarter.

If the student withdraws from UCSD before the final disposition of the case, the following policy shall govern. If the student is found to have committed an act of academic dishonesty, and the instructor assigns him or her a final grade in the course, this grade shall be permanently entered on the transcript. If the administrative penalty is dismissal, the transcript shall bear a notation that readmission is contingent upon the approval of the chancellor. Any administrative penalty less severe than dismissal shall be imposed when the student returns to the university.

If the final decision in the case results in dismissal of the student, a record of the case and its outcome shall be established, in the Office of the Vice Chancellor for Student Affairs or the Office of Dean of Graduate Studies, depending on the registration status of the student. If the administrative penalty is suspension or dismissal, the fact that the student was suspended or dismissed for academic dishonesty must be posted on the academic transcript for the duration of the suspension or dismissal.

If a case of suspected academic dishonesty is also the subject of an administrative inquiry under the Policy on Integrity of Research, then the vice chancellor of Academic Affairs, in consultation with the hearing board, may make such modifications in procedure as are necessary to coordinate the two inquiries.

The appropriate dean can extend any timelines in this policy.

### **Special Programs**

#### ***Education Abroad Program and the Opportunities Abroad Program***

Please refer to the "Courses, Curricula, and Programs of Instruction" section of this catalog, where the Education Abroad Program and the Opportunities Abroad Program are described in full.

#### ***Intercampus Transfer (ICT)***

An undergraduate in good academic standing who is now, or was previously, registered in

a regular session at any campus of the University of California and has not since registered at any other institution may apply for admission as a transfer in the same status to another campus of the university.

#### **HOW TO APPLY**

Intercampus transfers must complete the University of California Undergraduate Application form. These forms are available in the Office of the Registrar. You may apply to one or to as many as eight UC campuses of the university using one application form. Send your completed application to:

University of California  
Admissions Application Processing Service  
P.O. Box 23460  
Oakland, CA 94623-0460

Mail only your application form, fees, and essay to the processing service address above. Send your transcripts, test scores, and all other correspondence relating to your application directly to the Admissions Office at the university campus(es) to which you apply. The processing service will not forward them.

#### **APPLICATION FEES**

The basic application fee of \$40 entitles you to apply to one university campus. If you apply to more than one campus, you must pay an additional \$40 for each campus you select. These fees are not refundable.

#### **WHEN TO APPLY**

Priority dates for filing applications for inter-campus transfer are identical to the application filing dates for new students: fall, November 1-30; winter, July 1-31; and spring, October 1-31. UC Berkeley fall semester, November 1-30; spring semester, July 1-31.

A campus will accept applications after the priority period only if it still has openings. If you apply after the priority filing period to a campus that is no longer accepting applications, the Admissions Application Processing Service will notify you by mail that your application will not be forwarded to that campus. In this case, you may receive a full or partial refund of the application fee.

Please note: UCSD does not accept applications for winter and spring quarters.

### *Intercampus Visitor (ICV)*

Qualified undergraduates may take advantage of educational opportunities on other campuses of the University of California as an Intercampus Visitor (ICV). This program is designed to enable qualified students to take courses not available on their home campus, to participate in special programs, or to study with distinguished faculty members on other campuses of the university. Students who meet the following requirements should complete an application available in the Office of the Registrar.

1. An undergraduate student must have completed at least one year in residence on the home campus and have maintained a grade-point average of at least 2.0 (or equivalent) to apply as an intercampus visitor.
2. Approval of the appropriate provost office is required.

If students meet the above conditions, they should complete the ICV application form and return it to the Office of the Registrar on the home campus, on or before the appropriate deadlines listed above for an intercampus transfer (ICT). The ICV application is subject to approval of the host campus.

A nonrefundable fee of \$40 is charged for each ICV application.

### *ROTC*

UCSD does not have an ROTC program. Students may, however, with the permission of their college, enroll in ROTC courses at another institution in conjunction with completing their degree programs at UCSD.

ROTC courses are conducted on the campuses of the University of San Diego and San Diego State University (College of Extended Studies) for the Navy ROTC, and at San Diego State University for Army and Air Force ROTC. Further information on these programs may be obtained from the ROTC adviser at the Aerospace Studies Department, (619) 594-5545, and the Military Science Department, (619) 594-4943, at San Diego State University, or the Department of Naval Science, (619) 260-4811, at the University of San Diego.

### **Absence/Readmission to the University**

Students absent for no more than one quarter are considered to be continuing students and should contact the Office of the Registrar for registration information.

Undergraduates in good academic standing who are absent for two or more consecutive quarters must file an application for readmission no later than four weeks prior to the beginning of the quarter at the Office of the Registrar, 301 University Center. A nonrefundable fee of \$40 is charged.

Undergraduate students in good academic standing who are absent for **two quarters** are automatically readmitted to UCSD.

Undergraduate students in good academic standing who were absent for **three quarters or more**, and who have been readmitted, must consult with a college academic adviser before enrollment. Students must adhere to the graduation requirements in effect at the time of readmission or those subsequently established.

Students who were on probation or subject to dismissal the last quarter of attendance at UCSD, but were not dismissed, must consult with an academic adviser and establish a contract before enrollment.

Students who were dismissed from UCSD, but have subsequently met the conditions stipulated in their original dismissal letter, must consult with an academic adviser and establish a quarterly contract before readmission and enrollment.

Students who attended another institution since leaving UCSD must submit official transcripts for all academic work completed. This work must be of passing or higher quality.

In the case of major departments with approved screening criteria, students may be readmitted as pre-majors.

### *Withdrawal from the University*

Enrolled or registered (paid fees) students who wish to withdraw either prior to or during the quarter are required to complete the Undergraduate Application for Withdrawal. The form should be filed with the student's college aca-

ademic advising or dean's office. These forms serve two purposes: 1) a means to provide a refund of fees, if appropriate (see below); 2) automatic withdrawal from classes (see also "The W Grade"). Students considering withdrawing are urged to consult with their respective college. The colleges recognize that there are many reasons for students withdrawing from the university.

### *Refund Policy*

#### **NEW UNDERGRADUATE STUDENTS**

Prior to the first day of instruction, the registration fee is refunded minus the \$100 statement of intention to register fee.

#### **REFUND SCHEDULE**

The following schedule of refunds is effective beginning with the first day of instruction and refers to calendar days (including weekends):

0-1 days	2-7 days	8-18 days	19-35 days	36 days and over
100 percent	90 percent	50 percent	25 percent	0 percent

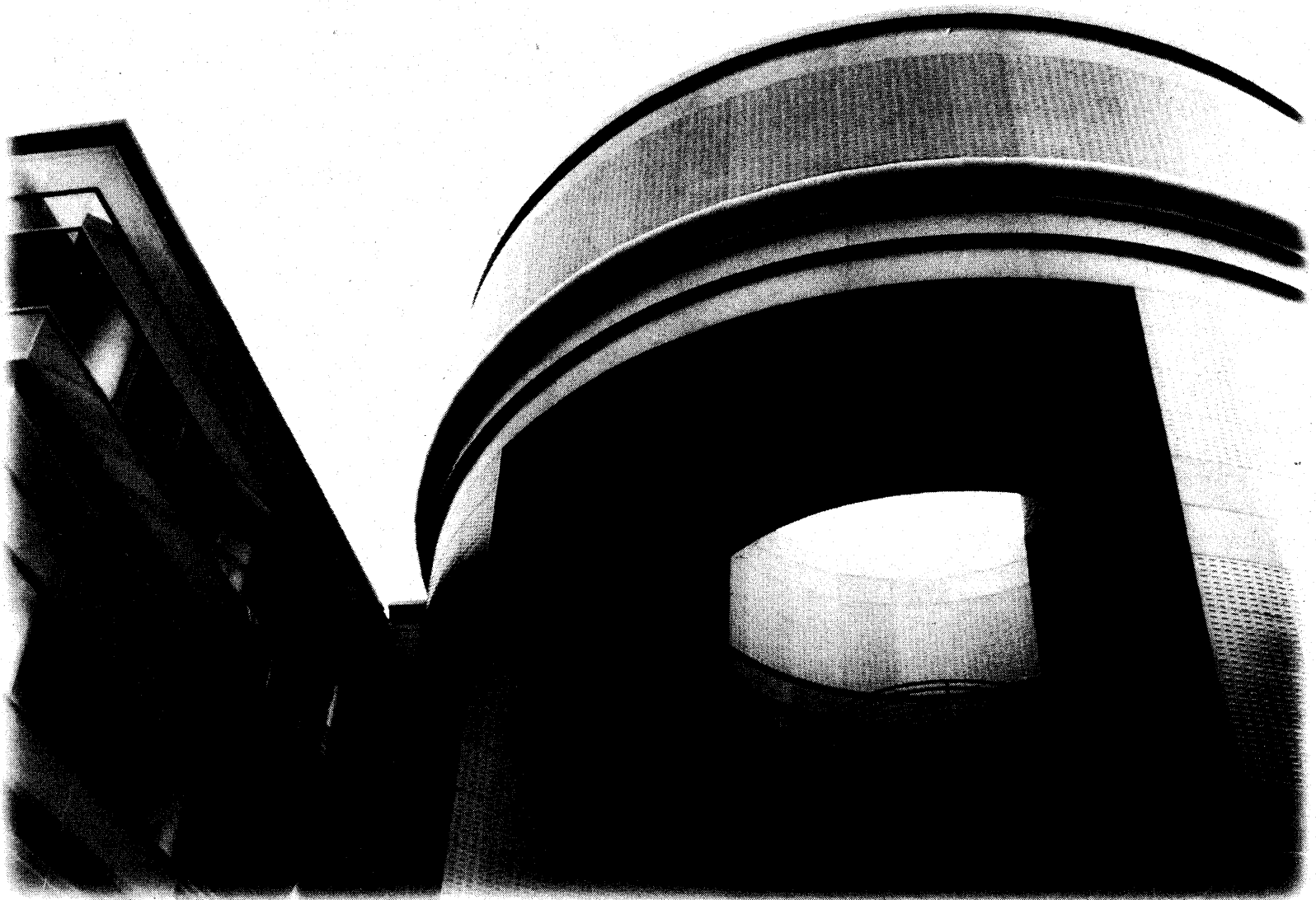
The effective date of withdrawal used in determining the percentage of fees to be refunded is the date indicated on the withdrawal form by the college academic advising or dean's office.

New students receiving Title IV federal financial aid, who withdraw during their first quarter at UCSD, will receive a pro rata refund if they withdraw by the end of the sixth week of the quarter.





## Graduate Studies



At the University of California, San Diego all programs leading to master's degrees and the doctor of philosophy degree are under the jurisdiction of the Graduate Council and are administered by the Office of Graduate Studies and Research.

The combined administrative responsibility for graduate studies and for research reflects the intention of the San Diego campus to emphasize the research character of graduate education.

Graduate study involves more than the accumulation of credits. Although certain formal requirements exist, a plan of study cannot be

programmed in advance simply by listing courses to be taken and by indicating the time to be devoted to research. The Ph.D. and most master's degrees are the culmination of creative effort; they attest to the ability of the recipient to continue original inquiry. In addition to requiring original research, most of UCSD's graduate programs expect their students to obtain teaching experience.

From its beginning, UCSD was determined to offer intellectual opportunities not elsewhere available. Much of the training it offers takes place outside the classroom—not only in seminars but in independent research and in tutorial

work. In addition to the permanent faculty, there are many visitors from other universities; there are opportunities to study at other campuses of the University of California; and there is frequent association between members of the university and those individuals who have come here to work within the research institutes at the UCSD campus. La Jolla has become one of the most important intellectual centers of the West. Not only has UCSD attracted many of the world's great scholars, but other research institutions located nearby such as the Salk Institute for Biological Studies and the Scripps Research Institute have enhanced the area's reputation.

## The Nature of Graduate Instruction

Graduate courses demand, on the part of both instructor and student, a capacity for critical analysis and a degree of research interest beyond those appropriate for undergraduate study. These courses generally carry a number in the 200 series and may be conducted in any of several ways: (1) as advanced lecture courses; (2) as seminars in which faculty and students present critical studies of selected problems within the subject field; (3) as independent reading or study under faculty supervision; or (4) as research projects conducted under faculty supervision. Graduate courses numbered 400–499 are designed for professional programs leading to degrees other than the M.A., M.S., M.F.A., or Ph.D. These courses may not be used to satisfy minimum graduate course requirements for degrees other than the specific degree program for which they are offered. Courses at the upper-division level (100–197) may be taken in partial satisfaction of the requirements for an advanced degree.

Graduate students may take lower-division courses (1–99), for a letter grade but grades earned in those courses will not be considered in their overall grade point average (GPA) for the purpose of determining good standing, except for students in the M.P.I.A. program who may take lower-division language courses for a letter grade and for inclusion in their GPA for the purpose of determining good standing.

The graduate student is accorded considerable liberty in choice of courses as long as minimum departmental core course, departmental requirements and grading standards, and residency requirements are met.

## Administration

### *The Office of Graduate Studies and Research*

The Office of Graduate Studies and Research is administered by a dean appointed by the president of the university on recommendation of the chancellor. The dean of Graduate Studies, vice chancellor for research (dean), is responsible for graduate admissions; graduate degree programs; the administration of fellow-

ships, traineeships, and other graduate student support; the development of new programs; and the maintenance of common standards of high quality in graduate programs across the campus.

The dean reports to the senior vice chancellor of Academic Affairs and to the Graduate Council, on the administration of graduate affairs.

### *The Graduate Council*

The Graduate Council is a standing committee of the San Diego Division of the Academic Senate composed of faculty and student representatives from graduate programs on the campus. The primary function of the council is to exercise overall responsibility for graduate study programs and to implement systemwide policies, procedures, requirements, and standards.

### *The Graduate Adviser*

The graduate adviser in a department, group, or school is the faculty member to whom graduate students direct requests for information about graduate study in a particular program.

The graduate adviser's duties include:

1. Advising the dean on admission of graduate students.
2. Advising graduate students regarding their programs of study and other matters pertinent to graduate work.
3. Appointing individual advisers for each graduate student.
4. Approving official study lists.
5. Acting on the petitions of graduate students.
6. Insuring that adequate records are maintained on all graduate students in the department, group, or school, and supplying relevant information as requested by the dean.
7. Assisting the dean of Graduate Studies in the application of university regulations governing graduate students, graduate study, and graduate courses.
8. Advising the chair of the department and the dean of Graduate Studies about developments of the graduate program in the department, group, or school.

### *Graduate Student Association*

The Graduate Student Association (GSA) is the officially recognized graduate student government at UCSD. It represents all graduate and medical students—including those at Scripps Institution of Oceanography, the Graduate School of International Relations and Pacific Studies, and the School of Medicine—in academic, administrative, campus, and university matters. The GSA Council, composed of five executive officers and representatives from each department, group and school, nominates graduate student representatives for appointment to campus governing bodies and committees, including the Graduate Council, the Registration Fee Committee, and the systemwide Student Body Presidents' Council. The GSA also sponsors projects and social activities designed to improve the academic and social lives of students. Meetings are open to all graduate and School of Medicine students.

For more information contact the GSA at (619) 534-6504.

### *Graduate Student Diversity*

The University of California, San Diego actively recruits and admits qualified students to graduate programs who will enhance the diversity of UCSD graduate programs.

Students who have overcome significant economic, educational, or social hardship in pursuit of their education or whose presence would enhance campus or departmental diversity in other ways are eligible for awards through the San Diego and Cota-Robles Fellowship Program. Fellows receive a stipend plus tuition and/or fees for at least four years. Students must be U.S. citizens or permanent residents. Integral to the fellowship experience, fellows are assigned a faculty mentor in their major department to assist with academic and research goals.

Fellows making good progress are eligible for departmental financial support for subsequent years usually in the form of teaching, research, and language assistantships.

For assistance and further information about special opportunities for underrepresented students, contact the assistant dean for Student Affairs, Office of Graduate Studies and Research, 518 ERC, (619) 534-2770 or (619) 534-3555.

For additional information on students with disabilities, see "Disabled Student Services."

**GRADUATE DEGREES OFFERED: 1997-98**

Anthropology	Ph.D.	History	M.A., Ph.D.
Bioengineering	M.S., Ph.D.	(Judaic Studies)	M.A.
Biology	M.S.***, Ph.D.	International Affairs	
Biology	Ph.D.	Pacific International Affairs	M.P.I.A.
(Joint doctoral degree with San Diego State University)		International Affairs	Ph.D.** <sup>1</sup>
Biomedical Sciences	Ph.D.*	International Technology and Management	M.I.T.M.**
Chemistry	M.S.***, Ph.D.*	Language and Communicative Disorders	
(Biochemistry)	Ph.D.*	(Joint doctoral degree with San Diego State University)	Ph.D.
Chemistry	Ph.D.	Latin American Studies	M.A.
(Joint doctoral degree with San Diego State University)		Linguistics	Ph.D.*
Clinical Psychology	Ph.D.	Literature	Ph.D.
(Joint doctoral degree with San Diego State University)		Comparative	M.A.
Cognitive Science	Ph.D.*	English and American	M.A.
Communication	Ph.D.*	French	M.A.
Comparative Studies in Language, Society, and Culture	Ph.D.§	German	M.A.
Computer Science	M.S., Ph.D.	Spanish	M.A.
(Advanced Manufacturing)	M.S.	Marine Biology	Ph.D.*
(Computer Engineering)	M.S., Ph.D.	Materials Science	M.S., Ph.D.
Earth Sciences	M.S.***, Ph.D.*	Mathematics	M.A., Ph.D.
Economics	Ph.D.*	Mathematics (Applied)	M.A.
Economics and International Affairs	Ph.D.**	Statistics	M.S.
Electrical Engineering	M.Eng.**	Mathematics and Science Education	
(Advanced Manufacturing)	M.S.	(Joint doctoral degree with San Diego State University)	Ph.D.
(Applied Ocean Science)	M.S., Ph.D.	Molecular Pathology	Ph.D.
(Applied Physics)	M.S., Ph.D.	Music	M.A., Ph.D., D.M.A.
(Computer Engineering)	M.S., Ph.D.	Neurosciences	Ph.D.*
(Communication Theory and Systems)	M.S., Ph.D.	Oceanography	Ph.D.*
(Electronic Circuits and Systems)	M.S., Ph.D.	Philosophy	Ph.D.*
(Intelligence Systems, Robotics and Control)	M.S., Ph.D.	Physics	M.S., Ph.D.
(Photonics)	M.S., Ph.D.	(Biophysics)	Ph.D.
Engineering Sciences		Political Science	Ph.D.*
(Advanced Manufacturing)	M.S.	Political Science and International Affairs	Ph.D.**
(Aerospace Engineering)	M.S., Ph.D.	Psychology	Ph.D.*
(Applied Mechanics)	M.S., Ph.D.	Public Health (Epidemiology)	
(Applied Ocean Science)	M.S., Ph.D.	(Joint doctoral degree with San Diego State University)	Ph.D.
(Chemical Engineering)	M.S., Ph.D.	Sociology	Ph.D.*
(Engineering Physics)	M.S., Ph.D.	Teaching and Learning	
(Mechanical Engineering)	M.S., Ph.D.	(Curriculum Design)	M.A.
(Structural Engineering)	M.S., Ph.D.	(American Sign Language)	M.A.
Engineering Sciences (Applied Mechanics)		Theatre	M.F.A.
(Joint doctoral degree with San Diego State University)	Ph.D.	(Joint doctoral degree with University of California, Irvine)	Ph.D.**
Ethnic Studies	Ph.D.	Visual Arts	M.F.A.

\*The master's degree may be awarded to students pursuing work toward the Ph.D. after fulfillment of the appropriate requirements. See appropriate section of catalog.

\*\*Pending approval

\*\*<sup>1</sup> Pending approval, Ph.D. admission in 1999 will only be to Political Science & International Affairs or Economics & International Affairs.

§ Students who have completed some graduate study at UCSD and have been admitted to a doctoral program may apply for this interdisciplinary program.

\*\*\*UCSD undergraduates in the junior or senior year may apply to their respective departments for admission to the integrated BS/MS degree program. A similar program is available to UCSD undergraduates in several of the engineering specialties. Consult department personnel and/or catalog departmental listing for complete information.



### *Career Services for Graduate Students*

The Career Services Center offers a wide range of programs and services to assist graduate students with their career planning and job search needs. Individual career counseling is available on both an appointment and drop-in basis. In addition, workshops and special events are regularly offered covering such areas as résumé writing, job search strategies, and non-academic employment options. The Career Services Center houses a career reference library containing information on employers, job listings, salaries, sample résumés, and publications pertinent to graduate students' career issues. An online database and Internet access computer lab is also available to assist in placement efforts. For more information, see the "Career Services" section of this catalog or visit the Career Services Office.

### **General Requirements for Higher Degrees**

#### *Courses and Grades*

Only upper-division and graduate courses in which a student is assigned grades A, B, C (including plus [+] or minus [-]), D, or S are

counted in satisfaction of the requirements for the master of fine arts, master of Pacific international affairs, master of arts, master of science, doctor of musical arts, and doctor of philosophy degrees. An Incomplete grade, as well as an NR, will automatically lapse to an F or U if it has not been removed when the final report for the degree is approved by the Office of Graduate Studies and Research. (See also "Grades.")

Undergraduate language courses and courses in the 400 series are only used for degree credit in the program for the M.P.I.A. degree offered by the Graduate School of International Relations and Pacific Studies. For course information see the section on "International Relations and Pacific Studies" elsewhere in this catalog.

### *Registration in the Final Quarter for the Award of the Degree*

A student completing course work, using university facilities including the library, or making any demands upon faculty time (other than final reading of the thesis or dissertation, or administering the comprehensive or doctoral examination), must register in the final quarter in which the degree is to be conferred. Students who need only to submit their theses or dissertations, or to take the comprehensive or

final examination may pay a filing fee in lieu of registration in the final quarter (see "Filing Fee").

### **The Master of Arts and Master of Science Degrees**

The master of arts and master of science degrees are offered under two plans: Plan I, Thesis, and Plan II, Comprehensive Examination. Since some departments offer both plans, with varying unit requirements, students should consult with their advisers before selecting a plan for completion of degree requirements.

#### *Programs of Study*

##### **PLAN I: THESIS PLAN**

A minimum of at least thirty-six quarter-units are required: eighteen units in graduate courses, including a minimum of twelve units in graduate-level courses in the major field; twelve additional units in graduate or upper-division courses; and six units in research course work leading to the thesis. Consult your department for specific unit and course requirements.

Following advancement to candidacy, the student electing Plan I must submit a thesis. The thesis committee, appointed by the chair of the department or group and approved by the dean of Graduate Studies, consists of at least three faculty members with at least two from the candidate's major department.

Information covering thesis preparation is contained in the publication, *Instructions for the Preparation and Submission of Doctoral Dissertations and Masters' Theses*, which is mailed to students electing Plan I, upon their advancement to candidacy. The completed thesis is submitted to the thesis committee for review.

When all members of the committee have approved the thesis, a Final Report of the Thesis for the Master of Arts or Master of Science Degree under Plan I must be completed. The candidate submits the thesis to the Office of Graduate Studies and Research and upon approval by the dean of Graduate Studies, files the thesis with the university archivist who accepts it on behalf of the Graduate Council. Acceptance of the thesis by the archivist with a subsequent second approval by the dean of Graduate Studies represents the final step in the completion of all requirements by the can-

didate for a master of arts or master of science degree on the San Diego campus.

## **PLAN II: COMPREHENSIVE EXAMINATION PLAN**

A minimum of at least thirty-six quarter-units are required: twenty-four units in graduate courses, including a minimum of fourteen units in graduate-level courses in the major field; and twelve additional units in graduate or upper-division courses. Consult your department for specific unit and course requirements.

### *Apprentice Teaching*

A maximum of six units of 500-level courses (apprentice teaching) may be credited toward the degree requirements.

### *Academic Residence*

The minimum residence requirement is three academic quarters, at least one of which must follow advancement to candidacy. Academic residence is met by satisfactory completion of six units or more per quarter, some of which must be graduate level.

A candidate must be registered in the quarter in which the degree is to be awarded. (See "Registration in the Final Quarter for the Award of the Degree.")

### *Advancement to Candidacy*

After completing all preliminary requirements of the major with a GPA equivalent to 3.0 in upper-division and graduate course work undertaken, a total of no more than eight units of F and/or U grades, and a minimum of two quarters or more of residency, the student may file an Application for Candidacy for the Thesis or Comprehensive Examination, Plan I or II, for the Master of Arts or Master of Science Degree. An application for candidacy must be filed no later than two weeks after the first day of the quarter in which degree requirements are to be completed. (See "Academic Calendar.")

Following advancement to candidacy, the student electing Plan II must pass a comprehensive examination administered by the major department. A Final Report of the Comprehensive Examination for the Master of Arts or Master of Science Degree under Plan II is used to report successful completion of the examination requirement.

### *Transferring Credit*

With the approval of the department concerned and the dean of Graduate Studies, upper-division and graduate course work completed with a grade of B- or better while in graduate standing at another campus of the University of California may be accepted in satisfaction of one of the three quarters of residence and up to one-half of the quarter-units of credit required for the master's degree at UCSD.

On the recommendation of the major department and with the approval of the dean of Graduate Studies, a maximum of eight quarter-units of credit for work completed with a grade of B- or better in graduate standing at an institution other than the University of California may be applied toward a master's degree at UCSD.

In any case, no more than a total of one-half of the units required for a master's degree may be transferred in from any UC or other institutions. Courses used for a previous degree may not be transferred. A letter from the institution from which the courses are being transferred will be required stating the courses were not used toward another degree.

Course work approved for transfer credit will not be included in calculating a student's grade-point average, regardless of the source.



### **Master of Engineering (M.Eng.)**

The campus is seeking approval for a master of engineering degree program to begin during the academic year 1998-1999. Details regarding the program may be obtained from the Department of Electrical and Computer Engineering.

### **The Master of Fine Arts Degree**

The master of fine arts degree is offered under a modified thesis plan. A short written thesis that may be regarded as a position paper, presenting a descriptive background for the student's work, is required. There is no written final examination, but great weight is given to the candidate's final presentation and the oral defense of the thesis.

### *Program of Study*

#### **PLAN III: MODIFIED THESIS PROGRAM**

Seventy-two quarter-units for visual arts and ninety quarter-units for theatre, with a GPA equivalent to 3.0 in upper-division and graduate course work undertaken, are required for a master of fine arts degree. Information covering thesis preparation is contained in the publication, *Instructions for the Preparation and Submission of Doctoral Dissertations and Masters' Theses*, which is mailed to students upon their advancement to candidacy. The completed thesis is submitted to the thesis committee for review.

Following the filing of an Application for Candidacy for the Modified Thesis, Plan III, the candidate must submit a thesis. The thesis committee, appointed by the chair of the department and approved by the dean of Graduate Studies, consists of four faculty members (three from the department and one, preferably tenured, from outside the department).

When all members of the committee have approved the thesis, a Final Report of the Modified Thesis Examination, Plan III, for the Master of Fine Arts Degree must be completed. Approval by the dean of Graduate Studies and subsequent acceptance of the thesis by the

university archivist. Special Collections, represents the final step in the completion of all requirements by the candidate for a master of fine arts degree on the San Diego campus.

### *Academic Residence*

The minimum residence requirement is six academic quarters for visual arts and eight academic quarters for theater, at least one of which must follow advancement to candidacy in either program. Academic residence is met by satisfactory completion of six units or more per quarter, some of which must be graduate level. The entire residence requirement must be satisfied at UCSD.

A candidate must be registered in the quarter in which the degree is to be awarded. (See "Registration in the Final Quarter.")

### *Advancement to Candidacy*

After completing all preliminary requirements of the department with a GPA equivalent to 3.0 in upper-division and graduate course work undertaken, a total of no more than eight units of F and/or U grades, and a minimum of five quarters of residency, the student may file an Application for Candidacy for the Modified Thesis, Plan III, for the Master of Fine Arts Degree. An application for candidacy must be filed no later than two weeks after the first day of the quarter in which degree requirements are to be completed. (See "Academic Calendar.")

### *Graduate Work Completed Elsewhere*

In exceptional circumstances, a student may be given a leave of absence for the purpose of studying elsewhere. While appropriate credit may be allowed for course work completed elsewhere with a grade of B or better in a graduate program, the period involved will not reduce the UCSD academic residence requirement of six academic quarters for visual arts and eight quarters for theatre.

### **The Master of Pacific International Affairs**

The master of Pacific international affairs program provides training for those interested in pursuing professional careers in international affairs and international management with an

emphasis on the countries of the Pacific Rim. For degree requirements and curriculum, please refer to the International Relations and Pacific Studies description under the catalog listings of programs of instruction.

### **Master of International Technology Management (M.I.T.M.)**

The campus is seeking approval for a master of international technology management degree program to begin during the academic year 1998-1999. Details regarding the program may be obtained from the Graduate School of International Relations and Pacific Studies.

### **The Doctor of Musical Arts Degree (D.M.A.)**

The DMA degree emphasizes the dual preparation for professional careers in the performance of contemporary music, as well as in the equally demanding area of teaching these skills on an advanced level. Candidates for this degree are expected to demonstrate musical excellence, artistic maturity, and the capability for doing original scholarly work. For degree re-

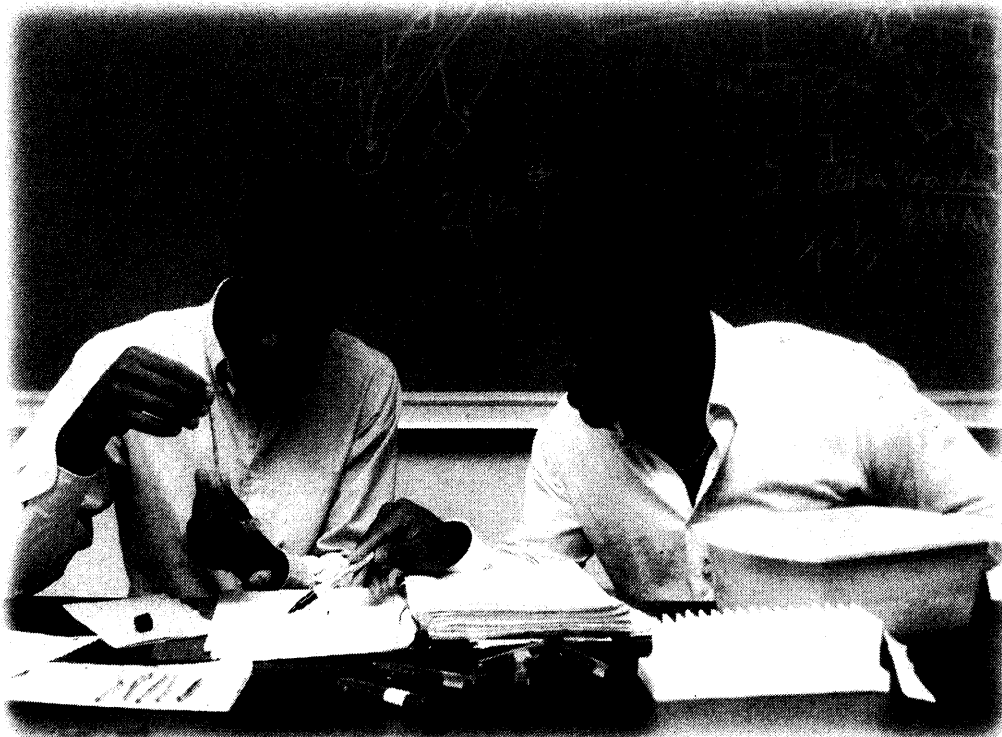
quirements and curriculum, please refer to the Department of Music description under the catalog listings of programs of instruction.

### **The Doctor of Philosophy Degree**

The doctor of philosophy degree is a research oriented degree which requires individual study and specialization within a field or the establishment of connections among fields. It is not awarded solely for the fulfillment of technical requirements such as academic residence and course work. Candidates are recommended for the doctorate in recognition of having mastered in depth the subject matter of their discipline and having demonstrated the ability to make original contributions to knowledge in their field of study. More generally, the degree constitutes an affidavit of critical aptitude in scholarship, imaginative enterprise in research, and proficiency in communication, including—in most departments—practice in teaching.

### *Program of Study*

The student's program of study is determined in consultation with the adviser who





supervises the student's activities until the appointment of the doctoral committee. A doctoral program generally involves two stages.

The first stage requires at least three quarters of academic residence and is spent in fulfilling the requirements established by the Academic Senate and by the major department, group, or school. When the department considers the student ready to take the qualifying examination, it arranges for the appointment of a doctoral committee. Immediately upon passing the qualifying examination administered by the doctoral committee, the student advances to candidacy.

The second or in-candidacy stage is devoted primarily to independent study and research and to the preparation of the dissertation. A minimum interval of three quarters of academic residence must elapse between advancement to candidacy and the filing and final defense of the dissertation.

### *Foreign Language Requirements*

Some doctoral programs require candidates to demonstrate language proficiency in one or more languages as part of the formal requirements for the Ph.D. degree. In these cases, the testing of proficiency is the responsibility of the department, group, or school concerned.

### *Ph.D. Time Limits*

All graduate students in doctoral programs are subject to campus policy on time limits to the Ph.D. Each graduate program has three time limits pertaining to students' academic progress toward the Ph.D. degree:

(1) the registered time by which a student must advance to Ph.D. candidacy; (2) the registered time during which a doctoral student is *eligible* for support; and (3) the registered time by which a student must complete all Ph.D. requirements. Students will not be permitted to continue in doctoral status beyond the pre-candidacy and total registered time limits. Students will not be permitted to receive UCSD-administered financial support beyond the support limit. Information about these time limits is given in the descriptions of each department's graduate program in this *catalog* and departmental publications.

University policy requires that graduate students be continuously registered—unless on an

approved leave of absence—from the first quarter of enrollment to completion of degree requirements. (See "Continuous Registration" and "Leave of Absence.")

For purposes of calculating when precandidacy and total registered time limits are reached, accrued time is the elapsed time from first enrollment as a graduate student at UCSD less (a) time withdrawn or on approved leave of absence, and (b) time between completion of one graduate program at UCSD and first registration in another. For the support time limit, a maximum of three quarters of approved leave or withdrawal may be deducted from elapsed time in calculating accrued time. Time spent in graduate study at another institution or University of California campus prior to beginning graduate study at UCSD will not count toward accrued time, with the exception of students entering the Ph.D. program in electrical engineering, computer science, or music who have earned a master's degree in that discipline. All of the following will count toward accrued time: time spent at UCSD as a master's, non-degree, or intercampus exchange graduate student; time spent on leave beyond three quarters; time spent between completion of or withdrawal from a graduate program at UCSD and re-registration in the same field of study. Pre-candidacy and total registered time limits will not accrue during periods of leave of absence and/or withdrawal in excess of three quarters.

Further information may be obtained from departmental graduate coordinators or the Office of Graduate Studies and Research.

### *Academic Residence*

The minimum residence requirement for the doctor of musical arts degree and doctor of philosophy degree is six quarters, three of which must be in continuous academic residence at UCSD. Residency is established by the satisfactory completion of six units or more per quarter, at least some of which must be at the graduate level. Joint doctoral students meet the UCSD academic residency requirement by successfully completing a minimum of thirty-six units of course work at UCSD.

A candidate must be registered in the final quarter in which the degree is to be awarded. (See "Registration in the Final Quarter." p.00)

### *The Doctoral Committee*

At least three weeks prior to a scheduled qualifying examination, the department requests approval for the appointment of the doctoral committee by the dean of Graduate Studies. This committee conducts the qualifying examination, supervises the preparation of and passes upon the dissertation, and administers the final examination.

The committee consists of five or more officers of instruction, no fewer than four of whom shall hold professorial titles of any rank. The committee members shall be chosen from two or more departments; at least two members shall represent academic specialties that differ from the student's field and one of these two must be a tenured UCSD faculty member from another department. Consult the departmental graduate coordinator or the Office of Graduate Studies and Research for further details.

### *Reconstituted Doctoral Committee*

For a variety of reasons a doctoral committee may need to be reconstituted. The request for reconstitution of the membership of a doctoral committee must be submitted in writing to the dean of Graduate Studies by the chair of the candidate's major department, group, or school no less than two weeks prior to the qualifying examination or defense of the dissertation. The request must include departmental affiliation of the members of the proposed reconstituted committee and the reason(s) for requesting the change.

### *Qualifying Examination and Advancement to Candidacy*

The doctoral committee administers the qualifying examination and authorizes the issuance of the Report of the Qualifying Examination and Advancement to Candidacy for the Degree of Doctor of Philosophy. Formal advancement to candidacy requires the student to pay a candidacy fee to the cashier prior to submitting the form to the dean of Graduate Studies for approval. Students must maintain a GPA equivalent to 3.0 or better in upper-division and graduate course work undertaken with a total of no more than eight units of F and/or U grades in order to take the qualifying examination and advance to candidacy.

If the committee does not issue a unanimous report on the examination, the dean of Graduate Studies shall be called upon to review and present the case for resolution to the Graduate Council, which shall determine appropriate action.

### ***Dissertation and Final Examination***

A draft of the doctoral dissertation should be submitted to each member of the doctoral committee at least four weeks before the final examination. The form of the final draft must conform to procedures outlined in the publication, *Instructions for the Preparation and Submission of Doctoral Dissertations and Masters' Theses*, which is mailed to candidates upon their advancement to candidacy.

The doctoral committee shall supervise and pass on the candidate's dissertation and conduct the final oral examination which shall be public and so announced.

If the committee does not issue a unanimous report on the examination, the dean of Graduate Studies shall be called upon to review and present the case for resolution to the Graduate Council, which shall determine appropriate action.

The Report of the Final Examination and Filing of the Dissertation for the Degree of Doctor of Philosophy form is initiated by the department, group, or school, signed by members of the doctoral committee, and the chair of the (major) department, group, or school.

The candidate submits the dissertation to the Office of Graduate Studies and Research and, upon approval by the dean of Graduate Studies, files the dissertation with the university archivist, who accepts it on behalf of the Graduate Council. Acceptance of the dissertation by the archivist, with a subsequent second approval by the dean of Graduate Studies, represents the final step in the completion by the candidate of all requirements for the doctor of philosophy degree. All dissertations and theses submitted in partial satisfaction of Ph.D. or master's degree requirements shall be catalogued and shelved in the university library and submitted to University Microfilms, Inc., for publication.

### ***Candidate in Philosophy Degree***

In several departments, as approved by the Graduate Council, the intermediate degree of

candidate in philosophy (C.Phil.) is awarded to students upon advancement to candidacy for the Ph.D. degree. The minimum residence requirement for this degree is three quarters of continuous academic residence at UCSD. The C.Phil. degree cannot be conferred before the master's degree, or simultaneously with or following the award of a Ph.D. degree.

### ***Letter of Completion***

The Office of Graduate Studies and Research will direct the Office of the Registrar to issue a Letter of Completion to a graduate student who has completed all requirements for a higher degree but whose diploma has not yet been issued.

### ***Postgraduate Appointments***

A UCSD graduate student is not eligible for any UCSD postdoctoral appointment until all requirements for the Ph.D. degree have been completed. Such appointments may begin after the university archivist has accepted the dissertation and the Office of Graduate Studies and Research has accepted the final report.

## **Special Degree Programs**

### ***Graduate Programs in the Health Sciences***

The university offers research training programs in the health sciences leading to the doctor of philosophy degree. The purpose of these graduate programs is to prepare students for careers in research and teaching in the basic medical sciences. Program requirements are flexible, consisting of graduate courses and supervised laboratory or clinical investigation. Graduate programs in the health sciences are offered by (1) regular campuswide departments with activities related to the health sciences, for example, the Departments of Applied Mechanics and Engineering Sciences, Bioengineering, Biology, Chemistry and Biochemistry, and Psychology and (2) interdisciplinary groups of faculty drawn from the School of Medicine and from campuswide departments or from San Diego State University.

The following departments or interdisciplinary graduate groups provide research training opportunities in the biomedical sciences and

should be contacted directly for further information: biomedical sciences, biochemistry (in either biology or chemistry and biochemistry), bioengineering, biology, biophysics, chemistry, clinical psychology, molecular pathology, neurosciences, physics, psychology, public health (epidemiology), and the Scripps Institution of Oceanography.

### ***Ph.D.-M.D. Program***

Students may meet the requirements for both the Ph.D. and M.D. degrees in programs offered jointly by the School of Medicine and the graduate programs in the health sciences. In most cases, students are first admitted to the School of Medicine and may then apply for admission to a relevant graduate program. However, those students who wish to be considered for admission to the Medical Scientist Training Program (MSTP) may apply for admission to the School of Medicine and the MSTP concurrently.

Elements of the first two years of the medical school curriculum satisfy many of the requirements of the graduate program, but additional courses will be required. Thus, the student must complete requirements for the Ph.D. in accordance with the regulations of a department or a group and must in addition meet the requirements for the professional degree. Students interested in such programs should consult the associate dean for Student Affairs, School of Medicine.

### ***Joint Doctoral Programs***

Certain departments of the University of California cooperate with similar departments on the several campuses in the California State University System to offer joint programs of study leading to the Ph.D. degree. At UCSD, joint doctoral programs in biology, chemistry, clinical psychology, language and communicative disorders, engineering sciences (applied mechanics), mathematics and science education, and public health (epidemiology) are currently offered in conjunction with San Diego State University. Applicants interested in these joint programs should consult the Departments of Biology, Chemistry and Biochemistry, Communicative Disorders, Mechanical Engineering, Psychology, or the Office of the Dean, College of Engineering; or the Center for Research in

Mathematics and Science Education, or School of Public Health at San Diego State University. Joint doctoral students meet the UCSD academic residency requirement by successfully completing a minimum of thirty-six units of course work at UCSD.

### Special Programs

#### *Intercampus Exchange Program for Graduate Students*

A graduate student registered on any campus of the University of California, who wishes to take advantage of educational opportunities for study and research available on another campus of the university, must apply to become an intercampus exchange student on that UC campus. UCSD students must have completed at least one quarter of study and be in good standing prior to beginning an exchange.

Informal arrangements between departmental faculty on the two campuses must be undertaken prior to submission of a student's application to assure that space in desired courses, seminars, or facilities will be available.

No later than four weeks prior to the opening of the term on the host campus, a student must complete the Application for Intercampus Exchange Program for Graduate Students obtainable at the Office of Graduate Studies and Research. This application, approved by the student's departmental graduate adviser and and the graduate dean of the home campus, is forwarded for approval by the department and the graduate dean on the host campus.

Students participating in an intercampus exchange must pay all required fees and enroll as appropriate at the home campus, and then present evidence of fee payment as directed by the host campus to enroll in class(es) on the host campus.

An exchange student is not admitted to graduate standing at the host campus but is considered a graduate student in residence at the home campus. Grades obtained in courses taken by the student enrolled in the intercampus graduate student exchange program are transferred to the home campus for entry on the student's official record. Library, health center, and other student privileges are extended by the host campus.



#### *Off-Campus Study*

(Other than Intercampus Exchange Program)

If the research and study program of a graduate student requires being off campus for extended periods of five weeks or more, the student may apply for off-campus study. During such periods a student is required to remain a registered student at UCSD and to carry twelve units of course work or research.

If the off-campus study is outside the state of California, one-half of the registration fee may be waived. All required fees including, but not limited to the full educational fee, student center fee, recreation facility fee, health insurance fee, and nonresident fee, if applicable, must be paid.

A graduate student who holds a fellowship, traineeship, or a research assistantship and desires to study off campus may do so under the following circumstances: The student must have completed at least one year of graduate study at UCSD, obtained the approvals of the academic department and the dean of Graduate Studies, and agreed to comply with the rules and regulations governing the award or appointment.

Regulations concerning accepting additional awards or compensation for appointments as

outlined under the financial assistance section apply to off-campus study as well as on-campus study.

#### *UCSD Extension*

Students wishing to offer UCSD Extension course work taken **prior** to admission at UCSD as a graduate student in partial satisfaction of requirements for a master's degree must file a General Petition with the Office of Graduate Studies and Research. Acceptance of such course work is subject to the regulations on "Transferring Credit" on page 81 of this catalog, the recommendation of the major department, and approval of the dean of Graduate Studies, and will be considered upon satisfactory completion of course work in a regular session.

#### **COMPLIMENTARY ENROLLMENT**

Through a reciprocal agreement with UCSD Extension, a limited number of spaces in extension classes are open to full-time graduate students (registered for twelve units or more) in good standing without payment of additional fees. The number of spaces available for each quarter varies. The student must obtain a UCSD Application for Enrollment from the Office of Graduate Studies and Research and personally

secure the necessary approvals. Coursework taken through Complimentary Enrollment cannot be used in partial satisfaction of requirements for a master's degree, nor can it be used toward the twelve-unit full-time enrollment requirement.

### Education Abroad Program

Graduate students may apply to study at most Education Abroad Program (EAP) host institutions, provided that they meet EAP requirements and have completed at least one year of graduate work prior to departure, are in good standing, and have the support of their academic department and graduate dean.

Costs vary according to location.

Students pay fees to the University of California and are enrolled at UCSD while abroad. Full academic credit is received for courses satisfactorily completed.

At UCSD, complete information and application forms for the various overseas campuses may be obtained from the Programs Abroad Office, International Center, University Center, 0018 or on the Programs Abroad Web site <http://orpheus.ucsd.edu/center/>. In addition, the Programs Abroad Office also offers information and advisory services to graduate and undergraduate students interested in pursuing other activities involving study, research, work, or travel abroad.

For a detailed list of the countries with EAP study centers, see also Education Abroad Program in chapter entitled "Courses, Curricula, and Programs of Instruction." Study abroad information is also available online by accessing the EAP Web site <http://www.ueap.ucsb.edu>.

### Postdoctoral Study

Postdoctoral fellows, trainees, scholars, and medical fellows play a major role in UCSD's teaching and research programs. All interested candidates should make advance arrangements with the appropriate department or research unit. The Office of Graduate Studies and Research has administrative responsibility for the appointment and census of postdoctoral scholars undertaking training at UCSD. A scholar is appointed by means of a Postdoctoral Study Appointment form initiated in the office of the faculty sponsor and is eligible for a UCSD academic photo identification card. When a

scholar has completed a period of postdoctoral study, the department at UCSD may request a Certificate of Postdoctoral Study from the Office of Graduate Studies and Research. This certificate will indicate the area of study and the dates of appointment.

Health Net, a prepaid health plan, and DentiCare, a prepaid dental plan, are available for purchase by UCSD postdoctoral scholars. All scholars are required to enroll in Health Net unless they have adequate coverage through another health insurance program. Information on Health Net, DentiCare, and enrollment procedures may be obtained from administrative offices of departments, groups, schools, or organized research units.

### Fees

Fees for the 1998-99 academic year are expected to increase less than five percent. The following schedule of fees is anticipated for the 1998-99 academic year:

#### FEES PER QUARTER\*

	Resident	Non-Resident
Tuition	\$	\$3,131.00
Registration	238.00	238.00
Educational	1,029.00	1,029.00
Student Center	37.50	37.50
Recreational		
Facilities	82.00	82.00
Graduate Student		
Assoc.	8.00	8.00
Health Insurance	241.00	241.00
Totals	\$1,635.50**	\$4,766.50**

#### Miscellaneous Fees and Fines

Students should also be aware of the following charges:

Application fee for admission	\$40
Duplicate Photo-ID card	10
Petition for Readmission	40
Removal of Grade "I"	5
Advancement to Candidacy for Ph.D.	50
Transcript of Record	5
Late payment of fees (Late registration)	50
Late filing of enrollment cards (including Preferred-Program Request)	50
Returned check collection	10
Filing fee	119.00

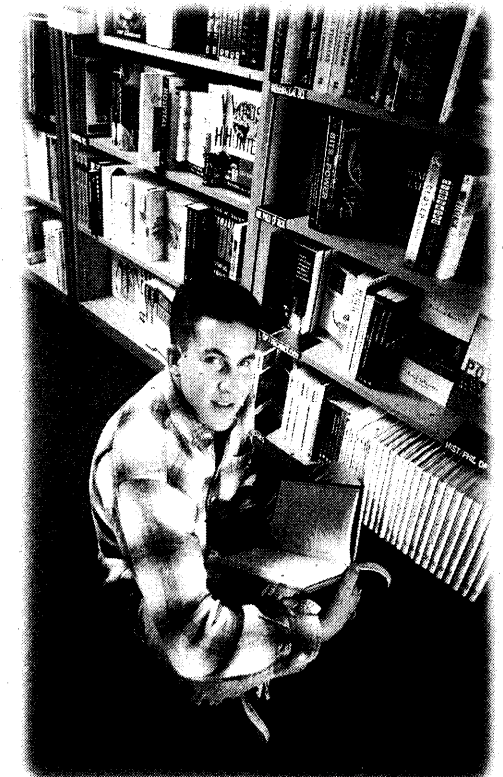
**\*Subject to change without notice.** All receipts for payments made to the cashier, whatever their nature, should be carefully preserved. Not only do they constitute evidence that financial obligations have been discharged, but they may be required to support a claim that certain documents or petitions have been filed.

\*\*Fees for graduate students approved for enrollment in a half-time program (not to exceed six units) may be reduced by one-half of the Educational fee.

### California Residency and the Nonresident Tuition Fee

Each new student entering UCSD is required to submit a Statement of Legal Residence to the Office of the Registrar. No tuition is charged to students classified as residents of California. Nonresidents, however, are required to pay a quarterly tuition fee.

A complete statement covering California residence requirements, determination of residence for tuition purposes, and/or recognized exceptions appears in the section "Residence Requirements" or on the Web site <https://hollerith.ucsd.edu/cgi-bin/studentlink.p1/5/students/finances/residency/>. Additional information may be obtained from the Campus Residence Deputy, Office of the Registrar, Building 301, University Center. No other university personnel are authorized to supply information



relative to residence requirements for tuition purposes.

To the extent funds are available, subject to change, waiver of nonresident tuition may be granted to spouses and dependent, unmarried children under age twenty-one of university faculty members who are qualified for membership in the Academic Senate. Inquiries should be directed to the Office of the Registrar or the Academic Senate Office.

### ***University Registration Fee***

The university registration fee is a quarterly fee required of all registered students, and it must be paid at the time of the student's registration. This fee is for services which benefit the student and are complementary to, but not part of, the regular instructional programs of the university. No part of this fee is refunded to students who do not make use of these services; however, students who petition and are approved for out-of-state study will receive a waiver for one-half of the registration fee. Exemption from this fee may be granted to surviving children of certain deceased California fire fighters or police officers. Students who believe they may qualify for an exemption on this basis must consult with the Student Financial Services Office, Building 201, University Center, for a ruling.

### ***Student Health Services and Insurance Plans***

The Student Health Center provides primary care without charge during the academic year for all students who pay the university registration fee. These services are also available during summer for a modest fee.

### ***The Graduate Student Health Insurance (GSHIP)***

GSHIP is a mandatory year-round insurance plan for graduate and professional students unless a waiver has been granted (see WAIVERS). Students must be enrolled in GSHIP for the spring quarter in order to retain coverage through summer. Three quarterly payments will provide year-round coverage under GSHIP. The spring quarter premium extends insurance coverage through the summer quarter.

Premium payment for GSHIP is due with the payment of the registration fee. Premiums for

students holding graduate academic appointment titles for a full academic term at 25 percent time or greater will be paid directly by the university. Premiums for most students holding fellowships and training grants are also paid directly. Loans to cover premiums may be available for students who receive need-based financial assistance. GSHIP is not available for dependents of graduate students.

For first-year students arriving on campus prior to the start of the academic calendar year, it is highly recommended that the student review current insurance status and purchase short term coverage if necessary. Insurance information may be obtained by calling the insurance counselor at (619) 534-2123.

### **REFUNDS**

Once registration fees have been paid, a refund of the insurance premium due to Leave of Absence or Withdrawal may be possible up to the end of the second week of classes.

### **LEAVE OF ABSENCE**

A student is eligible to be enrolled in GSHIP when on approved Leave of Absence for a total of three academic quarters. A student on approved leave is responsible for his or her enrollments and premium payments and for the Student Health Service access fee which is payable each quarter including summer. Enrollment in GSHIP is through the Student Health Insurance Office at the Student Health Services (SHS).

### **WAIVERS**

Students already insured under a policy containing benefits equal to or better than GSHIP may be eligible for GSHIP waivers up to one academic year. Documents required for a waiver are: 1) student's written request, 2) proof of present insurance and premium payment to the end of the quarter, 3) a copy of the summary of insurance benefits, and 4) a copy of the insurance identification cards. Submit written requests directly to UCSD, Student Health Insurance Office, 9500 Gilman Drive, Dept. 0039, La Jolla, CA, 92093-0039 no later than the last business day of the first week of the quarter. Final decisions regarding waiver requests will be mailed to the student by SHS.

### ***Educational Fee***

The educational fee was established as a required fee for all students beginning with the

fall quarter 1970. It is used to cover a variety of educational costs as determined by the regents. The educational fee may be reduced by one-half for students enrolled in six units or fewer (see "Part-time Study").

### ***Student Center Fee***

Every student is required to pay a student center fee each quarter.

### ***Recreation Facility Fee***

Every student is required to pay a recreation facility fee each quarter.

### ***Reduced Fee Enrollments***

1. One-half of the established registration fee may be waived for graduate students whose research or study requires them to remain outside the state of California for five weeks or more of the quarter. Students must file a General Petition for this privilege. The reduction pertains to one-half of the registration fee only. A student must pay, in addition, all required fees including, but not limited to, the educational fee, student center fee, recreation facility fee, health insurance fee, and nonresident tuition fee, if applicable.
2. Graduate students approved for enrollment in a half-time program (not to exceed six units) are eligible for a reduction in fees of one-half the educational fee, and, if applicable, one-half of the nonresident tuition fee.
3. A full-time employee who is not subject to nonresident tuition, who has worked full time for the university for at least six months prior to the latest date that registration will be accepted, and who meets the admission requirements of the university is eligible for two-thirds reduction of both the university registration fee and the university educational fee for up to nine units or three regular session university courses per quarter, whichever is greater. An employee so registered is ineligible for the services and facilities of the Counseling Center, recreation facilities, or the Student Health Services, other than those services to which the employee is regularly entitled (University of California Staff Personnel Policy 260.23). Authorization for this privilege is secured from the Staff Personnel Office for staff

employees, or from the Academic Personnel Office for individuals on academic appointments.

NOTE: In accordance with Academic Senate regulations, no voting member of the San Diego Division of the Academic Senate shall be recommended for a higher degree from UCSD unless the dean of Graduate Studies shall have certified that all requirements for that degree have been met prior to the appointment to a rank carrying the voting privilege.

### ***Filing Fee***

A student registered in the immediately preceding quarter, or on an approved leave of absence who has completed all requirements except for the final reading of the dissertation or thesis or the taking of the final examination is eligible to petition to pay a filing fee in lieu of registering and paying all required fees in the final quarter. The filing fee applies to both residents and nonresidents. Students must apply for this privilege by means of a General Petition.

### ***Refund of Fees***

Students who withdraw from the university during the first five weeks of instruction (35 calendar days) may receive partial refunds of fees, excluding health insurance, if applicable. The date of withdrawal, as related to the fee refund schedule, shall be the date on which notice of withdrawal is submitted to the Office of the Registrar. See Schedule of Classes for schedule of refunds.

### ***Parking Fee***

Students who park motor vehicles, including motorcycles, on the campus are subject to parking fees. (See "Parking," in chapter entitled "Campus Services and Facilities.")

### ***Penalty Fees***

Penalty fees (see "Fees"), are charged for failure to comply with normal deadline dates. To avoid such fines, students should fulfill all requirements in advance of the deadlines listed in the Schedule of Classes.

### ***Transcript Fees***

Students may obtain transcripts of their UCSD records from the Office of the Registrar for \$5 for each copy. Transcripts must be re-

quested several days in advance of date needed.

## **Financial Assistance**

Several kinds of financial assistance are available to graduate students at UCSD. These include fellowships and traineeships; assistantships in teaching, language instruction, and research; scholarships in full or partial payment of tuition and/or fees; and loans and grants-in-aid. Further details about these awards/appointments may be obtained from departmental, group, or school offices.

Descriptions in this section deal entirely with awards administered directly by the university.

Applicants for financial assistance should note the following: "Pursuant to Section 7 of the Privacy Act of 1974, applicants for student financial aid or benefits are hereby notified that mandatory disclosure of their Social Security number is required by the University of California to verify the identity of each applicant. Social Security numbers are used in processing the data given in the financial aid application; in the awarding of funds; in the coordination of information with applications for federal, state, university, and private awards or benefits; and in the collection of funds and tracing of individuals who have borrowed funds from federal, state, university, or private loan programs."

### ***Fellowships and Traineeships***

Regents Fellowships, offered to students with excellent academic and research qualifications, provide a stipend of \$10,000 for nine or ten months, plus tax-free resident fees and nonresident tuition, if applicable. These awards may be supplemented with a partial graduate student researcher or research fellowship from available departmental resources. The amount of the supplement varies by department.

The San Diego Fellowship, a program designed to increase the quality of education and research by enhancing campus diversity, currently provides a minimum stipend of \$750 per month plus resident fees and nonresident tuition, if applicable. These awards are usually given for two years. Academic departments are responsible for two additional years of support for Ph.D. students awarded San Diego Fellowships.

Seven additional Cota-Robles fellowships for the most outstanding incoming students from San Diego Fellowship nominees are available from monies provided by the Office of the President. These awards provide an annual stipend of \$12,500, resident fees and nonresident tuition, if applicable. The fellowship is given for a period of four years, and the student is eligible for additional funding in the dissertation year.

MINORITY BIOMEDICAL RESEARCH SUPPORT (MBRS): UCSD is a recipient of funding from the National Institutes of Health (NIH). The MBRS program provides graduate student support to a limited number of graduate students in the programs of biomedical sciences, chemistry and biochemistry, and neurosciences. Support includes fees, nonresident tuition (if applicable), a stipend, and travel funds for professional conferences.

All other fellowship stipends are established by the departments, group, or school and may vary in tenure from one to twelve months and in amount from \$100 to \$1,000 per month. Fellowships awarded for one, two or three quarters will also provide tax-free resident fees and nonresident tuition, if applicable. Awardees must register for twelve units of upper-division and graduate-level work each quarter and must remain in good academic standing, as described under "Standards of Scholarship" of this catalog.

Fellows and trainees on twelve-month tenure are required to devote full time to graduate study and research during the summer as well as during the academic year. A brief resume of proposed summer graduate study or research, approved by the appropriate adviser, must be filed with the dean of Graduate Studies before the end of the spring quarter preceding the summer portion of the fellowship or traineeship tenure.

Some fellowships and traineeships offer the privilege of participation in the teaching or research programs of the university.

The principal types of fellowships/scholarships at UCSD are the following:

1. Regents Fellowships
2. San Diego and Cota-Robles Fellowships
3. Research Fellowships
4. U.S. Public Health Service Predoctoral Traineeships



5. Fee Scholarships
6. Tuition Scholarships
7. Tuition and Fee Scholarships

### ***Assistantships***

Graduate students may be appointed by UCSD on a part-time basis as graduate student researchers and teaching assistants.

Graduate students enrolled full-time (twelve units or more) may be appointed up to 50 percent time (twenty hours/week) during the academic year and 100 percent time during the summer months, although most departments limit support to 50 percent time year-round. Students enrolled for less than full-time (one to eleven units) are eligible, at the discretion of the department, for 25 percent time appointments. Appointees must remain in good academic standing, as described under "Standards of Scholarship."

Graduate students who are appointed as graduate student researchers are eligible for remission of tuition and fees if they have a minimum 25 percent appointment for the entire quarter for which tuition and fees are paid, or the dollar equivalent; have an appointment effective with the first week of instruction in the quarter for which tuition and fees are paid; and are within the time limits for support described earlier in this section.

Teaching Assistants and others appointed on academic titles at 25 percent time or more for the quarter are eligible for payment of partial fee remission and Graduate Student Health Insurance.

All graduate students who are U.S. citizens and appointed as teaching assistants or graduate student researchers or are employed by the university in other positions are required by the California Constitution to sign the State Oath of Allegiance. In addition, all graduate student appointees and employees are required by university policy to sign the university's Patent Agreement. Copies of both documents may be obtained from the student's academic department.

### ***Taxability of Awards***

Under the 1986 Tax Reform Act, the taxability of awards is as follows:

1. *Fellowships and Scholarships for Ph.D. and Master's Students.* Funds used for tuition,

fees, books, and course-related expenses are *not* taxable income. Stipends used for other purposes are taxable income.

2. *Graduate Student Researchers and Teaching Assistants.* All compensation is taxable income.
3. Payment of tuition and fees under the Graduate Student Researcher Tuition and Fee Remission program and payment of partial fee remission and graduate student health insurance for those appointed 25 percent time or more as teaching assistants or other academic titles, is nontaxable income.
4. *Grants for Travel to Scholarly Meetings and for Graduate Student Research Expenses.* Not taxable.
5. *Awards to Postdocs and Non-Degree Graduate Students.* Tuition and fee awards, stipends, and other compensation are taxable.

Students are advised to review available tax materials and make their own decisions about tax withholding, reporting of income, excluding income from taxation, and filing required tax forms. UCSD departmental and central administrative staff are not able to advise students on individual tax matters.

Graduate student fellowships, scholarships and traineeships are not subject to withholding for taxes under the Federal Insurance Contribution ACT (FICA). The salary of graduate students appointed as Teaching Assistants and Graduate Student Researchers, Readers, or Tutors, or who are employed on campus are exempt from FICA if the students have appointments that sum to 50 percent time or less in any pay period AND if they are registered for a minimum of 12 units each quarter (including summer) during the appointment period. Students on F-1 and J-1 visas are, by federal law, exempt from FICA.

Limited written tax information is available from academic departmental offices and the Office of Graduate Studies and Research.

### ***Application Procedures***

**Entering students.** Obtain application materials from academic department, group, or school offices. Only one application form is needed to apply for graduate admission and for any of the following: fellowships, traineeships, scholarships; and assistantships (teaching, language, or research).

In order for an applicant to be considered for a fellowship, traineeship, or graduate scholarship for the ensuing academic year, an application for admission with financial aid and all supporting materials must be received by the deadline as listed in the Application for Graduate Admission. No assurance can be given that applications can be processed after stated deadlines. Applications for assistantships may be accepted after the deadline, but most departments offer assistantships at the same time they consider applications for fellowships. Therefore, applicants for these appointments are strongly urged to submit their applications as early as possible.

**Continuing and returning students.** Consult with their departments.

### ***Award Notification***

The awarding of fellowships and similar awards for the following academic year will be announced not later than April 1. UCSD subscribes to the agreement of the Council of Graduate Schools of the United States, under which successful applicants for awards are given until April 15 to accept or decline such awards. An award accepted from one of the member universities may be resigned at any time through April 15. However, an acceptance given or left in force after that date commits the student not to accept another appointment without first obtaining formal release for that purpose.

### ***Loans and Grants-in-Aid***

An excellent package of grants-in-aid, work-study, and loans is available to graduate students who show evidence of financial need as determined by analysis of a completed Free Application for Federal Student Aid (FAFSA).

See section on financial assistance in chapter entitled "Campus Services and Facilities."

### ***Time Limits for Graduate Student Support***

For Ph.D. and D.M.A. students, all financial support administered by UCSD (including fellowships, scholarships, and appointment but excluding loans) is restricted to students who are within their departmental support time limits (see "Ph.D. Time Limits" and description of each department's graduate program).

Within these limits, students can be appointed as teaching assistants for a maximum of six years. Absolutely no exceptions beyond the sixth year are permitted by university-wide policy.

M.F.A. and M.P.I.A. students can be supported for a maximum of ten quarters. M.A. and M.S. students can be supported for a maximum of seven quarters.

### ***Fellowships and Research Awards from Outside the University***

In addition to fellowships, traineeships, and loans administered by the university, other types of graduate student support are available through federal agencies and private foundations. Students wishing to explore such sources of support for their studies at UCSD are urged to consult one of the many directories available in the reference section of Geisel Library, the fellowship listings provided via the Graduate Studies World Wide Web site (<http://www-ogsr.ucsd.edu>), through the reference departments of other large libraries or the fellowship adviser in the Office of Graduate Studies and Research, 518 Eleanor Roosevelt College. Most application deadlines occur in the fall or early winter. Among the many organizations which award fellowships to students at UCSD are the Alcohol, Drug Abuse and Mental Health Administration; Department of Defense; the Ford Foundation; the Hertz Foundation; the Hughes Aircraft Company; IBM; Institute of International Education; the National Aeronautics and Space Administration; the National Science Foundation; the Pharmaceutical Manufacturers Association Foundation; the Social Science Research Council; the United States Information Agency; and the Woodrow Wilson National Fellowship Foundation.

California residents may apply for a California State Graduate Fellowship through the California Student Aid Commission to assist in payment of the university registration fee, the student center fee, and the educational fee. The deadline for application is at the beginning of March, and application materials and additional information can be obtained in mid-December from the Student Financial Services Office.

## **General Policies and Requirements**

### ***Integrity of Scholarship***

See "UCSD Policy on Integrity of Scholarship" in the Academic Regulations section of this catalog.

### ***Student Conduct***

Graduate students enrolling in the university assume an obligation to conduct themselves in a manner compatible with the university's function as an educational institution. Rules concerning student conduct, student organizations, use of university facilities, and related matters are set forth in *UC San Diego Campus Regulations Applying to Campus Activities, Organizations, and Students*, copies of which are available at the Office of Graduate Studies and Research, and the Office of Judicial Affairs.

### ***Student Appeals***

Because department chairs—in consultation with faculty colleagues—have primary responsibility for maintaining the excellence of graduate programs, and because faculty within a department are in the best position to judge their students' academic performance, graduate student appeals of an academic nature should first be made to the individual faculty member involved, and, if necessary, the department chair.

Graduate students who wish to appeal actions of individual faculty, departments, or administrators relating to their academic program or financial support may do so if:

1. They feel that due process was not followed in arriving at a decision.
2. They feel that personal prejudice affected the academic judgment rendered.

Students wishing to appeal a decision on these grounds should address such appeals to the dean of Graduate Studies. Students are encouraged to contact the assistant dean for Student Affairs for further assistance.

In resolving student appeals, the dean of Graduate Studies may seek a review and recommendation by the Graduate Council.

Graduate students may appeal a course grade or Ph.D. or master's qualifying or final exam only if they believe that nonacademic

criteria were used in determining their grade. Students who wish to appeal a course grade should follow the procedure described in "Grade Appeals" in the "Academic Regulations" section of this catalog.

### ***Exceptions***

A student may request an exception to the normal procedures and requirements governing graduate studies by submitting a General Petition, available from the department. The petition must state clearly the reasons for requesting the exception and bear all required approvals before being filed with the Office of Graduate Studies and Research.

Requests for exceptions to time limits require a letter of explanation and support from the student's research adviser, and support and justification from the program's graduate adviser and endorsement by the department or group chair. Such requests are submitted to the Graduate Council through the dean of Graduate Studies. Exceptions to the time limits policy are granted only in the case of truly exceptional and unavoidable circumstances.

## **Grades**

### ***Standards of Scholarship***

Only upper-division, graduate, and professional courses in which grades of A, B, C (including plus [+] or minus [-]), D, or S (Satisfactory) are earned can be counted in satisfaction of the requirements for a higher degree.

A student's grade-point average (GPA) is computed by dividing the total number of grade points earned by the total unit value of graded upper-division, graduate, and professional courses undertaken at UCSD with the exception of those undertaken in UCSD Extension. Grades of S, U, I, IP, NR, and W are excluded in computing a grade-point average. Lower-division course work units are not used in computing a graduate student's grade-point average nor in satisfying program requirements for a higher degree with the exception of language courses taken by students in the M.P.I.A. program.

Each department or group prepares, not later than the second week of each spring quarter, a detailed, written evaluation of each

of its Ph.D., D.M.A., or M.F.A. students. These evaluations are designed to inform students of their progress and to improve communications between faculty and graduate students. Evaluations are discussed with students who may elect to add written comments before signing the copy of the evaluation sent to the Office of Graduate Studies and Research. A student's signature on the evaluation indicates knowledge of the assessment but does not necessarily signify agreement.

To be in good standing academically a graduate student must meet departmental standards including a satisfactory spring evaluation, maintain a GPA of 3.0 or the equivalent in upper-division, graduate and professional course work, and must not have accumulated more than a total of eight units of F and/or U grades overall, unless departmental standards specify more stringent grade requirements.

Good standing is a requirement for:

1. Holding academic and staff appointments.
2. Holding fellowship, scholarship, or traineeship appointments.
3. Advancing to candidacy for a graduate degree.
4. Going on leave of absence.
5. Receiving a graduate degree from UCSD.

Graduate students who are not in good standing for any reason are subject to probation and/or disqualification from further graduate study.

### Grading System

The grade of A+, when awarded, represents extraordinary achievement but does not receive grade-point credit beyond that received for the grade of A. The grades of A, B, and C may be modified by plus (+) or minus (-). When attached to the grades of B and C, plus (+) grades carry three-tenths of a grade point more per unit, and when attached to A, B, and C, minus (-) grades carry three-tenths of a grade point less per unit. Grades and grade points are described as follows:

Grade	Grade Points per Unit
A+	4.0
A Excellent	4.0
A-	3.7
B+	3.3
B Good	3.0

B-	2.7
C+	2.3
C Fair	2.0
C-	1.7
D Poor	1.0
F Fail	0.0
S Satisfactory (equivalent to B- or better)	0.0

### Grade

U Unsatisfactory
I Incomplete—but work of non-failing quality*
IP In Progress (provisional grade; replaced when full sequence is completed)
W Withdrawal (assigned when withdrawing or dropping a course beginning fifth week to end of ninth week of instruction)

\*Requires Request to Receive Grade Incomplete form to be initiated and completed by the student, approved by the instructor, and filed with the department prior to the end of finals week. The Incomplete grade will lapse to F or U if not made up by the last day of finals week in the following quarter.

All grades except Incomplete and In Progress are final when entered in an instructor's course report filed at the end of the quarter.

While grades of U are not computed in a grade-point average, they are not considered satisfactory grades for students on appointment, nor are they considered to be evidence of satisfactory progress on the part of any student. Therefore, a student whose record bears more than eight units of U and/or F grades in upper-division, graduate, or professional course work may not be eligible to continue on appointment and may be subject to academic probation or disqualification.

### Changes in Grades

All grades except I and IP are final when filed by the instructor unless a clerical or procedural error is discovered.

No change of a final grade may be made on the basis of revision or augmentation of a student's work; no term grade except Incomplete may be revised by further examination; and no grade may be changed after one calendar year from the time the grade was recorded.

### Repetition of Courses

A student assigned a grade of D, F, or U may petition to repeat the course on the same grading basis for which it was first taken. That is, a

course in which a grade of D or F has been received may not be repeated on an S/U basis. Conversely, a course in which a grade of U has been awarded may not be repeated on the basis of a letter grade. Degree credit for a course will be given only once, but the grade assigned for each enrollment shall be permanently recorded. Only the grade received in the repetition of the course will be used in calculating the overall grade-point average for the first sixteen units repeated. For additional units repeated, the grade assigned for each enrollment shall be used in calculating the grade-point average.

### No Report/No Record

A blank entry appearing on student transcripts in lieu of a grade indicates that the student's name appeared on a grade report but no grade was assigned by the instructor. A blank entry will lapse automatically into an F or U if not removed or replaced by a final grade by the last day of instruction of the subsequent quarter, and will be computed in the student's GPA.

### I (Incomplete)

The grade of I may be assigned by an instructor only when the student's work is of passing quality but is incomplete. The student must complete and submit to the instructor the form, Request to Receive Grade Incomplete and Removal of Grade Incomplete, which will contain both the reason for requesting the grade I and the conditions to be met before the Incomplete can be replaced with a final grade. The Incomplete must be made up, the grade assigned, and the completed form filed with the Office of the Registrar no later than the end of final examination week the following quarter.

Incomplete grades assigned in the quarter before a graduate student withdraws or takes an approved leave of absence must be replaced by a final grade before the end of the academic quarter following to prevent the Incomplete from lapsing to F or U.

### IP (In Progress)

An IP is assigned in a sequential course which extends over more than one quarter, and the evaluation of a student's performance may not be possible until the end of the course. A student who has dropped out without complet-

ing the entire sequence may be assigned final grades and unit credit for any quarters completed, provided that the instructor has a basis for assigning the grades and certifies that the sequence was not completed for good cause. An IP not replaced by a final grade will remain on the student's record. Courses graded IP are not used in calculating a student's grade-point average until graduation. At that time course units still graded IP on a student's record must be treated as units attempted in calculating the GPA, **thus units graded IP will have the same effect on the overall GPA as an F or U.**

### *S/U (Satisfactory/Unsatisfactory)*

The minimum standard of performance for a grade of Satisfactory shall be the same as the minimum for a grade of B-.

With the approval of the Graduate Council, departments may offer graduate courses in which graduate students may elect to be evaluated on an S/U basis and courses in which S/U grading shall be the *only* grading option. Grading options for a given course are identified in course listings in the *UCSD General Catalog*.

In addition, and with the approval of the department and the instructor concerned, graduate students may elect to have the following courses graded on an S/U basis: any upper-division or lower-division course taken (provided they have obtained approval of the instructor and the department), and any graduate or upper-division course outside their major department. If departmental requirements have been fulfilled for advancement to candidacy for the Ph.D. or D.M.A. degree, graduate students may take any course on an S/U basis.

Selection of S/U as a grading option **must be made in the first two weeks of a quarter.** Units graded Satisfactory shall be counted in satisfaction of degree requirements but shall be disregarded in determining a student's grade-point average. No credit shall be allowed for work marked Unsatisfactory.

### *W (Withdrawal)*

Students who discontinue graduate study any time during a quarter without formally withdrawing will receive failing grades for all course work undertaken. Formal withdrawal requires filing a Leave of Absence, Extension



and/or Withdrawal form prior to leaving campus with the Office of Graduate Studies and Research after receiving departmental approval and all other approvals listed on the form.

When a student withdraws before the end of the fourth week of instruction, no course entries will appear on the transcript for that quarter. Students who withdraw from the university or drop a course between the beginning of the fifth week of instruction and the end of the ninth week of instruction will be assigned a W (Withdrawn) by the registrar for each course affected.

Courses in which a W has been assigned will be disregarded in determining a student's grade-point average.

### *Final Grades*

An unofficial copy of the complete transcript is sent to each student at the end of every spring quarter. Students may receive computer-generated telephone verification of their fall and winter grades (see Schedule of Classes for complete information). While grade reports submitted by instructors at the end of the quarter are generally considered final, **students should carefully examine their grade report or transcript for omissions and clerical errors and consult with instructors and the Office of the Registrar to clarify any discrepancies.**

## Admission Requirements

### *Academic*

Applicants for graduate admission must present official evidence of receipt of a baccalaureate degree from an accredited institution of higher education or the equivalent, with training comparable to that provided by the University of California. A minimum scholastic average of B or better is required for course work completed in upper-division, or prior graduate study.

## Admission Policies

### *Duplication of Advanced Degrees*

Normally, duplication of advanced degrees is not permitted. A student admitted to a Ph.D. program with a master's degree in the same general field will not be awarded a second master's degree even though course work satisfying the master's degree requirement is completed at UCSD. A professional degree is not regarded as a duplication of an academic degree.

### *Non-Degree Study*

There is no "student-at-large" classification at UCSD; application for admission must be

made to a specific department or group. Applicants who wish to enroll for "course work only" within a department or group and who do not intend to pursue a higher degree at UCSD may request admission for non-degree study. Applicants for non-degree study must satisfy all admission requirements and are not eligible for fellowships or assistantships. Non-degree status is granted for up to one year; students may petition the dean of Graduate Studies for a second year of non-degree status.

### *Part-Time Study, Including Half-Time*

Students who enroll in fewer than twelve graduate or upper-division units each quarter are considered part-time students. Students who are approved by their major department and by the dean of Graduate Studies for enrollment in a program of half-time study (maximum of six units or fewer) for reasons of occupation, family responsibilities or health, may be eligible for a reduction in fees. All other part-time students must pay the same fees as full-time students.

Part-time study may be pursued in several masters' programs and a few Ph.D. programs at UCSD. In all instances, part-time students must satisfy the same admission requirements as full-time students and are eligible, at the discretion of a department, for appointment to 25 percent time teaching or research assistantships. Admitted students must file the petition for half-time study with the Office of Graduate Studies and Research no later than the last day of the second week of the quarter to be eligible for a fee reduction.

## Application Procedures

### *When to Apply*

Applicants for admission who wish to be considered for a fellowship, traineeship, graduate scholarship, or assistantship should refer to "Financial Assistance—Application Procedures." Most programs have an application deadline of January 15 for fall admissions. A few programs accept applications for winter and spring admissions. For specific deadlines refer to the Application for Graduate Admission or contact the specific program office.

Applicants need not have completed their undergraduate programs in order to apply. However, when an applicant's grades or preparation appear to be marginal, the department, group, school, or the Office of Graduate Studies and Research may defer action upon an application until a supplementary record or evidence of the receipt of a degree becomes available.

### *How to Apply*

Applicants must complete an Application for Graduate Admission and submit it, together with a nonrefundable application fee of \$40, to the Office of Graduate Admissions. **Applications submitted without the application fee will not be processed.** An application and additional program and application information are obtained from the graduate office of the program to which the applicant is applying. To obtain the application, call, write the graduate office of the specific program to which you are applying or access the UCSD Web site and the appropriate program's graduate information. Telephone numbers and campus addresses are listed with the department information in this catalog, and the street address for all departments is 9500 Gilman Drive, La Jolla, California 92093. The Graduate Admission Application includes application for a fellowship, traineeship, scholarship, or assistantship. Detailed instructions as to how to complete the application appear within the application booklet. The documents which are required in support of an application for graduate admission are listed below.

### *Social Security Number Disclosure*

Pursuant to the Federal Privacy Act of 1974, applicants are hereby notified that disclosure of their Social Security number is mandatory. The Social Security number entered on the application for graduate admission may be used as the applicant's identification number for part of the UCSD graduate student record keeping system. A personal identification (PID) number will also be assigned by the UCSD student information system for record-keeping purposes. This record-keeping system was established prior to January 1, 1975 pursuant to the authority of

the Regents of the University of California under Art. IX, Sec. 9 of the California Constitution.

### *Required Supporting Documents*

All supporting documents, including letters of recommendation, should be forwarded directly to the applicant's prospective major department, group, or school.

### **ACADEMIC RECORDS**

Applicants must request that official transcripts of all previous academic work, including certification of degrees received or documentation of status upon leaving each institution, be forwarded to their prospective major department. Transcript labels are enclosed in the application packet for this purpose. Only official records bearing the signature of the registrar and the seal of the issuing institution will be accepted. Applicants with academic work in progress who expect to complete a degree program before the intended date of enrollment at UCSD **must submit evidence of degree conferral** and a final academic record, as soon as they are available. The undergraduate degree must be completed prior to the start of graduate study.

### **SPECIAL NOTE TO FOREIGN APPLICANTS**

In all applications for graduate admission, official records bearing the signature of the registrar or other responsible academic officer and the seal of the issuing institution are required. However, true copies, facsimiles, or photostatic copies of **foreign academic records** will be accepted if, after the copies have been made, they have been personally signed and stamped by an educational official **who certifies that they are exact copies of the original document.** Properly signed copies should be sent instead of irreplaceable original documents. Unless academic records are issued in English by the institution itself, **certified English translations must accompany official documents written in a language other than English.**

Foreign academic records should show all courses attended each year, examinations passed, seminars completed, and grades or marks received in all institutions where formal

records are maintained. **Official evidence of degree conferral must also be supplied,** together with evidence of rank in class if possible.

### **GRADUATE RECORD EXAMINATIONS (GRE) SCORES**

Most graduate programs require that applicants take the GRE. Contact the specific program for further information. Applicants who are applying for admission to a department, group, or school which requires that they take the GRE should do so as early as possible to insure the timely receipt of their score results.

**Applicants must take the GRE no later than fall in order to meet most departmental deadlines for admission.** The GRE is administered two times a year in the United States and in 133 other countries. Applicants are urged to consider taking the computer-based GRE test instead of the paper and pencil test. Applicants may also schedule individual computer testing dates. Consult the GRE Information & Registration Bulletin for further information. In addition, several administrative service tests are given each year in major U.S. cities (dates change). Applications may be obtained from the Educational Testing Service, Box CN 6000, Princeton, New Jersey 08541-6000.

**To facilitate the processing of applications for admission, applicants may forward to their proposed major department, group, or school a copy of their GRE examination score as soon as it is received, since official copies are not always received by the appropriate department at UCSD.**

**To facilitate the processing of applications for admission, applicants may forward to their proposed major department, group, or school a copy of their GRE examination score as soon as it is received, since official copies are not always received by the appropriate department at UCSD.**

### **LETTERS OF RECOMMENDATION**

Applicants should arrange to have three letters of recommendation forwarded directly to their prospective major department, group, or school. (Recommendation forms are included in the application booklet.) It is most important that letters of recommendation be completed by individuals in a position to analyze an applicant's abilities and academic or professional promise. Applicants who have applied within the last two years, and were admitted, but did not enroll, should check with their major department or group to determine if letters of recommendation are still on file.

### **INTERNATIONAL APPLICANT FINANCIAL STATEMENT**

**Foreign applicants are required to certify that they possess sufficient funds to cover all fees, transportation, and living expenses during the first academic year of graduate enrollment at UCSD.** In addition, they must certify as to the probability of funds for subsequent years of study. An International Applicant Financial Statement, for the purpose of indicating the amount and source of funds available for graduate study, is forwarded to foreign applicants upon admission into a graduate program. A written summary of present and future financial resources must be provided before visa forms can be granted.

Opportunities for employment on or off campus, are extremely limited, and foreign applicants should not base their educational plans on the hope of finding employment after arriving in the United States.

### *National Examination Information*

There are a variety of nationally administered examinations which may be taken to meet requirements for admission to graduate study or to satisfy certain requirements for advanced degrees. Several examinations of importance to UCSD students are listed here.

### **GRADUATE SCHOOL FOREIGN LANGUAGE TESTING PROGRAM (GSFLT)**

**Address:** Educational Testing Service, Box 519, Princeton, New Jersey 08541.

**Purpose:** To measure ability to read and understand literature in French, German, Russian, or Spanish in order to meet foreign language requirements for advanced degrees.

**Application:** Information and forms are available from San Diego State University Testing Office, Student Services Building, Room 2549, 5300 Campanile Drive, San Diego, California 92182-0577. Telephone: (619) 594-5216.

Tickets are available the first of the month prior to the month in which the examination is given. Students should arrange to pick up a ticket of admission at the testing office a few days before the scheduled examination. It is impossible to do this the same morning as the test.

**Examination Schedule:** Four times a year (dates change each year).

**Fee:** \$20\*

\*Subject to change

### **TEST OF ENGLISH AS A FOREIGN LANGUAGE (TOEFL)**

All foreign applicants whose native language is not English and whose undergraduate education was conducted in a language other than English must take the TOEFL and submit their test scores to the Office of Graduate Admissions.

Applicants who are admitted with a total TOEFL score of less than 550 may be required to take an English proficiency test upon arrival at UCSD and to enroll in an English course until the required proficiency is attained.

**Application:** Information and forms are available from TOEFL Services, P.O. Box 6151, Princeton, NJ 08541-6151, or from United States embassies, consulates, and related centers; and the San Diego State University Testing Office, Student Services Building, Room 2549, 5300 Campanile Drive, San Diego, California 92182-0577. Telephone: (619) 594-5216.

Applications must be submitted to TOEFL Services at least six weeks prior to the scheduled examination date.

**Examination Schedule:** One day each month (dates change each year) in approximately 135 countries and at computer-based testing sites by appointment.

**Fee:** Consult the current TOEFL booklet for fees.

### **TEST OF SPOKEN ENGLISH (TSE)**

**Address:** Educational Testing Service, Box 6157, Princeton, New Jersey 08541-6157.

**Purpose:** To help foreign students provide a reliable measure of proficiency in spoken English. This test is highly recommended for foreign applicants for teaching assistantships.

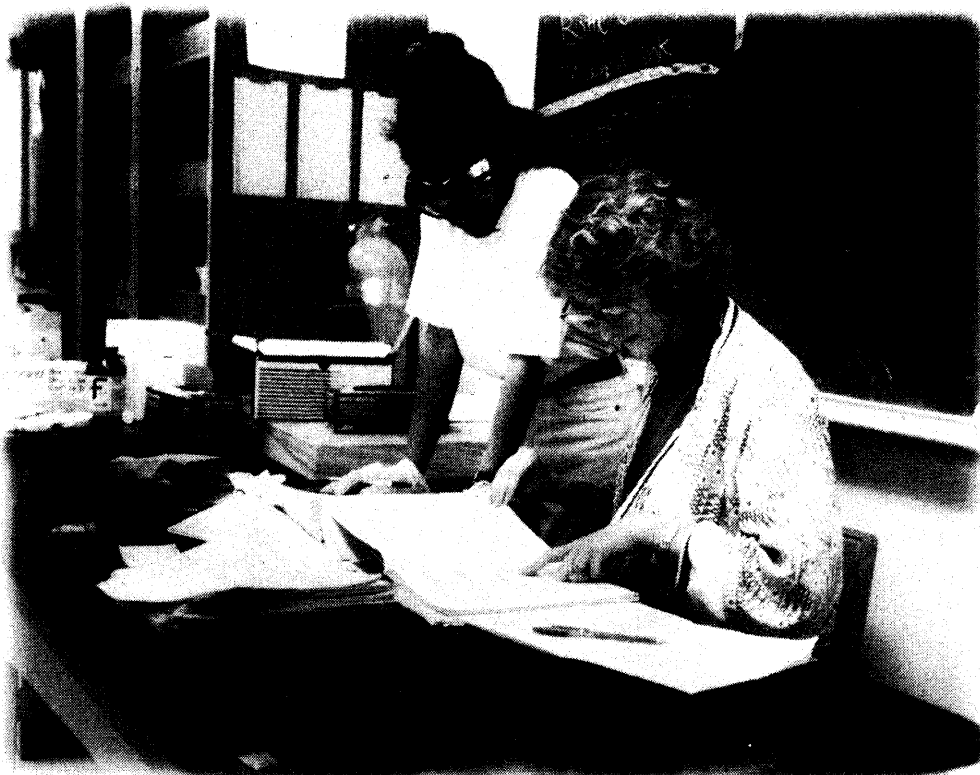
**Application:** Same as TOEFL above.

**Examination Schedule:** Given in approximately 135 countries. Consult the current testing booklet for current information.

**Fee:** Consult the current testing booklet for fees.

Foreign applicants who wish to be considered for a teaching assistantship are urged to submit scores on the Test of Spoken English (TSE), which is given at TOEFL test centers





throughout the world (approximately 185 countries), one day each month (dates change each year).

### Admission and Registration

Official admission to graduate study at the university is contingent upon review of an applicant's record, receipt of final undergraduate transcript showing degree(s) awarded, an affirmative recommendation by the prospective department, group, or school, and action by the Office of Graduate Studies and Research. The dean of Graduate Studies or the prospective major department, group, or school may deny admission if an applicant's scholastic record is undistinguished, if the preparation is judged inadequate as a foundation for advanced work, or in the event that no further students can be accommodated for a given quarter. **Only the official Certificate of Admission from the dean of Graduate Studies constitutes formal approval of admission to a graduate program at UCSD.**

Official notification of admission by the dean of Graduate Studies will be mailed well in advance of the beginning of the quarter for which application has been made. Applicants should call their prospective major department, group,

or school if formal notification is not received four weeks prior to the beginning of the quarter for which they applied.

Admission to graduate standing does not constitute registration for classes. A student is not officially registered for classes until the entire registration procedure is completed each quarter. Information and all necessary registration materials will be available at department, group, or school offices approximately two weeks before the opening of the quarter (see "Academic Calendar").

### Reapplication

Applicants who are admitted and fail to register in the quarter for which they first apply may request deferral of their application for a later quarter within the same academic year or the academic year immediately subsequent. Application for admission of a deferred applicant for the subsequent academic year may be made by submitting a statement of activities and official transcripts of any academic work undertaken since the first application to the department or group. Admission is not guaranteed to previously admitted applicants who request a deferral. In no case are application files retained for more than four consecutive academic quarters from the date of first appli-

cation. Application after this period may be made only by completing a new application and providing all necessary documents, including payment of the graduate application fee.

**Students who are denied admission must submit a new application and fee together with required documentation in order to be considered for admission in another academic year.**

### Readmission

A graduate student whose status has lapsed because of an interruption in registration must petition his or her department for readmission at least eight weeks prior to the first day of the quarter in which reenrollment is intended. **Do not complete an Application for Admission.** Students must submit supplementary transcripts of all academic course work undertaken since last enrolled at UCSD, pay a readmission fee of \$40, and complete a General Petition and a supplementary Statement of Activities. In addition, a Statement of Legal Residence is required for all students returning after an absence of two quarters or more.

**Readmission is not automatic.**

### Registration Requirements and Procedures

All students must enroll and pay fees on or before the deadline dates established by the Office of the Registrar for each quarter to avoid paying late fees. Enrollment materials are obtained at the major department. (See Schedule of Classes for current deadlines.)

### Full-Time Student

A full-time student is required to be registered for twelve units each quarter of each academic year until the completion of all requirements for the degree, including the filing of the thesis or dissertation.

### Part-Time Student

A part-time student is enrolled in fewer than twelve units a quarter but is admitted as a regular student. A part-time student must pay full fees unless approved by the dean of Graduate Studies to enroll in half-time status for six units or fewer. A student must file the petition for half-time study with the Office of Graduate

Studies and Research no later than the last day of the second week of the quarter to be eligible for reduced fees. (See "Admissions Policies-Part-Time Study.")

### *Schedule of Classes*

Detailed information on registration and enrollment procedures is contained in the quarterly *Schedule of Classes*, available for purchase at the University Bookstore before the beginning of the quarter. **It is the responsibility of each graduate student to keep informed of and meet all enrollment and registration (fee payment) deadlines.** Scheduling information may also be found on the Office of Admissions and Records home page on the World Wide Web: <http://studentlink.ucsd.edu>

### *Priority Enrollment*

#### **Continuing Students**

Continuing graduate students may enroll any time during Priority Enrollment by telephone. A Personal Access Code (PAC) number is issued to graduate students by the Office of the Registrar. These PAC numbers will be released by the department after required advising has taken place, or directly to the student if adviser approval is unnecessary. Students may also use StudentLink to enroll, add, change, and drop classes. Students who do not use telephone or StudentLink registration may complete Add/Drop Cards and file them with the Office of the Registrar any time during enrollment periods.

Complete instructions for enrolling by telephone (T-REG) or Add/Drop Cards can be found in the quarterly *Schedule of Classes*.

Confirmation of classes is immediate by telephone. Students must officially withdraw from a course to avoid receiving a failing grade.

#### **New Students**

New students enroll just prior to the start of instruction during enrollment periods. New students may enroll by telephone after receiving adviser approval, or may complete Add/Drop Cards and file them with the Office of the Registrar.

### *Registration Receipt*

Upon payment of fees in person, the Cashier's Office will provide a cash register re-

ceipt and will affix a validation sticker to the back of the Student Photo-Identification Card. Students who pay fees by mail may obtain the validation sticker from the Bursar's Office.

### *Student Photo-Identification Card*

A validated Student Photo-Identification Card is the official ID for registered students and entitles the student to library privileges, a student health card, and use of other university facilities, as well as for purchasing tickets and/or admission to certain university events and voting in student body elections.

If the Student Photo-Identification Card is lost, students may obtain a duplicate at the Campus Card Services Office, 508 University Center; if the Registration Receipt is lost, a duplicate may be obtained from the Cashier's Office (see "Fees").

The validation sticker is removed from the Student Photo-Identification Card when students withdraw or go on leave of absence.

UCSD graduate students on campus continuing their graduate studies or research during the summer months may request a Summer Validation Sticker from their major department, group, or school office.

### *Registration Procedures*

Students are considered enrolled when they have requested at least one course and space in it has been reserved. Every effort will be made to enroll students in their preferred class sections. Students are not considered registered until they have both enrolled in classes and paid registration fees.

### *Payment of Registration Fees*

Please refer to the "Payment of Registration Fees" section in the "Undergraduate Registration" portion of this catalog or the quarterly *Schedule of Classes* which outlines procedures for payment of registration fees.

#### **Note to Fellowship, Scholarship, or Traineeship Holders:**

The first billing statement will be sent to the major department, group, or school about one month prior to the start of each quarter. Fees and tuition awarded to pay registration fees will be credited to the graduate student's account and appear on the statement as a payment or credit. Each award recipient should

carefully check the amounts listed on the statement against the graduate award letter and contact the Office of Graduate Studies immediately at (619) 534-6464 if there is a discrepancy. Graduate students with partial fee and/or tuition awards will be required to pay the balance by the fee deadline to complete their registration.

Fellowship, scholarship, or traineeship holders must enroll in and maintain full-time enrollment status (at least twelve units per quarter).

#### **Note to Students on Academic Titles:**

Students appointed 25 percent time or more as graduate student researchers on the tuition and fee remission program will have the amount of their required tuition/fees credited to their account prior to the beginning of the quarter. This payment will also appear on the student's university billing statement.

Students appointed 25 percent time or more as teaching assistants or associates will have health insurance and partial fee remission credited to their account prior to the beginning of the quarter. Readers and tutors appointed 25 percent time (110 hours) or more are issued refunds for health insurance and partial fee remission at the end of the quarter.

Teaching assistants appointed 25 percent time or more are eligible to apply for the TA Fee Deferment program. Under this program, the balance of resident fees (but not tuition) is deducted from the second and third check each quarter.

During the fall quarter only, teaching assistants and graduate student researchers appointed 25 percent time or more may be eligible to apply for the TA/RA Loan program.

For additional information, contact your graduate department or the Office of Graduate Studies and Research.

**Full-time graduate study requires enrollment in a minimum of twelve units each quarter.**

### *Continuous Registration*

All graduate students are required to be registered each quarter until all degree requirements have been completed, including filing of the thesis or dissertation and the final examination, or to be on an approved leave of absence.

A student who fails to register or to file an approved leave of absence form by the registrar's deadline date (no later than the end

of the second week each quarter) will be assumed to be withdrawn from UCSD and will be dropped from the official register of graduate students. In addition, all outstanding Incomplete grades, and NRs assigned by the registrar, will lapse to F's or U's unless cleared by the end of the current quarter. A student who is on leave of absence or who has withdrawn from the university is not entitled to withdraw books from the library or to use other university facilities or faculty time. A student who is withdrawn must petition for readmission to resume study at a later date, pay the nonrefundable readmission fee, and be considered for readmission with all others requesting admission to that quarter.

Ph.D. degree candidacy will lapse for graduate students who fail to register and are not granted a formal leave of absence. To be reinstated to candidacy, a graduate student must be readmitted, enroll and register, be readvanced to candidacy, and pay the candidacy fee.

### ***Late Registration/Deadline and Penalty Fees***

Students will be assessed late fees if not enrolled and registered by the registrar's published deadlines outlined in this catalog and the quarterly *Schedule of Classes*. Please refer to the "Graduate Admission Information and Enrollment Deadlines" portion of this catalog or to the quarterly *Schedule of Classes* for additional information.

A student who has not completed registration (enrolled and paid fees) by the deadline for change of program **must petition for permission to register late and will pay late fees totalling \$100**, regardless of the source of fees payment.

A student whose registration in classes is cancelled for non-payment of fees and seeks reinstatement will be assessed both the late enrollment (\$50) and late registration fees (\$50), currently totaling \$100, regardless of the source of fees payment.

Students are advised to consult the quarterly *Schedule of Classes* for current deadline dates.

### ***Changes in Course Selection***

Add/Drop Cards reflecting changes in class enrollment must be filed with the Office of the Registrar in order for the student to receive

credit for added courses and be relieved of responsibility for dropped courses.

Add/Drop Cards must be completed in full and include correct course information and course codes as listed in the current *Schedule of Classes*.

After enrolling in courses, a graduate student may add courses, change sections of a given course, or change grading options up to the end of the second week of instruction without fee by completing an Add/Drop Card available at the Office of the Registrar. Students may also use StudentLink. Students in some programs must obtain approval of their graduate adviser or department. See *Schedule of Classes*, "Changes of Programs." Any requests to the dean of Graduate Studies for exception to this policy require written explanation and instructor verification of attendance/course work completion to date.

A graduate student may drop a class up to the end of the ninth week of classes by filing an Add/Drop Card with the registrar, **after** first notifying the instructor, and obtaining the approval of the graduate adviser or department and the dean of Graduate Studies. If the course is dropped before the end of the fourth week of classes, no course entry will appear on the student's transcript. Courses dropped after the end of the fourth week of instruction and before the end of the ninth week of instruction will remain on the transcript as permanent entries showing course number and title, and the registrar will assign a final grade of W, signifying Withdrawal.

Students may not drop courses after the end of the ninth week of instruction and will receive the earned grade or an Incomplete, if applicable. When a grade in a course has been assigned in accordance with the Academic Senate policy on Integrity of Scholarship, a student may not subsequently change that grade by dropping the course or withdrawing from the university.

### ***Enrollment Limits***

**A full-time graduate student in a regular quarter is expected to enroll in twelve units of upper-division or graduate course work** with the exception that in the Graduate School of International Relations and Pacific Studies the normal course load is sixteen units. A student who wishes to take units in excess of

these limits must obtain the approval of the graduate adviser or department chair.

Graduate students holding half-time appointments as graduate student researchers, teaching assistants, language assistants, readers, or other employment titles, or who receive support from traineeships, fellowships, or scholarships paid through the university or directly to the student, must enroll and register for twelve units of upper-division and/or graduate course work and research each quarter.

Teaching units (500 series) above the full-time program of twelve units are not considered an overload.

Graduate students approved for half-time study are limited to a maximum of six units of upper-division or graduate course work each quarter.

### ***Changes of Name or Address***

Students must file official change of name or address forms with the Office of the Registrar. Students are advised to also notify their major department, group, or school.

### ***Leave of Absence/Extension***

A student who discontinues graduate study with the intention of resuming during a later quarter files a formal Leave of Absence, Extension and/or Withdrawal form prior to leaving the campus. Graduate students must have completed at least one quarter of academic residence and be in good standing (GPA 3.0 minimum or equivalent and no more than eight units of U or F) to be granted a leave. All graduate students are limited to a maximum of three quarters of leave and/or withdrawal.

Prior to the end of the second week of instruction of the quarter in which the leave is to begin, a student must complete a Leave of Absence form and obtain required signatures as listed under the clearance section of the form, and the approvals of the graduate adviser, chair of the (major) department, group, or school, and dean of Graduate Studies. If a student has registered, paid fees and enrolled for the quarter in which a leave is being requested, the validation sticker will be removed from the Photo-Identification Card; **fee refund will be subject to the refund schedule published in the quarterly *Schedule of Classes* (see section on "Withdrawal").** A graduate student

who enrolled in classes before requesting a Leave of Absence must also request a withdrawal from coursework for the quarter of leave to avoid paying fees for that quarter. Graduate students may request an extension of an approved leave prior to the expiration of the leave, up to the maximum of three quarters in all degree programs.

A student who has a long-term loan is considered to be out of school while on a leave of absence and **must set up an exit interview with the Loan Records Office before leaving the campus.** Since rules and regulations pertaining to such loans are complex, it is to the student's advantage to determine loan requirements prior to seeking a leave of absence.

A student on leave of absence may not (1) be employed by UCSD, UCSD Medical Center or UC Extension, or hold a fellowship, traineeship, or similar appointment administered by the university, (2) use university facilities, (3) complete a qualifying examination for advancement to candidacy, or (4) place demands on faculty, including discussion of thesis or dissertation work, either directly or by correspondence, during the period of leave.

A student may remain in student housing while on an approved leave of absence providing he or she has been a full-time student (twelve units or more) for three consecutive

quarters immediately prior to the leave of absence and is eligible for university housing.

Students must return all borrowed library material if requesting a leave of absence or withdrawing.

Any student on an approved Leave of Absence must contact their major department to be reinstated and cleared for enrollment and registration.

A new Statement of Legal Residence is required for all graduate students **returning from a leave of absence of two quarters or more.**

### *Withdrawal*

A student withdrawing from the university must obtain a Leave of Absence, Extension and/or Withdrawal form and secure appropriate signatures. The approved form must be filed with the Office of Graduate Studies and Research and the validation sticker removed from the Photo-Identification Card.

Students who withdraw during the first thirty-five days of instruction will receive refunds of fees in proportion to the number of *elapsed calendar days since the first day of instruction.* **The date of withdrawal used in calculating the refund shall be the date on which the approved notice of withdrawal is submitted to the Office of Graduate Studies and Research.**

A registered student who stops attending classes and fails to file a Leave of Absence, Extension, and/or Withdrawal form will receive a grade of F or U in each course, thus jeopardizing eligibility for readmission.

### *Bar from Registration/Nonacademic*

After suitable warning, a student may be barred from further registration for a variety of nonacademic reasons, including failure to comply with official notices, to settle financial obligations when due, to provide final undergraduate transcripts, or other related matters.

### *Bar from Registration/Academic*

Academic disqualification is determined by the dean of Graduate Studies in consultation with the student's department, and normally relates to: unsatisfactory academic performance, e.g., failure to maintain a grade-point average of 3.0 or better; failure to meet departmental criteria of performance; accumulation of more than eight units of F or U grades; or failure to comply with conditions set at the time of admission to a graduate degree program.



# Campus Services and Facilities

## Academic Services and Programs

### *Academic Advising*

The college academic advising offices and the academic departments are the designated campus units responsible for providing official academic advice and direction to undergraduate students. The college academic advising offices and departments have primary responsibility for academic advice and services that assist new and continuing students to develop educational plans and course schedules which are compatible with their interests, academic preparation, and educational and career goals.

#### **COLLEGE ADVISING OFFICES**

**Revelle College**, Office of the Provost, Revelle College, Mail Code 0321, (619) 534-3490

**John Muir College**, 2126 H&SS, Mail Code 0106, (619) 534-3580

**Thurgood Marshall College**, Admin. Building, Mail Code 0509, (619) 534-4110

**Earl Warren College**, Literature Building, Mail Code 0422, (619) 534-4350

**Eleanor Roosevelt College**, 412 University Center, Mail Code 0069, (619) 534-9864

Specifically, the college academic advisers conduct academic orientation/enrollment programs for all new students and advise new and continuing students about college general education and graduation requirements. The advising staff of each college provides general academic and curricular information, clarifies academic rules and regulations, reviews all aspects of academic probation, monitors academic progress, assists students with decision-making strategies, and provides information about major prerequisites as well as criteria for departments that screen students. In conjunction with the academic departments and the Office of the Registrar, the advising offices certify graduation and generally facilitate students' academic adjustment to the university.

Moreover, academic advisers are available to counsel students about educational alternatives,

selection of courses and majors, program changes, new academic opportunities, and special programs such as exchange programs, honors programs, outreach programs, etc.

See your college academic adviser for assistance with academic concerns or referral to appropriate academic support units.

### *Academic Computing Services*

User Support Office  
2113 Applied Physics and Mathematics,  
Muir College  
(619) 534-4060

Administration and Director's Office  
1141-1161 AP&M  
(619) 534-4050  
<http://www-accs.ucsd.edu/>

Academic Computing Services (ACS) plays a variety of roles relating to computing at UCSD. Among these are support of instructional computing, management of the main academic computer network, hardware repair, and administration of site agreements for the licensing and distribution of software.

#### **Student Computing**

The main function of ACS is to provide facilities for instructional computing. In addition to timesharing systems ACS maintains nearly 1000 workstations of various types available across campus. These include Macintosh, PC, and UNIX workstations (Sun, Hewlett-Packard, Silicon Graphics) located in public areas, computer labs, and libraries.

A wide variety of software is available on various platforms, including general purpose word-processing and spread sheet applications; compilers and program development tools; special purpose packages for electronic design, mechanical engineering, animation, image analysis, genetic studies, and symbolic mathematics.

Beyond instructional computing, ACS provides facilities to students for popular activities such as electronic mail and other network-based communications. Incoming students receive personal account information at Orientation.

ACS has student assistants who are available at scheduled times in computer labs and terminal rooms to help students use the facilities. These assistants complement other forms of support such as guidance from instructors and teaching assistants, and online documentation.

The Open Computing Environment (OCE) is a service model available to students in many academic disciplines. OCE provides both instructional and extra-curricular computing services to students through a single "personalized" account. The goal is to make computing more convenient and flexible, and to allow students to pursue academic computing interests on their own initiative.

#### **Network Management**

The Office of Network Operations is a branch of ACS. Network Operations plays a major role in the management of campus computer networks, campus dial-in modems, and connections to global networks. To facilitate electronic mail communications within and beyond the boundaries of the campus, Network Operations maintains a popmail server, the campus email gateway, and a registry of campus members and affiliates.

To use campus dial-in lines, UCSD users must sign up and pay for dial-in service. Users will also need a network security username and password. Incoming students have these issued automatically; others may register by bringing a picture ID to the Office of Network Operations in room 2113 AP&M. Signups for dial-in service may be made at this location or via the Web at <http://www-no.ucsd.edu>.

Network Operations can assist you in connecting your computer to make use of Internet services using electronic mail and mailing lists, and conducting research and information searches over the Internet. Information about many of these services can be found on the World Wide Web at <http://www-no.ucsd.edu>.

Network Operations Access Services is located in 2113 AP&M. The Network Operations User Support help line is (619) 534-1857 or [userserv@ucsd.edu](mailto:userserv@ucsd.edu).

## Software Licensing and Distribution Services

In addition to its other functions, ACS is one of several departments on campus that assists in distributing software and administering agreements to make software available to the campus community at reduced costs. Look on InfoPath for an overview of UCSD software resources.

## Other ACS Functions

Two ACS systems, one Unix and one VMS, are available on a fee-for-service (recharge) basis. These systems are used primarily by UCSD academic departments for administrative and grant funded research purposes. ACS also has a service to distribute campus administrative data to academic departments.

## Academic Enrichment Programs/ Student Affairs

University Center 411  
Mail code 0074  
(619) 534-1774

*Dedicated to providing UCSD undergraduates with research and other academic enrichment experiences beyond the classroom.*

### PROGRAM DESCRIPTIONS:

#### Faculty Mentor Program

The Faculty Mentor Program offers research experience to juniors and seniors. Participants work as research assistants to UCSD faculty members for at least ten hours per week during the winter and spring quarters. Students receive four units of 199 independent study credit for each quarter, attend seminars on how to write and present a research paper, and receive graduate school and fellowship information. At the conclusion of the program, students present their research papers at the Faculty Mentor Program Research Symposium.

#### Health Professions Program

The Health Professions Program assists students in their undergraduate preparation for careers in the health professions. These include medicine, dentistry, pharmacy, veterinary, public health, nursing, and others. Program activities include seminars, a volunteer referral service, and mentorship opportunities. Seminars are designed to enhance students' knowledge



about specific health professional careers and the latest developments in these fields. Examples of seminars include "Getting Strong Letters of Recommendation" and "Medical School Admissions—A View from the Admissions Office." Scholarships are available to program participants for professional school entrance exam preparation courses.

#### Summer Research Program

The Summer Research Program offers full-time research experience to students who are interested in preparing for careers in research or university teaching. As research assistants, students work on their faculty mentor's project for at least thirty hours per week. Students are trained in research skills, how to write and present a research proposal or paper, and how to prepare for the Graduate Record Examination (GRE). At the conclusion of the program, students present their papers at the Summer Research Conference.

#### McNair Program

The McNair Program is a U.S. Department of Education initiative designed to serve low-income, first-generation college students and underrepresented minorities who are interested in pursuing a Ph.D. It is a one-year rigorous program of scholarly activities that includes

participation in the Faculty Mentor Program and the Summer Research Program. In addition, participants receive training in how to write and present a scholarly paper, preparation for the GRE, and assistance with the graduate school application process. All participants have the opportunity to present a paper at a minimum of two research conferences.

#### CAMP Science Program

The CAMP Science Program is funded by the California Alliance for Minority Participation in the Sciences, Mathematics, and Engineering (CAMP) grant from the National Science Foundation. This program is designed to provide support to underrepresented minority students who are seeking bachelor's degrees in chemistry or physics. Participants in the program tour local companies and research institutes, attend local or national conferences, receive tutoring, and earn book scholarships. In addition, students may participate in academic year or summer research.

#### Undergraduate Research Conference

The UCSD Undergraduate Research Conference is an annual event where more than 100 students who have written outstanding research papers are invited to present their research. Invitation is by faculty nomination. Students present their papers at small roundtable discussions led by a faculty president.

#### Faculty-Staff-Student Interaction Program

The Faculty-Staff-Student Interaction Program (FSSI) is a student organization that was initiated and is supported by Academic Enrichment Programs. Students invite faculty and staff to attend luncheons and other informal gatherings.

#### Education Abroad Program (EAP)

International Center (corner of Gilman Drive and Library Walk)  
Mail code 0018  
(619) 534-1123

The Education Abroad Program provides students enrolled at the University of California an opportunity for an intercultural experience at UC centers located in Australia/New Zealand, Africa, Asia, Europe, Latin America, and North America, while allowing normal progress toward a degree.



The program is described in detail in the "Courses, Curricula, and Programs of Instruction" section of this catalog under the "Education Abroad" heading.

Students interested in studying abroad should also see the entry on the Programs Abroad Office, below.

### ***International Scholar Adviser***

International Center (corner of Gilman Drive and Library Walk)

Mail code 0018

(619) 534-3730

The international scholar adviser provides assistance to UCSD's international faculty, researchers, and post-doctoral fellows, in the areas of immigration and visa matters, financial, health, and personal issues. The adviser also informs campus departments about regulations and documentation pertaining to international visitors. The Friends of the International Center provide additional hospitality services and programs to international scholars and their family members.

### ***International Student Adviser***

International Center (corner of Gilman Drive and Library Walk)

Mail code 0018

(619) 534-3730

The international student adviser provides assistance to UCSD's nonimmigrant undergraduate and graduate international students, including advising on immigration, financial, health, and personal matters. The international student adviser also coordinates campus programs such as orientation and check-in for new students, and provides support to international student organizations.

### ***OASIS (Office of Academic Support and Instructional Services)***

3rd Floor, Center Hall

Mail code 0045

534-3760

The Office of Academic Support and Instructional Services (OASIS) provides a variety of services to maximize student performance and retention at the University of California, San Diego.

### **MISSION**

The mission of OASIS is to assist UCSD students in reaching their full potential by developing an appreciation for learning. OASIS strives to facilitate learning by concentrating on learners, and supporting their academic, intellectual, and personal growth at UCSD. Services are designed to assist students develop the academic skills to excel in their subject matter at UCSD and eventually in graduate or professional school.

### **SERVICES**

A description of services offered each quarter is available at the OASIS office on the third floor of Center Hall. All students in any of the five colleges are eligible for OASIS services. Underrepresented students are strongly encouraged to use OASIS services.

#### **The Academic Transition Program**

The Academic Transition Program coordinates a residential Summer Bridge Program, and professional and academic transition counseling for freshmen who are members of ethnic groups underrepresented at UCSD. A variety of academic support and personal development activities are offered to facilitate a smooth transition from high school to UCSD's fast-paced quarter system.

During the Summer Bridge Program, students attend courses in mathematics, science, and a Contemporary Issues I course. The Contemporary Issues I course promotes an understanding of the history and role of higher education in the United States, and assists students in the development of critical thinking skills. Additionally, the course provides a theoretical framework of factors which affect student retention and development.

#### **The Math and Science Tutorial Program**

The Math and Science Tutorial Program is designed to support students in their desire to excel in mathematics and science courses. The program offers individual tutoring, small-group study sessions, and workshops for lower-division mathematics, physics, biology, chemistry, engineering, economics, and computer science courses.

#### **The Writing Program**

The Writing Program offers students an opportunity to improve their writing skills and strategies for a range of different writing situations—the essay exam, the lab report, term and research papers—and across disciplines, from science to literature. One-to-one writing conferences are available by appointment for all UCSD students. These conferences stress pre-writing preparation, revision, and editing strategies. Small-group sessions address special needs, for example, research writing and editing.

#### **The Language Program**

Students whose first language is not English are assisted in the Language Program. In addition, students doing academic work in Spanish, French and other foreign languages can participate in Language Program tutorial sessions conducted by bilingual staff. Language Program services include group or individual intensive reading and writing sessions, workshops on grammar and mechanics, and individual conferences where feedback on drafts of writing in the languages is provided.

#### **The Student Support Services Program**

The Student Support Services Program is a comprehensive U.S. Department of Education initiative designed to support the academic efforts of participating students. The program seeks to increase the retention of eligible students, particularly those who have been traditionally underrepresented due to race or ethnicity, gender, disability, and/or economic status. Student Support Services also strives to enhance each program participant's eligibility for entrance to graduate and professional schools and to foster an institutional climate which will support the success of program participants. The program consists of intensive individual tutoring, professional counseling, peer mentoring, and various cultural enrichment activities.

#### **The Research and Evaluation Program**

Administered jointly by the Office of the Assistant Vice Chancellor for Academic Services and OASIS, the Research and Evaluation Program maintains data about students using OASIS services and conducts research projects

which examine a particular problem or issue related to OASIS services. In addition, longitudinal studies of the effect of services on student users are undertaken, such as follow-up studies on the retention of Summer Bridge students. Evaluation activities that are essential to the provision of effective services to students are also the responsibility of this program.

### **TEP 116—The Psychology of Teaching**

OASIS offers a four-unit, upper-division course that provides instruction to all OASIS student staff members on the teaching-learning process. The course is designed to balance lectures and readings with supervised, practical experience.

### ***Office of International Education***

International Center  
corner of Gilman Drive and Library Walk  
Mail code 0018  
(619) 534-3730

The International Center houses the offices of the international student and scholar advisers and advisers for the Education Abroad Program and the Opportunities Abroad Program, as well as the Programs Abroad Resource Library. In addition, the center has American English tutors available to international students, scholars and spouses, and houses the office of all the community volunteers who provide a wealth of hospitality programs to international students, scholars, and spouses, including language tutors and host families.

The staff and community volunteers as well as the International Club also sponsor a variety of international/intercultural programs and services for all members of the UCSD community. These include lectures, language exchanges, linkages with international faculty specialists, and weekly international cafe lunches which are open to the entire campus.

### ***Opportunities Abroad Program (OAP)***

International Center (corner of Gilman Drive and Library Walk)  
Mail code 0018  
(619) 534-1123

The Opportunities Abroad Program (housed in the Programs Abroad Office, along with the

Education Abroad Program) facilitates participation in programs abroad sponsored by institutions other than the University of California. OAP offers a resource library and advisory services enabling UCSD students to choose study, work, internship, and educational travel abroad programs best suited to their individual needs. Programs are available for students in all majors, for periods ranging from a quarter to a full academic year. Students participating in approved academic programs abroad transfer credit back to UCSD. They receive assistance with this as well as application, financial aid, predeparture and re-entry issues through the OAP. Special study abroad scholarships are also available. Students participating in non-academic programs generally do not earn credit but in some instances may arrange to do so, for example, through the Academic Internship Program.

### ***San Diego Supercomputer Center and the National Partnership for Advanced Computational Infrastructure***

Mail code 0505  
(619) 534-5000 (general inquiries)  
(619) 534-5100 or [consult@npaci.edu](mailto:consult@npaci.edu) (user inquiries)  
<http://www.sdsc.edu>  
<http://www.npaci.edu>

The San Diego Supercomputer Center (SDSC) is a national laboratory for computational science and engineering. Its mission is to provide world leadership in advancing knowledge through the development and application of advanced computing technologies. With a staff of more than 150 scientists, software developers, and research and operations support personnel, the center has served more than 10,000 researchers from 300 academic, government, and industrial institutions since its inception in 1985. Researchers around the country are using SDSC to investigate new scientific applications areas and paradigms of computing. They have founded new research collaborations, taught hundreds of courses, and started spin-off companies.

More specifically, SDSC:

- leads the NPACI partnership (see next section);

- develops and deploys advanced computing technologies, including a national metacomputing infrastructure;
- conducts and fosters scientific research;
- broadens the impact of computational science and engineering through education, outreach, and training;
- integrates computational technology into commercial research, design, and manufacturing processes through partnerships with industry.

SDSC has an annual budget of \$42 million. Approximately half of this funding comes from the National Science Foundation (NSF); the remainder comes from other federal funding agencies (primarily the Defense Advanced Research Projects Agency and the National Institutes of Health), the State and University of California, industrial partners, and gifts.

### **NATIONAL PARTNERSHIP FOR ADVANCED COMPUTATIONAL INFRASTRUCTURE**

SDSC was founded in 1985 with a grant from the NSF supercomputer centers program. The years 1996–1997 were a period of transition for SDSC when it broadened its mission to promote interdisciplinary links among computational science programs and other computing endeavors on campus through the establishment of the Center for Advanced Computational Science and Engineering (CACSE), a campus research unit. In doing so, SDSC formally became a part of UCSD. Also through CACSE, SDSC has become the foundation for the National Partnership for Advanced Computational Infrastructure (NPACI), which, effective October 1, 1997, won a five-year, \$170 million grant from NSF. NPACI is developing the national computational infrastructure to support tomorrow's scientific discovery. Funds from this grant help keep SDSC's computational resources at the state of the art and support a variety of related development projects led by faculty members.

NPACI's mission is to create and deploy a leading-edge, ubiquitous, pervasive, and continuous computational infrastructure to support disciplinary and interdisciplinary research by the national research community. This mission is complemented by education, outreach, and training activities that target underrepresented

populations in the sciences and communities newly ready to benefit from high-performance computing.

Initial NPACI goals include near-term deployment of a teraflops-scale compute server and a petabyte archive containing scientific data collections. This infrastructure will support the computation-intensive needs of the national research community and explore novel architectures to continue testing routes to higher performance. NPACI plans to extend this infrastructure by incorporating data-intensive computing capabilities to enable management of petabytes of data and identification and retrieval of relevant information from discipline-specific data collections.

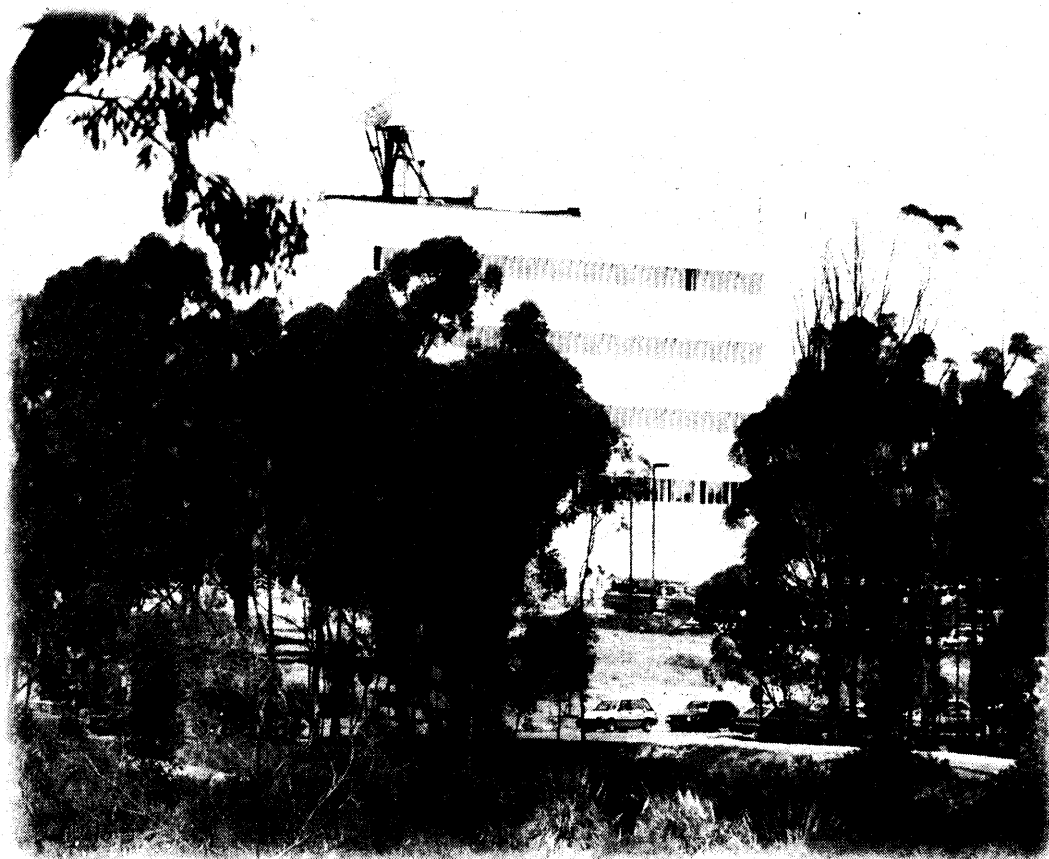
To build this infrastructure, NPACI teams the nation's experts in computational and computer science at thirty-eight partner institutions. Development projects, which leverage independently funded, peer-reviewed research grants, are organized into technology and applications thrust areas. Initial technology thrusts are metasegments, programming tools and environments, data-intensive computing, and interaction environments. Initial applications thrusts are molecular science, neuroscience, earth systems science, and engineering. All thrusts share two characteristics: They are poised for scientific discovery and promise the development of dramatically new technology that will benefit a wide array of disciplines. Each project teams applications and technology developers, and involves representatives from multiple partner sites to facilitate maximum integration of the results. This infrastructure is being developed further through partnerships with computer vendors and companies with high-performance computing applications, <http://www.npaci.edu>.

### SDSC RESEARCH ACTIVITIES

SDSC supports computational work across a broad spectrum of sciences. SDSC's internal research activities focus on biology, chemistry, and environmental sciences, and developing the necessary computational technology to effectively support these applications areas.

### BIOLOGY/BIOCHEMISTRY/ BIOMEDICINE

Computational Center for Macromolecular Structure—This group deciphers protein structures; collects, develops, and tests software and visualization tools; and documents and distrib-



utes the tools to the wider research community. This group developed XtalView, a package to analyze and visualize protein crystallography data; DOT, a macromolecular docking code; SHAPE, to analyze structure and function at the molecular surface; and Flex, a molecular graphics package, <http://www.sdsc.edu/CCMS>.

National Biomedical Computation Resource—This group works to make advanced computation and support services available to the biomedical research community. Its goals are to develop computational approaches that extend and benefit from new technologies for computation and visualization, expedite the implementation of critical biomedical software that spans the size scales of interest to biomedical researchers, and use these programs as drivers to make the new technologies friendly and accessible to a larger research community, <http://www.sdsc.edu/NBCR>.

Laboratory for Microscopic Digital Anatomy—This group is developing a collaborative computational environment for biomedicine that will increase access to specialized research equipment and sophisticated image processing. This project is enabling researchers at remote

sites to control an intermediate-voltage electron microscope and use high-performance computing to acquire and process data for 3-D visualization and analysis of biological structures, <http://www-ncmir.ucsd.edu/CMDA>.

Biological Data Representation and Query—This is an initiative to manage and make effective use of an exponentially growing body of biological data. Efforts range from PC-compressed databases of structural information (WPDB) to detailed collections of information on the protein kinase family of enzymes to complex pattern-matching of DNA sequence and protein structure information, <http://www.sdsc.edu/pb/Group.html>, <http://www.sdsc.edu/kinases>.

Molecular Interactive Collaborative Environments—This group brings together computational biology researchers and visualization specialists to develop collaboratories—scientific collaboration and instruction environments used over the Internet, <http://mice.sdsc.edu>.

### CHEMISTRY

SDSC chemists are developing and applying methods for the accurate prediction of molecu-

lar properties, developing, from first principles, a new continuum solvation model for incorporating solvation effects into quantum mechanical calculations; and modeling, from first principles, the fundamental chemical reactions involved in ozone depletion, <http://www.sdsc.edu/~taylor>, <http://www.sdsc.edu/chemdyn>.

## ENVIRONMENTAL SCIENCES

The San Diego Bay project is providing the infrastructure to help public policy makers monitor and regulate the use of San Diego Bay. Data collected by some thirty local, state, and federal monitoring agencies are being centralized at SDSC, and a 3-D hydrodynamic model of the bay is being implemented. Project researchers are also creating a detailed VRML model of the bay from data in the bay repository, <http://www.sdsc.edu/sdbay>.

Computational Ecology Projects—One project is helping the United States EPA quantify the potential impact of pesticides on surface water throughout the United States. SDSC is also supporting the NSF's Long-Term Ecological Research program by developing a prototype for ecological data management and by hosting workshops and meetings on computational ecology. SDSC also has been one of the leaders in establishing the U.S. Organization on Biodiversity Information. A related collaborative project seeks to make pixon-based image-processing methods widely available. SDSC researchers are also spearheading a partnership to implement a Web-based resource for ecological data and investigating high-resolution flow and pollutant transport modeling, [http://www.sdsc.edu/compeco\\_workshop/report/helly\\_publication.html](http://www.sdsc.edu/compeco_workshop/report/helly_publication.html).

## COMPUTING TECHNOLOGIES

Scalable Parallel and Distributed Computing—SDSC provides state-of-the-art parallel computing systems. For example, SDSC has received the first-of-its-kind Tera MTA supercomputer and plans to evaluate its novel multi-threaded architecture.

The Distributed Climate Simulation Laboratory—This project, which teams the National Center for Atmospheric Research (NCAR) and SDSC, supports research on the integration of distributed heterogeneous data sources. SDSC developed a data-handling system that provides Web access to data sets archived in the NCAR Mass Storage System.

Collaboration with UCSD's Parallel Computation Laboratory—UCSD researchers have been developing tools and algorithms to support supercomputer applications. Their work includes optimizing applications through improved memory cache utilization, examining architecture-dependent optimization of applications for near-peak performance, developing and distributing a run-time library that supports multilevel and adaptive grid applications, and designing and developing agents to schedule parallel applications on heterogeneous distributed resources, <http://www-cse.ucsd.edu/groups/hpcl/hpcl.html>.

## INFORMATION-BASED COMPUTING

Distributed Object Computation Testbed (DOCT)—In partnership with SAIC, the National Center for Supercomputing Applications (NCSA), Caltech, the University of Virginia, Old Dominion University, and Open Text corporation, SDSC has developed an Intelligent Metacomputing Testbed. This project integrates a persistent object computation environment with a distributed data-handling system to support analysis of complex documents such as U.S. patent applications and scientific environmental data sets. The testbed supports advanced data workflow, distributed databases, and distributed

computing applications on computer resources at the various sites, <http://www.sdsc.edu/DOCT>.

In related projects, SDSC is developing an information-based computing environment that will enable information discovery and access to heterogeneous, distributed data sources from applications running on supercomputers. SDSC has implemented the High Performance Storage System (HPSS) as its production archival storage system and is integrating HPSS (and the DB2 object relational database software on an IBM hardware testbed) to support data-intensive computing. The resulting system will provide a seamless environment for managing and analyzing massive, distributed data sets, <http://www.sdsc.edu/MDAS>.

SDSC's information-based computing research will support applications including clones of the Alexandria Digital Library at UC Santa Barbara, the UC Berkeley Digital Library, the Synthetic Aperture Radar Atlas at Caltech, SDSC's Protein Kinase Resource, the San Diego Bay Project environmental database, and other data repositories, <http://www.npaci.edu/Research/DI/>.

National Laboratory for Applied Network Research (NLANR)—NLANR is a collaboration among NSF and the very-high-performance Backbone Network Service (vBNS) community



on the use of the vBNS as a resource. NLANR's Measurement and Operations Analysis Team is part of a triad with Carnegie Mellon University (engineering) and NCSA (applications). SDSC is responsible for coordinating the development and deployment of measurement tools and the NLANR global Web-caching hierarchy, as well as the application of new protocols and technologies such as IPv6, service levels, and some multicast aspects, <http://www.nlanr.net>.

Cooperative Association for Internet Data Analysis (CAIDA)—With the goal of promoting a more robust, scalable Internet infrastructure by fostering engineering and technical collaborations among Internet providers, vendors, and users, CAIDA works with the community to develop and transfer tools and technologies that provide engineering and other insights relating to the operation of the Internet infrastructure. CAIDA is collaborating with the Internet Engineering Task Force and others to encourage the creation of a set of Internet performance metrics, create a collaborative research environment in which commercial providers can develop tools to share performance and engineering data confidentially (or in desensitized forms), and foster the development of advanced networking technologies, <http://www.caida.org>.

### SCIENTIFIC VISUALIZATION

Web-based 3-D Visualization—SDSC is leading the national effort to develop functionality for 3-D scientific visualization on the Web. This work includes development of VRML (Virtual Reality Modeling Language) display and collaboration applications, research into virtual reality user interfaces, design of virtual reality environments, and the establishment and maintenance of a repository of information about VRML. Andrea L. Ames, Dave Nadeau, and John Moreland wrote *The VRML 2.0 Sourcebook* published by John Wiley & Sons, <http://www.sdsc.edu/vrml>.

TeleManufacturing—Rapid prototyping technology is finding novel applications in a variety of scientific disciplines. In this area, SDSC researchers are enabling access to a Laminated Object Manufacturing system on the Internet, which produces solid "hardcopies" of 3-D data sets. To make this technology easier to access and use, the researchers are developing the necessary user-interface and error-detection software. In each application to date, the resulting solid model has helped the researcher recognize pertinent features that were not apparent in a

3-D computer graphics display. Examples are docking sites on proteins, silt mounds in San Diego Bay, and the tilt of geophysical subduction zones. This facility has proven useful for applications in biochemistry and environmental, earth, and space science, <http://www.sdsc.edu/tmf>.

### SECURITY

Pacific Institute for Computer Security (PICS)—PICS conducts and publishes leading-edge research on real-world computer and network security issues, emphasizing solutions to real security problems. This project has produced several CERT advisories and numerous security tools available via the Web and FTP. These "active confrontation" tools help system administrators analyze and investigate intrusions. Active software countermeasures include aggressive schemes to detect intrusions as they occur, monitor and track ongoing intrusion attempts, and support post-intrusion investigations. SDSC leads NPACI security efforts and works with local organizations through the San Diego Regional Information Watch ([sdriv.org](http://sdriv.org)) and law enforcement through the High Technology Crime Investigation Association, <http://www.sdsc.edu/Security>.

### COMPUTATIONAL RESOURCES

SDSC computational resources include:

- CRAY T914—a 14-processor vector system with 4 GB of memory, 8 GB of high-performance solid-state memory, and 900 GB of disk;
- CRAY T3E—a 256-processor parallel system with 128 MB of memory per node and 300 GB of disk;
- IBM SP2—a 256-processor parallel system with 256 MB of memory and 9 GB of disk per node, and more than 400 GB of shared high-performance disk;
- Tera MTA—With the first-ever system recently installed, SDSC is collaborating with Tera Computer Company to evaluate its Multi-Threaded Architecture (MTA) architecture;
- HPSS—a 240-TB archival storage system accessible from all SDSC production systems;
- A visualization laboratory featuring Silicon Graphics workstations, a Fakespace boom head-mounted virtual reality device, the TeleManufacturing Facility (described above) for producing solid 3-D models of geometric

data sets, a variety of hardcopy and film output devices, and an audio/video suite for producing professional-quality videotapes of visualized research results.

Additional systems being allocated through NPACI include:

- CRAY T3E and J90 at the University of Texas;
- IBM SP at the University of Michigan;
- HP Exemplar at Caltech;
- Network of Workstations at UC Berkeley.

### ALLOCATIONS

UCSD faculty and students are eligible for allocations of time on SDSC's supercomputers and other resources available through NPACI. Undergraduate and graduate students may obtain time through applications submitted by their advisers. Such allocations should support research projects and class curricula. All proposed projects must be nonproprietary. To apply for time, you must submit an application at least sixty days prior to the quarter in which you want your allocation to begin (quarters begin January 1, April 1, July 1, and October 1; allocations are typically made for twelve-month periods). Applications for relatively small amounts of time can be submitted any time and are reviewed shortly after receipt, <http://www.npaci.edu/Allocations>.

Accounts are also available on workstations in SDSC's VisLab. Any academic researcher, or graduate or undergraduate student may apply for one. To apply, fill out the SDSC Workstation Access Request form, which is available from Rachel Chrisman, (619) 534-5025, [chrisman@sdsc.edu](mailto:chrisman@sdsc.edu). Each form is reviewed to ensure that the goals of the applicant are consistent with the mission of SDSC. This review process takes two to four weeks.

### USER SUPPORT

Researchers with access to SDSC's resources are supported by SDSC's consulting staff and other support staff at the University of Texas and the University of Michigan. SDSC consultants are available through the Web (<http://www.npaci.edu/Consult>) or email ([consult@npaci.edu](mailto:consult@npaci.edu)) 8:00 a.m.–5:00 p.m. Monday through Friday. Researchers and students with accounts are welcome to attend SDSC's periodic training workshops, (<http://www.npaci.edu/Training>).

## ADDITIONAL OPPORTUNITIES FOR THE CAMPUS COMMUNITY

SDSC offers the following additional opportunities for UCSD faculty, staff, and students:

- Access to high-performance computers through UCSD classes—Many UCSD and Extension classes make use of SDSC resources and staff expertise, providing a hands-on way to learn about high-performance computing. Check particularly the class listings for biology, chemistry and biochemistry, computer science and engineering, electrical and computer engineering, applied mechanics and engineering sciences, and the Scripps Institution of Oceanography. Recent classes offered through UCSD Extension have included UNIX and Web/html-related classes.
  - Research program for undergraduates—The "Research Experiences for Undergraduates" program, funded by NSF, provides an opportunity for undergraduates to work on computational science research projects under the guidance of SDSC mentors and their campus advisers. Students can participate in a nine-week summer program or a part-time program during the academic year, and they must apply for and be accepted into the program. Stipends are provided. For more information, contact Bob Leary, (619) 534-5123, leary@sdsc.edu.
  - Seminars—SDSC hosts a wide variety of seminars on topics of interest to the high-performance computing and computational science community, open to the UCSD community.
  - Internships—Through the academic internship program at UCSD, students can obtain work experience at SDSC for course credit. SDSC has internships in systems software development, computational science research, visualization and applications programming, scientific and technical writing, and curriculum development. For more information, contact Peggy Wagner, (619) 534-5121, wagner@sdsc.edu. SDSC also plans to participate in the proposed NPACI Coop Program, which will enable selected students to alternate full-time paid employment at selected NPACI compute sites with full-time study at UCSD over several quarters. For more information, contact Victor Hazlewood, (619) 534-5115, victor@sdsc.edu.
- Part-time and postgraduate employment—SDSC posts part-time and full-time professional job openings at the UCSD Career Services Center. Typical jobs are in programming, researcher support, technical writing, library assistance, computer operations, and reception work. These positions are also advertised on SDSC's web site at <http://www.sdsc.edu>
  - SDSC's library—SDSC maintains a professionally staffed library (room 308) with specialized information on all aspects of high-performance computing, including relevant scientific and computational journals, proceedings from relevant conferences, and newsletters from other supercomputer centers. The library is open 8:00 a.m.–5:00 p.m. Monday through Friday; visitors should first check in with the SDSC receptionist on the first floor. Faculty and students can use materials in the library, but only those with SDSC/NPACI allocations may check materials out.
  - Tours—SDSC offers a forty-five minute tour at 4:00 p.m. every Friday. Reservations are recommended and can be made by contacting the SDSC receptionist, (619) 534-5000, reception@sdsc.edu. Special-interest group tours can be arranged by contacting Cheryl Converse-Rath, (619) 534-5099, cheryl@sdsc.edu.

Additional information about SDSC can be obtained from SDSC's Web server (<http://www.sdsc.edu/>) or contacting Ann Redelfs, External Relations, (619) 534-5032, redelfs@sdsc.edu.

### *Extended Studies and Public Programs*

9600 North Torrey Pines Road  
(on the UCSD campus north of Muir College)  
Mail code 0176  
(619) 534-3400  
email: [reg@unexpost.ucsd.edu](mailto:reg@unexpost.ucsd.edu)  
Fax: (619) 534-8527  
Internet: <http://www-esps.ucsd.edu>

The Division of Extended Studies and Public Programs is the key lifelong learning resource for the University of California, San Diego. The organization provides a rich and varied array of academic and community outreach programs designed to support a diverse constituency. The division has classroom and administrative centers

in La Jolla, and Rancho Bernardo. The division provides advanced learning opportunities for adults, including courses, seminars, workshops, institutes, conferences, and study tours. Annual enrollment is approximately 45,000 in the various programs administered through UCSD Extension, the largest department of Extended Studies and Public Programs. Over 75 percent of UCSD Extension participants have a bachelor's degree.

With the exception of specific grant-funded programs, the division's programs are supported by course fees and receive no state funds.

For further information on the Division of Extended Studies and Public Programs, phone (619) 534-0406 for a free quarterly catalog. Among the many programs in the division are:

## CONTINUING PROFESSIONAL EDUCATION

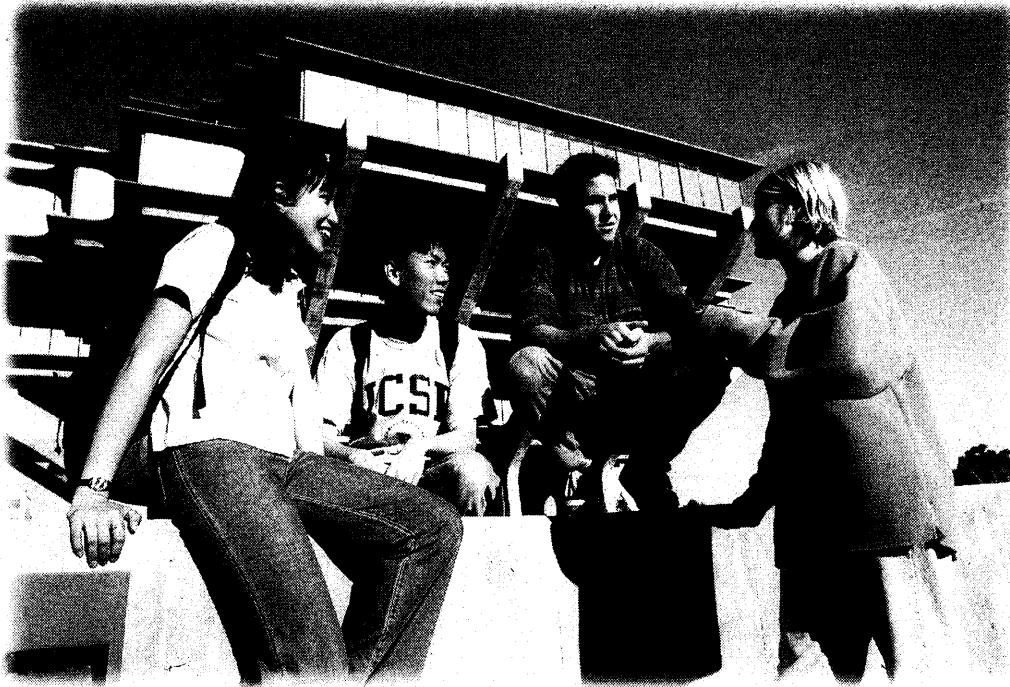
Courses and certificate programs are offered in a wide range of fields, including microcomputer engineering, accounting, business management, financial management, hazardous materials management, legal assistant training, marketing management, computer systems programming, human resource management, urban planning, desktop publishing, quality management, U.S.-Mexican trade, international trade, nursing, and fitness instruction. State-approved credential programs for educators, quarterly engineering colloquia, a career-planning program, and specializations in business, science, engineering, and information technologies are also offered.

## EXECUTIVE PROGRAMS

UCSD Extension offers a variety of programs to meet the needs of San Diego companies for astute, broadly educated managers equipped to deal with the dramatic financial, technological, and cultural changes in today's workplace.

Three such programs include the "Executive Program for Scientists and Engineers" (EPSE), the "Leadership and Management Program for Scientists and Engineers" (LAMP), and the "Healthcare Executive Leadership Program" (HELP). All are accelerated, proficiency-based courses of study tailored to the scientist, engineer or healthcare administrator who holds, or is about to be promoted to, a significant management position. Participants are nominated to apply for the programs by their companies or organizations. In addition, UCSD Extension sponsors major institutes and conferences featuring international experts.





tificate programs are offered at the Extension campuses in La Jolla and Rancho Bernardo as well as at corporate training facilities in San Diego and throughout the world under a program called "UCSD On-Site".

Certificate programs in environment and safety include studies in hazardous materials management, natural resource management, occupational health and safety, and site assessment and remediation.

*The OSHA Training Institute, Pacific Coast Education Center* provides standards-based occupational safety and health courses approved by the U.S. Department of Labor for practitioners in the private sector and in federal agencies. The center also provides Title 8-based safety and health courses throughout California to assist companies, utilities, and others to comply with Cal-OSHA standards. For information, call (800) 358-9206.

### ADVANCED TRAINING FOR EDUCATORS

State-approved credential programs for teachers offered by UCSD Extension include adult education, vocational education, special education, and pupil personnel services. There are certificate programs in Teaching Reading, Educational Technologies, Teaching English as a Second Language (TESL), and a commission-approved Cross-Cultural Language and Academic Development (CLAD) certificate. A wide range of seminars and workshops in innovative teaching techniques and educational administration are also available.

In addition, summer institutes for teachers allow the university to contribute to the education of our community's young people by enhancing the intellectual perspective of teachers and administrators. For example, the Program for Teacher Enhancement in Liberal Arts (PTELA) and the Program for Teacher Enhancement in Science and Technology (PTEST), bring selected teachers to the campus and various sites in the San Diego area for seminars and courses taught by prominent UCSD faculty. PTELA's Principals Executive Program is a partnership between business and industry and San Diego County K-12 schools to share proven management techniques with school administrators.

### CONNECT: THE PROGRAM IN TECHNOLOGY AND ENTREPRENEURSHIP

Founded in 1985 at the urging of the local business community, UCSD CONNECT was created to contribute to the economic development of San Diego by linking high-tech and biotech entrepreneurs with the resources they need for success—money, markets, management, partners, support services, technology, and government. Often referred to as an incubator without walls, CONNECT accomplishes its goals through educational and networking programs, practical business seminars and technology transfer demonstrations, and international financing forums. CONNECT is self-supporting and receives no funding from the university or the state of California. It is supported by dues from its 450 members and sponsors; on fees from its courses, seminars, and conferences; and on underwriting for specific programs. For further information, call (619) 534-6114 or access CONNECT on the World Wide Web at <http://www.connect.org/connect>.

### ENGINEERING, SCIENCE, AND ENVIRONMENTAL STUDIES

UCSD Extension is responding to the growing need for practical continuing education for professionals in engineering, science, environmental management, and occupational health and safety. Courses, seminars, and full curricula cer-

### INFORMATION TECHNOLOGIES

The Department of Information Technologies (IT) offers a broad array of courses and curricula enabling those who wish to enter, or upgrade their skills in, the rapidly expanding fields of information and communications technology. With a clear mission to lead the San Diego region in developing new programs to keep pace with rapid advances in technology, the Department of Information Technologies currently offers twenty-one certificate programs in the broad areas of communications and networking, computer languages and programming, database, geographic information systems, graphics and digital design, CAD, Internet and Web Technologies, microcomputer engineering, Microsoft system engineering, multimedia, software analysis and design, and UNIX.

### LIBERAL ARTS AND INTERNATIONAL PROGRAMS

People who enjoy reading, thinking and talking about ideas, exploring the philosophies of other cultures and other times, or exercising their creative talents have a special resource in UCSD Extension. People interested in keeping current on changing trends and public issues can also turn to UCSD Extension for in-depth analyses and discourse. Courses and workshops are offered in painting, music, acting, literature, history, oceanography, political science, health, and foreign languages, to name just a few. A

variety of free public lectures, community forums, and public policy seminars are also available.

Courses in English as a Second Language, foreign languages, arts, humanities, writing, and general interest are all offered through the Department of Liberal Arts and International Programs. The English Language Programs include year-round, ten-week intensive programs for international students as well as short courses in conversation and in specialized areas such as business English and medical English. Evening courses for foreign professionals are also available in accent reduction, technical writing, and oral presentation. A large number of foreign languages are also offered as well as liberal arts programs addressing topics of broad interest to the community.

**HEALTHCARE MANAGEMENT AND DELIVERY**

The delivery of healthcare is no longer just a professional practice, it is big business with complex financing structures, and integrated networks comprised of hospital systems, physician groups, and insurance companies. The business and provision of healthcare is a critical issue from an economic, sociological, and clinical perspective. UCSD Extension, through EdVantage: San Diego's Partnership for Professional Healthcare Education, offers continuing education in healthcare management and healthcare delivery. Certificate programs and an advanced executive leadership program for healthcare providers are available, as is a beginning and advanced certificate program in fitness instruction and exercise science.

**CONCURRENT REGISTRATION**

Concurrent registration is a procedure that allows individuals who are not officially matriculated UCSD students to participate for credit in regular UCSD courses. Enrollment is on a space-available basis with the approval of the course instructors. Individuals must register through UCSD Extension. Information on this program can be obtained through the UCSD Extension Registration Office, (619) 534-3400.

Through a reciprocal arrangement with the university, UCSD Extension offers a limited number of complimentary enrollment to full-time UCSD seniors, juniors, and sophomores, who may enroll in one free course of up to \$270

(students must pay anything over the amount) on a first-come, first-served basis. Graduate students please contact OGSR. Medical students contact your department.

**PROGRAMS FOR RETIRED PERSONS**

The Institute for Continued Learning (ICL) is an organization for retired persons conceived, developed, and directed by retirees themselves. ICL has an active learning and social program created by members, including seminars, study groups, classes, forums, trips, and luncheons. Approximately 350 members participate in ICL activities. Information and a brochure are available by calling (619) 534-3409.

*The UCSD Libraries*

The UCSD Libraries consist of the Social Sciences and Humanities Library, the Science and Engineering Library, the Biomedical Library and Medical Center Library, the Scripps Institution of Oceanography Library, the International Relations and Pacific Studies Library, the Undergraduate Library, the Art and Architecture Library, the Film and Video Library, the Music Library, and The Mandeville Library of Special Collections.

**COMBINED UCSD LIBRARIES STATISTICS, 1997**

Volumes .....	2,531,418
Periodical and other serial publications received .....	22,323
Government documents .....	205,022
Maps .....	216,733
Microforms .....	2,676,146
Audio and video materials .....	80,315
Slides and other pictorial items .....	286,687
Computer files .....	11,691

The library is a center for study, reading, and scholarship at UCSD. Its collections and services are basic resources supporting undergraduate and graduate instructional programs, as well as advanced research. The library units are organized and staffed to meet these academic objectives. While each library may have varying rules, all are open to all members of the UCSD community.

Reference services are available at each of the campus libraries and are designed to assist students and faculty with their course needs and research activities. Through its Instructional

Services Program, the library offers campus users a variety of orientation and instructional opportunities. The Contemporary Issues 50 course (Information and Academic Libraries) of Muir College is one example. Group tours of the libraries can be arranged through the reference librarians.

The Interlibrary Loan Service locates and borrows materials not held at UCSD. This service is available to all faculty, staff, and students of the university. Our students enjoy direct borrowing privileges at the other UC campuses.

InfoPath is a World Wide Web-based campus-wide information system developed by UCSD Libraries to provide access to campus and community electronic resources as well as a gateway to the resources of the Internet. Services and resources currently offered through InfoPath include extensive library resources such as ROGER (UCSD Libraries catalog); MELVYL® (the University of California systemwide catalog, indexes, and full-text databases), and links to research resources on the Internet. A wide variety of other information about the campus is available through InfoPath, and new resources are added continually. The InfoPath URL is <http://www.ucsd.edu>.

Library hours of service vary and are regularly posted in the libraries and on InfoPath. Most units extend hours during examination periods.

**Note:** Call 534-3336 for an up-to-date schedule of open hours for all libraries (recorded message).

**SOCIAL SCIENCES AND HUMANITIES LIBRARY**

(located north of the Price Center in Geisel Library)  
Mail code 0175R  
(619) 534-3336

The SS&H Library houses the research collections in the social sciences and humanities (1,397,503 vols.). Its reference collection contains an outstanding collection of bibliographies, indexes, encyclopedias, biographical directories, and other information resources in print and electronic form. The Documents Collection is a depository for the official publications of California, the United States, the United Kingdom and the United Nations, and also contains a major topographical and political map collection. Course reserve materials used by faculty in their classes are provided at the circulation desk.

## SCIENCE AND ENGINEERING LIBRARY

East Wing, Geisel Library  
Mail code 0175E  
(619) 534-3258

The Science and Engineering Library contains strong collections in the physical sciences and technology (232,711 vols.). Of particular importance are its research materials in chemistry, computer science, electronics, engineering, mathematics, physics, space sciences, nuclear energy, and materials science.

## BIOMEDICAL LIBRARY AND MEDICAL CENTER LIBRARY

Basic Science Building, School of Medicine  
Mail code 0699  
(619) 534-3255

The Biomedical Library contains collections in biology and medicine which are especially rich in the journal literature of the basic sciences and clinical medicine, with emphasis on cellular and molecular biology, neurosciences, and genetics (205,580 vols.). A branch library, the Medical Center Library (26,315 vols.), supports the activities of health care providers at the UCSD Medical Center in the Hillcrest area of San Diego. Mail code 8828, 543-6520.

## INTERNATIONAL RELATIONS AND PACIFIC STUDIES LIBRARY

Robinson Complex, Bldg. 3  
Mail code 0514  
(619) 534-7785

The IR/PS Library features materials on contemporary political, economic, and business affairs in East Asia, Latin America, and the rest of the Pacific Basin region (75,507 vols.).

## SCRIPPS INSTITUTION OF OCEANOGRAPHY LIBRARY

Eckart Bldg.  
Mail code 0219  
(619) 534-3274

Scripps Institution of Oceanography Library is one of the largest marine science libraries in the world (230,764 vols.). It has outstanding collections in marine biology, oceanography, and marine technology, and also specializes in geology, geophysics, and zoology.

## UNDERGRADUATE LIBRARY

While Galbraith Hall is closed for renovation, June 1998 to January 2000, the Undergraduate Library Collection is located on level one, west wing, Geisel Library.

Undergraduate Library has a general collection (40,000 vols.). Services are provided by the Social Sciences and Humanities Library.

The Playback Center has permanently relocated to Geisel Library and renamed Film and Video Reserves.

## ART AND ARCHITECTURE LIBRARY

West Wing, Geisel Library  
Mail code 0175F  
(619) 534-4811

The Art and Architecture Library's collections support the study of the visual arts and architecture (59,827 vols.; 251,673 slides). Collection strengths include art history, performance and environmental art, photography, painting, sculpture, and architectural design, theory, and history, urban design, landscape architecture, and building technology. The Slide Collection provides visual materials for on-campus instructional purposes.

## MUSIC LIBRARY

West Wing, Geisel Library  
Mail code 0175Q  
(619) 534-2759

Located on the first floor of Geisel Library, the Music Library contains a strong collection of books and periodicals emphasizing music of the twentieth century and music theory, as well as music scores centered around twentieth century and chamber music performance materials (27,502 vols.; 37,260 scores). The Listening Room has sixty stations for listening and viewing of course reserve and related materials; it contains a large and diverse collection of music and spoken word LP recordings, CDs, audio tapes, and CD-ROMs. The Film and Video Library collection includes over 7,700 videos, laser discs, and films. Films and videos on course reserve are available at the Film and Video Reserves service point.

## THE MANDEVILLE LIBRARY OF SPECIAL COLLECTIONS

West Wing, Geisel Library  
Mail code 0175S  
(619) 534-2533

The Special Collections (155,078 vols.) include rare books, manuscripts, and other research materials. Other resources include materials about Baja California, Pacific Voyages, the Spanish Civil War, science and public policy, and modern poetry.

## Student Services and Programs

### *Vice Chancellor, Student Affairs*

Building 112 University Center  
Mail code 0015  
(619) 534-4370

The Office of the Vice Chancellor of Student Affairs is responsible for the overall quality of life at UCSD for undergraduate and graduate students. The office provides coordination and direction to more than two dozen student service departments and works closely with other components of the campus to ensure that programs, services, policies, and procedures foster the development of students and the achievement of their academic and career goals.

### *Career Services Center*

Mail code 0330  
(619) 534-3750

The Career Services Center exists to help UCSD students and alumni determine and fulfill their employment and career goals. To that end, we offer the following services:

**Career Development:** Resources are available through individual advising, computerized testing programs, workshops, a career information fair, practical experience, and reference materials to provide occupational information.

**Tools, Techniques, and Tactics:** Resume, interviewing and job search workshops, information sessions regarding graduate school admissions, critiques for resumes and personal statements, individual advising and reference materials.

**Job Opportunities:** Job listings (updated daily), on-campus interviews with employers in various fields, networking programs, job fairs and reference materials to identify potential employers.

**Graduate School Opportunities:** Annual fairs with recruiters from professional and graduate schools, individual advising, reference letter file service, reference materials regarding individual schools, program information, fellowship

opportunities, and graduate school admission testing brochures.

For a complete description of our services, check our home page: <http://www-csc.ucsd.edu>.

### College Deans' Offices

Revelle, Mail code 0321, (619) 534-3492

Muir, Mail code 0106, (619) 534-3587

Marshall, Mail code 0509, (619) 534-4390

Warren, Mail code 0022, (619) 534-4731

Roosevelt, Mail code 0069, (619) 534-2237

The staffs of the college deans' offices perform many different functions. They provide help, advice, counseling, and referral in many areas including commuter and residential matters. The deans' offices regularly develop and coordinate activities such as orientation, Welcome Week, commencement, leadership opportunities, decisions about remaining in or withdrawing from school, college disciplinary matters, involvement in student governments, planning social and educational activities, handling housing concerns, assisting with specialized concerns for physically limited students, and assisting in hearing procedures regarding grievances.

Contact your college dean's office for assistance, particularly if you do not know which university office or resource would best be able to assist you with your problem or concern.

### Dining Services

Administration: Muir Commons Annex

Mail code 0122

(619) 534-4014

A variety of high quality food appealing to all types of diners is served in distinctive settings at UCSD Dining Services facilities. Dining restaurants are located at Revelle, Muir, Warren, and Thurgood Marshall Colleges, as well as at the School of Medicine, and Scripps Institution of Oceanography. Many are located near residence halls.

Each restaurant has its own unique atmosphere and menu, with hours depending on location and time of year. Students and members of the community are welcome to dine at any facility.

A meal plan is mandatory for residence hall students and optional for apartment residents. Please refer to the "Housing" section for meal plan options and prices.

TritonPlus Account, the campus debit account, is also available from Dining Services.

Accepted at over forty locations, TritonPlus Account offers an easy, convenient, and secure way to shop and dine on campus. For information, call (619) 534-7587.

Students use their official UCSD Campus ID card to access their meal plan and TritonPlus Account.

Other food service facilities include six fast-food restaurants and a convenience store located at the Price Center; the Food Co-op and Grove Caffe at the Student Center; and Ché Cafe on Revelle campus. In addition, a limited selection of food may be purchased at portable food carts, convenience stores, and vending machines throughout UCSD. Dining Express, the mobile dining unit, stops at many locations on and around campus.

### Disabilities, Office for Students with (OSD)

202 University Center

(619) 534-4382 (Voice/TDD)

(619) 534-4650 (Fax)

OSD facilitates student development and independence through the coordination of campus programs, services, and facility access. Coordination may include disability management counseling, note takers, sign language interpreters, real-time captioners, readers, typists, library/laboratory assistants, special equipment loans/minor repair, priority registration/enrollment assistance, on-campus housing coordination, exam arrangements, and on-campus transportation/parking coordination and referrals. College learning skills seminars (including memory strategies, note-taking, test taking, time management, and study skills) are offered on an individual and small group basis. OSD serves as a liaison with academic departments and campus community, as well as off-campus disability-related agencies. In addition, OSD provides disability awareness through maintenance of a resource library of books, periodicals, articles, films, and video formats about disability issues, and as requested, provides on-campus disability awareness workshops.

Students who have been diagnosed as having a disability should consult promptly with a qualified specialist at the Office of Students with Disabilities (OSD), as only students certified as disabled by OSD are entitled to accommo-

tion in classes. In order to implement an OSD-approved accommodation in examinations or assignments, students must meet with the course instructor within the first two weeks of instruction and present a certificate from OSD recommending appropriate accommodations, including accommodation in test taking.

If the student disability has been certified by OSD, the course instructor should accommodate the student's needs. Faculty are not responsible for determining what accommodations are appropriate for a particular student; if an instructor is presented with a claim of a disability by a student who has not been certified by OSD, the course instructor should refer the student to OSD and not become personally involved in diagnosing or evaluating the seriousness of the disability. OSD is available to assist instructors in providing accommodation and if for any reason an instructor cannot meet the request, the department chair and OSD should be promptly consulted.

The full text of the Policy on Students with Disabilities and Steps for Academic Accommodation has been posted to the Academic Senate Web site (as an Appendix to the San Diego Division Regulations), at the following address: <http://www-senate.ucsd.edu/apxtoc.html>

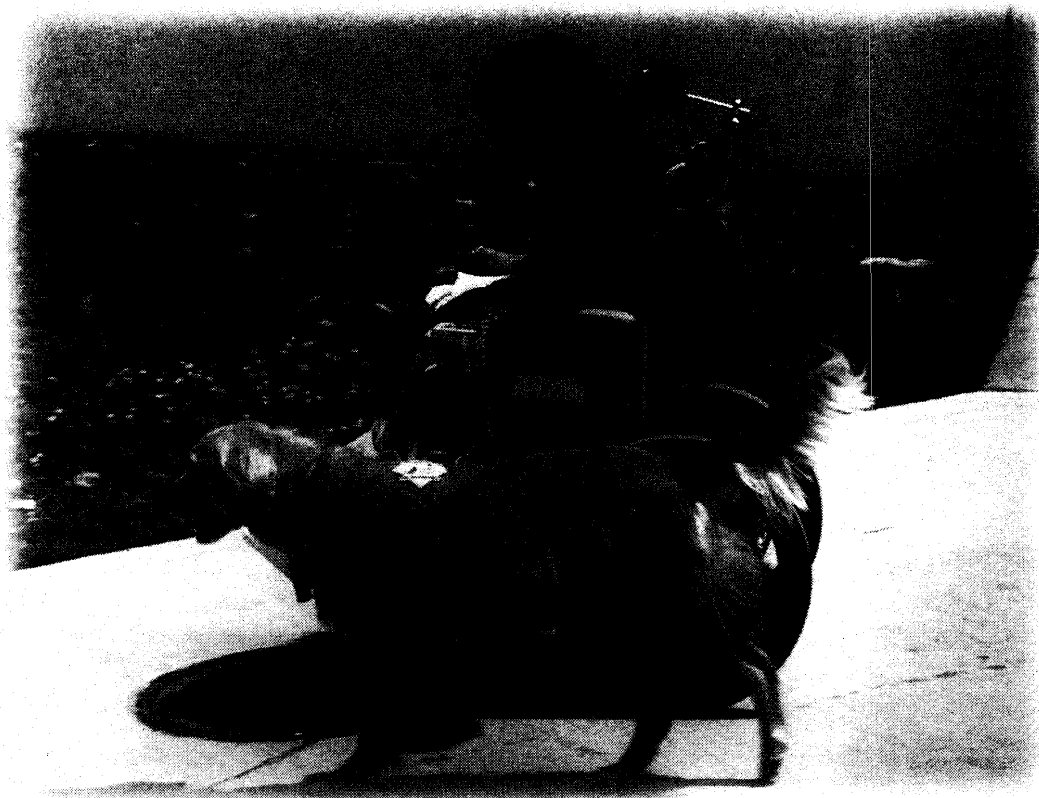
### Financial Aid

#### Student Financial Services

All financial assistance for undergraduate and medical students and need-based aid for graduate students is administered by Student Financial Services. Information relating to graduate student support in the form of fellowships and assistantships is presented in the catalog section entitled "Graduate Studies."

Student Financial Services is located in University Center 201 and can be contacted at the phone numbers below. Student Financial Services also includes the Undergraduate Scholarship Office and the Office of Veterans' Affairs.

Thurgood Marshall College	(619) 534-3805
John Muir College	(619) 534-3808
Revelle College	(619) 534-3806
Eleanor Roosevelt College	(619) 534-2550
Earl Warren College	(619) 534-4686
Graduate Division	(619) 534-3807



Medical School	
Financial Aid	(619) 534-4664
Scholarship Office	(619) 534-3263
Veterans Affairs	(619) 534-4480

Other information about our services and programs is available on the Internet. The Web site address is: <http://www.ucsd.edu/finaid>.

Applications and requests for information should be addressed to Student Financial Services, 0013, 9500 Gilman Drive, La Jolla, California 92093-0013.

No student should leave the university for financial reasons before exploring all possible avenues of assistance with a Student Financial Services counselor. *All information contained herein is intended to serve as a general guide and is subject to change due to new and revised federal, state, and University of California regulations and procedures.*

### Applying for Student Financial Assistance

UCSD students must meet the following criteria to be eligible for financial assistance:

1. Be a United States citizen or eligible noncitizen.

2. Be accepted to or enrolled at least half-time in a program leading to a degree or certificate and maintain satisfactory academic progress as defined for UCSD financial aid recipients.
3. Not owe a refund on any federal educational grant or be in default on any federal educational loan unless satisfactory arrangements to repay or otherwise resolve the overpayment or default have been made.
4. Be registered with Selective Service if you are a male who is at least eighteen years old and born after December 31, 1960, unless you are not required to be registered.

For evaluation of financial need, all applicants must submit a *Free Application for Federal Student Aid (FAFSA)* or *renewal FAFSA* and, if requested, copies of the 1997 federal income tax returns, and any other required documents. The *FAFSA* form should be filed by March 2, 1998, the UCSD priority filing date, with the appropriate processing agency and must indicate the University of California, San Diego (list Federal School Code 001317) to receive a processed copy of the *FAFSA*. Late applicants will be considered for limited aid.

### Receiving Financial Assistance

UC financial assistance for students with demonstrated financial need is funded by a combination, or "package", of gift and self-help aid. Grants and scholarships are awards that do not have to be repaid. Self-help aid may consist of a loan, which does have to be repaid, or a work-study award, earned by working a part-time job while attending school, or a combination of both. UCSD ensures that students in similar circumstances receive similar packages. Grant funds are directed to the most needy students. Students who are nonresidents of California should note that need-based financial aid funds are not sufficient to meet the additional cost of nonresident tuition (\$9,384 during 1998-99). The family should be prepared to provide this amount from their own personal resources or educational loan programs. The various types of aid and programs which may be included in need-based packages are listed below:

#### Federal Pell Grant

The Federal Pell Grant program is designed to provide financial assistance to undergraduates attending postsecondary educational institutions. Amounts range from \$400-\$3000 for 1998-99.

#### University of California Grant Program

The University of California Grant Program provides grants to undergraduate and graduate students.

#### Federal Supplemental Educational Opportunity Grant (SEOG)

SEOG awards are federally funded and are available only to undergraduates. Awards may range from \$100 to \$4,000 per academic year.

#### Cal Grants (Undergraduate)

Cal Grants are awarded by the California Student Aid Commission to undergraduate California residents. All resident applicants for UCSD aid are required to apply for a Cal Grant. To be considered as a new winner, the *FAFSA* or *renewal FAFSA* and the GPA Verification Form must be postmarked prior to March 2, 1998. Current recipients must file a *FAFSA* or a *renewal FAFSA* each year to have their award renewed.

### **California State Graduate Fellowship**

California State Graduate Fellowships are awarded by the California Student Aid Commission to California residents who are admitted to or continuing in a graduate degree program who intend to become college or university faculty members. This fellowship eligibility is based on financial need, GPA, Graduate Exam Test Scores, and disadvantaged background to assist eligible students with registration fees. Current recipients must file a *FAFSA* or a *renewal FAFSA* each year to have the award renewed. The *FAFSA* must be postmarked by the preceding March 2.

### **Work-Study**

Federal and state work-study awards are employment programs that provide funds for student employment by the university or by public and private profit/nonprofit organizations. The work-study program provides experience in many fields, including experimental sciences, library work, recreation, computer sciences, peer counseling, and office work. Pay ranges from minimum wage and above. Job listings and referrals are provided through the Career Services Center.

### **Federal Perkins Loans**

This loan carries a 5 percent interest rate. Students begin paying both the principal and the interest nine months after ceasing to be enrolled at least half-time.

### **Federal Subsidized Stafford Loans**

The annual maximum allowed during the first year of undergraduate study is \$2,625. Sophomores can borrow an annual maximum of \$3,500, and the yearly limit for juniors and seniors is \$5,500, with an undergraduate cumulative maximum of \$23,000. Graduate students may borrow up to \$8,500 per academic year with an aggregate sum up to \$65,000, including the amount borrowed as an undergraduate. The interest rate for new borrowers is variable, not to exceed 8.25 percent. The 1997-98 rate was 8.25 percent.

The federal government pays (subsidizes) the interest on the student's behalf during in-school (enrolled in six units or more), grace, and authorized deferment periods. Repayment of principal and interest begins six months after the bor-

rower leaves school or ceases to be enrolled as a half-time student.

### **Federal Unsubsidized Stafford Loans**

Students who do not have financial need eligibility for the maximum Federal Stafford Loan may borrow under this program. The annual maximum and interest rate are the same as the Subsidized Stafford Loan. Independent undergraduates may borrow an additional \$4,000-5,000 annually; graduate students may borrow an additional \$10,000 annually. The maximums include amounts borrowed under the Federal Stafford Loan program. Aggregate maximums are \$23,000 for dependent undergraduates, \$46,000 for independent undergraduates, and \$138,500 for graduate students. The interest is **not** paid on the student's behalf. Interest begins accruing immediately after disbursement, but payment of principal and interest may be deferred until six months after ceasing to be enrolled for six units or more. The amount borrowed cannot exceed the cost of education minus other financial aid resources (including other need-based loans).

### **Federal PLUS Loans for Parents**

Parents of dependent undergraduate students are eligible to borrow under this program if they have no adverse credit history and meet program eligibility requirements. The interest rate for this loan is variable, but not to exceed 9 percent. In 1997-98, the interest rate was 8.98 percent. Parents are eligible to borrow up to the cost of education minus other financial aid (including other loans). The first payment is due within sixty days after disbursement by the lender.

### **Triton Registration Installment Plan (TRIP)**

The UCSD Triton Registration Installment Plan (TRIP), administered by the Bursar's Office, is a monthly payment arrangement and is available for students who desire an alternative method of financing their registration fees on a short-term basis. All students in good financial and academic standing are eligible for the program, except for those students whose financial aid or graduate support will pay their registration fees by the quarterly registration fee due date. A prerequisite to applying for the program is enrollment for the term. The TRIP allows registration fees to be paid in up to three installments each quarter. On a three-month plan, the first pay-

ment is required by the quarterly registration due date. The remaining payments are itemized on the student's next two monthly UCSD Billing Statements. There is a \$30 nonrefundable quarterly fee that must be submitted with the application to the Bursar's Office. This fee is strictly used to offset the costs of the program. Applications may be obtained and submitted at the Bursar's Office.

### **Short-Term Emergency Loans**

The limited emergency loan funds, administered by Student Financial Services, are loaned in small amounts to help students in critical short-term emergencies, and usually must be repaid within thirty days. There currently is a service charge of \$20 per emergency loan, and students must be enrolled in at least six units. Registration fees must be paid prior to applying. Applications and further information are available from Student Financial Services.

### **Federal Tax Credits**

Two new federal tax credits may benefit you or your parents, if the grants and scholarships you receive do not fully cover your fees. Both tax credits are tied to the tuition and fees paid for college.

The Hope Scholarship Credit (up to \$1,500) is available for the first two years of at-least-half-time enrollment in postsecondary education.

The Lifetime Learning Credit (up to \$1,000 for the 1998 tax year) is available for postsecondary enrollment at any level.

To find out more about these tax credits, consult your tax adviser or visit the U.S. Dept. of Education Web site ([www.ed.gov/offices/OPE/Students/hopegd.html](http://www.ed.gov/offices/OPE/Students/hopegd.html)).

### **Graduate Financial Assistance**

See catalog section titled "Graduate Studies" for additional types of financial assistance available to graduate students.

### **THE UNDERGRADUATE SCHOLARSHIP PROGRAM**

The purpose of the Undergraduate Scholarship Program at UCSD is to recognize outstanding achievement, to encourage academic excellence, and to offer support to meritorious students.

Scholarships are awarded on a competitive basis by the UCSD faculty Committee on Undergraduate Scholarships and Honors. **Unrestricted**



honorary scholarships are generally awarded on the basis of merit, academic excellence, and potential. **Restricted** honorary scholarships are awarded based on one or more additional criteria such as financial need, study in a particular major, or leadership. Additionally, undergraduate research scholarships and fellowships are offered which enable students to pursue special studies and projects under faculty supervision.

UCSD is actively engaged in developing new scholarship opportunities. Many of these awards were established through the generous support of individual sponsors, foundations, businesses, and community organizations. Every gift toward undergraduate scholarships is appreciated and appropriately recognized. Further information about supporting scholarships at UCSD may be obtained from Mary Gagliardo, Director of Development, Student Affairs. She may be reached at (619) 534-9646. Her address is 9500 Gilman Drive, La Jolla CA 92093-0937.

You may view a listing of scholarships, financial aid resources, and information on outside agency scholarship opportunities on Student Financial Services web page at: <http://www.ucsd.edu/finaid>.

The Scholarship Office is part of Student Financial Services and is located in Building 201, University Center, 9500 Gilman Drive, La Jolla, CA 92093-0013. Office hours are from 9 a.m. to 4 p.m., Monday through Friday. For additional information regarding the scholarship program, contact the Scholarship Office at (619) 534-3263.

## How to Apply for Scholarships

### Entering Students

Entering students apply for scholarships at the same time they apply for admission to UCSD, by filing the UC Application for Undergraduate Admissions and Scholarships. The filing period is in November for the following fall quarter. The student information provided on the application is used for both admission and scholarship purposes. It is not necessary to request any additional information or provide any other documents for scholarship purposes. Entering students who are selected for a scholarship are generally notified of the scholarship award at the time of admission.

### Current and Readmitted UCSD Students

Current UCSD students and readmitted UCSD students apply for scholarships annually during

winter quarter for the following fall quarter by filing the UCSD Continuing Student Scholarship Application. This application is available from Student Financial Services in March and is due in April.

Current Early Admission Honors (EAH) students will be mailed a scholarship application in October from the Office of Admissions and Outreach. EAH students should return their application directly to the EAH coordinator by the deadline.

## UCSD Undergraduate Scholarships

The scholarships listed below are generally available at UCSD. Although every effort is made to present the most accurate information, this listing is subject to change due to federal, state, and university funding limitations, and changes in policy or law.

*Charles and Clara Ash Scholarship:* Awarded to students with demonstrated financial need. This is a one-year award. The award amount varies.

*Black Alumni Scholarship:* Awarded to entering African-American students. This is a four-year \$1,000 award. There is also an additional \$1,000 award for graduate and professional school applications in the senior year.

*Jane A. Bosworth Scholarship:* Awarded to an outstanding junior or senior who is supported by the Office for Students with Disabilities. This is a one-year award for \$500.

*Clayton H. Brace Scholarship:* Awarded to an entering student with an interest in communications. This is a one-year award. The award amount varies.

*Community Scholars Scholarships:* Awarded to San Diego and Imperial County high school seniors, admitted to UCSD and who have made valuable contributions through community and volunteer service. This is a one-year award of \$1,000.

*Braille Transcribers Guild:* Awarded to visually impaired students. This award may be renewable. The award amount varies.

*CAL-DIEGO Paralyzed Veterans Association Scholarship:* Awarded to a student who is a California resident and who is disabled or who is a dependent of a Vietnam-era or post-Vietnam-era veteran. Selection is based on academic excellence and leadership qualities. This is a one-year award in the amount of \$2,880.

*Thomas B. Curtis Scholarship:* Awarded to juniors or seniors in the fields of biology, chem-



istry, or physics, who also demonstrate interest in the larger world around them, with leadership-level involvement outside the classroom, and have a minimum 2.75 GPA. This is a one-year award. The award amount varies.

*Brython P. Davis Scholarship:* Awarded to students whose parent was a regular member of the U.S. Navy or Marine Corps. This is a one-year award. The award amount varies.

*Del Mar Thoroughbred Club Scholarships:* Awarded to newly admitted UCSD students from San Diego County, based on academic achievement, financial need, and community involvement and/or participation in school extra-curricular activities. This a four-year \$10,000 award, paid in the amount of \$2,500 annually.

*Klara D. Eckart Scholarship:* Awarded to students in the field of computation, mathematics, or physics. This is a one-year award. The award amount varies.

*First Interstate Bank Leadership Award:* Awarded to students who through their leadership, academic excellence, unique talents, and active involvement, have brought recognition and acclaim to UCSD. This is a one-year award. Students with financial need are awarded \$1,500 and students without demonstrated financial need are awarded \$1,000.

*Ed and Mary Fletcher Scholarship:* Awarded to a graduate of a San Diego County high school with demonstrated financial need. This is a one-year award for \$2,500.

*Herbert and Renita Greenberg Scholarship:* Awarded to an underrepresented, entering student with demonstrated financial need. This is a four-year award. The award amount is \$1,000 for the first two years and \$1,500 for the junior and senior years.

*Jaye Haddad Memorial Scholarship:* Awarded to students who have been diagnosed with cancer, with Acquired Immune Deficiency Syndrome, with AIDS-Related Conditions, or to students with physical disabilities. This is a one-year award. The award amount varies.

*E. Coke Hill Scholarship:* Awarded to students with demonstrated financial need. This is a one-year award. The award amount varies.

*Hispanic Achievement Award:* Awarded to an entering and/or a continuing Hispanic student based on academic achievement and financial need. The award amount and term varies.

*Iranian Scholarship:* Awarded to students who are of Iranian or Iranian-American descent with financial need and academic merit.

*Irvine Memorial Scholarship:* Awarded to students based on merit and potential. This is generally a one-year award. The award amount varies.

*KFMB Scholarship:* Awarded to an upper-division student who is a permanent resident of San Diego or Imperial Counties and is studying communications or visual arts with a media emphasis. This is a one-year award. The award amount is \$576 and may include the opportunity for a paid internship at KFMB.

*Kelly J. Kolozsi Scholarship:* Awarded to students in the following priority: 1) graduates of Menlo Atherton High School, 2) graduates of a high school in the Sequoia Union High School District. Preference is given to students diagnosed with a learning disability. This is a one-year award. The award amount varies. The recipients are chosen by the Kolozsi Scholarship Selection Committee.

*Madge E. Lawhead Scholarship:* Awarded to junior-level students who entered UCSD from high school and senior-level students who entered UCSD from another institution. Selection is based on academic achievement at UCSD. The award amount varies.

*Jeffrey R. Leifer Leadership Award:* Awarded to students who through their demonstrated leadership and active involvement have made a significant contribution to UCSD or the community. This is a one-year award of \$1,500 to students with financial need and \$1,000 to students without demonstrated financial need.

*Los Angeles Times Scholarship:* Awarded to graduates of Los Angeles, Orange, Riverside, or Ventura County high schools who have completed one year in college, minimum GPA of 2.8, demonstrate financial need, and have expressed interest in a career in journalism, communications, or English. This is a one-year award of \$5,000. Students may re-apply each year.

*Rebecca E. Lytle Memorial Scholarship:* Awarded to an entering student in Thurgood Marshall College with a minimum 3.5 high school grade-point average and an extensive record of volunteer or community service. Must have demonstrated financial need. Other factors that may be considered are: first-generation college student, demonstrated history of over-

coming a particular hardship, demonstrated artistic ability, or participation in an AVID-like high school program. This a four-year award. The award is \$1,000 each year. In addition, assistance is provided in the form of a \$200 quarterly book award.

*Alice Marriott Scholarship:* Awarded to students with demonstrated financial need. This is a one-year award. The award amount varies.

*Marx and Marshall Scholarship:* Awarded to gay and lesbian students with financial need who have made a significant contribution to the gay and lesbian community. This is a one-year award. The award amount is \$1,000. Recipients may reapply.

*Medtronic Foundation Scholarship:* Awarded to current students who are female or underrepresented with demonstrated financial need, majoring in engineering, health, premed, or computer science. This is a one-year award. The award amount is approximately \$2,300.

*National Merit University-Sponsored Scholarships:* Awarded to entering students who are National Merit finalists and who are sponsored by UCSD. This is a four-year award. Students with financial need may receive up to \$2,000 per year. Those students without demonstrated financial need receive \$500 per year.

*LaVerne Noyes Scholarship:* Awarded to descendants of World War I Veterans (defined as four months of service prior to November 11, 1918). This is a one-year award. The award amount varies.

*John and Laura Olinski Scholarship:* Awarded to an upper-division student with a management science or economics major, with a minimum 3.5 GPA. This is a one-year award. The award amount is \$1,500.

*Ray and Betty Ramseyer Scholarship:* Awarded to an entering student with an interest in the social sciences. This is a four-year award. The award amount is \$1,000.

*Regents Scholarship:* Awarded to entering freshman for four years. The award amount is \$1,000. Students with demonstrated financial need receive a stipend to cover the difference between their family contribution and other resources, excluding nonresident tuition. Selection for entering students is based on the following criteria: GPA capped at 4.00, math and verbal SAT I scores, SAT II scores, honors courses,

and additional a-f courses taken beyond the requirement. Other factors may be considered.

*Roger and Ellen Reville Scholarship:*

Awarded to entering students based on merit and potential. This is a four-year award. The award amount is \$1,500 per year.

*Mabel Wilson Richards Scholarship:* Awarded to women residents of the greater Los Angeles area for the past two years with a B average and demonstrated financial need. Must be a U.S. citizen or, if under 21, one parent should possess a permanent resident visa. This is a one-year award. The award amount is \$1,000.

*Laura E. Settle Scholarship (California Retired Teachers Association):* Awarded to an upper-division or graduate student who is planning a career in teaching. Candidates must be declared majors in the Teacher Education Program. This is a one-year award. The award amount is \$1,500.

*Shimotori Scholarship:* Awarded to students with demonstrated financial need. This is a one-year award. The award amount varies.

*Malcolm R. Stacey Memorial Scholarship:* Awarded to Jewish students in the following priority: 1) undergraduate who is an orphan and preparing for graduate study in aeronautical engineering, 2) undergraduate or graduate in the field of aeronautical engineering, 3) a student in the division of engineering, and 4) a student in any field of study. This is a one-year award. The award amount is usually \$1,000.

*William H. Stout Scholarship:* Awarded to students based on merit. This is a one-year award. The award amount varies.

*James Avery/Black Alumni Scholarship:* Awarded to an African-American student pursuing studies in the performing arts at Thurgood Marshall College. This is a four-year award for \$1,000. There is an additional \$1,000 award available for graduate and professional school applications in the senior year.

*Sheila Owens-Collins/Black Alumni Scholarship:* Awarded to an African-American student pursuing studies in the life sciences. This a four-year award for \$1,000. There is an additional \$1,000 award available for graduate and professional school applications in the senior year.

*Errett Bishop Scholarship:* Awarded to upper division mathematics majors with financial need. Preference given to graduating seniors. Minimum award is \$1,000.

*Peter Jensen Scholarship:* Awarded to a current freshman for three years. Minimum award is \$1,000 annually.

If you have any questions regarding graduate scholarships, they should be directed to the Office of Graduate Studies at (619) 534-3555.

## THE UNDERGRADUATE RESEARCH SCHOLARSHIPS AND FELLOWSHIPS

These special awards are for current undergraduate students who wish to engage in special studies or research projects under faculty supervision. The work must be above and beyond the normal course of study. The subject matter does not have to be related to the student's major, minor, or other course work. These are one-year awards, however, a student may submit a new application each year for consideration. Awards range from \$1,000 to \$2,000.

Applications are available from Student Financial Services in March and are due in May. Winners are notified by the end of June. All recipients are required to submit a brief summary report, including details of how the funds were used. Also, the sponsoring faculty member must submit a review and appraisal of the results of the project.

*David Marc Belkin Memorial Research Scholarship* will give preference to those proposals designed to pursue special studies and projects in the general areas of environmental and ecological issues. The award amount is \$1,000.

*David Jay Gambee Memorial Research Fellowship* will give preference to proposals which involve the student as an active citizen in university governance, the local community, or national and international affairs. Also receiving preference are proposals which lead to a heightened awareness of the relationship between environment and society. Service in the community through volunteer activities or participation in programs related to the Institute on Global Conflict and Cooperation is encouraged. The award amount is \$1,000.

*Chancellor's Research Scholarship* will give consideration to proposals regardless of proposal topic. The award amount is \$1,500.

*Doris A. Howell Foundation Research Scholarship* will give consideration to proposals designed to improve the physical, mental, spiritual and behavioral health, and/or well-being of women. Proposals may encompass all areas

related to women's health including biologic, medical, cultural, economic, behavioral, psychosocial, or cross-cultural influences.

*Silicon Graphics/Cray Research Scholarship* will give consideration to proposals regardless of proposal topic. Recipients must be U.S. citizens. The award amount is \$1,500.

## SCHOLARSHIPS FOR STUDY ABROAD

UCSD students study abroad through the UC Education Abroad Program (EAP) and the UCSD Opportunities Abroad Program (OAP). In addition to the UCSD scholarships listed above, study abroad students may also qualify for special awards restricted to EAP and OAP participants. All of the scholarships listed below require a separate application through the International Center, unless otherwise indicated.

For more information about these scholarships and other outside opportunities for study abroad, contact the Programs Abroad Office at the International Center at (619) 534-1123 or via email to: [abroad@ucsd.edu](mailto:abroad@ucsd.edu).

*Betty Tate International Scholarships:* Awarded based on financial need and students must have a minimum 2.8 grade-point average.

*Chris Borton Memorial Study Abroad Scholarships:* Awarded without consideration of financial need.

*EAP Alumni and General Scholarships:* Awarded primarily on the basis of financial need, with some consideration given to students from underrepresented groups and to those students bound for developing countries.

*EAP Program-Specific Scholarships:* Awarded to students bound for the Pacific region and some European countries.

*Eleanor Roosevelt College (ERC) Scholarships:* Awarded to ERC students with financial need. Applicants should apply through ERC.

*Friends of the International Center:* Awarded predominantly on merit, with some consideration of financial need.

*Judaic Studies Scholarship:* Awarded to students bound for Israel, with preference given to students with a major or minor in Judaic studies. Applicant should apply through the Department of Judaic Studies.

*Zonta International Scholarship:* Awarded to a female bound for a Spanish-speaking country through the Opportunities Abroad Program. Applicants should apply through the Programs Abroad Office.

## INTERNSHIP PROGRAMS

*University of California President's Washington Scholarship:* Awarded to students on internship in Washington, D.C. with financial need. Applicants should apply through the Academic Internship Program Office. Contact the Internship Program coordinator at (619) 534-4355.

## Housing

### ON-CAMPUS HOUSING

Administration:  
Building 310 University Center  
Mail code 0041  
(619) 534-4010  
World Wide Web: <http://housing.ucsd.edu>

### SINGLE UNDERGRADUATE HOUSING

Residence halls and apartments are located at Revelle, John Muir, Thurgood Marshall, Eleanor Roosevelt, and Earl Warren Colleges.

#### Residence Halls

Residence hall rooms are arranged in suites of eight to ten students who share a bathroom and study/living area. Suites are single gender and some buildings are coed. A meal plan is mandatory in the residence halls. Most freshmen live in residence halls; single rooms are often reserved by returning students. Rooms are furnished and provide ample space for effective studying, sleeping, and storing of personal belongings, books and clothes.

#### Apartments

Campus apartments are self-contained units with kitchens, bathrooms, bedrooms, and study/living areas. Each unit is fully furnished with carpets, drapes, beds, desks, chest of drawers, tables, couch, dining set, stove, and refrigerator. Typically a bedroom is shared by two students; single rooms are available in some apartments. Meal plans are optional.

#### Rates for 1998-99

The estimated budget figure for room and board in the residence halls is \$7,275 for the three-quarter academic year (excluding quarter breaks); apartments without the board plan will be about \$4,200 for the academic year. Payment plans are available and will be listed in the housing contract.

A housing brochure with an application for on-campus housing was sent in mid-March to all who were admitted to UCSD. Students must return the housing application with a \$20 nonrefundable application fee to the Housing Administration Office and file a Statement of Intent to Register form with the Admissions Office by the specified due dates to be eligible for housing. Contracts are issued in batches based on a campus priority lottery system. As space permits, the first contracts will be mailed in early June and every four weeks thereafter throughout the summer. The priority lottery system is explained in detail in the housing brochure.

The housing application deadline for guaranteed housing for fall 1998-99 was May 6, 1998, for new freshmen and transfers. However, applications are still being accepted. Students guaranteed housing are accommodated first. Applications received after May 6, 1998 will be handled on a first-come-first-serve basis.

The Housing Administration Office recommends that students who have not been offered housing by early August call us at (619) 534-4010 for further information.

The resident dean of the applicable college assigns rooms in the residence halls or spaces in the apartments. The Housing and Dining Services Administration Office, located in Building 310 University Center, administers housing contracts and handles other details related to housing contracts.

### MARRIED AND SINGLE GRADUATE HOUSING—OFF-CAMPUS

The University of California, San Diego Affiliated Housing Operations provides a variety of residential facilities.

MESA RESIDENTIAL APARTMENTS (located minutes off campus) are designed to house single graduate or medical students, married students with or without children, and single parents. Residents must be enrolled full-time in a degree granting program or Teacher Education Program. The Mesa Residential Apartments offer unfurnished one-, two-, and three-bedroom units. Each unit features carpeting, blinds/drapes, a stove, and refrigerator. In addition, apartments are prewired for cable television and include at least one telephone jack.

Some units include utilities and some require electricity to be paid by the residents. The community is a park-like setting and amenities include community rooms, coin-operated laundry

rooms, co-op garden plots, storage space for each apartment, ample parking, playgrounds for children, and an outdoor sports area providing courts for tennis, basketball, and volleyball.

LA JOLLA DEL SOL (located in La Jolla Colony) is designed to house UCSD faculty, staff, students, and a limited number of non-university residents. La Jolla Del Sol is a luxurious condominium-style community offering one- and two-bedroom apartments. All apartments feature full-size washer and dryer, refrigerator, dishwasher, stove, and ceiling fan. All apartments are prewired for cable and feature private patios or balconies. Second- and third-floor apartments have wood-burning fireplaces and assigned covered parking. Unassigned parking is also available for all residents. Apartments are assigned on an individual basis. Non-university roommates are welcome. Residents enjoy the use of two solar-heated pools and adjoining spas, two lighted tennis courts, and a fitness room. Doyle Community Park is just across the street, while local malls and shopping are within walking distance.

Campus is easily accessible via the city bus and/or by bicycle.

Married students without children may reside in a one- or two-bedroom unit. Married students with children may reside in a two- or three-bedroom unit. Single graduate students may choose a studio, one- or two-bedroom unit. If a two-bedroom unit is selected by a single student, at least one other roommate is required, who must meet all eligibility requirements.

Current rental rates range from \$486 to \$990 per month unfurnished and are subject to change with 30 days' prior notice.

The Residential Apartments currently have extensive waiting lists.

### SINGLE GRADUATE HOUSING—ON-CAMPUS

Single graduate apartments (located on the Warren Campus) are designed to house unmarried individuals without children. Residents must be enrolled full-time in a degree granting graduate or medical course of study, or participating in the Teacher Education Program. Single graduate apartments all have four single bedrooms and a shared living room, dining, kitchen, and bath area. Units are fully furnished with the exception of personal linen and cooking utensils. All utilities are included in the rental rate. All units have

cable TV included at no extra charge and optional connections to the campus computer system for a fee. All spaces are available on a twelve month lease.

**Note:** All policies and procedures concerning the operation of married and graduate student housing, the eligibility for housing, and the application process are subject to change without notice.

For more detailed information on any of the above graduate or married housing facilities and/or an application, you may write, apply in person, or telephone the following:

Mesa Residential Apartments Office  
UCSD  
9500 Gilman Drive, Dept. 0907  
San Diego, CA 92093-0907  
(619) 824-0852  
<http://hdsu.ucsd.edu/hsgaffil/affhome.htm>

### *International Center*

(Located at the corner of Gilman Drive and Library Walk)  
Mail code 0018  
(619) 534-3730  
Facility reservation: (619) 534-6442

The International Center assists U.S. students going abroad as well as international students, scholars and families, and facilitates interaction among all internationally minded UCSD students, faculty, and staff.

Services to students going abroad include advising on a wide range of study, work, and travel opportunities through the UCSD Programs Abroad Office, and administration of the systemwide UC Education Abroad Program.

The International Student/Scholar Office serves as the liaison with government agencies for all nonimmigrants, and advises international students, researchers, faculty, and campus departments about immigration and visa matters. The office also provides pre-arrival information, orientation, and check-in for new students and scholars. The Friends of the International Center provide additional services and programs to international visitors and their family members.

The staff and Friends of the International Center as well as the International Club sponsor a variety of international/intercultural programs and services for all members of the UCSD community. These include lectures, language ex-



changes, a tutoring program, linkages with international faculty specialists, and weekly international cafes.

The International Center facility also includes a resale shop, a reservable conference room, and a meeting/office facility for Oceanids, the volunteer support organization for the university.

### *Off-Campus Housing*

Student Center, Building B  
Mail code 0309  
(619) 534-3670  
fax (619) 822-1440

Off-Campus Housing is a rental referral and housing information resource center. We encourage you to visit our office and become familiar with what our services provide. This office receives and maintains up-to-date available rentals from people in the community within the various areas near campus. These rentals are advertised on kiosk boards in the lobby. The rentals include individual houses, apartments, and condos, as well as roommates, rooms in private homes, and work-exchange situations.

The most common housing situation involves sharing with other UCSD students, and such opportunities are found through the assistance

of the room rental boards. The university is located in the midst of a resort area that results in relatively high rents in the coastal towns of San Diego: Del Mar and Solana Beach to the north of campus, La Jolla, and Pacific Beach to the south. A general rule of thumb: the closer to the beach, the higher the rent. This is especially true during the months of July and August.

Services are available to registered students, staff, faculty and alumni of the University of California only. You must show a current UC ID card or official Letter of Acceptance to receive rental contacts. The rental referrals are not mailed, faxed, or given out over the telephone.

Also available through our office are landlord/tenant information such as: leases, room rental agreements, a variety of house hunting aids, bus schedules, and maps, as well as a courtesy phone for use in locating housing. The office staff will be happy to assist you with any questions or concerns regarding housing, transportation, and student services.

Approximate monthly costs are:

- \$345-\$460—furnished room with kitchen privileges
- \$350-\$470—own room in a home with other students

- \$750-\$900—studio apartment
- \$900-\$1,100—one-bedroom apartment
- \$900-\$1,300—two-bedroom apartment
- \$1,200-\$1,700—three-bedroom apartment
- \$1,700-up—four-and five-bedroom house

Furnished rentals will generally cost an additional \$50 to \$100 per month.

It is suggested that students who wish to find off-campus housing plan to make arrangements early by consulting the available rentals posted in the office. The best time to begin looking for housing is from two to three weeks before the start of the fall quarter, and one to two weeks before the spring and winter quarter.

During September, the office operates a Temporary Emergency Housing Program for a fee. The program provides dorm-style lodging for students only, while they locate permanent housing. Space is limited, and reservations are required.

For further information contact:

Off-Campus Housing  
Student Center Building B  
Dept. 0309  
La Jolla, Ca 92093-0309  
Phone: (619) 534-3670  
Fax: (619) 822-1440  
<http://evita.ucsd.edu/offcampushousing>

### *Psychological and Counseling Services*

Central Location:  
242 Social Sciences Building  
Mail code 0304  
(619) 534-3755

Psychological and Counseling Services provides professional assistance to students having difficulty in coping with any of a wide array of problems. In addition, members of the staff offer professional consultation to the university regarding matters of student behavior to prevent problems and enhance the student experience.

Specific problems for which students may seek help include loneliness and isolation, personal problems, homesickness, parent/family problems, difficulties with studying, concentrating and test taking, relationship/marital problems, sexual difficulties, educational/career questions, depression, and anxiety.

Individual and group counseling, psychotherapy, marriage or relationship counseling, sex therapy, family therapy, behavioral and hypnotic techniques, and many issue-related groups are provided for dealing with these problems.

During any year support groups, such as ones for ethnic minorities, reentry students, women in medicine, men in medicine, women in science and engineering, and gay and lesbian students are offered. Time-limited focus groups include social skills, coping skills, assertion training, stress management, test anxiety reduction, decision making, coping with alcohol and drug abuse, eating disorders, enhancing creativity, weight management, and life-style workshops.





Members of Psychological and Counseling Services are clinical and counseling psychologists and social workers. The service has offices at all colleges in addition to the central location.

Services are available to any regularly enrolled undergraduate, graduate or medical school student, by contacting the central office. The counseling relationship is private and confidential.

## Recreation

RIMAC

Mail code 0529

(619) 534-4037

Campus Recreation provides UCSD students with quality recreation programs. They are designed to meet leisure-time needs and interests through on-campus programs offering clubs, intramural sports, recreation classes, outings, and a myriad of activities and special event programming. Our goal is to provide opportunities promoting a lifetime of health-conscious options.

## FACILITIES

RIMAC with arena, gymnasium, weight room, racquetball and squash courts, and equipment room.

Main and Recreation Gymnasia

Indoor 25-Yard Natatorium Pool and Spa

Outdoor 50-Meter Canyonview Pool and Spa

Outback Indoor Climbing Center

Tennis Courts

Playing Fields

Canyonview Weight Room

Golf Driving Range

Mission Bay Aquatics Center

Spanos Training Facility with weight training equipment, martial arts studio, and trainers' facility

Running and Jogging Track

Par Courses

Sand Volleyball Courts

Outback Adventures equipment rentals

## INTRAMURAL SPORTS

The Intramural Sports Program at UCSD is a balanced blend of team and individual sports activities that are designed to meet the diverse needs of the campus community. Sports offered include flag football, floor hockey, tennis, basketball, softball, soccer, bowling, volleyball, tube water polo, badminton, and over-the-line.

## RECREATION CLUBS

Recreation Clubs are special-interest activity clubs open to the entire campus community. The clubs are designed to bring together people with common interests. Students may join or begin new recreation clubs and participate in the workouts, meetings, social gatherings, and special events that are part of the RecClub structure. RecClubs include interests from aerobics to wrestling.

## SPORT CLUBS

Sport Clubs are those teams that compete on an intercollegiate basis but without many of the restrictions of the formal Intercollegiate Athletic Teams. The clubs offer students the opportunity to become involved in somewhat less traditional competitive sports, while still enjoying the travel to and competition against other institutions. Teams include ballroom dance, equestrian, water ski, cycling, lacrosse, sailing, surfing, rugby, alpine ski/snowboard ski racing, ice hockey, and ultimate disc.

## RECREATION CLASSES

Recreation classes provide students and the university community an opportunity for non-credit, nongraded instruction in a range of physical and leisure activities. The program includes professional instruction in everything from aerobics, tennis, weight training and swimming to karate, gymnastics, dance, and yoga.

## OUTBACK ADVENTURES

Outback Adventures (outdoor recreation program) is a passport to adventure and the great outdoors. The program offers fun, full-service trips (transportation, meals, instruction, equipment) in backpacking, rock-climbing, cross-country skiing, canoeing, kayaking, mountain-biking, and other outdoor pursuits. The Outback Adventures director will also arrange customized trips. In addition, the program offers instructional workshops, a resource library of maps and park information, and a camping and outdoor equipment rental service which includes downhill and cross-country skiing equipment, mountain bikes, camping equipment, and game equipment. Outback also runs the indoor climbing center, with facilities for beginning to advanced climbers, rentals and instruction.

## AQUATICS

UCSD Campus-Recreation Aquatics encompasses a wide range of aquatic activities. Student users can participate in competitive and training programs in diving, swimming, and water polo. Special events scheduled throughout the year range from student social activities to international team competitions. Additionally, an extensive recreational lap swim program is maintained to accommodate daily users from the campus and community.

## OPEN (INFORMAL) RECREATION

Open recreation provides individuals and groups of students the opportunity to make use of any and all of the physical activity facilities at UCSD. From jogging on the par course to shooting hoops in the gym, or playing racquetball in RIMAC, "open rec" time allows students to develop their own leisure activities.

## MISSION BAY AQUATIC CENTER

Located on Santa Clara Point in Mission Bay, this facility and its programs provide students with an exclusive opportunity to participate in all aspects of aquatic recreation. From highly structured classes to equipment rentals, MBAC is a "first class" operation. (488-1036)

## INTERCOLLEGIATE ATHLETICS AT UCSD

With twenty-two teams to choose from, the Intercollegiate Athletics Program provides students with varying interests the opportunity to participate in a highly competitive program. As a nonscholarship institution, UCSD's Tritons compete in the NCAA Division III, achieving national prominence in several sports. The women's volleyball team is the only collegiate team at any level to have captured five national women's volleyball championships, winning the NCAA title in 1981, 1984, 1986, 1987, and 1988. Women's tennis has also brought back championship trophies, winning national titles in 1985, 1987, and 1989. The men's soccer team won its first national championship in 1988, while the women's soccer team was the best in the nation in 1989. In addition, the women's water polo team won the USA Collegiate National Championship in 1985.

Over the past decade, UCSD has produced national runners-up in men's golf (1985, 1986,



1987), women's swimming (1986, 1988, 1989), men's soccer (1986), women's volleyball (1982, 1983), women's soccer (1988), men's swimming (1989), women's water polo (1989), and women's tennis (1982, 1984); and national third place teams in men's swimming (1984, 1985, 1986, 1987, 1988), women's swimming (1985, 1987), women's soccer (1986), women's tennis (1988), women's water polo (1988), and men's soccer (1989). The Tritons have also reached the national top ten in men's baseball, men's tennis, women's softball, and women's track and field. Individually, 37 Tritons have captured national championships, while 300 have been named All-Americans during the 1980s. Twenty were named Academic All-Americans and three were given the prestigious NCAA Postgraduate Scholarship.

Sports offered for men and women include volleyball, basketball, soccer, tennis, swimming and diving, water polo, cross country, crew, fencing, track and field, and golf. Men's baseball and women's softball are also offered. In addition, the intercollegiate athletic department sponsors club sports including surfing, badminton, cycling, sailing, rugby, snow skiing, and lacrosse. Opportunities to be a part of the athletic atmosphere are also available in the UCSD Pep Band, Cheerleaders, and Triton Athletic Associates. In each of the intercollegiate programs, student/athletes enjoy healthy physical activity, the struggle for excellence, travel with teammates to other universities, a sense of belonging, and a feeling of pride in their team and university.

### **Religious Affairs**

Building 502 University Center  
Mail code 0081  
(619) 534-2521

The Office of Religious Affairs is a privately-funded cooperative venture of representatives from various religious denominations for the purpose of serving as a campus resource on a non-sectarian basis, sponsoring lectures and facilitating discussion of theological, ethical, and moral issues faced by students, faculty, and staff at UCSD.

### **Student Affirmative Action and Human Relations Programs**

Student Center B  
Mail code 0362

SAA & HR Programs Office: (619) 534-6708  
Program Interns Office: (619) 534-2573

#### **Student Affirmative Action**

This unit serves as a campus resource on issues of cross-culturalism and provides ongoing workshops, discussions, and presentations on topics such as: cross-cultural communication, racism, sexism, and homophobia. The office provides programming and maintains a small lending library of video and written resources which may be used to further discussion on these important topics. SAA & HR Programs serves as a support mechanism and a vehicle through which SAA concerns are articulated, addressed, and, where appropriate, resolved. In addition to educational programming, the major program components include:

The Student Affirmative Action Committee (SAAC) serves as an advisory body to the vice chancellor of Student Affairs on issues which affect the quality of campus life and the educational experience of underrepresented students at UCSD. It also serves in an advisory capacity to the office of SAA & HRP in the implementation of its annual goals and objectives, including the allocation of funds for activities that promote positive race relations and cross-cultural/multi-ethnic understanding. SAAC membership is composed of representatives from the African American Student Union (AASU), Asian/Pacific Islander Student Alliance (APSA), Disabled Students Union (DSU), Kaibigang Pilipino (KP), Movimiento Estudiantil Chicano de Aztlán (MEChA), Native American Student Association (NASA), and the Women's Resource Center (WRC).

**The SAA & HR Resource Intern Program** has been in existence since 1976. Interns assist the SAA & HR Programs in its programming, and research efforts are utilized to provide information, guidance, and general assistance to the SAAC.

**Complaint Report/Resolution:** Students may report incidents and situations of racial insensitivity and/or discriminatory practices. Where undergraduate students are directly involved—and when knowledge of such practices is gained—staff and faculty are encouraged to contact the office as well. SAA & HR Programs staff will provide educational programming, advocacy, or referral as appropriate.

### **Student Health Service**

Mail code 0039  
(619) 534-3300

Comprehensive primary health care, urgent care, laboratory, x-ray, as well as health education programs are provided *free of charge* to all registration paying students during the academic quarters. A one-time health fee is charged during the summer quarter to continuing students.

Specialized care is provided through the Women's Clinic, Sports Medicine Clinic, Dermatology Clinic, Nurses' Clinic, and Travel Clinic, most at no additional fee.

Reduced fees are charged for pharmaceuticals, contraceptives, travel immunizations, PAP smears, and some laboratory tests. A Visual Care Clinic is available at modest fees.

Although undergraduate, graduate, medical, and international students may have unlimited visits with Student Health Service, students requiring medical or surgical care from outside practitioners, hospitals, or clinics should be prepared to assume the cost of such care. All students are *strongly urged* to have and maintain adequate health insurance.

A *Voluntary Insurance Plan (VIP)* is available for purchase by undergraduate students each quarter. This adds benefits for hospitalization, surgery, and major medical expenses. The premium for this insurance plan may be paid along with student fees.

Participation in the *Graduate Student Health Insurance Plan (GSHIP)* is mandatory for all graduate, professional, and international students. GSHIP provides benefits for certain outpatient services, hospitalization, surgery, and major medical expenses by referral. The fee for GSHIP is paid by the university for graduate and professional students holding academic appointments of 25 percent time or more.

Brochures describing these insurance plans, their limitations, exclusions, and open enrollment periods are available at Student Health Service. A representative of the insurance company has an office at Student Health Service and is available to assist students.

### **Student Policies and Judicial Affairs**

Building B, Student Center  
Mail code 0329  
(619) 534-6225

Student Policies and Judicial Affairs (SP&JA) consists of the administration of student judicial affairs, which includes campus-wide coordination of student conduct, including graduate students, monitoring of compliance requirements, applicable federal and state laws, and university policies and campus regulations, such as Right to Privacy as it affects students. In addition, the director also provides legal advice and consultation to faculty and administrators on student-related matters. Other programs encompassed by SP&JA include the Student Legal Services Office and the Office of Religious Affairs.

### ***Student Legal Services***

Building B, Student Center  
Mail code 0329  
(619) 534-4374

Student Legal Services (SLS) provides advice to UCSD students in legal matters. It prepares and drafts legal documents for students seeking to represent themselves in court. These include Petitions for Dissolution, Name Change, Adoption, and Answers to Complaints for Unlawful Detainer. Student Legal Services also counsels and prepares students for *in pro per* court appearances, i.e., Small Claims, Municipal, Traffic, and Misdemeanor, Arraignment hearings. As SLS cannot represent students, if such representation is deemed necessary the student is referred to an outside attorney or agency specializing in that particular area of the law.

### ***Student Safety Awareness Program***

Building B, Student Center  
Mail code 0309  
(619) 534-5793

The Student Safety Awareness Program (SSAP) is the primary source of information, crisis intervention, and follow-up support regarding sexual assault and general personal safety on the UCSD campus. The goals of the peer-to-peer education programs for men and women are to dispel myths, to promote awareness of rape and other sex offenses, and to prevent the incidence of these crimes. The program also explains the victim's options to notify law enforcement and to utilize other resources, i.e., campus and community counseling, and student services. SSAP outlines procedures to follow if a sex offense occurs, if a victim reports to law

enforcement and/or uses the on-campus disciplinary process.

SSAP provides information and education about sexual harassment. Students who have questions and/or concerns may seek confidential assistance by calling the above number.

### ***University Centers***

The facilities, services, and programs of the University Centers at UCSD complement the teaching and research functions of the university. Both the Price Center and the Student Center provide opportunities for students and the campus community to meet, relax, dine, and enhance their experiences outside the classroom or lab.

### **THE PRICE CENTER**

Mail code 0076  
Administration office: (619) 534-7666

The centrally located, modern facilities of the Price Center are home to a variety of services geared to the needs of students. The Price Center is the place for eating, studying, surfing the Internet, running errands, and catching the latest feature film at the Dolby Digital sound equipped movie theatre. The 24 hour Library Lounge is perfect place to study. The adjacent galleries exhibit student art. Services that are located in the Price Center include the university bookstore, a copy and technology center, a travel agency, a post office, a video and billiard gameroom, a music listening room, a Ticketmaster outlet, a flower stand, and a photo lab. Many afternoons, sounds of bands and socializing fill the patio in the outdoor courtyard. An equally-vibrant indoor food court has a variety of fast-service restaurants such as: Crepes A la Cart, Dessert Works, Espresso Roma, On The Juice, Round Table Pizza, Smart Dogz, Subway Sandwiches, Tia Molly, Wendy's, and Wok's Up Restaurant. A large ballroom hosts major exhibits, conferences, meetings, concerts and dances throughout the year. Fifteen state-of-the-art conference/meeting rooms are available for use by the campus community. Professional catering and high tech audio and visual services can also be arranged. The Price Center is also home to many student organizations since the administrative offices of the Associated Students, University Events, and the Office of Student Organizations and Leadership Opportunities are located on the third floor.

### **THE STUDENT CENTER**

Student Center Services  
Mail code 0323  
Administration office: (619) 534-8929

Nestled among the eucalyptus trees, the wood exterior of the Student Center stands in contrast to the modern marble of the Price Center. The casual atmosphere and unique blend of services make the Student Center a special place. The main building is home to The General Store, Groundwork Books, and the Food Co-op. These are UCSD's own brand of student-run cooperatives. The UCSD Guardian newspaper, KSDT radio station and SRTV are located here along with several alternative campus newspapers. The Student Center main building is a popular study spot with academic services such as A.S. Soft Reserves, A.S. Lecture Notes, three indoor lounges, and plenty of comfortable outdoor study areas. There are also conference/meeting rooms, two ATMs, a fast copy center, and the UCSD Bike Shop managed by top notch bicyclists. Next to the main building is a unique facility known as The Pub where dances, concerts and many other events occur. Around the corner, Porter's at the Pub serves up lunch, dinner and micro-brews. Students, faculty, staff, alumni, and community members learn the art of neon, pottery, glass blowing, and other crafts in classes offered at the Crafts Center. The work of artists from around the world is exhibited at the adjacent Grove Gallery. Nearby, specialty coffees, light cuisine, and an occasional musical performance are served up in the patio setting of the Grove Caffe, one of the most beautiful places on campus. Just south of the Student Center on the Revelle campus is the Ché Café, which serves a vegetarian menu at very affordable prices.

### **STUDENT INFORMATION CENTER (EDNA)**

Price Center  
Mail code 0076  
Administration Office: (619) 534-3362

Located in the Price Center Plaza next to the theater lobby, the information desk serves the campus community by providing information and a variety of other services benefitting the students, faculty, and the general public.

If the student staff cannot answer your question, they will direct you to the proper person or agency.

## **STUDENT GOVERNMENTS**

Associated Students  
Third Floor, Price Center  
Mail code 0077  
ASUCSD: 534-4450  
Hours: 8:00 a.m.– 4:30 p.m. Monday–Friday  
Graduate Student Association  
Student Center A  
First Floor, room 132  
Mail code 0353  
GSA: 534-6504  
Hours: 9:00 a.m.–5:00 p.m. Monday–Friday

The Associated Students Government (ASUCSD) and the Graduate Student Association (GSA) provide students with practical leadership experience in the areas of programming, financial planning, and in the development of programs and services which are designed to meet the students' needs. The ASUCSD operates ASIO, Grove Caffe, Lecture Notes, Soft Reserves, U.S. Grants, and the Volunteer Connection. The ASUCSD also sponsors a wide variety of programming, including concerts, films, and festivals.

The GSA takes a pro-active stance on graduate concerns in the areas of housing, TA/RA work-related issues, and mandatory health insurance. The Student Government staffs work with the AS and the GSA in providing logistical, accounting, and programmatic advice. The student leaders and the staff of the ASUCSD, the GSA, and the Student Government Services office encourage you to get involved and take part in the many leadership opportunities available at UCSD.

## ***University Events Office***

Price Center  
Mail code 0078  
(619) 534-4090

The University Events Office is a central resource for programming of events and activities at UCSD. The office hosts over one hundred events annually. It provides the campus and community with programs in the areas of internationally acclaimed dance, drama, chamber music, popular entertainment and the San Diego International Film Festival. All programs are presented in conjunction with student committees and volunteers are welcome.

The staff is a central resource for programming advice and assistance in the areas of event

planning, publicity, marketing, ticket handling, and contracting. The management of the Central Box Office provides for the sale of tickets to most campus events as well as tickets sold on the Ticketmaster system to events in town and around the country.

## **STUDENT ORGANIZATIONS AND LEADERSHIP OPPORTUNITIES**

Price Center  
Mail code 0078  
(619) 534-0501

The office of Student Organizations and Leadership Opportunities strongly supports the notion that the university must provide learning experiences for students both within and outside the classroom. Participating in leadership workshops, seminars, conferences and in any of the over 250 student organizations is an integral part of the university experience. With so many organizations to choose from, there is bound to be one that sparks individual interest. If not, students can start their own organization! Registration for student organizations begins in the fall and continues throughout the academic year. The advisers are here to assist in selecting an organization or in starting one.

In addition, leadership seminars are organized to help strengthen the leadership potential of students. Listed below are some of the training programs we schedule each year:

- Improving interpersonal skills
- Public relations
- Interviewing techniques
- Fund raising
- Team building
- Running effective meetings
- Time management
- Careers in student affairs
- Budget management
- Motivation
- Stress management
- Ethics
- Publicity/advertising
- Recruiting volunteers
- Diversity

We invite you to stop by the third floor of the Price Center to learn more about student organizations and leadership opportunities!

## ***Veterans' Affairs***

Building 201 University Center  
Mail code 0013  
(619) 534-4480

## **ELIGIBILITY**

The following persons may be eligible for federal veterans' educational benefits:

### **Chapter 35**

1. Sons, daughters, spouses, and surviving spouses of veterans who died, or are permanently and totally disabled as the result of a service-connected disability, or persons missing in action or captured in line of duty by a hostile force.

### **Chapter 30**

2. A person who entered active duty for the first time after June 30, 1985, and served continuously for three years.

### **Chapter 106**

3. Persons who have a six-year obligation to serve in the Selected Reserve signed after June 30, 1985.

### **CalVet Fee Waiver**

4. California Veterans' Dependents College Fee Waiver Program: A student who is the child of a deceased veteran or veteran with a service-connected disability may receive a waiver of registration and educational fees. Applicants including support received from parents, cannot exceed \$7,000 annually. Student cannot be over 27 years of age.

## **OTHER SERVICES**

In addition to certifying paperwork to initiate a student's veterans' benefits, the Office of Veterans' Affairs staff can answer questions about check problems or other programs administered by the Veterans Administration such as tutorial assistance and VA work-study, or can provide you a phone number so that you can make an inquiry to the Veterans Administration Regional Office.

Upon admission to the university, please contact the Veterans' Affairs Office to request certification of VA educational benefits.

### **Other Services and Programs**

## ***UCSD Alumni Association***

202 University Center  
Mail code 0083  
(619) 534-3900  
email: AAssociation@dur.ucsd.edu

The UCSD Alumni Association was founded in 1972 with a grant from the University of California Board of Regents to promote the university as an exceptional institution of higher education through alumni involvement.

Today, the association co-sponsors and provides funds for the National Merit Scholarship program, honors distinguished alumni and faculty, provides student and alumni career programs, and educational and professional seminars, develops regional clubs, and actively supports alumni legislative advocacy programs affecting higher education.

Members of the UCSD Alumni Association enjoy free library privileges at all UC libraries, a discount at the Career Services Center, networking and volunteer opportunities, travel programs, a quarterly subscription to *UCSD Perspectives*, discount cards for a variety of services, and a membership newsletter. In partnership with the Office of Student Affairs, the Alumni Association now offers two-year student memberships with a variety of special discounts and benefits.

## Art Galleries

### UNIVERSITY ART GALLERY

Mandeville Center, Room 101  
Mail code 0327  
(619) 534-2864

The University Art Gallery presents six exhibitions each year with an emphasis on contemporary works. Painting, sculpture, and photography are joined by newer art forms such as performance art, installation works and video art, giving visitors a chance to experience the full range of contemporary artistic expression. Exhibitions last year included: *Gary Hill: Tall Ships; Eight on the Edge: New Architecture in the West; and Thirty-Five Years at Crown Point Press.*

Gallery hours are from 11:00 a.m. to 4:00 p.m., Tuesday through Saturday. The gallery is closed Sundays, Mondays, and school holidays. There is no admission charge.

### MANDEVILLE ANNEX GALLERY

Mandeville Center, Room B-118  
Mail code 0327

The Mandeville Annex Gallery is for Visual Arts undergraduate art exhibitions. A new exhibition is mounted each week of the quarter.

Included in the exhibition schedule are individual, group, and class shows. Gallery hours are from 12:00 noon to 5:00 p.m., Monday through Friday. There is no admission charge.

### VISUAL ARTS GRADUATE GALLERY

Visual Arts Facility, Room 309  
Mail code 0327

The six-building complex, which opened January 1993, houses the Visual Arts Graduate Gallery. First-year review shows and M.F.A. exhibitions will be mounted each week of the quarter. Hours may vary. There is no admission charge.

### Crafts Center

Mail code 0338  
(619) 534-2021

Located in the center of the campus, the Crafts Center offers studio and art/crafts instructional facilities in ceramics, photography, jewelry, drawing, neon, glassblowing and other crafts. The center provides personal enrichment and creative educational opportunities to individuals wishing to develop artistic skills in an active studio-classroom situation.

The Grove Gallery is a part of the center, and offers ongoing exhibits of contemporary crafts and ethnic arts. The Grove Gallery Store sells an international selection of handmade crafts and other decorative accessories.

Registration for Crafts Center activities takes place the first week of every quarter at the center. Specific classes, schedules, and course fees information can be obtained by calling (619) 534-2021 or <http://www-crafts.ucsd.edu>.

### Day Care Center

Mail code 0962  
(619) 534-2768

The UCSD Early Childhood Education Center serves the children of students, staff, and faculty. Age requirements are eleven months to age five and one-half. State subsidy is available for income-eligible staff and full-time students on a limited basis. Only full-time enrollment is offered, 7:30 a.m. to 5:00 p.m., Monday through Friday. Breakfast, lunch, and afternoon snack are included in the cost. For further information or to visit, call the Day Care Center's office at (619) 534-2768 between 8:00 a.m. and 4:30 p.m.

As an alternative, the Infant Toddler Referral Program aids campus families in locating licensed home-care providers for children from six weeks through preschool ages. For assistance, call (619) 534-2768 during office hours or leave a recorded message for a return call.

## Transportation and Parking Services

Mail code 0040  
(619) 534-4223

Transportation and Parking Services, (T&PS) sponsors a variety of programs and services designed to help students living at UCSD without a car. An extensive network of shuttles spans the campus and also serves several off-campus locations. A special sticker can be affixed to a UCSD ID card, free of charge, allowing unlimited rides on San Diego Transit buses within a two-mile radius of campus. T&PS offers a free holiday shuttle service to the airport or downtown Amtrak station, helping students get home during breaks. For information, route maps, or schedules, please telephone (619) 534-RIDE.

A number of money-saving rideshare programs have been developed for commuting students. Carpool, vanpool, rail, bicycle, and subsidized transit programs feature terrific additional incentives including a free emergency ride home and complimentary parking. For program details, call Rideshare Operations at (619) 534-RIDE.

If you choose to bring a car to campus, be aware that a parking permit is required on UCSD property, Monday through Friday, 7:00 a.m. to 11:00 p.m., unless otherwise posted. (A short grace period during September's Welcome Week allows parking in student spaces without a parking permit.) Parking permits and applications can be obtained at the Parking Office (619) 534-4223. A parking application form is included in student packets. If you plan to park on campus, please return the application by the indicated deadline.

Student spaces are defined by yellow lines, student ("S") parking permits are valid in these yellow-striped spaces at all times. After 4:30 p.m. weekdays, all UCSD permits are upgraded and become valid in spaces marked with green or red squares, and metered (no fee required) spaces. Permits are not required on campus Saturday and Sunday, unless otherwise posted. Student permits are never valid in spaces marked "A" *Permit Required, 24 Hours a Day, 7 Days a Week*, or in any other 7/24 parking space.

T&PS supports many other vehicle related services, including the maintenance and operation of a fleet of vehicles leased or rented by campus departments and organizations. T&PS also has a Motorist Assistance Program which provides battery jumps, help with lock outs, flat tire inflation, or a lift to the nearest station to buy gas for drivers who are stranded on campus. Call (619) 534-8108.

If you have questions about T&PS, purchasing a permit, or parking at UCSD, please telephone a service representative at (619) 534-4223, or visit our web site: [parking.ucsd.edu](http://parking.ucsd.edu).

### UCSD Quick Copy Centers

Campus Services Complex, Bldg. A  
Mail code 0031  
(619) 534-3020

A variety of copying and binding services are provided, including high-speed duplication, color copies, and self-serve copy machines.

Binding services, comb, tape, or glue binding are available, in addition to lamination and padding. Many paper and cover stocks are available.

Self-serve copiers are located at the AP&M Building and University Center locations. Library photocopy card, PLUS card and cash accepted. Facsimile services are also available at University Center Quick Copy in Building 201.

Quick Copy locations are:

- Applied Physics and Math Bldg., Room #3301, (619) 534-2197
- Campus Services Complex, Bldg. A, (619) 534-3020
- Geisel Library, Main Flr (619) 534-2534
- University Center, Bldg. 201, (619) 534-7050

### Student Mail Services

Campus Services Complex, Bldg. A  
Mail code 0047  
(619) 534-7098

The Student Mail Services provides Monday through Saturday distribution of mail to resident students during the academic year. Hours of operation are 8:00 a.m. to 4:30 p.m. Stamps and various other U.S. Postal commodities can be purchased and international items can be mailed at this location.



### The UCSD Bookstore

Located in the Price Center Plaza  
9500 Gilman Drive  
La Jolla, CA 92093-0008

Monday-Friday 8 a.m.-6 p.m.  
Saturday 10 a.m.-5 p.m.  
Extended hours during the beginning of each quarter.

Textbook Information	(619) 534-4557
General Information	(619) 534-READ
Birch Aquarium Bookshop	(619) 534-8753
Clothing & Gifts	(619) 534-8530
Computer Center	(619) 534-4291
Computer Repair	(619) 537-2438
Custom Publishing	(619) 534-7963
Electronics Department	(619) 534-3786
Refund/Recharge	(619) 534-7326
Sunshine Store/Film	(619) 534-2875
Supplies Department	(619) 534-3786
Toll Free	(800) 520-7323

Trade and Professional  
Book Information (619) 534-3149

Fax Numbers

- General Number (619) 534-0565
- Computer Center (619) 534-1430
- Medical & Technical (619) 534-5286
- Supplies & Clothing (619) 534-0410

email [bookorder@ucsd.edu](mailto:bookorder@ucsd.edu)  
web site [www-bookstore.ucsd.edu](http://www-bookstore.ucsd.edu)

### Book Information

The Book Information Department can help find any title that's still in print in the United States. If the book is not available in the store, it can be special ordered. In addition to offering personal service inside the store, orders can be placed and questions can be answered via phone, fax, email, and through our web site.

### General Books

The 17,000 square foot General Book Department contains over 141,000 shelved books representing over 67,500 titles from more than 900 different publishers. The strongest sections are literature (especially classic literature, literature in foreign languages, new fiction, short stories and emerging young writers), mysteries, cinema, cultural studies, political science, history, Black studies, art, music, children's and gender issues. Any title that's still in print in the United States can be located. Bestsellers are always discounted 35 percent. We are constantly seeking new titles from interesting sources in order to broadly represent the entire world of books. Every Wednesday from 4 p.m.-6 p.m. all general, scientific and technical books are discounted 10 percent.

### Medical & Technical Books

The UCSD Bookstore is proud of its partnership with the medical community and has been recognized as a primary resource for the technological, biotechnological, and telecommunications communities offering up-to-date, quality, medical, and technical reference information. More than 25,000 titles, in over 130 medical and technical disciplines are shelved at the UCSD Bookstore. In addition, a large selection of medical instruments are available along with lab coats, clinical jackets, and medical software programs.

### Faculty Authored Books

The UCSD Bookstore is proud to display and sell books written by UCSD faculty. Books are shelved in the categorical section that applies, in a special faculty author area of the UCSD Bookstore and also in the Faculty Club. Faculty members who have written a book they would like the UCSD Bookstore to sell, should provide the title, the publisher, and the ISBN number. Unfortunately, the UCSD Bookstore is not able to order out-of-print titles.



### Custom Courseware

The Educational Resources Division of the UCSD Bookstore provides custom course materials as part of the UCSD Bookstore's mission to serve the UCSD community as an essential academic resource. The purpose in providing this service is not to replace those materials already available from publishers, but to supplement them with a variety of other printed matter, including out-of-print books, out-of-stock books, journals and newspaper articles, syllabi, anthologies, lab manuals, course notes, workbooks and original works. To ensure that the UCSD Bookstore is complying with any and all legal requirements involving reproduced printed materials, necessary copyright permission is secured. The UCSD Bookstore is committed to providing professional service and quality products on a timely basis and at a reasonable cost—at all times within the legal framework of copyright authorizations.

### Textbooks

All required and recommended textbooks are stocked at the UCSD Bookstore. Also provided are lecture notes, laboratory guides, software, and many other publications. Books for UCSD Extension courses can be found in a special section of the UCSD Bookstore, and at the UCSD North County Center in Rancho Bernardo. Each quarter, the UCSD Bookstore sends a letter to faculty requesting textbook orders within a certain time frame. Textbook orders can be submitted directly to the Textbook Department at the UCSD Bookstore, or through the book coordinator within the various campus departments. Each department can help estimate enrollment quantities to determine how many books to order. Textbook orders need to be submitted before the quarterly deadline to ensure that the books can be purchased in time for the beginning of class. At the beginning and end of each quarter the UCSD Bookstore provides a buy back service for students to sell their used textbooks for cash.

### Textbook Reservations

At the beginning of every fall quarter, the UCSD Bookstore offers a hassle-free textbook reservation service.

### Emblematic Clothing and Gifts

An up-to-date selection of fashionable UCSD insignia and gift items are available at the UCSD

Bookstore as well as a gift and clothing catalog with toll-free and online ordering capabilities.

### Supplies: School, Art and Office

In addition to finding an extensive selection of supplies carried within the department a catalog containing over 10,000 art, office, and school supplies—more than in any store—is available through the UCSD Bookstore's supply department.

### Electronics

A comprehensive selection of brand name calculators such as Hewlett Packard, Casio, Texas Instruments, and Sharp as well as many more electronic items and accessories are stocked at the UCSD Bookstore. Special orders are always welcome.

### Computers

The knowledgeable staff of the UCSD Bookstore computer department is available to assist those who wish to purchase computer and printer hardware and accessories. Educational pricing is offered for full-time UCSD students, extension students (certificate courses), faculty and staff on Macintosh and PC software for Microsoft, Word Perfect, Borland, Aldus, Adobe, Claris and on hardware products for Apple, IBM, Sun Microsystems and Silicon Graphics. Special orders are encouraged for products that may not be stocked. The UCSD Bookstore One Stop Shopping (BOSS) system was created to allow ordering computer products electronically via email. With the explosion of the World Wide Web, the computer center has incorporated BOSS with the Internet: [www-bookstore.ucsd.edu/computers/ucsd.html](http://www-bookstore.ucsd.edu/computers/ucsd.html).

### Computer Repair

The UCSD Bookstore has a fully certified Apple Computer Repair Shop, open Monday through Friday.

### Special Orders

Books, gifts, clothing, office and art supplies, medical instruments, computer hardware and software can be special ordered at any time.

### Internet Access

The UCSD Bookstore has been online since March 1995 with one of the most comprehensive World Wide Web sites ([www-bookstore.ucsd.edu](http://www-bookstore.ucsd.edu)), of any university bookstore

in the country. Internet surfers have full access to the UCSD Bookstore's book database and can receive complete customer service including purchasing a book from the shelf, having books mailed around the world and ordering state-of-the-art computer equipment, software, gifts, clothing, art and office supplies.

### BIRCH AQUARIUM AT SCRIPPS BOOKSHOP

2300 Expedition Way  
La Jolla, CA 92093-0207  
Monday–Sunday 9:30 a.m.–5 p.m.  
(619) 534-8753  
(Closed Thanksgiving Day and Christmas Day)

This bookshop has been operated by the UCSD Bookstore since August 1994. Its goal is to support the education and community service missions of the Scripps Institution of Oceanography and the Birch Aquarium at Scripps. The bookshop has an exciting selection of educational books concerning the geological, biological, and physical sciences and how they interact with the sea. A dazzling variety of children's books and educational toys are available to children of all ages who have interest in the ocean and its marine life. Other popular items are guides to scuba diving and snorkeling, tide pool guides, San Diego tourist guides, and maps. The bookshop's selection of souvenirs and gifts is fun-loving with a wide-ranging selection of T-shirts, sweatshirts, postcards, calendars, cassette tapes, video tapes, stuffed animals, jewelry, and lots more.

### THE SUNSHINE STORE

Monday–Friday 7 a.m.–8 p.m.  
Saturday 10 a.m.–5 p.m.  
Sunday 11 a.m.–5 p.m.

Established in April 1979 as an auxiliary operation of the UCSD Bookstore, the Sunshine Store is a busy annex located next to the UCSD Bookstore on the ground floor of the Price Center Plaza. Open seven days a week, the Sunshine Store carries snacks and groceries along with school and office supplies, soda, juice, coffee, tea, popcorn, health and personal care products, ice cream, sandwiches, donuts, and candy. Film and film processing are also available with film specials running throughout the year.

## **CUSTOMER SATISFACTION PHILOSOPHY**

The UCSD Bookstore strives for customer satisfaction. Should any product you select from the UCSD Bookstore fail to meet your expectations, we will respond to your concern and assist you in an exchange, refund or credit whenever possible within the guidelines which apply to our specific merchandise categories.

- All categories of refundable merchandise require a receipt to obtain a refund.
- Textbooks must be in resalable condition, accompanied by a cash register receipt, and returned within two weeks of purchase or within the first two weeks of the current quarter for refund, exchange or credit.
- Trade, technical and medical books may be returned for refund, exchange or credit within 14 days if they are in resalable condition and are among the titles currently carried in the UCSD Bookstore.
- Nonrefundable merchandise: medical instruments, Medical (MDTEST), other testing (REFEXM) books and magazines.
- Computer hardware and software refund policies are available in the computer department.

### *University Police Department*

Building 500 University Center  
Mail code 0017

**EMERGENCY**, DIAL 9-1-1  
Business, (619) 534-4357

The UCSD Police Department protects life and property through the enforcement of local, state, and federal laws. The police department strives for a safe campus environment, where the educational and research pursuits of the university can be realized.

The Police Department provides continuous twenty-four-hour-a-day police patrol to protect the campus community, along with the dispatching of emergency fire and ambulance services.

In addition, student residential areas are provided with additional security with on-site residential security officers (RSOs) during the evening and early morning hours.

## **CRIME PREVENTION PROGRAM**

(619) 534-3644

The Police Department's Crime Prevention Program offers a variety of information to the campus community on crime prevention methods. Pamphlets and informative seminars are available.

## **COMMUNITY SERVICE OFFICER PROGRAM**

(619) 534-9255

CSOs are students employed by the UCSD Police Department. They provide a variety of services related to crime prevention and campus safety. One of the services is the ESCORT program, which is available every evening from 5:00 p.m. to 1:00 a.m. They also provide security for campus events and facilities. Call for more information.

## **LOST AND FOUND**

(619) 534-4361

The Police Department serves as a central repository for lost and found articles. Lost and found items should be taken to the police station. The station is open twenty-four hours daily.

### *U.S. Neighborhood Post Office*

2.425 Price Center  
Mail code 0324  
(619) 534-2052

The Price Center Post Office is a contract station operated under the rules and regulations of the U.S. Postal Service. Stamps, money orders, phone cards, and other postal items may be purchased and mailed at this location Monday-Friday, 8:30 a.m. to 4:00 p.m. P.O. Box rentals are available in various sizes. Stamp purchases from stamp vending machines are available Monday-Friday, 8:30 a.m. to 7:00 p.m.

## Research at UCSD

Members of organized research institutes and centers carry out advanced research projects, often spanning the areas of knowledge encompassed by several academic departments, and provide opportunities for graduate student support in broad disciplines. The study programs of graduate students supported by institutes and centers are administered by the academic departments in which the students are enrolled. The senior staff of these units are faculty members in related academic departments. Institutes and centers currently in operation at UCSD are described below.

In addition, the university is formally and informally affiliated with various private research organizations such as the Institute of the Americas, the Salk Institute for Biological Studies, and the San Diego Supercomputer Center.

### Universitywide Institutes/ Organized Research Units

**California Space Institute (Cal Space)** was established in 1979 as a multicampus organized research unit of the University of California (UC). It supports and conducts pure and applied space-related science and technological research and development throughout the UC system. Specific areas of investigation include the following:

*Remote Sensing*—acquisition, processing, and application of observations by satellites or other remotely automated instruments to study the Earth and its changing environment. The primarily satellite-based investigations study the greenhouse effect, global warming, hydrological cycle, land surface processes, air-sea interactions, radiation and cloud dynamics.

*Climate*—interdisciplinary scientific research that applies space observations and numerical modeling techniques to fundamental issues of climate prediction and global change caused by both natural and human forces. CalSpace collaborates with the Climate Research Division and other divisions at Scripps to study complex geophysical and biochemical interactions and



feedbacks that link the components of the climate system, including the atmosphere, oceans, and land surfaces.

*Space science and engineering*—investigations of both the solar system and universe, and the development of automation and robotic systems for space exploration. Current investigations include the study of comets, asteroids, the solar wind, and cosmic background radiation. Space observations are often conducted with instruments and techniques designed by CalSpace researchers.

*Minigrant program*—distribution of small research grants for investigations in the fields of space science and engineering, astronomy and astrophysics, satellite remote sensing, climate and global change. The program is open to all researchers in the UC system. It is designed to provide seed money to explore and develop new areas of research and particularly encourages proposals that involve graduate students or postgraduate researchers.

*Education*—promotion of undergraduate and graduate education in the interdisciplinary fields of climate and global change, and space science and engineering. The CalSpace-led state-wide consortium (California Space Grant Consortium) was designated in 1989 as a Space Grant College by NASA's Office of Education. The program expands leadership in the development and application of space resources through research and hands-on space projects, fellowship funding, and educational outreach activities. The California Space Grant Program works with NASA Centers and the aerospace and high technology industries to strengthen its educational objectives.

**Institute of Geophysics and Planetary Physics (IGPP)** was established in 1960 and named the Cecil H. and Ida M. Green IGPP in 1994. The present facility includes the Roger and Ellen Revelle Laboratory and the Judith and Walter Munk Laboratory. Present research concentrates on the study of crustal dynamics by measurements of gravity, tilt, displacement, and strain in both continental and oceanic environments; of regional seismicity and linear and nonlinear earthquake and explosion source mechanisms; of the variability of the earth's geomagnetic field and its generation by the geodynamo; of the spherical and aspherical structure of the earth by measurements of free oscillations, surface waves, and travel times; of

seafloor tectonics using marine geophysical methods; of linear and nonlinear theoretical and computational fluid dynamics; of the variable mesoscale structure of the oceans and global ocean warming by acoustic tomography; of the structure of the oceanic crust and lithosphere by seismic and electromagnetic measurements on the ocean bottom and at the ocean's surface through seismic multichannel methods; of sea-floor and planetary topography and gravity using satellite methods; of nonlinear dynamics applied to geomorphology; and of tides, waves, turbulence, and circulation in the oceans. The institute operates a global network of forty broadband seismometers, the IDA (International Deployment of Accelerometers) Array, with ten of these stations in the former Soviet Union which are telemetered by satellite to the institute; a crustal strain and seismic observatory at the Cecil and Ida Green Piñon Flat Observatory near Palm Springs; a southern California network of Global Positioning System (GPS) satellite geodetic sites operated by the Scripps Orbit and Permanent Array Center (SOPAC); an acoustic network in the Pacific for measuring ocean temperature variability; a 5m, X-band satellite receiving antenna for satellite remote sensing; an array of ocean bottom seismographs; and telemetered seismic arrays in Kirghizia and Anza, California. The institute does not grant degrees, but makes its facilities available to graduate students from various departments who have chosen to write their dissertations on geophysical problems. Members of the institute staff now hold joint appointments with the Departments of the Scripps Institution of Oceanography, and Applied Mechanics and Engineering Sciences. Support for visiting scholars is provided through an endowment to the Cecil and Ida Green Foundation for the Earth Sciences.

The University of California **Institute on Global Conflict and Cooperation (IGCC)** was founded in 1983 as a multicampus research unit serving the entire University of California (UC) system, including the UC-managed National Laboratories. The institute's purpose is to study the causes of international conflict and the opportunities to resolve it through international cooperation. During IGCC's first five years, research focused largely on the issue of averting nuclear war through arms control and confidence-building measures between the

superpowers. Since then the research program has diversified to encompass several broad areas of inquiry: regional relations, ethnic and internal conflicts, international environmental policy, international relations theory, proliferation of weapons of mass destruction, and most recently, the domestic sources of foreign policy.

IGCC serves as a liaison between the academic and policy communities, injecting fresh ideas into the policy process, establishing the intellectual foundations for effective policymaking in the post-Cold War environment, and providing opportunities and incentives for UC faculty and students to become involved in international policy debates. Scholars, researchers, government officials, and journalists from the United States and abroad participate in IGCC projects, and IGCC's publications—books, policy papers, and semiannual newsletter—are widely distributed to individuals and institutions around the world. A Washington, D.C. office was established in 1997 to further these objectives.

In addition to projects undertaken by the central office at UC San Diego, IGCC supports graduate and faculty research, instructional programs, and public education throughout the UC system. The institute receives financial support from the regents of the University of California, the UC Office of the President, and the State of California, and has been awarded grants by such foundations as Ford, MacArthur, Hewlett, Rockefeller, W. Alton Jones, Ploughshares, the Rockefeller Brothers Fund, the United States Institute of Peace, The Pew Charitable Trusts, the Japan-U.S. Friendship Commission, The Smith Richardson Foundation, and the U.S. Dept. of Energy.

**The White Mountain Research Station (WMRS)** was established as a UC multicampus research unit in 1950 to support high altitude research. The station includes 4 laboratory facilities located over a 3,000m (10,000 vertical ft.) altitude transect, ranging from the floor of the Owens Valley to the highest peak in the White/Inyo Mountains. Located on the western edge of the Great Basin, WMRS also provides access to three major biogeographic regions (Sierra Nevada and White/Inyo montane, Mojave desert and Great Basin desert), and geologically rich and diverse field sites. WMRS has evolved into a major multidisciplinary research and teaching institution in eastern Califor-

nia, and hosts programs in archaeology and anthropology, atmospheric and space sciences, biological and medical sciences, conservation and natural resource management, geological and earth sciences.

WMRS facilities include: (1) the business office, laboratories, classrooms, dormitories and dining hall for up to seventy people in Bishop, (2) a newly renovated lodge, cabins, and laboratory at Crooked Creek (3,094m altitude), which accommodates up to fifty people, (3) the Nello Pace Laboratory and Mount Barcroft facilities (3,801m altitude) which accommodate thirty-five people in dormitories, and (4) the 450 square foot Summit Laboratory located on White Mountain peak (4,342m altitude), and is the highest research lab in North America.

WMRS hosts more than 1,000 users from over 100 institutions per year for research, teaching and conferences. Research is most intensive in the summer and involves students supported by WMRS Fellowships, UC faculty supported by WMRS Research Grants, and faculty from other universities around the world. Educational uses include several geology field courses and the UC intercampus field course in Environmental Biology with the students in residence for the spring quarter. WMRS hosts annual professional society meetings and has published proceedings from biennial symposia on the natural history of the region over the past several years.

A new geographic information system (GIS) laboratory is under construction in Bishop to house the USGS-funded "Easter Sierra Geospatial Data Clearinghouse." This is used by visiting researchers and local agency scientists, as well as off-site investigators and policy makers via World Wide Web access.

### Campuswide Institutes

The **AIDS Research Institute (ARI)**, established as a project in 1988, became an ORU in 1996. The institute is designed to provide a forum for collaboration and exchange of research in AIDS at the basic and clinical levels. An NIH-supported Center for AIDS Research (CFAR) has been established which provides core facilities and resources to university investigators pursuing AIDS-related research. A seminar series and other activities have been initiated to facilitate interaction among faculty



from over six departments and three geographic locations.

Investigators at UCSD conduct cutting-edge research in the areas of AIDS pathogenesis, therapy, and prevention. In addition to the CFAR award, UCSD investigators are also recipients of the Strategic Programs for Innovative Research in AIDS Therapy (SPIRAT) award, AIDS Clinical Trial Units (ACTU) for adult and pediatric patients, the NIH Postdoctoral AIDS Research Training Grant, the HIV Neurobehavioral Research Center (HNRC) award, and individual RO1 grants that total \$6.2 million. A Phase I gene therapy protocol utilizing a novel RNA enzyme to inactivate HIV in AIDS patients received FDA approval in May 1996, and has been initiated in conjunction with the UCSD Clinical Research Center and the VA Medical Center.

The **Institute for Biomedical Engineering (IBME)** was established in 1991 with the aim of promoting and coordinating interdisciplinary interactions among UCSD faculty and students

at the interface of engineering, biology, and medicine. Members of the institute include more than eighty faculty and research scientists from the School of Engineering, the School of Medicine, other departments on the main campus and at the Scripps Institution of Oceanography, as well as the Scripps Research Institute, the Salk Institute, and the Burnham Institute.

Tissue engineering science is a major research theme of the institute. Under this general theme, principles and methods of engineering and life sciences are applied to elucidate structure-function relationships in normal and pathological tissues, including the mechanisms of control of tissue growth, adaptation and repair, and to develop biological substitutes to restore or improve tissue functions. The tissue engineering sciences pursued in IBME are in three main areas: cardiovascular, somatic, and neuroendocrine tissues. Investigations under cardiovascular tissue engineering science include hypertrophy and remodeling of the heart, stress-growth relationship in blood

vessels, stress failure of pulmonary capillaries, modified hemoglobins as blood substitute, structure and function of erythrocyte membranes, engineering of blood substitutes, stem cell technology, and motility and adhesion of leukocytes. Studies on somatic tissue engineering science comprise skin replacement, repair of cartilage defects, effects of mechanical forces on bone growth, effects of stress deprivation on tendon and ligaments, and injury, repair and strengthening of skeletal muscle. Research on neuroendocrine tissue engineering science embodies injury and regeneration of peripheral nerves, somatic cell gene delivery for repair of brain damage, transplantation of retinal pigment epithelium, molecular basis of development and healing of the cochlea, and a biosystems approach to the design of artificial pancreas. These research activities involve interdisciplinary approaches ranging from cellular-molecular biology to tissue, organ and systems levels, with the coupling of quantitative engineering analysis and modern biomedical sciences.

The research and training activities fostered by the institute are related to important medical problems such as heart failure, hypertension, atherosclerosis, pulmonary diseases, shock, inflammation, burns, orthopedic disorders, sports injuries, myopathies, peripheral nerve and brain injuries, age-related blindness, noise injury, cancer, and diabetes. The coordinated engineering and biomedical research allows the theoretical analysis of the experimental findings on physiological and pathological processes, thus generating quantitative information and new investigative approaches. The ultimate goal is to improve the methods of prevention, diagnosis, and treatment of diseases. To this end, the institute endeavors to enhance the collaboration between basic science and clinical medicine and the cooperation between academia and industry. An Industrial Affiliates Program was formed in October 1993 to foster collaborative research, student internship, industrial continuing education, and organization of scientific symposia. There were fifteen industrial members as of December 1997.

IBME received a five-year Whitaker Foundation Development Award which began in September 1993. The award is aimed at fostering graduate and postgraduate training in biomed-

ical engineering through the recruitment of new faculty members, granting of student fellowships, establishment of core facilities (including confocal microscopy and flow cytometry), initiation of new educational courses, and holding of workshops, seminars, and symposia.

The **Institute for Neural Computation** has as its goals the understanding of how nervous systems function through direct observation, experimental investigation, and modeling of neural structures. It extends into cognitive neuroscience where it seeks to uncover cognitive principles through experimentation and parallel-distributed processing models. The institute also applies the principles of neural computation toward the solution of diverse technological and scientific problems, particularly the building of a new generation of massively parallel computers. The institute is multidisciplinary, with founding members coming from both biological and social sciences as well as engineering. The research areas in which the institute has major projects include motor systems, visual processing, learning and memory, and language modeling.

The **Institute for Nonlinear Science (INLS)** promotes interdisciplinary research and graduate education in the development and applica-

tion of contemporary methods in the study of nonlinear dynamical systems. Using a common mathematical language, faculty and students from disciplines as diverse as cardiology, mathematics, oceanography, mechanical engineering, and economics pursue the implications of generic characteristics of nonlinear problems for their subjects. Each year the institute sponsors several long- and short-term senior visitors from the University of California and elsewhere and provides, through funds from external funding agencies, support for about twenty-five graduate students to work on Ph.D. dissertations concerned with nonlinear problems. Also associated with INLS are about ten postdoctoral fellows.

The core of INLS activities is composed of (1) joint research among faculty and students across disciplinary lines, and (2) lecture series and working seminars designed to convey recent research progress and to stimulate new investigations. Through contracts with external agencies the INLS supports a major center in the experimental, numerical, and theoretical study of chaos and turbulence in fluid dynamics, investigations in nonlinear polymer science, studies (jointly with the University of California, Berkeley) in the nonlinear stability of fluids and plasmas, investigations of mathematical properties of quasi-conformal mappings, and work on the bifurcation of symmetric systems.

INLS has developed joint research programs with universities, research institutes, and commercial companies in areas of common interest. It actively works with colleagues at MIT and the University of Michigan, at Lockheed Sanders, Inc., Randle Corp., and Mission Research, and with the Institute for Applied Physics in Nizhny Novgorod. These affiliations provide new research horizons and realistic opportunities for technology transfer.

**Institute for Pure and Applied Physical Sciences (IPAPS)** is an interdisciplinary research unit which brings together faculty and researchers in physics, chemistry, engineering, and Scripps Institution of Oceanography. The institute is concerned with fluids and materials. Specific subjects of research include superconductivity, ferromagnetism, semiconductor heterostructures, solid surfaces, plasma physics, hydromagnetics, turbulence, fluid mechanics, laser physics, and numerical analysis.





Within the IPAPS is the Center for Interface and Materials Science (CIMS), which emphasizes interdisciplinary collaborative research on the properties of surfaces, thin-layered composites, and novel materials, as well as their technological applications. With centralized space and equipment, CIMS brings together faculty and research staff from the Departments of Physics, Applied Mechanics and Engineering Sciences, Chemistry and Biochemistry, Electrical and Computer Engineering, and the Scripps Institution of Oceanography.

The **Sam and Rose Stein Institute for Research and Education on Aging** advocates an interdisciplinary approach to research on a wide range of phenomena associated with aging: From the basic nature of the biological process of aging to the clinical disorders that occur in greater frequency with advanced age. The following program areas have been designated for highest priority research: Alzheimer's disease, cardiovascular disease, arthritis, osteoporosis. Other specialty areas include immunology, genetics, neurosciences, endocrinology and cell biology, atherosclerosis, clinical research, education (aging specific), psycho-socio aspects of aging, and human development and aging.

### Centers

The UCSD **Cancer Center (CC)**, active in the fight against cancer since 1978, is a National Cancer Institute-designated Clinical Cancer Center. The specific goals of the Cancer Center are to enhance the present level of basic research, increase collaborative research, increase the application of basic science to solve clinical problems through translational research, disseminate new knowledge to oncology professionals and scientists in the San Diego community, enable the biomedical industry to transfer new technology to the clinical setting, develop a strong effort in cancer prevention and control, and educate and train undergraduate and postgraduate physicians, and basic scientists. Under the auspices of a Cancer Center Support Grant from the National Cancer Institute, there are seven active program areas within the Cancer Center. These include Cancer Genetics, Cancer Prevention and Control, Clinical Investigation and Developmental Therapeutics, Glycobiology, Growth Control, Immuno-

logy, and Molecular Virology. Shared resources at the Cancer Center include Biostatistics, Flow Cytometry, Glycobiology, Lab Support, Molecular Biology, Pharmacology, Tissue Bank, Transgenic Mouse Colony, and Clinical Trials.

Research and educational grants support the training of postdoctoral fellows and medical students. The Clinical Trials Office coordinates clinical research trials involving cancer patients at UCSD and is the focal point for a large cancer Protocol Outreach Network which provides state-of-the-art protocol treatment opportunities for patients in a broad geographic area within Southern California. Patient care activities of the Cancer Center are located in the Combined Oncology Clinic at the Theodore Gildred Cancer Facility in the Inpatient Oncology Unit at UCSD Medical Center, both located at Hillcrest, and at the Oncology Clinic of the Perlman Ambulatory Care Center adjacent to Thornton Hospital in La Jolla. Basic research activities of the Cancer Center are carried out at a variety of other locations on or adjacent to the La Jolla campus. Members and associate members of the Cancer Center number more than 120 laboratory investigators and clinical physicians from fifteen academic departments. The overall funding revenue of the Cancer Center, including contracts, grants, foundation and awards, exceeds \$30 million a year in direct costs.

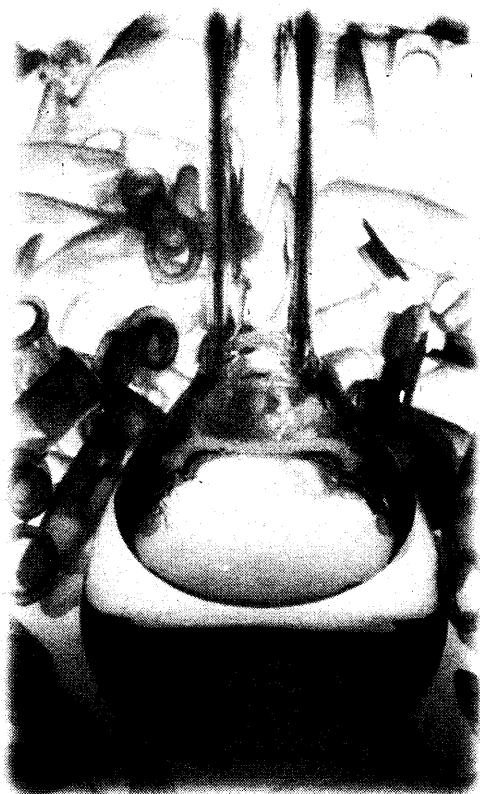
The **Center for Advanced Computational Science and Engineering (CACSE)**, established in 1996, fosters research, technology development, and education in computational science across disciplines to enhance the position of UCSD and the UC system as a world leader in computational science and engineering. CACSE, building on the foundation of the **San Diego Supercomputer Center (SDSC)**, accomplishes its mission by: (1) conducting and promoting computational science research, especially multidisciplinary research, (2) promoting multidisciplinary curriculum development as appropriate, in concert with relevant departments, (3) facilitating interactions and information exchange among departments, faculty, research staff, and students, and between the campus community and the national research community, including industry, (4) providing outreach to communities new to high-performance computing, including the social sciences, and (5) enhancing computational infrastructure.

Recent CACSE activities have included development of the winning National Partnership for Advanced Computational Infrastructure grant, awarded to UCSD by the National Science Foundation in 1997. This five-year, \$170 million grant teams 37 leading institutions in high-performance computing to create and deploy a leading-edge, ubiquitous, pervasive, and continuous computational infrastructure to support disciplinary and interdisciplinary research by the national community. This grant is providing significant funding to keep SDSC's systems at the state of the art and involves researchers from several departments on campus, including the Departments of Applied Mechanics and Engineering Sciences, Bioengineering, Biology, Chemistry and Biochemistry, Computer Science and Engineering, Mathematics, and the Scripps Institution of Oceanography, to improve the infrastructure.

In addition, CACSE teamed twelve diverse groups on campus, including the arts and humanities, engineering, and the natural, environmental, and social sciences to win a three-year, \$2.4 million Intel Windows/NT equipment grant that started the fall of 1997. Plans in 1998 include development of a seminar series for the grantees to share experiences with each other and the campus community at large in applying these systems to research and curriculum development projects. CACSE looks for exactly these types of opportunities to promote the spread of high-performance computing on campus across multiple disciplines.

Through these and other activities, CACSE supports research and educational opportunities for undergraduates, graduate students, and postdoctoral researchers in computational science and computer science.

The **Center for Astrophysics and Space Sciences (CASS)** is an interdisciplinary research unit established in 1979. The center brings together academic and research staff from the Departments of Physics, Chemistry, and Electrical and Computer Engineering. Research is conducted in the scientific areas of theoretical astrophysics; infrared, optical, and ultraviolet astronomy; solar observational and theoretical studies; X-ray and gamma-ray astrophysics; experimental and theoretical magnetospheric and space plasma physics; radio astronomy and cosmochemistry, including the chemistry of interstellar matter.



CASS provides a jointly shared facility which has office, laboratory, and computer space to enhance the interchange of expertise. Researchers in CASS have access to many University of California observing facilities, including Lick Observatory and the Keck Telescopes, and have contributed experiments to many major NASA space missions including the Hubble Space Telescope and the Rossi X-Ray Timing Explorer. Associated with CASS are included seventeen faculty, about twenty-five Ph.D.-level research staff, twelve graduate students, and thirty technical and administrative support personnel.

The center's facilities, faculty, and research staff are available to graduate students in the Departments of Physics, Electrical and Computer Engineering, and Chemistry who have chosen to write their dissertation on subjects of research encompassed by CASS. Graduate and undergraduate courses in astrophysics, astronomy, and space sciences are developed and taught by the academic staff of CASS. The total yearly budget is about \$10 million, mostly from federal funding sources.

The Mariar Foundation provides several enhancements to the academic program, including support of the astrophysics and space

science library, and funding for a yearly public lecture given by an eminent astrophysicist.

The **Center for Energy and Combustion Research (CECR)** is concerned with interdisciplinary studies in energy and combustion, the principal means of producing power. Approximately twenty faculty and professional staff members are affiliated with CECR. Since its origins, the center has focused on basic problems in finding new sources of energy and on the social, environmental, economic, and political consequences of energy consumption. Studies range from investigations into the fundamental nature of energy and combustion to practical applications in energy conservation and production, as well as pollution control. The center carries on research programs in these areas, and there are graduate and undergraduate courses on combustion and propulsion and on energy production and utilization. A limited number of graduate research assistantships are available. Applications for graduate study in any of the disciplines covered by CECR should be directed to the academic department in which graduate study is to be undertaken.

The **Center for Environmental Research and Training (CERT)** coordinates the broad range of environmental research activities across the university. Departmental participation includes the Departments of Anthropology, Biology, Chemistry and Biochemistry, Economics, School of Engineering, School of Medicine, Scripps Institution of Oceanography, the Center for U.S.-Mexican Studies, and the Graduate School of International Relations and Pacific Studies. This extensive group offers an opportunity to address environmental issues across traditional disciplinary boundaries. This opportunity is particularly crucial for understanding the complex interactive nature of global and regional environmental issues. The CERT also provides an interface for interaction with environmental agencies outside the university, including the environmental technology sector and governmental agencies.

The **Center for Human Information Processing (CHIP)** is a center for the study of brain and cognition. It is composed of four subdivisions, each operating with the common goal of furthering our understanding of human cognitive processes and the neurological bases of these processes. The subdivisions are: Brain

and Perception Division, the Cognitive Processes Division, the Human Development Division, and the Language Processing Division.

CHIP provides facilities for visiting scholars and supports workshops, conferences, and brown-bag discussion groups centering on the theoretical and empirical issues in each of these areas. In addition to these activities, two of these subdivisions house academic programs at UCSD: The Human Development Division houses the **Human Development Program** (an undergraduate program begun in 1995), and the Language Processes Division houses (together with CRL) the **Joint UCSD/SDSU Doctoral Program in Language and Communicative Disorders** (a graduate program due to officially begin in 1996). These two subdivisions, in particular, sponsor active area research meetings as well as focal conferences, workshops, and colloquia, and 'one-time' courses related to the mission of the ORU and available to the entire university community (the latest was a functional MRI course offered in fall quarter 1995)

The **Laboratory of Comparative Human Cognition (LCHC)** operates under the auspices of CHIP. From its inception at UCSD in 1978, the focus of the LCHC's theoretical and empirical work has been the role of culture in shaping human development and human cognition. Members of the LCHC elaborate on culture as the species-specific medium of human existence, constituted of systems of artifacts and acting as both a constraint on and a tool kit for human action. Research sites focus on adult development, the organization of learning, and connecting theory and practice in community-based activity systems.

Within psychology, the approach adopted by LCHC is variously referred to as cultural-historical psychology, cultural psychology, or a cultural context approach to mind. It treats the mind as a phenomenon distributed among people and their artifacts, including language and social institutions. This approach is closely linked to social science movements referred to as activity theory, constructivism, and distributed cognition, which ground their analyses in people's everyday culturally organized activities.

Current research projects are grouped around five major areas: (1) the creation of experimental educational activities in community settings to promote the development of

numerous forms of literacy; (2) investigation of cultural and linguistic factors in cognitive and social development; (3) computer networking and joint activity; (4) intervention studies of work and expertise as collaborative activity; and (5) analyses of discourse and representation. The LCHC published fifteen volumes of *The Quarterly Newsletter of the Laboratory of Comparative Human Cognition*. It now publishes a journal, *Mind, Culture, and Activity: An International Journal*. The LCHC also coordinates several international electronic discussion conferences which currently includes more than 400 researchers from sixteen countries. The LCHC conducts a weekly seminar and workshops focused on special topics, including cutting-edge research reports from members of an interdisciplinary, international group of LCHC alumni who visit periodically.

The **Center for Iberian and Latin American Studies (CILAS)** coordinates and promotes Latin American and Iberian research, and service activities for faculty and students in all departments at the university. It sponsors multidisciplinary colloquia, conferences, projects and publications, as well as library expansion and outreach efforts. The center also hosts visiting faculty. It awards fellowships each year to promising Latin Americanist graduate students.

The **Center for Magnetic Recording Research (CMRR)**, founded in 1983, is devoted to multidisciplinary teaching and research in areas of science and engineering related to magnetic recording. As part of its mission to educate future leaders in this vital technology, the center, in cooperation with the Departments of Physics, Chemistry, Computer Science and Engineering, Electrical and Computer Engineering, and Applied Mechanics and Engineering Sciences, offers classes at both the undergraduate and graduate levels in order to expose students to the concepts of magnetic recording and encourages graduate-level study. In addition, the center assists in the continuing education of professionals already in the field through workshops and seminars. CMRR also stimulates and supports research related to magnetic recording, especially the development of techniques to increase the storage capacity of magnetic recording devices.

**Center for Molecular Genetics (CMG)** promotes molecular genetic research and the training of graduate students and postdoctoral

fellows in the biological, chemical, and biomedical sciences. The center's research focus integrates basic science, including work on model developmental systems, with clinical applications aimed at understanding the molecular bases of human diseases. The latest techniques of gene isolation, gene manipulation (including control of gene expression), and the genetic transformation of cells and organisms are further developed and applied to major problems in biology and medicine. The center serves as a resource for the entire campus for molecular genetic techniques, materials, and facilities, and it encourages interactions with other ORUs in the biomedical area.

The center also strives to promote interactions between laboratories at UCSD and the biotechnology community and to facilitate the prompt and orderly transfer of new information resulting from innovative research into the private sector. The center reaches out to its supporters in the biotechnology and biopharmaceutical sectors through its industrial affiliates program, Biotechnology InCyte. This unique program brings together scientists, business executives, and lawyers from both the for-profit and not-for-profit sectors of the industry to participate in a variety of meetings, conferences, and symposia throughout the year.

The **Center for Research on Biological Structure (CRBS)** is an interdisciplinary research unit focused on learning more about the nature and interrelationship of increasingly complex levels of biological structure, from the atomic and molecular level to the cellular and tissue level. Researchers involved with this center are studying the arrangements of atoms that determines the structures of enzymes, proteins, and the body's vast chemical communications network to the tissues and organs that provide an organism's inner strength and outside support. The center's goals include creating new tools to understand cell functions such as those involved in muscle contraction, cardiovascular networking, and the activities of the central nervous system such as thinking, memory, and emotion. Longer-term goals include providing a structural and computational basis for understanding signal transduction at all levels. A key aspect of this work will be to provide a state-of-the-art interdisciplinary environment in which biology and medicine merge with chemistry, physics, and computation.

Researchers participating in the center are applying the most sophisticated computer-assisted technologies. These technologies include a high-power electron microscope capable of revealing the three-dimensional structures of living cells and their internal components, state-of-the-art resources for X-ray crystallography and magnetic resonance analysis that define high-resolution structures of simple and complex proteins, and confocal light microscopes that allow researchers to visualize molecules tagged with fluorescent markers as they pass chemical messages to each other. The researchers are also using the powerful computing resources of the San Diego Supercomputer Center (SDSC) to simulate the activity of such systems, analyze the results, and organize and make accessible the growing storehouse of biological information for the benefit of all. These resources include the highest-performance supercomputers, visualization and database technologies, large archival storage systems, and high-speed networks.

Established in 1996, the center involves researchers from a cross section of disciplines across the campus, the UCSD Medical School, the Salk Institute for Biological Studies, and SDSC, including from bioengineering, biology, chemistry, computer science, mathematics, neuroscience, pharmacology, psychiatry, and physics. This group also seeks to forge new interactions with the biotechnology and biocomputing-related companies to effect technology transfer. The interaction among these researchers is expected to produce new perspectives, point out fruitful research topics, lead to the development of new technologies and drugs, and train a new generation of researchers interested in biological structures and how they interact with each other.

The **Center for Research in Computing and the Arts (CRCA)** exists to foster collaborative working relationships among artists, scientists, and technologists by identifying and promoting projects in which common research interests may be advanced through the application of computer-mediated strategies.

In this context, "artist" is understood to include, but not be limited to, practitioners and theorists in architecture, dance, literature, music, poetry, theatre, and the visual arts. "Scientists and technologists" are similarly understood to include researchers in cognitive

science, computer science, engineering, linguistics, mathematics, physics, and psychology.

The center has two closely related goals. One is the discovery, evaluation and development of new conceptual modes, drawing on the most productive aspects of the intellectual disciplines of all its members. The other is to further the aims of the arts, science, and technology through the exploration of ways in which the expanding bodies of knowledge invested in each can be used to promote the aims of the others. Research conducted under the auspices of the center is intended to challenge and expand conventional categories under which the results of artistic, scientific, and technological pursuits are understood.

#### **Center for Research in Language (CRL).**

The foci of the center are on language processing, language learning, language disorders, and simulations of all these aspects of language in artificial systems. Research in the center is interdisciplinary and draws upon the fields of linguistics, psychology, cognitive science, neurosciences, computer science, sociology, and anthropology.

The center's facilities are designed to accommodate laboratory research projects by the faculty and graduate students; facilities include a number of high-performance work stations, a transputer laboratory, extensive equipment for audio recording and analysis, and equipment for psycholinguistic experimentation.

Current research projects include studies of language and cognitive development in children; language impairment in children and adults; word and sentence processing in bilinguals; foreign vocabulary in American Sign Language; development of neurally inspired parallel processing models of speech perception; studies in first language acquisition; cross-linguistic comparisons of the process of language acquisition and aphasia; research on the integration of grammatical analyses and theories; the compilation of a comparative dictionary of the Yuman languages, and the compilation of an Albanian-English dictionary. The center administers an NIH pre- and postdoctoral training grant, "Language, Communication and Brain." CRL has also entered into several institutional agreements with research institutions in Europe, providing for the exchange of personnel and support for projects

of mutual interest. An ongoing speaker series presents a broad range of experimental approaches to the study of language. The center publishes a monthly newsletter.

The **Center for U.S.-Mexican Studies (CUSMS)**, established in 1979, is the nation's largest program devoted to the study of Mexico and U.S.-Mexican relations. It supports research in all of the social sciences and history, graduate student training, publications, and public education activities that address the full range of problems affecting economic and political relations between Mexico and the United States. The center also studies the history, economy, politics, and social structure of Mexico, and aspects of the U.S. economy and U.S. public policy that affect Mexico.

Through its program of researchers-in-residence, the center each year sponsors the research of twenty to twenty-five predoctoral and postdoctoral scholars and nonacademic specialists, who spend three to ten months in residence. Typically, people from Mexico receive over half of these awards, which are made through an open, international competition. Other visiting fellows come from Europe, Canada, Latin America, and East Asia. The center's permanent academic staff also conducts long-term studies of political change in Mexico, the U.S.-Mexico border environment, Mexican migration to the U.S., and social and economic consequences of North American economic integration. The center publishes much of the research conducted under its auspices.

Each summer, the center conducts a six-week seminar in studies of the United States for twenty to twenty-five Latin American social scientists and nonacademic professionals.

The center's interdisciplinary Research Seminar on Mexico and U.S.-Mexican Relations, which meets weekly throughout the academic year, and its research library attract leading researchers from throughout the United States, Mexico, and other countries. In addition, several research workshops on specialized subjects are held each year.

The center has a very active public education program, which includes frequent briefings for journalists, business executives, public officials, and community groups.

### **Projects**

The goal of the **African and African-American Studies Research Project** is to facilitate faculty, postgraduate, and graduate research in the areas of Africa and African diaspora studies in the social sciences and the humanities, and to foster the comparative, cross-national, and interdisciplinary dimensions of research, with a core group of scholars drawn from several fields in the social sciences and humanities. These research efforts are linked directly to larger local and international community concerns.

The project sponsors visiting scholars, focused research groups, a seminar, and symposia. Faculty from seven university departments are involved. The project oversees the African Studies Minor. The project is also part of the UC Systemwide Consortium of African Studies Programs and the national Association of African Studies Programs. It provides the basis for the establishment of an organized research unit on African and African-American Studies at a later time.

The **American Political Institutions Project (APIP)** was established in 1989 as a center for research and public education on American politics and public policy. Composed of faculty from the Departments of Political Science, Economics, History, Communication, Sociology, and the UCSD Library, the project's primary mission is to stimulate cross-disciplinary research. To this end, APIP sponsors lunch-table seminars and research conferences and assists scholars in identifying external sources of support, as well as preparing research proposals.

Recognizing the vital role of the university in civic education, the project has also initiated a series of public affairs programs for the campus and surrounding communities.

APIP's collaboration with UCSD's Center for U.S.-Mexican Studies continued in 1995 with the organization of the third annual summer seminar for Latin American scholars and professionals. This six-week program introduces participants from several Latin American nations to the most recent research on U.S. politics, economics, and history and also provides training in survey research and policy analysis.

The **Interactive Instruction Project (IIP)** is devoted to research in the use of modern tech-

nology to increase the interactivity of instruction. The intention is to change the nature of instruction from the passive lecture to something that requires effort on the part of the student and something which provides immediate feedback to students as they attempt to learn. Technologies which are being investigated include the use of the World Wide Web, e-mail, virtual classrooms (multiuser virtual environments), intelligent software agents, and advanced user interfaces. Work is being done on the development of tools for course development, course delivery, and course evaluation. Research done at the Interactive Instruction Project is intended to benefit both students who are physically on campus and students whose access to the campus is through computer networks (distance learning).

The **Project for Explaining the Origin of Humans** is a broad-based multidisciplinary coalition of individuals in the La Jolla area (from UCSD as well as surrounding institutions) who are interested in defining and explaining the evolutionary origins of humans and in generating testable hypotheses and new agendas for research regarding this matter. Areas of current interest include primate genetics and evolution, paleoanthropology and hominid origins, mammalian and primate neurosciences, primate biology and medicine, the roles of nature and nurture in language and cognition, human and primate society and culture, comparative primate reproductive biology, geographic, environmental and climatic factors in hominid evolution, as well as general theories for explaining humans. The group includes faculty from the Departments of Anthropology, Biology, Chemistry and Biochemistry, Cognitive Science, Linguistics, Medicine, Neurosciences, Oceanography, Pathology, and Psychology.

The **Project in Cognitive and Neural Development**. The purpose of the UCSD Project in Cognitive and Neural Development is to provide a forum for interdisciplinary research on brain and cognition in human children, including research on the neural bases of language and communication. The project brings together faculty and research staff from the UCSD Departments of Cognitive Science, Communication, Linguistics, Neurosciences, Psychology, Psychiatry and Sociology, the San Diego State University Departments of Psychology and Communication Disorders, the Salk Institute

for Biological Studies, and Children's Hospital Research Center.

The **Project in Display Phosphor Research** provides a forum for research on the synthesis, characterization, and processing of phosphors for high definition display applications. The project brings together faculty and researchers from the UCSD Departments of Chemistry, Applied Mechanics and Engineering Sciences (AMES), and Electrical and Computer Engineering (ECE). The project was organized in 1992 in order to expand collaboration with other colleagues at UCSD and to extend research efforts to address both near-term and future research issues concerning phosphor materials and advanced displays.

The **Project In Econometric Analysis (PEA)** is concerned with the analysis of economic data and with techniques for modeling relationships between economic variables and testing economic theories. As economic variables have properties not generally found in other fields, standard procedures from mainstream statistics are often not appropriate. The field of econometrics has been developed to deal with these issues. Its importance is indicated by its effect on the methodologies in other social sciences, such as political science and empirical history, and the fact that several Nobel Prize winners in economics have been econometricians.

The Project in Econometric Analysis (PEA) supports the work of an active group of researchers and provides opportunities for productive interaction among faculty and students. Areas of active research include financial econometrics, non-linear time series modeling, properties of neural network models, the theory of economic forecasting and various actual applications including a panel model of the dynamics of deforestation in the Amazon region and its effect on the local economy. The PEA allows links with workers from other universities in this and other countries. In 1997-98 the project had visitors from Europe, Japan and Australia; some were senior and some exceptional pre- and post-doctoral students. An international conference on the Time Series of High Frequency Financial Data was held April 1997, in San Diego. In addition, PEA facilitates the submission of grant proposals to outside agencies.

The **Project in Geometry and Physics (PGP)**, established in 1987, provides opportuni-

ties for increased collaboration between mathematicians and physicists. The project hosts several scientific meetings each year and also sponsors a number of research seminars with distinguished scientists from inside and outside the UCSD community.

The **Project in Information Engineering** was established in 1993 to unify many separate research efforts in information engineering at UCSD. The project focuses on improved computational methods and information management tools and is facilitating the initiation of several interdisciplinary research programs of academic and industrial significance. Among its current activities are research on and development of technology essential for the merger of computing and communication and the establishment of laboratories in multimedia computing and intelligent autonomous systems. Researchers from Electrical and Computer Engineering, Computer Science and Engineering, San Diego Supercomputer Center, and the School of Medicine are participating in the project's research programs.

The **Project on International and Security Affairs (PISA)** is the campus affiliate of the Institute on Global Conflict and Cooperation (IGCC), a UC systemwide institute housed at UCSD. PISA's mission is to encourage research, teaching, and public discussion on international relations. PISA's primary activity is to sponsor conferences, seminars, and lectures for faculty, students, and the public on world affairs, usually in conjunction with other campus organizations. PISA also provides support for faculty and student research and for a research seminar on international relations theory. Recent activities include a lecture series on Asia-Pacific economic integration, support for a conference on trilateralism in North America, and funding for international programming at Eleanor Roosevelt College.

The **Public Policy Research Project** was established to facilitate interdisciplinary research and educational opportunities in public policy and business-government interaction. Through conferences, focused research groups, and lecture series, the project acts as a catalyst for interaction among economists, political scientists, moral philosophers, historians, cognitive scientists, anthropologists, and sociologists. The project supports programs that: (1) help

faculty obtain funding that are engaged in policy-related research, (2) conduct research apprenticeships for doctoral students working on research projects dealing with issues and processes of public policy, and (3) provide technical support and arrange faculty-proposed conferences within the scope of the project's mission statement.

### Natural Reserve System (NRS)

The **Natural Reserve System (NRS)** was founded to establish and maintain significant examples of California's diverse ecosystems and terrain. These reserves are used for teaching and research in all disciplines, from geology and environmental sciences to anthropology and art. Faculty and students of the University of California and other institutions are encouraged to use any of the thirty reserves in the system for serious academic pursuits. The San Diego campus administers the following four reserves:

**Dawson Los Monos Canyon Reserve:** This 200-acre reserve is located in the cities of Carlsbad and Vista in north coastal San Diego County. Its young, stream-cut valley contains a year-round creek with precipitous north- and south-facing slopes. The major habitat types are Southern Riparian Woodland, Diegan Coastal Sage Scrub, Perennial Coastal Stream, Coast Live Oak Woodland, Mixed Grassland of native bunchgrass and introduced annuals, and South Coastal Mixed Chaparral. This area is also of unique and significant historical and archaeological value.

**Elliott Chaparral Reserve:** Located ten miles to the east of campus, this 107-acre reserve, adjacent to the large expanse of Miramar Naval Air Station that is undeveloped, features Chamise Chaparral typical of the Southern California coastal plain and a large stand of mature planted eucalyptus. It is readily available during a normal three-hour lab period or for term-paper-length field studies as well as for more lengthy projects.

**Kendall-Frost Mission Bay Marsh Reserve:** This twenty-acre reserve, together with the city of San Diego's contiguous Northern Wildlife Preserve, constitute the last remaining fifty acres of tidal salt marsh on Mission Bay and one of the few such wetlands remaining in Southern California. It is recognized for the

habitat it provides for several rare and endangered birds including the light-footed clapper rail, Belding's savannah sparrow, and the California least tern, as well as many resident and migratory shorebirds and waterfowl, and several fish species. An on-site trailer houses limited laboratory facilities, and extensive facilities exist across the Bay at Hubb's Sea World, as well as within ten miles on the UCSD main campus and at the Scripps Institution of Oceanography.

**Scripps Coastal Reserve:** This reserve consists of disjunct shoreline and cliff-top (or "knoll") portions. The shoreline part consists of the sixty-seven acre San Diego Marine Life Refuge extending seaward 1,000 feet from the beach and an 800-acre contiguous submerged lands lease. Surrounding the Scripps Pier, habitats include sandy beach and submerged plain, seasonally exposed cobble beach, rocky reef, pier pilings, and upper submarine canyon ledges. Habitats of the cliff-top knoll and canyons include coastal sage scrub, maritime succulent scrub, southern coastal mixed chaparral, and disturbed grassland. The latter is particularly suitable for ecological restoration experiments. This reserve is enhanced by the availability of the laboratories and facilities of nearby Scripps Institution of Oceanography and the main San Diego campus.

### Campuswide Research Facilities

#### *Academic Computing Services*

See page 99.

#### *San Diego Supercomputer Center*

See page 102.

#### *The UCSD Libraries*

See page 108.



# The School of Medicine

The faculty of the School of Medicine is committed to nurturing and reinforcing the attributes that are important in the making of a doctor—dedication, compassion, and intellectual curiosity.

The goal of the medical school curriculum, clinical experience, and faculty-student interactions is to develop well-trained, objective, and conscientious physicians prepared for the changing conditions of medical practice and continuing self-education. Students acquire understanding of the basic medical sciences and clinical disciplines, and are encouraged to choose their own areas of interest for eventual development into careers in the broadly diversified medical community. Required course offerings are designed to provide students with a broad background suitable for general practice, and all students are trained in the delivery of primary care.

The School of Medicine accepted its charter class in 1968. The founding faculty drew upon the strength of UCSD's existing basic science departments rather than recreating such departments for the new school. Today this unique relationship continues with faculty from campus departments joining faculty from the School of Medicine's thirteen departments in teaching the core courses in medicine. Both preclinical and clinical courses are taught by UCSD faculty physicians who also have active patient caseloads. Courses are continually evaluated and updated by interdisciplinary course committees.

An honors, pass, fail grading system puts the emphasis on mastering the knowledge students need to practice medicine. The honors grade is not used to rank the class numerically, but to acknowledge students who have demonstrated superior academic performance. Students receive individual evaluations written by the faculty.

Students at the UCSD School of Medicine are encouraged to explore a variety of clinical, laboratory, and community-based experiences.

UCSD facilities are the main sites for clinical education. UCSD Medical Center-Hillcrest is

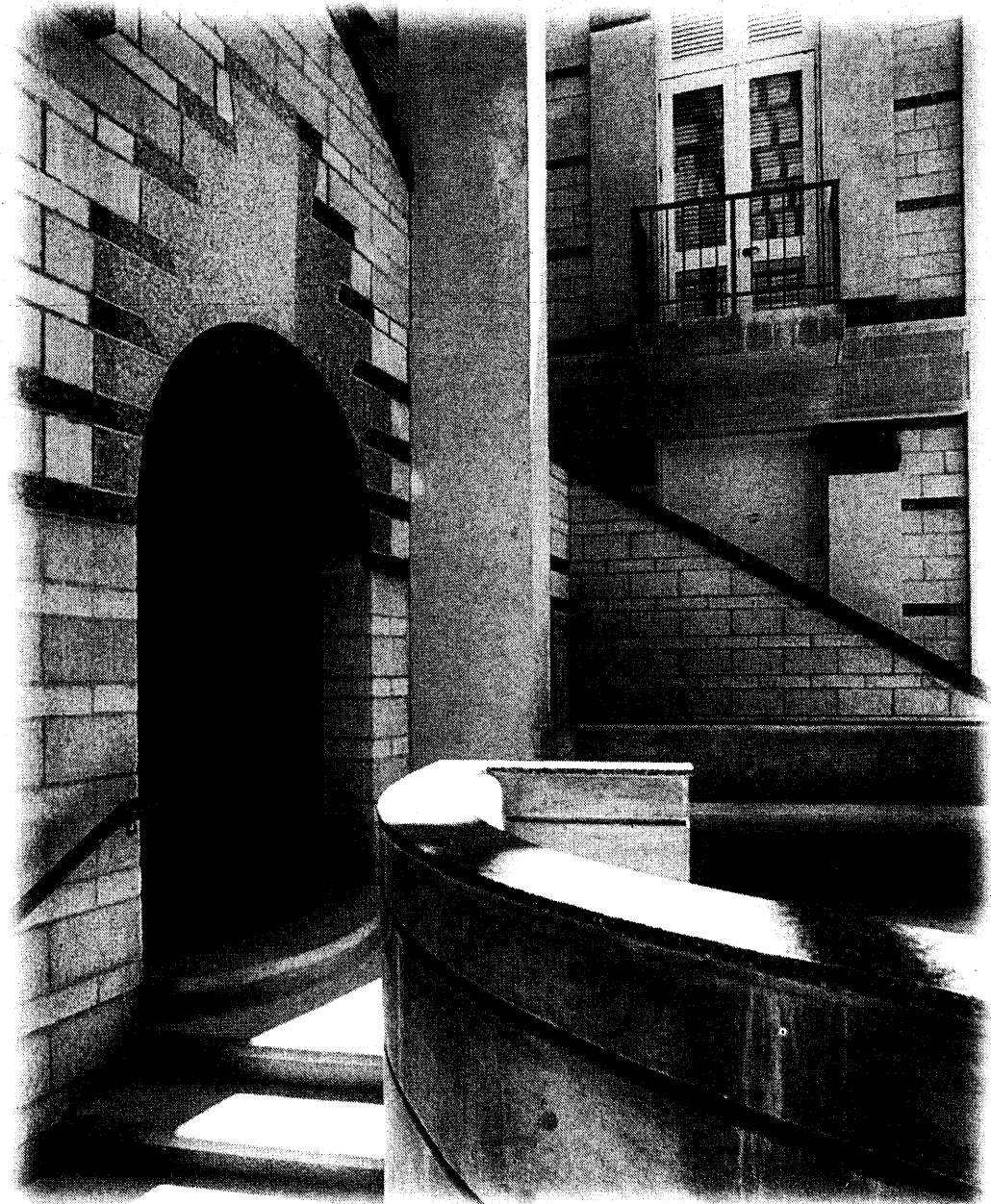
licensed for 442 beds. The majority of UCSD inpatients are admitted here; where a number of Regional Care Centers are located, including San Diego and Imperial Counties' only Level I Trauma Center. The UCSD Ambulatory Care Center is located across the street from the hospital tower.

In July 1993, a 120-bed general medical-surgical hospital, The John M. and Sally B. Thornton Hospital, opened at UCSD Medical Center-La Jolla which is located on the La Jolla campus. Adjacent to the Thornton Hospital is

the Perlman Ambulatory Care Center and the Shiley Eye Center.

The Veterans Affairs Medical Center, located adjacent to the School of Medicine campus in La Jolla, also is an important training site.

Outpatient experiences include private medical practice, community clinics, and home visitation programs. Students see patients in many of San Diego's most modern hospitals and outpatient facilities, as well as in some of the disadvantaged neighborhoods of San Diego and Baja California, Mexico.



In all their clinical experiences UCSD medical students have an opportunity to see how physicians work as a team with physician assistants, nurses, nurse practitioners, laboratory technicians, social workers, physical and occupational therapists, pharmacists, and other health care professionals to provide health care. In many cases they also can see how the trend toward "managed care" affects both patients and the practice of medicine.

San Diego ranks fourth nationally in the biotechnology industry. There are many opportunities for students to participate in cutting-edge research in laboratories of UCSD School of Medicine researchers, as well as in the laboratories of scientists from the general UCSD campus, the Veterans Affairs Medical Center, The Salk Institute, Scripps Clinic and Research Foundation, and some of the many private biomedical research companies in the region.

The medical school curriculum provides flexibility so that the individual needs and goals of each student can be met. The curriculum is divided into two major components: the core curriculum and the elective programs.

Elective opportunities constitute nearly one-fourth of classes during the first two years and more than one third during the last two years. The core curriculum of the first two years is designed to provide each entering student an essential understanding of the fundamental disciplines underlying modern medicine. The core curriculum of the last two years is composed of the major clinical specialties taught in hospital settings, outpatient situations, and relevant extended-care facilities. A Medical Scientist Training Program provides the opportunity for a limited number of students to earn both the M.D. and Ph.D. degrees over a six- to seven-year period of study.

Each student is expected to develop an individualized program of independent study in conjunction with a faculty member and to describe it in writing.

Freshman student enrollment is 122, and a total of 528 medical students were enrolled in 1997-98.

### ***Selection Factors***

Selection is based upon the nature and depth of scholarly and extracurricular activities undertaken, academic record, performance on the MCAT, letters of recommendation, and personal interviews.

The Admissions Committee gives serious consideration only to those applicants with above average GPA values and MCAT scores. The School of Medicine is seeking a student body with a broad diversity of backgrounds and interests reflecting our diverse population.

A complete catalog and information on the foregoing programs are available for purchase at the UCSD Bookstore for \$4.00, plus \$2.50 for shipping and handling (make checks pay-

able to the UC Regents). Send School of Medicine catalog requests to: UCSD Bookstore 0008, University of California, San Diego, 9500 Gilman Drive, La Jolla, California 92093-0008, or for more information, call the UCSD Bookstore at (619) 534-7326.

For additional information about the UCSD School of Medicine and its programs, write or call:

The Office of Admissions  
School of Medicine, 0621  
University of California, San Diego  
9500 Gilman Drive  
La Jolla, California 92093-0621  
(619) 534-3880

### ***Programs for Prospective Medical Students***

UCSD offers no special premedical major. An undergraduate student considering medicine as a career may choose any major or concentration area leading to the bachelor's degree, provided that he or she elects those additional courses which the medical school of his or her choice may require for admission. Admission requirements differ among medical schools, but most desire a solid foundation in the natural sciences—biology, chemistry, physics, mathematics—and a broad background in the humanities, social sciences, and communication skills. A premedical/dental advisory program is available through the campus-wide Career Services Center.



# Scripps Institution of Oceanography

Scripps Institution of Oceanography is one of the oldest, largest, and most important centers for marine science research, graduate training, and public service in the world. Its preeminence in the marine sciences is reflective of its excellent programs, distinguished faculty, and outstanding facilities.

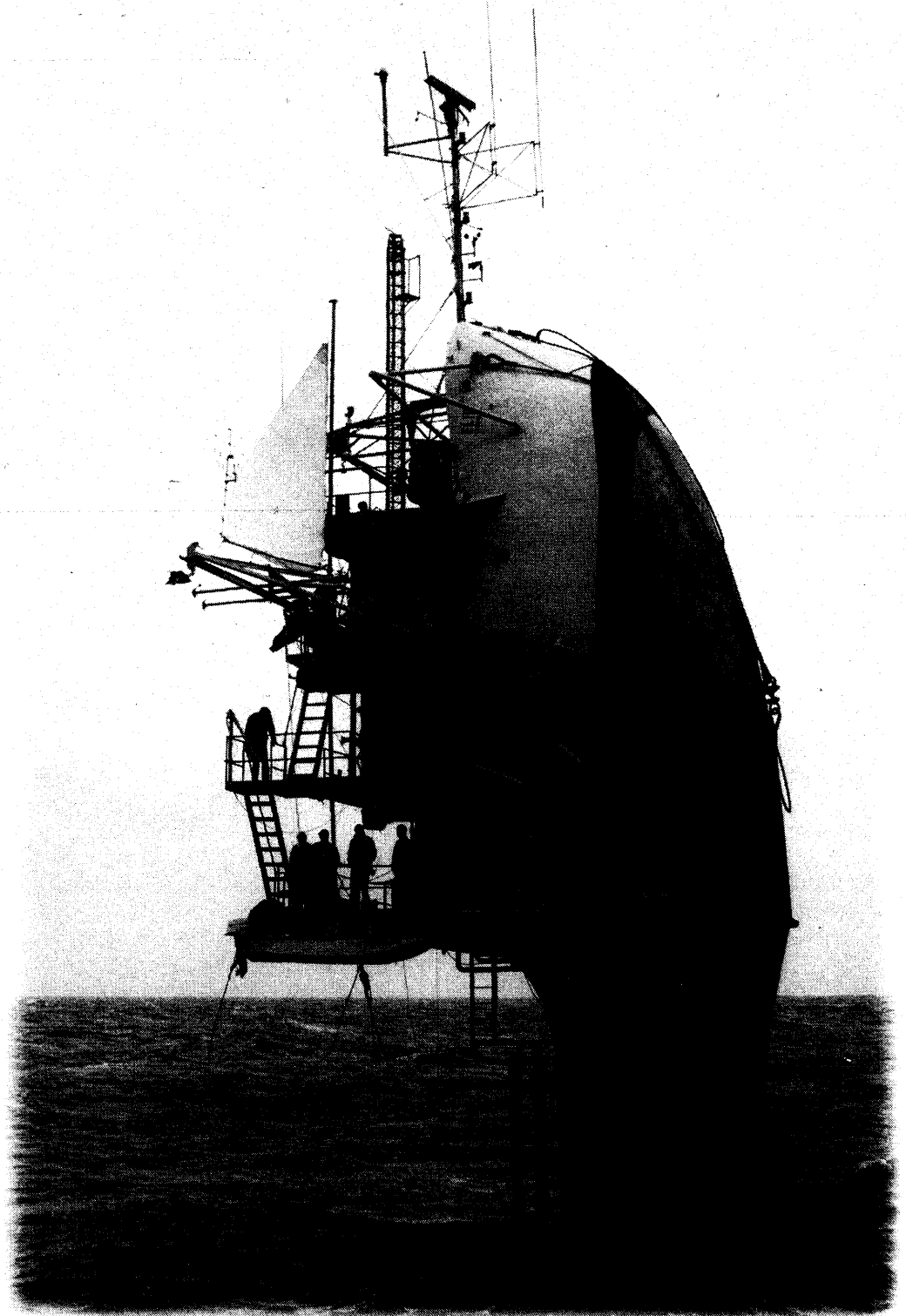
In all, Scripps occupies sixty-seven buildings on 230 acres mostly along the Pacific coastline below the mesa on which UCSD is located. Its staff numbers approximately 1,200, including approximately 190 graduate students. The institution's annual expenditures exceed \$100 million.

Scripps Institution was founded in 1903 as an independent biological research laboratory, which became an integral part of the University of California in 1912. At that time the laboratory was given the Scripps name in recognition of Ellen Browning Scripps and E.W. Scripps.

Research at Scripps encompasses physical, chemical, biological, geological, and geophysical studies of the oceans. Ongoing investigations include the topography and composition of the ocean bottom, waves and currents, and the flow and interchange of matter between seawater and the ocean bottom or the atmosphere. Scripps's research ships are used in these investigations throughout the world's oceans. Among the more than 300 programs that may be under way at any one time are studies of air-sea interaction, climate prediction, earthquakes, the physiology of marine animals, marine chemistry, beach erosion, the marine food chain, the ecology of marine organisms, the geological history of the ocean basins, and the multidisciplinary aspects of global change and the environment.

Scripps operates four ships and one platform for oceanographic research primarily in support of programs by Scripps researchers, although a significant part of their work is for oceanographers from other institutions throughout the world. Cruises range from local, limited-objective trips to far-reaching expeditions in the world's oceans.

Investigations supported by contracts and grants, primarily federal, cover a wide latitude



of marine research. The general research effort is conducted by five divisions: Climate Research Division, Geosciences Research Division, Marine Biology Research Division, Marine Research Division, and Physical Oceanography Research Division. The diversity of Scripps's work is extended by two special purpose laboratories: Marine Physical Laboratory and Center for Marine Biotechnology and Biomedicine. Other specialized groups also are located on campus: Center for Coastal Studies, Marine Life Research Group, and Center for Atmospheric Sciences. A ship operations and marine technical support unit provides essential services and facilities to all research units of the institution.

Scripps's educational program has grown hand in hand with the research programs. Instruction is on the graduate level, and students are admitted as candidates for a Ph.D. degree. Academic work is conducted through an organizational segment of the institution known as the Graduate Department of SIO and its eight curricular groups: biological oceanography, physical oceanography, marine biology, geological sciences, marine chemistry and geochemistry, geophysics, climate sciences, and applied ocean sciences. Approximately ninety professors are complemented by an academic staff of more than 200 research scientists, many of whom have a regularly scheduled role in the instructional program.

The Birch Aquarium at Scripps provides a wide variety of educational courses in the marine sciences for students from primary grades to high school level. UCSD students also may become involved in work-study programs or serve as volunteers or aquarist trainees. A limited number of students can be accommodated for a four-unit course in independent study by arrangement with a faculty member and the aquarium director. The facility's resources include natural habitat groupings of marine life from local and Gulf of California waters; many of these marine groups are on display in the aquarium. The museum exhibits present basic oceanographic concepts and explain research undertaken at Scripps. The aquarium is open from 9:00 a.m. to 5:00 p.m. daily.

The La Jolla Laboratory of the University of California's Institute of Geophysics and Planetary Physics, and UC's California Space Institute, although organizationally separate, are closely affiliated with Scripps. The California Sea Grant College System, a systemwide pro-

gram with more than forty projects and approximately forty-five trainees supported on California campuses and in several specialized research units, is headquartered at Scripps. The Southwest Fisheries Science Center (SWFSC), located near the Scripps campus, is one of thirty major laboratories and centers operated by the National Marine Fisheries Service, a component of the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce. Also, the Inter-American Tropical Tuna Commission is colocated at SWFSC.

Students enter oceanography with extremely varied interests and backgrounds—naturalists, explorers, engineers, and theorists from the United States and many foreign countries. One thing they have in common, however, is that they come to Scripps with a very strong understanding of science. Most students select positions as research assistants when they enter the program—a practice that not only gives them an early involvement with research, but also provides salaries. The student-faculty ratio at Scripps is about two-to-one; consequently, classes are small, and the student has the opportunity to work closely with his or her thesis adviser. Oceanography is an interdisciplinary field that allows for informal exchange and interaction on a variety of levels.

While at Scripps, students have for their use some of the nation's most sophisticated and complete special laboratories and facilities for oceanographic studies covering a wide range of disciplines from biology and physiology to geophysics and atmospheric sciences. A hydraulics laboratory features a unique ninety-foot strati-

fied wave-and-current channel, and an analytical facility has a host of scanning electron microscopes and other high-precision instruments. Among the many computer resources is access to the San Diego Supercomputer Center. The Scripps Library is the University of California's major collection of marine science materials, with outstanding collections in oceanography, marine biology, and marine technology. It also specializes in atmospheric sciences, fisheries, geology, geophysics, and zoology. The various marine life and geological specimens housed at Scripps form a vast "library" of oceanographic resources available for investigations. Two underwater research areas that are part of the UC Natural Reserve System are adjacent to the Scripps campus. During a student's tenure at Scripps, he or she will have the opportunity to go to sea on any of Scripps's four research vessels as well as those from other oceanographic institutions.

The combination of the large scientific staff and extensive facilities at Scripps provides an extraordinary opportunity for each student to enjoy close contact with existing oceanographic concepts and active participation in research.

See "Scripps Institution of Oceanography" in "Courses, Curricula, and Programs of Instruction" for further details on study programs, requirements, degrees, and courses.

For additional information, write:  
Graduate Student Information  
Scripps Institution of Oceanography  
University of California, San Diego  
9500 Gilman Drive, Dept. 0208  
La Jolla, California 92093-0208



# Graduate School of International Relations and Pacific Studies

The Graduate School of International Relations and Pacific Studies (IR/PS), University of California, San Diego was created by the Board of Regents in 1986 as the University of California's first professional school of international affairs. The school's regional focus is on the Pacific Rim, which extends from the southernmost tip of Latin America northward, across the United States and Canada, down through the Soviet Union, Japan, China, Korea, the Philippines, Australia, New Zealand, and the other nations of Oceania.

The school's programs have been developed in response to the increasing participation of the United States in global economic and political affairs. The United States wields less economic and political influence than it did in the immediate postwar years; at the same time, American industries face increasing competitive pressures in domestic and international markets. As a result, professionals who can understand and work in an internationalized environment are needed in both the public and private sectors. Moreover, while the United States once looked primarily to Europe as the site of its major commercial, financial, and strategic interests, the United States now has large stakes in the Pacific Basin, a likely source of both our greatest national challenges and possibilities in the next decades. These changes create both a need and an opportunity: a need for new programs of training and research in international affairs and an opportunity for a new school of international affairs and management to develop a distinctive, modern program that links professional training with international competence and gives greater prominence to the Pacific Basin.

The school's primary objectives are to prepare students with an interest in the Pacific Rim countries for positions of leadership in business, government, journalism, diplomacy, public service, and other fields; to serve as a center of excellence for research on economic, political, social, technological, and security issues confronting those nations; and to promote dialogue on Pacific region issues of common concern.



1. The degree programs provide students with professional training for careers in international affairs and management, including jobs in industry, government, international organizations, foundations, schools, and research institutes. Whatever their specific goals, students receive a broad training across professional areas so that those headed for the government have a grasp of decisions in the private sector and those planning business careers acquire a grasp of decision-making in public organizations. A program combining applied social science and professional subjects with courses on Pacific region countries provides students with both general skills and particular knowledge of the history, culture, language, and contemporary situations of those countries.
2. The school serves as a center for research on issues of common concern to the nations of the Pacific Rim. Since the Pacific Rim countries have become important foci of economic and security relations, the need for information and research centered on this dynamic region has become urgent. The diversity of national experiences represented by the Pacific region countries suggests a research agenda that includes comparisons of different approaches to economic management, foreign relations, policymaking, and development.
3. As part of the University of California, the school plays an important role in developing public awareness and understanding of the Pacific region. Programs of public outreach contribute to the information available to citizens and specialized groups about international issues that affect their lives.

## *Degree Programs*

The degrees offered by the school include a professional Master of Pacific International Affairs (M.P.I.A.), Master of International Technology Management (approval pending) and a joint Ph.D. in Political Science and International Affairs and Economics and International Affairs (approval pending). Training emphasizes inter-

national relations, economics and management, international technology management, policy, knowledge of specific countries or regions, analytical and research skills, and foreign language.

Mid-career and other executive certificate programs are also offered by IR/PS. In particular, the International Career Associates Program (ICAP) is designed for working professionals seeking additional study in international management, international relations, and comparative public policy. Participants in the program spend an academic year at IR/PS beginning in mid-September and ending in mid-June. Under the auspices of the program, associates have the opportunity to further internationalize their knowledge and experience as well as enhance their professional development in such areas as finance, accounting, quantitative methods, econometrics, and long-range strategic planning. The program of study is tailored to individual interests under the guidance of the program's director and faculty advisers.

The M.P.I.A. program is distinctive in several respects. The program:

1. Exposes students to the perspectives of both private business and public policymaking.
2. Offers specialized training in economics, management, international relations, and political analysis and integrates the languages, history, and cultures of the Pacific region into the curriculum.
3. Creates a laboratory for comparative analysis of economic management, foreign relations, policymaking, and development in the diverse countries of the Pacific region.
4. Offers language skills training necessary for international affairs professionals specializing in Pacific Rim countries.

The Ph.D. in International Affairs is offered only in conjunction with either the Ph.D. in Political Science or the Ph.D. in Economics. These Ph.D. programs are designed for students who seek a rigorous training in a discipline (either Economics or Political Science) along with a specialization in a specific policy area and regional expertise. Ph.D. students will be required to demonstrate knowledge of a foreign language linked to their regional specialization.

The master's and Ph.D. programs are distinct and separate. There is little overlap in the structure or requirements of the two programs because their objectives are very different. The master's program provides professional training for graduates who will pursue international careers in business, government, journalism and other fields. The Ph.D. programs offer an academic education to a small number of students who will pursue international careers requiring advanced research capabilities in universities, corporations, government agencies, consulting firms, or other research organizations.

The master's and Ph.D. programs do share a common intellectual framework. Both the professional master's curriculum and the academic Ph.D. curriculum are designed to bring the theories, methods, and insights of various disciplines together to analyze policy issues of the Pacific region and to blend the perspectives of public policy makers and private managers. The same faculty teach and advise students in both the master's and Ph.D. programs.

### *The Faculty*

The school has attracted an interdisciplinary faculty from such fields as economics, linguistics, management sciences, international relations, comparative politics, and public policy. The various programs draw upon and contribute to research which focuses on the regions of the Pacific Rim and on major issues that affect the region.

The school places special emphasis on research in and teaching of topics of particular importance to the program. These topics currently include:

1. The Pacific Rim as system, including the interaction of the countries and regions within it (e.g., Latin American-Japanese economic relations, U.S. relations with both East Asia and Latin America, and the placement of the Pacific in the global system of international relations, both contemporary and historical).
2. Studies in international economics, management, and finance, including such subject areas as international competition, comparative industrial organizations, international trade and development, industrial relations,

technological innovation, international financial structures, policies, institutions, and historical patterns of development.

3. Comparison of the trajectories of socioeconomic development among the countries of Asia and Latin America, including the exploration of differences and similarities in state-society relations, culture, entrepreneurship, linkage to the global economy, and geopolitical position.
4. Comparative analysis of patterns of policymaking in the countries of the Pacific region to understand how different governmental structures, economic systems, and social group interests shape the policy process and influence policy choices in such areas as budget allocation, regulation of industry, and foreign trade.

For further information, contact the Office of Admissions, Graduate School of International Relations and Pacific Studies, UCSD, 9500 Gilman Drive, La Jolla, CA 92093-0520. (619) 534-5914, email: [irps-apply@ucsd.edu](mailto:irps-apply@ucsd.edu), Web site: <http://www-irps.ucsd.edu>.



# UCSD Faculty Members

NAME	TITLE	DEPARTMENT	COLLEGE
<b>Abarbanel, Henry D. I.</b>	Professor	Physics	Revelle
<b>Abramson, Ian S.</b>	Associate Professor	Mathematics	Muir
<b>Acampora, Anthony</b>	Professor	ECE	Revelle
<b>Ackerman, Farrell</b>	Associate Professor	Linguistics	Marshall
<b>Adler, Steve</b>	Senior Lecturer (SOE)	Theatre and Dance	Roosevelt
<b>Agler, Jim</b>	Professor	Mathematics	Muir
<b>Agnew, Duncan C.</b>	Professor	SIO	SIO
<b>Agre, Philip E.</b>	Associate Professor	Communication	Muir
<b>Alexander, Nicholas M.</b>	Professor Emeritus	Pathology	SchMed
<b>Algaze, Guillermo</b>	Associate Professor	Anthropology	Roosevelt
<b>Allison, Henry E.</b>	Professor Emeritus	Philosophy	Revelle
<b>Allison, William S.</b>	Professor	Chemistry and Biochemistry	SchMed
<b>Anagnostopoulos, Georgios H.</b>	Professor	Philosophy	Warren
<b>Ancoli-Israel, Sonia</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Anderson, Donald W.</b>	Professor	CSE	Muir
<b>Anderson, Norman H.</b>	Professor Emeritus	Psychology	Muir
<b>Anderson, Victor C.</b>	Professor Emeritus	ECE	SIO/Muir
<b>Anstis, Stuart</b>	Professor	Psychology	Roosevelt
<b>Antin, David A.</b>	Professor Emeritus	Visual Arts	Muir
<b>Antin, Eleanor</b>	Professor	Visual Arts	Muir
<b>Appelbaum, Mark</b>	Professor	Psychology	Muir
<b>Armi, Laurence</b>	Professor	SIO	SIO
<b>Arneson, Richard J.</b>	Professor	Philosophy	Marshall
<b>Arnold, James R.</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle/SIO
<b>Aroian, Raffi</b>	Assistant Professor	Biology	Marshall
<b>Arovas, Daniel P.</b>	Associate Professor	Physics	Revelle
<b>Arrhenius, Gustaf</b>	Professor	SIO	SIO
<b>Asaro, Robert J.</b>	Professor	AMES	Revelle
<b>Asbeck, Peter M.</b>	Professor	ECE	Marshall
<b>Ashford, Scott</b>	Assistant Professor	AMES	Roosevelt
<b>Atkinson, Richard C.</b>	Professor/Chancellor Emeritus/UC President	Psychology/Cognitive Science	Marshall
<b>Attiyeh, Richard E.</b>	Professor/Dean/Vice Chancellor	Economics/Graduate Studies/Research	Revelle
<b>Azam, Farooq</b>	Professor	SIO	SIO
<b>Backus, George E.</b>	Professor Emeritus	SIO	SIO
<b>Bada, Jeffrey L.</b>	Professor	SIO	SIO/Warren
<b>Baden, Scott B.</b>	Associate Professor	CSE	Warren
<b>Bailey, Frederick G.</b>	Professor Emeritus	Anthropology	Muir
<b>Baird, Stephen M.</b>	Professor of Clinical Pathology	Pathology	SchMed
<b>Balzano, Gerald J.</b>	Associate Professor	Music	Muir
<b>Bank, Randolph E.</b>	Professor	Mathematics	Warren
<b>Baouendi, M. Salah</b>	Professor	Mathematics	Warren
<b>Barker, Chris</b>	Assistant Professor	Linguistics	Marshall
<b>Barrett, Kim</b>	Professor	Medicine	SchMed
<b>Bartlett, Douglas H.</b>	Associate Professor	SIO	SIO
<b>Basov, Dimitri N.</b>	Assistant Professor	Physics	Warren
<b>Batali, John D.</b>	Assistant Professor	Cognitive Science	Warren
<b>Batchen, Geoffrey</b>	Associate Professor	Visual Arts	Marshall
<b>Bates, Elizabeth A.</b>	Professor	Cognitive Science/Psychology	Marshall

<b>Bear, Donald V. T.</b>	Professor Emeritus	Economics	Revelle
<b>Beck, Nathaniel L.</b>	Professor	Political Science	Warren
<b>Behar, Jack</b>	Associate Professor Emeritus	Literature	Revelle
<b>Belew, Richard K.</b>	Associate Professor	CSE	Marshall
<b>Belgrader, Andrei</b>	Professor	Theatre and Dance	Muir
<b>Bellare, Mihir</b>	Associate Professor	CSE	Muir
<b>Bender, Edward A.</b>	Professor	Mathematics	Muir
<b>Benirschke, Kurt</b>	Professor Emeritus	Reproductive Med/Pathology	SchMed
<b>Benson, Andrew A.</b>	Professor Emeritus	SIO	SIO
<b>Benson, David J.</b>	Associate Professor	AMES	Marshall
<b>Berg, Darwin K.</b>	Professor	Biology	Warren
<b>Berger, Bennett M.</b>	Professor Emeritus	Sociology	Muir
<b>Berger, Wolfgang H.</b>	Professor	SIO	SIO
<b>Berkowitz, Ami E.</b>	Professor Emeritus	Physics	Warren
<b>Berman, Francine D.</b>	Professor	CSE	Revelle
<b>Berman, Ronald S.</b>	Professor	Literature	Muir
<b>Bernstein, Michael A.</b>	Associate Professor	History	Warren
<b>Bertram, H. Neal</b>	Professor	ECE	Revelle
<b>Betts, Julian</b>	Associate Professor	Economics	Marshall
<b>Bhatia, Sangeeta</b>	Assistant Professor-in-Residence	Bioengineering	Revelle
<b>Bier, Ethan</b>	Associate Professor	Biology	Roosevelt
<b>Biernacki, Richard</b>	Associate Professor	Sociology	Roosevelt
<b>Blanco-Aguinaga, Carlos</b>	Professor Emeritus	Literature	Marshall
<b>Blantz, Roland C.</b>	Professor	Medicine	SchMed
<b>Bloor, Colin M.</b>	Professor	Pathology	SchMed
<b>Blumberg, Rae L.</b>	Professor Emeritus	Sociology	Marshall
<b>Bohn, Roger E.</b>	Associate Professor	IRPS	IRPS
<b>Boland, Richard C.</b>	Professor	Medicine	SchMed
<b>Bond, F. Thomas</b>	Associate Professor/Provost	Chemistry and Biochemistry/Revelle	Revelle
<b>Borges, Dain</b>	Associate Professor	History	Roosevelt
<b>Boss, Gerry R.</b>	Professor	Medicine	SchMed
<b>Both, Andrei</b>	Professor	Theatre and Dance	Marshall
<b>Bowles, Kenneth L.</b>	Professor Emeritus	CSE	Muir
<b>Boynton, Robert M.</b>	Professor Emeritus	Psychology	Roosevelt
<b>Brace, Robert A.</b>	Professor	Reproductive Medicine	SchMed
<b>Bradbury, Jack W.</b>	Professor	Biology	Muir
<b>Bradner, Hugh</b>	Professor Emeritus	AMES	Revelle/SIO
<b>Braff, David L.</b>	Professor	Psychiatry	SchMed
<b>Branson, James G.</b>	Professor	Physics	Marshall
<b>Brenner, Suzanne A.</b>	Associate Professor	Anthropology	Warren
<b>Bridges, Amy</b>	Professor	Political Science	Marshall
<b>Briggs, Charles</b>	Professor	Ethnic Studies	Marshall
<b>Brink, David</b>	Professor	Philosophy	Muir
<b>Britton, Karen T.</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Brodkey, Linda</b>	Professor	Literature	Warren
<b>Brody, Stuart</b>	Professor	Biology	Muir
<b>Brown, Gregory</b>	Associate Professor-in-Residence	Psychiatry	SchMed
<b>Brown, Joan Heller</b>	Professor	Pharmacology	SchMed
<b>Brown, Kevin M.</b>	Associate Professor	SIO	SIO
<b>Brown, Sandra A.</b>	Professor	Psychology/Psychiatry	Marshall/SchMed
<b>Brown, Sheldon G.</b>	Assistant Professor	Visual Arts	Warren
<b>Brown, Willie C.</b>	Associate Professor Emeritus	Biology	Marshall
<b>Brueckner, Keith A.</b>	Professor Emeritus	Physics	Revelle
<b>Brunton, Laurence L.</b>	Professor	Pharmacology/Medicine	SchMed
<b>Buckingham, Michael J.</b>	Professor	SIO	SIO
<b>Bullock, Theodore H.</b>	Professor Emeritus	Neurosciences	SchMed/SIO

<b>Bunch, James R.</b>	Professor	Mathematics	Warren
<b>Burbidge, E. Margaret</b>	Professor Emeritus	Physics	Revelle
<b>Burbidge, Geoffrey R.</b>	Professor	Physics	Revelle
<b>Burkhard, Walter A.</b>	Professor	CSE	Warren
<b>Burton, Ronald S.</b>	Professor	SIO	SIO
<b>Buss, Samuel R.</b>	Professor	Mathematics	Roosevelt
<b>Caciola, Nancy</b>	Assistant Professor	History	Revelle
<b>Calcutt, Nigel</b>	Assistant Professor	Pathology	SchMed
<b>Calder, Bradley</b>	Assistant Professor	CSE	Roosevelt
<b>Caldwell, John</b>	Associate Professor	Communication	Marshall
<b>Cancel, Robert</b>	Associate Professor	Literature	Marshall
<b>Cande, Steven C.</b>	Professor	SIO	SIO
<b>Carmody, James</b>	Associate Professor	Theatre and Dance	Warren
<b>Carson, Dennis A.</b>	Professor	Medicine	SchMed
<b>Carson, Richard T.</b>	Professor	Economics	Muir
<b>Carter, Lawrence</b>	Professor	CSE	Revelle
<b>Cartwright, Nancy D.</b>	Professor	Philosophy	Roosevelt
<b>Case, Ted J.</b>	Professor	Biology	Revelle
<b>Caserio, Marjorie C.</b>	Professor Emeritus/Vice Chancellor Emeritus	Chemistry & Biochemistry/ Academic Affairs	Roosevelt
<b>Cassedy, Steven D.</b>	Professor	Literature	Roosevelt
<b>Castillo, Paterno E.</b>	Associate Professor	SIO	SIO
<b>Catalan, Diego</b>	Professor Emeritus	Literature	Revelle
<b>Catanzarite, Lisa M.</b>	Assistant Professor	Sociology	Marshall
<b>Cattolica, Robert J.</b>	Professor	AMES	Warren
<b>Cavane, Webster K.</b>	Professor	Medicine	SchMed
<b>Cespedes, Guillermo</b>	Professor Emeritus	History	Revelle
<b>Cessi, Paola</b>	Associate Professor	SIO	SIO
<b>Chandler, Marsha A.</b>	Professor/Senior Vice Chancellor	Political Science/Academic Affairs	Roosevelt
<b>Chandler, William</b>	Sr. Lecturer (SOE)	Political Science/IRPS	Warren
<b>Chang, William S. C.</b>	Professor Emeritus	ECE	Warren
<b>Charles, Christopher D.</b>	Associate Professor	SIO	SIO
<b>Charles, Maria</b>	Assistant Professor	Sociology	Muir
<b>Chau, Pao C.</b>	Associate Professor	AMES	Revelle
<b>Chau, Paul M.</b>	Associate Professor	ECE	Revelle
<b>Cheatham, James R.</b>	Sr. Lecturer (SOE) Emeritus	Music	Marshall
<b>Checkley, David M.</b>	Associate Professor	SIO	SIO
<b>Chen, Joseph C. Y.</b>	Professor	Physics	Roosevelt
<b>Chen, Matthew Y. C.</b>	Professor	Linguistics	Muir
<b>Cheng, Chung-Kuan</b>	Professor	CSE	Muir
<b>Chiba, Andrea</b>	Assistant Professor	Cognitive Science	Revelle
<b>Chien, Andrew</b>	Professor	CSE	Marshall
<b>Chien, Kenneth R.</b>	Professor	Medicine	SchMed
<b>Chien, Shu</b>	Professor	Bioengineering	SchMed
<b>Chojkier, Mario</b>	Associate Professor-in-Residence	Medicine	SOM
<b>Chrispeels, Maarten J.</b>	Professor	Biology	Muir
<b>Christenfeld, Nicholas</b>	Associate Professor	Psychology	Roosevelt
<b>Christmas, Eric C.</b>	Professor Emeritus	Theatre and Dance	Muir
<b>Chun, Jerold J. M.</b>	Assistant Professor	Pharmacology	SchMed
<b>Churchland, Patricia S.</b>	Professor	Philosophy	Muir
<b>Churchland, Paul M.</b>	Professor	Philosophy	Warren
<b>Cicourel, Aaron V.</b>	Professor Emeritus	Cog. Sci./Sociology/Pediatrics	Revelle/SchMed
<b>Clark, Leigh B.</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle
<b>Clementz, Brett A.</b>	Associate Professor	Psychology	Marshall
<b>Cleveland, Don W.</b>	Professor	Medicine/Neurosciences	SchMed

<b>Cohen, Alain J.-J.</b>	Professor	Literature	Muir
<b>Cohen, Harold</b>	Professor Emeritus	Visual Arts	Muir
<b>Cole, Michael</b>	Professor	Communication	Roosevelt
<b>Coles, William A.</b>	Professor	ECE	Muir
<b>Comisso, Ellen T.</b>	Professor	Political Science	Roosevelt
<b>Concha, Jaime</b>	Professor	Literature	Muir
<b>Conlisk, John</b>	Professor	Economics	Revelle
<b>Conn, Robert W.</b>	Professor/Dean	AMES/School of Engineering	Warren/SchEng
<b>Constable, Catherine G.</b>	Professor	SIO	SIO
<b>Constable, Steven</b>	Professor-in-Residence	IGPP-SIO	SIO
<b>Continetti, Robert E.</b>	Associate Professor	Chemistry and Biochemistry	Warren
<b>Cooper, Charles R.</b>	Professor Emeritus	Literature	Marshall
<b>Corbeil, Lynette B.</b>	Professor	Pathology	SchMed
<b>Cornelius, Wayne A.</b>	Professor	Political Science	Roosevelt
<b>Corrigan, Mary K.</b>	Associate Professor Emeritus	Theatre and Dance	Warren
<b>Cosman, Pamela</b>	Assistant Professor	ECE	Marshall
<b>Cottrell, Garrison W.</b>	Professor	CSE	Revelle
<b>Courchesne, Eric</b>	Professor	Neurosciences	SchMed
<b>Covell, James W.</b>	Professor	Medicine	SchMed
<b>Cowhey, Peter F.</b>	Professor	IRPS	IRPS
<b>Cox, Charles S.</b>	Professor Emeritus	SIO	SIO
<b>Cox, Gary W.</b>	Professor	Political Science	Muir
<b>Cox, Stephen D.</b>	Professor	Literature	Revelle
<b>Craig, Ann L.</b>	Associate Professor/Provost	Political Science/Roosevelt	Roosevelt
<b>Craig, Harmon</b>	Professor Emeritus	SIO	Revelle/SIO
<b>Crawford, Nigel</b>	Associate Professor	Biology	Warren
<b>Crawford, Vincent P.</b>	Professor	Economics	Warren
<b>Cristian, Flaviu</b>	Professor	CSE	Marshall
<b>Crowell, John E.</b>	Associate Professor	Chemistry and Biochemistry	Revelle
<b>Crowne, David K.</b>	Associate Professor Emeritus	Literature	Revelle
<b>Cruz, Rene L.</b>	Professor	ECE	Marshall
<b>Curiel, Anthony</b>	Associate Professor	Theatre and Dance	Marshall
<b>Curry, Joseph R.</b>	Professor Emeritus	SIO	SIO
<b>Czernowin, Chaya</b>	Assistant Professor	Music	Roosevelt
<b>D'Andrade, Roy G.</b>	Professor	Anthropology	Roosevelt
<b>David, Michael</b>	Assistant Professor	Biology	Warren
<b>Davidson, R. Michael</b>	Professor	Literature	Revelle
<b>Davis, Anthony C.</b>	Professor	Music	Marshall
<b>Davis, Charles E.</b>	Professor Emeritus	Pathology/Medicine	SchMed
<b>Davis, Russ E.</b>	Professor	SIO	SIO
<b>Davis, Susan G.</b>	Professor	Communication	Warren
<b>Dayton, Paul K.</b>	Professor	SIO	SIO
<b>Deak, Frantisek J.</b>	Professor/Dean	Theatre and Dance/Arts and Humanities	Warren
<b>Deftos, Leonard J.</b>	Professor-in-Residence	Medicine	SchMed
<b>Delis, Dean C.</b>	Professor-in-Residence	Psychiatry	SchMed
<b>den Haan, Wouter</b>	Assistant Professor	Economics	Marshall
<b>Dennis, Edward A.</b>	Professor	Chemistry and Biochemistry	Revelle/SchMed
<b>Deutsch, Diana</b>	Professor	Psychology	Warren
<b>Deutsch, J. Anthony</b>	Professor Emeritus	Psychology	Muir/SchMed
<b>Dey, Sugit</b>	Associate Professor (Acting)	ECE	Muir
<b>Diamond, Patrick H.</b>	Professor	Physics	Roosevelt
<b>Dickson, Andrew</b>	Associate Professor-in-Residence	SIO	SIO
<b>Diez-Medrano, Juan</b>	Associate Professor	Sociology	Marshall
<b>Dijkstra, Abraham J.</b>	Professor	Literature	Revelle

<b>Dillmann, Wolfgang H.</b>	Professor	Medicine	SchMed
<b>Dimsdale, Joel E.</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Dobkins, Karen</b>	Assistant Professor	Psychology	Revelle
<b>Donoghue, Daniel J.</b>	Professor	Chemistry and Biochemistry	Revelle/SchMed
<b>Doolittle, Russell F.</b>	Professor Emeritus	Chemistry and Biochemistry/Biology	Revelle/SchMed
<b>Doppelt, Gerald D.</b>	Professor	Philosophy	Warren
<b>Dorman, LeRoy M.</b>	Professor	SIO	SIO
<b>Douglas, Jack D.</b>	Professor Emeritus	Sociology	Muir
<b>Doyle, Peter G.</b>	Professor	Mathematics	Muir
<b>Drake, Paul W.</b>	Professor/Dean	Political Science/Social Sciences	Roosevelt
<b>Driscoll, C. Fred</b>	Professor	Physics	Warren
<b>Driver, Bruce K.</b>	Professor	Mathematics	Marshall
<b>Droge, Arthur</b>	Professor	Literature	Roosevelt
<b>Dryden, Deborah M.</b>	Professor Emeritus	Theatre and Dance	Muir
<b>Dubin, Daniel H.</b>	Associate Professor	Physics	Muir
<b>duBois, Page A.</b>	Professor	Literature	Muir
<b>Ducille, Ann</b>	Professor	Literature	Marshall
<b>Dunseath, Thomas K.</b>	Associate Professor Emeritus	Literature	Revelle
<b>Duntley, Seibert Q.</b>	Professor Emeritus	SIO	SIO
<b>Dynes, Robert C.</b>	Professor/Chancellor	Physics	Warren
<b>Ebbesen, Ebbe B.</b>	Professor	Psychology	Muir
<b>Edelman, Robert S.</b>	Professor	History	Revelle
<b>Edwards, Anthony</b>	Associate Professor	Literature	Marshall
<b>Elgamal, Ahmed-W. M.</b>	Professor	AMES	Roosevelt
<b>Elkan, Charles P.</b>	Associate Professor	CSE	Muir
<b>Elliott, Graham</b>	Assistant Professor	Economics	Muir
<b>Ellisman, Mark H.</b>	Professor	Neurosciences	SchMed
<b>Elman, Jeffrey L.</b>	Professor	Cognitive Science	Muir
<b>Emr, Scott D.</b>	Professor	Medicine	SchMed
<b>Engestrom, Yrjo H.</b>	Professor	Communication	Marshall
<b>Engle, Robert F.</b>	Professor	Economics	Marshall
<b>Enright, James T.</b>	Professor	SIO	SIO
<b>Enright, Thomas J.</b>	Professor	Mathematics	Marshall
<b>Epstein, Steven</b>	Assistant Professor	Sociology	Warren
<b>Erickson, Gregory F.</b>	Professor	Reproductive Medicine	SchMed
<b>Erie, Steven P.</b>	Professor	Political Science	Marshall
<b>Esener, Sadik C.</b>	Associate Professor	ECE	Warren
<b>Esherick, Joseph</b>	Professor	History	Roosevelt
<b>Esko, Jeffrey</b>	Professor	Medicine	SchMed
<b>Espiritu, Yen</b>	Professor	Ethnic Studies	Marshall
<b>Evans, Ivan T.</b>	Associate Professor	Sociology	Roosevelt
<b>Evans, John W.</b>	Professor Emeritus	Mathematics	Muir/SchMed
<b>Evans, Ronald J.</b>	Professor	Mathematics	Marshall
<b>Fagin, Steve</b>	Professor	Visual Arts	Marshall
<b>Fahey, Robert C.</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle
<b>Fainman, Yeshaiahu</b>	Professor	ECE	Warren
<b>Fanestil, Darrell D.</b>	Professor	Medicine	SchMed
<b>Fantino, Edmund J.</b>	Professor	Psychology	Muir
<b>Farber, Manny</b>	Professor Emeritus	Visual Arts	Muir
<b>Farquhar, Marilyn G.</b>	Professor	Pathology	SchMed
<b>Farrell, Peter</b>	Professor Emeritus	Music	Warren
<b>Fauconnier, Gilles R.</b>	Professor	Cognitive Science	Marshall
<b>Faulkner, D. John</b>	Professor	SIO	SIO/Revelle
<b>Feher, George</b>	Professor Emeritus	Physics	Revelle

<b>Feinberg, Richard</b>	Professor	IRPS	IRPS
<b>Fejer, Jules A.</b>	Professor Emeritus	ECE	Muir
<b>Felbeck, Horst</b>	Associate Professor	SIO	SIO
<b>Fenical, William H.</b>	Professor	SIO	SIO
<b>Fenner-Lopez, Claudio E.</b>	Lecturer (SOE) Emeritus	Visual Arts/Communication	Marshall
<b>Feramisco, James R.</b>	Professor	Medicine/Pharmacology	SchMed
<b>Ferneyhough, Brian J.P.</b>	Professor	Music	Marshall
<b>Ferrante, Jeanne</b>	Professor	CSE	Roosevelt
<b>Ferreira, Victor</b>	Assistant Professor	Psychology	Marshall
<b>Fierer, Joshua</b>	Professor-in-Residence	Medicine/Pathology	SchMed
<b>Fillmore, Jay P.</b>	Professor	Mathematics	Muir
<b>Finney, Nathaniel</b>	Assistant Professor	Chemistry and Biochemistry	Muir
<b>Firtel, Richard A.</b>	Professor	Biology	Revelle
<b>Fisk, Zachary</b>	Professor Emeritus	Physics	Muir
<b>FitzGerald, Carl H.</b>	Professor	Mathematics	Revelle
<b>Fitzgerald, William C.</b>	Professor	Literature	Warren
<b>Fitzsimmons, Patrick J.</b>	Professor	Mathematics	Marshall
<b>Flavin, Marjorie</b>	Associate Professor	Economics	Roosevelt
<b>Fonville, John W.</b>	Associate Professor	Music	Revelle
<b>Forbes, Douglass Jane</b>	Professor	Biology	Muir
<b>Fortes, P. A. George</b>	Associate Professor	Biology	Marshall
<b>Frangos, John A.</b>	Professor	Bioengineering	Warren
<b>Frank, Ross H.</b>	Assistant Professor	Ethnic Studies	Marshall
<b>Frankel, Theodore T.</b>	Professor Emeritus	Mathematics	Revelle
<b>Franks, Peter J. S.</b>	Associate Professor	SIO	SIO
<b>Fredkin, Donald R.</b>	Professor	Physics	Revelle
<b>Freedman, David Noel</b>	Professor	History	Revelle
<b>Freedman, Michael H.</b>	Professor	Mathematics	Revelle
<b>Frenk, Margit</b>	Professor Emeritus	Literature	Marshall
<b>Friedberg, Leora</b>	Assistant Professor	Economics	Revelle
<b>Friedkin, Morris E.</b>	Professor Emeritus	Biology	Revelle/SchMed
<b>Friedman, Richard E.</b>	Professor	Literature	Muir
<b>Friedmann, Theodore</b>	Professor	Pediatrics	SchMed
<b>Frieman, Edward A.</b>	Professor/VC Emeritus	SIO/Marine Sciences	SIO
<b>Fu, Xiang-Dong</b>	Associate Professor	Medicine	SchMed
<b>Fujitani, Takashi</b>	Associate Professor	History	Roosevelt
<b>Fuller, George M.</b>	Professor	Physics	Roosevelt
<b>Fung, Yuan-Cheng B.</b>	Professor Emeritus	Bioengineering	Revelle
<b>Fussell, Edwin S.</b>	Professor Emeritus	Literature	Muir
<b>Gaffney, Floyd</b>	Professor Emeritus	Theatre and Dance	Marshall
<b>Galambos, Robert</b>	Professor Emeritus	Neurosciences	SchMed
<b>Galbraith, John S.</b>	Professor Emeritus	History	Revelle
<b>Galton, Ian</b>	Associate Professor	ECE	Muir
<b>Garsia, Adriano M.</b>	Professor	Mathematics	Revelle/SchMed
<b>Geiduschek, E. Peter</b>	Professor Emeritus	Biology	SchMed/Roosevelt
<b>George, Rosemary M.</b>	Assistant Professor	Literature	Roosevelt
<b>Gerber, Elisabeth</b>	Assistant Professor	Political Science	Marshall
<b>Getoor, Ronald K.</b>	Professor	Mathematics	Revelle/SchMed
<b>Geyer, Mark A.</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Ghosh, Gourisankar</b>	Assistant Professor	Chemistry and Biochemistry	Marshall
<b>Ghosh, Partho</b>	Assistant Professor	Chemistry and Biochemistry	Roosevelt
<b>Gibson, Carl H.</b>	Professor	AMES/SIO	Revelle/SIO
<b>Gieskes, Joris M.T.M.</b>	Professor	SIO	SIO
<b>Gilbert, J. Freeman</b>	Professor	SIO	SIO
<b>Gill, Gordon N.</b>	Professor	Medicine	SchMed



<b>Gill, Philip E.</b>	Professor	Mathematics	Marshall
<b>Gillin, J. Christian</b>	Professor	Psychiatry	SchMed
<b>Gilpin, Michael E.</b>	Professor	Biology	Muir
<b>Glass, Christopher K.</b>	Associate Professor	Medicine	SchMed
<b>Glymour, Clark</b>	Professor	Philosophy	Roosevelt
<b>Goda, Yukiko</b>	Assistant Professor	Biology	Roosevelt
<b>Goddard, Joseph D.</b>	Professor	AMES	Marshall
<b>Goguen, Joseph</b>	Professor	CSE	Roosevelt
<b>Goldberg, Adele</b>	Associate Professor	Linguistics	Roosevelt
<b>Goldberg, Edward D.</b>	Professor Emeritus	SIO	SIO
<b>Goldberger, Marvin</b>	Professor/Dean	Physics/Natural Sciences	Warren
<b>Goldman, Harvey S.</b>	Professor	Sociology	Marshall
<b>Goldstein, Lawrence S.B.</b>	Professor	Pharmacology	SchMed
<b>Goodblatt, David</b>	Professor	History	Muir
<b>Goodkind, John M.</b>	Professor	Physics	Revelle
<b>Goodman, Murray</b>	Professor	Chemistry and Biochemistry	Revelle
<b>Gorin, Jean-Pierre</b>	Professor	Visual Arts	Marshall
<b>Gorman, Michael</b>	Assistant Professor	Psychology	Roosevelt
<b>Gough, David A.</b>	Professor	Bioengineering	Marshall
<b>Gould, Robert J.</b>	Professor Emeritus	Physics	Revelle
<b>Goulian, Mehran</b>	Professor Emeritus	Medicine	SchMed
<b>Gourevitch, Peter A.</b>	Professor	IRPS/Political Science	IRPS/Roosevelt
<b>Graham, Fan Chung</b>	Professor	Math/CSE	Muir
<b>Graham, Ronald</b>	Professor	CSE	Roosevelt
<b>Granholt, Eric L.</b>	Assistant Professor-in-Residence	Psychiatry	SchMed
<b>Grant, Igor</b>	Professor	Psychiatry	SchMed
<b>Green, Melvin H.</b>	Professor	Biology	Revelle
<b>Greenstein, Jack M.</b>	Associate Professor	Visual Arts	Muir
<b>Griest, Kim</b>	Professor	Physics	Roosevelt
<b>Grinstein, Benjamin</b>	Professor	Physics	Muir
<b>Griswold, William G.</b>	Associate Professor	CSE	Warren
<b>Grobstein, Clifford</b>	Professor Emeritus	Biology	Revelle/SchMed
<b>Groves, Philip M.</b>	Professor	Psychiatry/Neurosciences	SchMed
<b>Groves, Theodore</b>	Professor/Associate Dean	Economics/Social Sciences	Revelle
<b>Guasch, J. Luis</b>	Associate Professor	Economics	Roosevelt
<b>Guest, Clark C.</b>	Associate Professor	ECE	Warren
<b>Gusfield, Joseph R.</b>	Professor Emeritus	Sociology	Muir
<b>Gutierrez, David G.</b>	Associate Professor	History	Marshall
<b>Gutierrez, Ramón A.</b>	Professor/Associate Chancellor	Ethnic Studies/History	Marshall
<b>Guza, Robert T.</b>	Professor	SIO	SIO
<b>Haas, Richard H.</b>	Professor	Neurosci/Pediatrics	SchMed
<b>Haff, Leonard R.</b>	Professor	Mathematics	Marshall
<b>Haggard, Stephan M.</b>	Professor	IRPS	IRPS
<b>Hahn, Steven</b>	Professor	History	Muir
<b>Haiman, Mark D.</b>	Professor	Mathematics	Roosevelt
<b>Halberstam, Judith M.</b>	Associate Professor	Literature	Revelle
<b>Halkin, Hubert</b>	Professor Emeritus	Mathematics	Revelle
<b>Halleck, DeeDee</b>	Professor	Communication	Warren
<b>Hallin, Daniel C.</b>	Professor	Communication	Marshall
<b>Hamburger, Robert N.</b>	Professor Emeritus	Pediatrics	Revelle/SchMed
<b>Hamilton, James D.</b>	Professor	Economics	Roosevelt
<b>Hamilton, Richard S.</b>	Professor	Mathematics	Warren
<b>Hammel, Harold T.</b>	Professor Emeritus	SIO	SIO/SchMed
<b>Hampton, Randolph</b>	Assistant Professor	Biology	Warren
<b>Hanson, Marta</b>	Assistant Professor	History	Muir

<b>Hardimon, Michael</b>	Associate Professor	Philosophy	Marshall
<b>Harkins, Edwin L., Jr.</b>	Professor	Music	Muir
<b>Harper, Elvin</b>	Professor Emeritus	Chemistry and Biochemistry	Marshall
<b>Harris, Thomas A.</b>	Assistant Professor	Visual Arts	Muir
<b>Harris, William A.</b>	Professor	Biology	Marshall
<b>Harrison, Helen M.</b>	Professor Emeritus	Visual Arts	Roosevelt
<b>Harrison, Newton A.</b>	Professor Emeritus	Visual Arts	Roosevelt
<b>Hartouni, Valerie A.</b>	Associate Professor	Communication	Muir
<b>Harvey, Daniel F.</b>	Associate Professor	Chemistry and Biochemistry	Marshall
<b>Haubrich, Richard A.</b>	Professor Emeritus	SIO	SchMed
<b>Hauger, Richard L.</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Havis, Allan</b>	Associate Professor	Theatre and Dance	Muir
<b>Hawkins, James W.</b>	Professor	SIO	Revelle/SIO
<b>Haxo, Francis T.</b>	Professor Emeritus	SIO	SIO
<b>Hayashi, Masaki</b>	Professor Emeritus	Biology	Revelle
<b>Haydu, Jeffrey M.</b>	Associate Professor	Sociology	Roosevelt
<b>Haygood, Margo G.</b>	Associate Professor	SIO	SIO
<b>He, Zheng-Xu</b>	Associate Professor	Mathematics	Marshall
<b>Heaton, Robert K.</b>	Professor	Psychiatry	SchMed
<b>Hedrick, Stephen M.</b>	Professor	Biology	Marshall
<b>Hegemier, Gilbert A.</b>	Professor	AMES	Revelle
<b>Helinski, Donald R.</b>	Professor Emeritus	Biology	Marshall
<b>Heller, Walter P.</b>	Professor	Economics	Revelle
<b>Hellman, Frances</b>	Associate Professor	Physics	Marshall
<b>Helstrom, Carl W.</b>	Professor Emeritus	ECE	Muir
<b>Helton, J. William</b>	Professor	Mathematics	Marshall
<b>Henaff, Marcel</b>	Professor	Literature	Warren
<b>Hendershott, Myrl C.</b>	Professor	SIO	SIO
<b>Hendrickson, David N.</b>	Professor	Chemistry and Biochemistry	Muir
<b>Herz, Richard K.</b>	Associate Professor	AMES	Warren
<b>Hessler, Robert R.</b>	Professor	SIO	SIO
<b>Hildebrand, John A.</b>	Professor	SIO	SIO
<b>Hillyard, Steven A.</b>	Professor	Neurosciences	SchMed
<b>Hilton, David R.</b>	Assistant Professor	SIO	SIO
<b>Hirsch, Harry N.</b>	Professor	Political Science	Warren
<b>Hirsch, Jorge E.</b>	Professor	Physics	Revelle
<b>Hiscox, Michael</b>	Assistant Professor	Political Science	Revelle
<b>Ho, Steffan</b>	Assistant Professor	Pathology	SchMed
<b>Hock, Louis J.</b>	Professor	Visual Arts	Marshall
<b>Hodgkiss, William S., Jr.</b>	Professor	SIO	SIO
<b>Hofmann, Alan F.</b>	Professor Emeritus	Medicine	SchMed
<b>Hoger, Anne</b>	Associate Professor	AMES	Warren
<b>Holl, Augustin</b>	Professor	Anthropology	Muir
<b>Hollan, James</b>	Professor	Cognitive Science	Revelle
<b>Holland, John J.</b>	Professor Emeritus	Biology	Warren
<b>Holland, Nicholas D.</b>	Professor	SIO	SIO/Revelle
<b>Holloway, Jonathan S.</b>	Assistant Professor	Ethnic Studies	Marshall
<b>Holm, Connie</b>	Associate Professor-in-Residence	Pharmacology	SchMed
<b>Holston, James</b>	Associate Professor	Anthropology	Warren
<b>Holt, Christine E.</b>	Associate Professor	Biology	Marshall
<b>Hook, Vivian</b>	Professor-in-Residence	Medicine	SchMed
<b>Horwitz, Robert B.</b>	Associate Professor	Communication	Marshall
<b>Hoshi, Takeo</b>	Associate Professor	IRPS	IRPS/Roosevelt
<b>Hoston, Germaine A.</b>	Professor	Political Science	Revelle
<b>Houston, Alan C.</b>	Associate Professor	Political Science	Roosevelt
<b>Howden, William E.</b>	Professor	CSE	Muir

<b>Howe, Fanny Q.</b>	Professor	Literature	Warren
<b>Howell, Stephen B.</b>	Professor	Medicine	SchMed
<b>Hu, Ping C.</b>	Lecturer (SOE)	History	Muir
<b>Hu, Te C.</b>	Professor	CSE	Warren
<b>Hubbard, Kathleen A.</b>	Assistant Professor	Linguistics	Warren
<b>Huerta, Jorge A.</b>	Professor	Theatre and Dance	Marshall
<b>Hughes, H. Stuart</b>	Professor Emeritus	History	Revelle
<b>Hughes, Judith M.</b>	Professor	History	Roosevelt
<b>Humphries, Tom L.</b>	Lecturer (SOE)	TEP/Communication	Marshall
<b>Hunefeldt, Christine F.</b>	Associate Professor	History	Marshall
<b>Hutchins, Edwin L., Jr.</b>	Professor	Cognitive Science	Revelle
<b>Hwa, Terence T.</b>	Associate Professor	Physics	Revelle
<b>Ierley, Glenn R.</b>	Professor	SIO	SIO
<b>Impagliazzo, Russell</b>	Associate Professor	CSE	Marshall
<b>Inman, Douglas L.</b>	Professor Emeritus	SIO	SIO
<b>Insel, Paul A.</b>	Professor	Pharmacology/Medicine	SchMed
<b>Intaglietta, Marcos</b>	Professor	Bioengineering	Revelle/SchMed
<b>Intriligator, Kenneth</b>	Associate Professor	Physics	Muir
<b>Iragui-Madoz, Vicente J.</b>	Prof of Clin Neurosciences	Neurosciences	SchMed
<b>Irons, Peter H.</b>	Professor	Political Science	Marshall
<b>Irwin, Michael</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Jackson, Gabriel</b>	Professor Emeritus	History	Revelle
<b>Jackson, Jeremy</b>	Professor	SIO	SIO
<b>Jacobson, Gary C.</b>	Professor	Political Science	Marshall
<b>Jain, Ramesh C.</b>	Professor	ECE/CSE	Roosevelt
<b>James, Luther</b>	Associate Professor Emeritus	Theatre and Dance	Muir
<b>Jameson, Kimberly</b>	Assistant Professor	Psychology	Roosevelt
<b>Jed, Stephanie H.</b>	Associate Professor	Literature	Muir
<b>Jenik, Adriene</b>	Assistant Professor	Visual Arts	Roosevelt
<b>Jenkins, Elizabeth</b>	Associate Professor	Physics	Muir
<b>Jennings, Patricia</b>	Assistant Professor	Chemistry and Biochemistry	Roosevelt
<b>Jernigan, Terry L.</b>	Professor-in-Residence	Psychiatry/Radiology	SchMed
<b>Jeste, Dilip V.</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Johnson, Chalmers</b>	Professor Emeritus	IRPS	IRPS/Roosevelt
<b>Johnson, Randell</b>	Assistant Professor	Biology	Marshall
<b>Jolley, S. Nicholas</b>	Professor	Philosophy	Revelle
<b>Jones, Barbara</b>	Professor	Physics	Muir
<b>Jones, Walton</b>	Professor	Theatre and Dance	Muir
<b>Jordan, David K.</b>	Professor/Provost	Anthropology/Warren	Warren
<b>Judd, Lewis L.</b>	Professor	Psychiatry	SchMed
<b>Jules-Rosette, Bennetta W.</b>	Professor	Sociology	Muir
<b>Kadonaga, James T.</b>	Professor	Biology	Revelle
<b>Kagnoff, Martin F.</b>	Professor	Medicine	SchMed
<b>Kahler, Miles E.</b>	Professor	IRPS	IRPS
<b>Kahr, Madlyn M.</b>	Professor Emeritus	Visual Arts	Warren
<b>Kamen, Martin D.</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle
<b>Kamps, Mark P.</b>	Associate Professor	Pathology	SchMed
<b>Kane, Alex</b>	Professor	IRPS	IRPS/Roosevelt
<b>Kaplan, Robert M.</b>	Professor	Family and Preventive Medicine	SchMed
<b>Kaprow, Allan</b>	Professor Emeritus	Visual Arts	Warren
<b>Karbhari, Vistasp M.</b>	Associate Professor	AMES	Muir
<b>Karin, Michael</b>	Professor	Pharmacology	SchMed
<b>Karin, Sidney</b>	Professor-in-Residence	CSE	Warren

<b>Karis, Aleck</b>	Professor	Music	Warren
<b>Karpishin, Timothy</b>	Assistant Professor	Chemistry and Biochemistry	Warren
<b>Karten, Harvey J.</b>	Professor	Neurosciences/Psychiatry	SchMed
<b>Kastner, Miriam</b>	Professor	SIO	SIO/Revelle
<b>Katzman, Robert</b>	Professor Emeritus	Neurosciences	SchMed
<b>Kavanagh, Karen L.</b>	Professor	ECE	Roosevelt
<b>Kayali, Hasan</b>	Associate Professor	History	Roosevelt
<b>Kearns, David R.</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle
<b>Keeling, Charles D.</b>	Professor	SIO	SIO
<b>Keeling, Ralph F.</b>	Associate Professor	SIO	SIO
<b>Kelly, Carolyn J.</b>	Professor-in-Residence	Medicine	SchMed
<b>Kelner, Michael J.</b>	Professor	Pathology	SchMed
<b>Kelsoe, John R.</b>	Associate Professor	Psychiatry	SchMed
<b>Kennel, Charles F.</b>	Professor/VC/Dean	SIO	SIO
<b>Kernell, Samuel H.</b>	Professor	Political Science	Warren
<b>Keyssar, Helene</b>	Professor	Communication	Marshall
<b>Kim, Euysung</b>	Assistant Professor	IRPS	IRPS
<b>Kipps, Thomas J.</b>	Professor	Medicine	SchMed
<b>Kirkland, Theo N.</b>	Professor-in-Residence	Pathology/Medicine	SchMed
<b>Kirkpatrick, Susan</b>	Professor/Associate Chancellor	Literature	Muir
<b>Kirsch, David J.</b>	Associate Professor	Cognitive Science	Roosevelt
<b>Kitcher, Patricia W.</b>	Professor	Philosophy	Muir
<b>Kitcher, Philip S.</b>	Professor	Philosophy	Revelle
<b>Klatch, Rebecca E.</b>	Associate Professor	Sociology	Muir
<b>Klein, Rachel</b>	Associate Professor	History	Warren
<b>Kleinfeld, David</b>	Associate Professor	Physics	Warren
<b>Klima, Edward S.</b>	Professor Emeritus	Linguistics	Muir
<b>Klimenko, Mikhail M.</b>	Assistant Professor	IRPS	IRPS
<b>Kluender, Robert E.</b>	Associate Professor	Linguistics	Warren
<b>Knowlton, Nancy</b>	Professor	SIO	SIO
<b>Kohn, Joshua R.</b>	Associate Professor	Biology	Warren
<b>Kokotovic, Milos</b>	Assistant Professor	Communication	Muir
<b>Kolodner, Richard</b>	Professor	Medicine	SchMed
<b>Komives, Elizabeth A.</b>	Associate Professor	Chemistry and Biochemistry	Roosevelt/SchMed
<b>Konecni, Vladimir J.</b>	Professor	Psychology	Muir
<b>Kontje, Todd C.</b>	Associate Professor	Literature	Marshall
<b>Koo, Edward</b>	Associate Professor	Neurosciences	SchMed
<b>Kooyman, Gerald L.</b>	Professor-in-Residence Emeritus	SIO	SIO
<b>Kosmatka, John B.</b>	Associate Professor	AMES	Warren
<b>Krause, Lawrence B.</b>	Professor	IRPS	IRPS/Roosevelt
<b>Krauss, Ellis S.</b>	Professor	IRPS	IRPS
<b>Kraut, Joseph</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle
<b>Kreutz-Delgado, Kenneth</b>	Associate Professor	ECE	Warren
<b>Kripke, Daniel F.</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Kristan, William B., Jr.</b>	Professor	Biology	Marshall
<b>Kroll, Norman M.</b>	Professor Emeritus	Physics	Revelle
<b>Kronick, Richard G.</b>	Associate Professor	Family and Preventive Medicine	SchMed
<b>Ku, Walter H.</b>	Professor	ECE	Revelle
<b>Kubiak, Clifford P.</b>	Professor	Chemistry and Biochemistry	Warren
<b>Kuczenski, Ronald T.</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Kulik, James A.</b>	Professor	Psychology	Warren
<b>Kummel, Andrew C.</b>	Professor	Chemistry and Biochemistry	Muir
<b>Kuperman, William A.</b>	Professor	SIO	SIO
<b>Kuroda, Sige-Yuki</b>	Professor Emeritus	Linguistics	Muir
<b>Kutas, Marta</b>	Professor	Cognitive Science	Muir
<b>Kuti, Julius G.</b>	Professor	Physics	Marshall

<b>Kyte, Jack E.</b>	Professor	Chemistry and Biochemistry	Warren
<b>Lake, David A.</b>	Professor	Political Science	Marshall
<b>Lakoff, Sanford A.</b>	Professor Emeritus	Political Science	Warren
<b>Lal, Devendra</b>	Professor	SIO	SIO
<b>Lampland, Martha</b>	Associate Professor	Sociology	Roosevelt
<b>Lane, Thomas A.</b>	Professor	Pathology	SchMed
<b>Langacker, Ronald W.</b>	Professor	Linguistics	Revelle
<b>Langdon, Margaret H.</b>	Professor Emeritus	Linguistics	Warren
<b>Larsen, Susan</b>	Assistant Professor	Literature	Roosevelt
<b>Larson, Lawrence</b>	Professor	ECE	Roosevelt
<b>Larson, Philip C.</b>	Associate Professor	Music	Roosevelt
<b>Lasheras, Juan C.</b>	Professor	AMES	Marshall
<b>Lau, Silvanus S.</b>	Professor	ECE	Muir
<b>Lawder, Standish D.</b>	Associate Professor Emeritus	Visual Arts	Warren
<b>Ledden, Patrick J.</b>	Sr. Lecturer (SOE)/Provost	Mathematics/Muir	Muir
<b>Lee, Edward N.</b>	Professor Emeritus	Philosophy	Revelle
<b>Lee, Sing H.</b>	Professor	ECE	Muir
<b>Leffert, Hyam L.</b>	Professor	Pharmacology	SchMed
<b>Lehmann, Bruce N.</b>	Professor	IRPS	IRPS
<b>Lepore, Jill</b>	Assistant Professor	History	Warren
<b>Levin, Lisa</b>	Professor	SIO	SIO
<b>Levin, Paula</b>	Lecturer (SOE)	Teacher Education Program	Marshall
<b>Levine, Fred</b>	Associate Professor-in-Residence	Pediatrics	SchMed
<b>Levine, Herbert</b>	Professor	Physics	Marshall
<b>Levy, Robert I.</b>	Professor Emeritus	Anthropology	Muir
<b>Levy, Thomas E.</b>	Professor	Anthropology	Revelle
<b>Lewak, George J.</b>	Associate Professor Emeritus	ECE	Muir
<b>Lewin, Ralph A.</b>	Professor Emeritus	SIO	SIO
<b>Lewis, George</b>	Professor	Music	Marshall
<b>Libby, Paul A.</b>	Professor Emeritus	AMES	Revelle
<b>Lieber, Richard L.</b>	Professor	Orthopaedics	SchMed
<b>Liebermann, Leonard N.</b>	Professor Emeritus	Physics	Revelle
<b>Lijphart, Arend</b>	Professor Emeritus	Political Science	Revelle
<b>Lin, Bill</b>	Assistant Professor	ECE	Roosevelt
<b>Lin, James P.</b>	Professor	Mathematics	Muir
<b>Lin, Shao-Chi</b>	Professor Emeritus	AMES	Revelle
<b>Lin, Ting-Ting Y.</b>	Associate Professor	ECE	Muir
<b>Lindblad, Hans</b>	Associate Professor	Mathematics	Roosevelt
<b>Linden, Paul</b>	Professor	AMES	Muir
<b>Lindenberg, Katja</b>	Professor	Chemistry and Biochemistry	Marshall
<b>Lindsley, Dan L.</b>	Professor Emeritus	Biology	Revelle/SchMed
<b>Lipsitz, George</b>	Professor	Ethnic Studies	Marshall
<b>Liu, John H. K.</b>	Associate Professor-in-Residence	Ophthalmology	SchMed
<b>Livingston, Robert B.</b>	Professor Emeritus	Neurosciences	SchMed
<b>Lonidier, Fred S.</b>	Professor	Visual Arts	Revelle
<b>Lonsdale, Peter F.</b>	Professor	SIO	SIO
<b>Loomis, William F., Jr.</b>	Professor	Biology	Revelle
<b>Lovberg, Ralph H.</b>	Professor Emeritus	Physics	Revelle
<b>Lowe, Lisa M.</b>	Professor	Literature	Muir
<b>Luco, J. Enrique</b>	Professor	AMES	Marshall
<b>Luft, David S.</b>	Professor	History	Revelle
<b>Lugannani, Robert</b>	Professor	ECE	Warren
<b>Luhrmann, Tanya M.</b>	Associate Professor	Anthropology	Muir
<b>Lumpkin, Oscar J.</b>	Associate Professor	Physics	Revelle

<b>Luo, Huey-Lin</b>	Professor	ECE	Muir
<b>Lupia, Arthur W.</b>	Associate Professor	Political Science	Marshall
<b>Lyon, James K.</b>	Professor Emeritus	Literature	Roosevelt
<b>Lytle, Cecil W.</b>	Professor/Provost	Music/Marshall	Marshall
<b>MacConnel, Kim R.</b>	Professor	Visual Arts	Marshall
<b>MacDonald, Gordon</b>	Professor	IRPS	IRPS
<b>Macdougall, J. Douglas</b>	Professor	SIO	Revelle/SIO
<b>MacFarlane, David</b>	Professor	Physics	Marshall
<b>Machina, Mark J.</b>	Professor	Economics	Revelle
<b>MacIntyre, Andrew</b>	Associate Professor	IRPS	IRPS
<b>MacLeod, Carol L.</b>	Professor-in-Residence	Medicine	SchMed
<b>MacLeod, Donald I.A.</b>	Professor	Psychology	Muir
<b>Madsen, Richard P.</b>	Professor	Sociology	Roosevelt
<b>Magagna, Victor V.</b>	Associate Professor	Political Science	Muir
<b>Magde, Douglas</b>	Professor	Chemistry and Biochemistry	Warren
<b>Malhotra, Vivek</b>	Associate Professor	Biology	Revelle
<b>Manaster, Alfred B.</b>	Professor	Mathematics	Revelle
<b>Mandler, George</b>	Professor Emeritus	Psychology	Muir
<b>Mandler, Jean M.</b>	Professor	Cognitive Science	Revelle
<b>Mangolte, Babette M.</b>	Professor	Visual Arts	Marshall
<b>Manohar, Aneesh V.</b>	Professor	Physics	Marshall
<b>Manovich, Lev</b>	Assistant Professor	Visual Arts	Revelle
<b>Maple, M. Brian</b>	Professor	Physics	Revelle
<b>Mares, David R.</b>	Professor	Political Science	Muir
<b>Marino, John A.</b>	Associate Professor	History	Revelle
<b>Mariscal, George L.</b>	Associate Professor	Literature	Warren
<b>Markenscoff, Xanthippe</b>	Professor	AMES	Revelle
<b>Marquardt, Diana L.</b>	Associate Professor-in-Residence	Medicine	SchMed
<b>Marshall, Margaret C.</b>	Senior Lecturer (SOE)	Theatre and Dance	Marshall
<b>Marth, Jamey D.</b>	Associate Professor	Medicine	SchMed
<b>Marti, Kurt</b>	Professor	Chemistry and Biochemistry	Revelle
<b>Martin, Paul T.</b>	Assistant Professor	Neurosciences	SchMed
<b>Martin, Wayne M.</b>	Assistant Professor	Philosophy	Muir
<b>Marzullo, Keith</b>	Associate Professor	CSE	Marshall
<b>Masek, George E.</b>	Professor Emeritus	Physics	Revelle
<b>Masliah, Eliezer</b>	Professor	Neurosciences/Pathology	SchMed
<b>Masouredis, Serafeim P.</b>	Professor Emeritus	Pathology	SchMed
<b>Masry, Elias</b>	Professor	ECE	Muir
<b>Masters, T. Guy</b>	Professor	SIO	SIO
<b>Mathieu-Costello, Odile</b>	Professor-in-Residence	Medicine	SchMed
<b>Mayford, Mark</b>	Assistant Professor	Neurosciences	SchMed
<b>McCammon, James Andrew</b>	Professor	Chemistry and Biochemistry/ Pharmacology	Revelle/SchMed
<b>McCubbins, Mathew D.</b>	Professor	Political Science	Marshall
<b>McCulloch, Andrew D.</b>	Associate Professor	Bioengineering	Muir
<b>McCurry, Stephanie</b>	Associate Professor	History	Warren
<b>McDaniel, Timothy L.</b>	Professor	Sociology	Roosevelt
<b>McDonald, Marianne</b>	Professor	Theatre and Dance	Revelle
<b>McElroy, William D.</b>	Professor Emeritus	Biology	Revelle
<b>McGinnis, William J.</b>	Professor	Biology	Marshall
<b>McGowan, John A.</b>	Professor Emeritus	SIO	SIO
<b>McGuire, Shirley</b>	Assistant Professor	Psychology	Roosevelt
<b>McIlwain, Carl E.</b>	Professor Emeritus	Physics	Revelle
<b>McKenzie, Craig R.M.</b>	Assistant Professor	Psychology	Revelle
<b>McKittrick, Joanna M.</b>	Associate Professor	AMES	Warren



<b>McMillan, R. John</b>	Professor	IRPS	IRPS/Roosevelt
<b>McMorris, Trevor C.</b>	Professor	Chemistry and Biochemistry	Marshall
<b>Meeker, Michael E.</b>	Professor	Anthropology	Revelle
<b>Mehan, Hugh B., Jr.</b>	Professor	Sociology	Marshall
<b>Mellon, Pamela L.</b>	Professor	Repro Med/Neurosciences	SchMed
<b>Melville, W. Kendall</b>	Professor	SIO	SIO
<b>Mendis, D. Asoka</b>	Professor Emeritus	ECE	Muir
<b>Meranze, Michael</b>	Associate Professor	History	Marshall
<b>Metzger, Thomas A.</b>	Professor Emeritus	History	Muir
<b>Meyer, Ursula</b>	Lecturer (SOE)	Theatre and Dance	Warren
<b>Meyers, Marc A.</b>	Professor	AMES	Revelle
<b>Middleman, Stanley</b>	Professor	AMES	Warren
<b>Miles, John W.</b>	Professor Emeritus	AMES	Warren/SIO
<b>Miller, Arnold L.</b>	Professor	Neurosciences	SchMed
<b>Miller, David R.</b>	Professor/Associate Dean	AMES/Engineering	Revelle
<b>Miller, Stanley L.</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle
<b>Mills, Stanley E.</b>	Professor Emeritus	Biology	Muir
<b>Milstein, Laurence B.</b>	Professor	ECE	Warren
<b>Minster, Jean-Bernard</b>	Professor	SIO	SIO
<b>Mitchell, Allan</b>	Professor Emeritus	History	Roosevelt
<b>Mitchell, Sandra D.</b>	Associate Professor	Philosophy	Revelle
<b>Miyai, Katsumi</b>	Professor	Pathology/Medicine	SchMed
<b>Miyoshi, Masao</b>	Professor	Literature	Marshall
<b>Mizisin, Andrew</b>	Associate Professor	Pathology	SchMed
<b>Moerner, William</b>	Professor	Chemistry and Biochemistry	Revelle
<b>Montal, S. Mauricio</b>	Professor	Biology	Revelle
<b>Monteón, Michael P.</b>	Professor	History	Muir
<b>Montrose, Louis A.</b>	Professor	Literature	Revelle
<b>Moore, F. Richard</b>	Professor	Music	Revelle
<b>Moore, James J.</b>	Associate Professor	Anthropology	Warren
<b>Moore, John C.</b>	Assistant Professor	Linguistics	Muir
<b>Mosshammer, Alden A.</b>	Professor	History	Revelle
<b>Movellan, Javier R.</b>	Assistant Professor	Cognitive Science	Warren
<b>Mukerji, Chandra</b>	Professor	Sociology/Communication	Marshall
<b>Mullin, Michael M.</b>	Professor	SIO	SIO
<b>Munk, Walter H.</b>	Professor Emeritus	SIO	SIO/Warren
<b>Murakami, Hidenori</b>	Professor	AMES	Revelle
<b>Murashige, Michael</b>	Assistant Professor	Literature	Muir
<b>Murre, Cornelis</b>	Professor	Biology	Revelle
<b>Myers, Robert R.</b>	Professor-in-Residence	Anesthesiology/Pathology	SchMed
<b>Nachbar, William</b>	Professor Emeritus	AMES	Revelle
<b>Najmabadi, Farrokh</b>	Associate Professor	ECE	Roosevelt
<b>Naughton, Barry</b>	Professor	IRPS	IRPS
<b>Nee, Thomas B.</b>	Professor Emeritus	Music	Warren
<b>Négyesy, János</b>	Professor	Music	Muir
<b>Nemat-Nasser, Siavouche</b>	Professor	AMES	Revelle
<b>Nesbitt, Muriel N.</b>	Associate Professor	Biology	SchMed/Warren
<b>Nesterenko, Vitali</b>	Associate Professor-in-Residence	AMES	Roosevelt
<b>Neuhouser, Frederick</b>	Associate Professor	Philosophy	Roosevelt
<b>Newman, William A.</b>	Professor	SIO	SIO
<b>Newmark, Leonard D.</b>	Professor Emeritus	Linguistics	Revelle
<b>Newport, John W.</b>	Professor	Biology	Muir
<b>Newsome, Elizabeth</b>	Assistant Professor	Visual Arts	Revelle
<b>Newton, Alexandra</b>	Associate Professor	Pharmacology	SchMed
<b>Nguyen-Huu, Xuong</b>	Professor	Physics/Biology/Chem and Biochemistry	Revelle/SchMed

<b>Nicolaides, Becky M.</b>	Assistant Professor	History	Marshall
<b>Nicolaou, Kyriacos C.</b>	Professor	Chemistry and Biochemistry	Muir
<b>Nierenberg, William A.</b>	Prof/V Chan/Dir Emeritus	SIO/Mar Sci/SIO	SIO
<b>Niiler, Pearn P.</b>	Professor	SIO	SIO
<b>Nodelman, Sheldon A.</b>	Professor	Visual Arts	Warren
<b>Nomura, Keiko</b>	Assistant Professor	AMES	Marshall
<b>Norman, Donald A.</b>	Professor Emeritus	Cognitive Science	Revelle
<b>Northcutt, R. Glenn</b>	Professor	Neurosciences	SchMed/SIO
<b>Oates, Charles</b>	Lecturer (SOE)	Theatre and Dance	Revelle
<b>O'Brien, John S.</b>	Professor	Neurosciences	SchMed
<b>O'Brien, William A.</b>	Associate Professor	Literature	Muir
<b>O'Connor, Daniel T.</b>	Professor-in-Residence	Medicine	SchMed
<b>O'Connor, Joseph M.</b>	Associate Professor	Chemistry and Biochemistry	Marshall
<b>Oesterreicher, Hans K.</b>	Professor	Chemistry and Biochemistry	Muir
<b>Ogdon, Wilbur L.</b>	Professor Emeritus	Music	Muir
<b>Ohman, Mark D.</b>	Associate Professor	SIO	SIO
<b>Okamura, Melvin Y.</b>	Professor	Physics	Revelle
<b>Okikiolu, Kate</b>	Associate Professor	Mathematics	Revelle
<b>Olafson, Frederick A.</b>	Professor Emeritus	Philosophy	Revelle
<b>Olefsky, Jerrold M.</b>	Professor	Medicine	SchMed
<b>Olfe, Daniel B.</b>	Professor Emeritus	AMES	Revelle
<b>O'Neil, Thomas M.</b>	Professor	Physics	Warren
<b>Onuchic, José N.</b>	Professor	Physics	Muir
<b>O'Quigley, John</b>	Professor	Mathematics	Muir
<b>Orailoglu, Alex</b>	Associate Professor	CSE	Revelle
<b>Orcutt, John A.</b>	Professor	SIO	SIO
<b>Orlitsky, Alon</b>	Professor	ECE	Marshall
<b>Orloff, Marshall J.</b>	Professor	Surgery	SchMed/Muir
<b>Oxman, Michael N.</b>	Professor	Medicine/Pathology	SchMed
<b>Paar, Hans P.</b>	Professor	Physics	Roosevelt
<b>Padden, Carol A.</b>	Associate Professor	Communication	Marshall
<b>Palade, George</b>	Professor-in-Residence/Dean	Medicine/Sci. Affairs	SchMed
<b>Palenik, Brian</b>	Assistant Professor	SIO	SIO
<b>Palsson, Bernhard O.</b>	Professor-in-Residence	Bioengineering	Warren
<b>Papakonstantinou, Yannis</b>	Assistant Professor	CSE	Roosevelt
<b>Papayouanou, Paul A.</b>	Assistant Professor	Political Science	Revelle
<b>Parish, Steven</b>	Assistant Professor	Anthropology	Roosevelt
<b>Parker, Robert L.</b>	Professor	SIO	SIO
<b>Parra, Max</b>	Assistant Professor	Literature	Marshall
<b>Parrish, Michael E.</b>	Professor	History	Muir
<b>Parry, Chris N.</b>	Professor	Theatre and Dance	Roosevelt
<b>Pashler, Harold E.</b>	Professor	Psychology	Muir
<b>Pasler, Jann C.</b>	Professor	Music	Roosevelt
<b>Pasquale, Joseph</b>	Professor	CSE	Marshall
<b>Patterson, Patricia A.</b>	Professor	Visual Arts	Muir
<b>Paturi, Ramamohan</b>	Associate Professor	CSE	Warren
<b>Pearce, Roy Harvey</b>	Professor Emeritus	Literature	Roosevelt
<b>Penn, Nolan E.</b>	Professor Emeritus	Psychiatry	SchMed
<b>Penner, Stanford S.</b>	Professor Emeritus	AMES	Revelle
<b>Perlmutter, David M.</b>	Professor	Linguistics	Revelle
<b>Perrin, Charles L.</b>	Professor	Chemistry and Biochemistry	Revelle
<b>Peterson, Laurence E.</b>	Professor Emeritus	Physics	Revelle
<b>Phillips, David P.</b>	Professor	Sociology	Revelle

<b>Phipps-Morgan, W. Jason</b>	Professor	SIO	SIO
<b>Piccioni, Oreste</b>	Professor Emeritus	Physics	Revelle
<b>Pickowicz, Paul G.</b>	Professor	History	Muir
<b>Pilz, Renate B.</b>	Associate Professor-in-Residence	Medicine	SchMed
<b>Piñeda, Jaime A.</b>	Associate Professor	Cognitive Science	Roosevelt
<b>Pinkel, Robert</b>	Professor	SIO	SIO
<b>Piñon, Ramón, Jr.</b>	Associate Professor Emeritus	Biology	Marshall
<b>Plantamura, Carol</b>	Professor	Music	Revelle
<b>Pogliano, Kit</b>	Assistant Professor	Biology	Roosevelt
<b>Polinsky, Maria</b>	Associate Professor	Linguistics	Revelle
<b>Politis, Dimitris</b>	Associate Professor	Mathematics	Roosevelt
<b>Polyzos, George C.</b>	Associate Professor	CSE	Roosevelt
<b>Pomeroy, Earl</b>	Professor Emeritus	History	Warren
<b>Poo, Mu-ming</b>	Professor	Biology	Muir
<b>Poole, Fitz John P.</b>	Associate Professor	Anthropology	Muir
<b>Popkin, Samuel L.</b>	Professor	Political Science	Marshall
<b>Posakony, James W.</b>	Professor	Biology	Marshall
<b>Powell, Frank L., Jr.</b>	Professor	Medicine	SchMed
<b>Powell, Henry C.</b>	Professor	Pathology	SchMed
<b>Pozrikidis, Constantine</b>	Professor	AMES	Muir
<b>Price, Paul A.</b>	Professor	Biology	Muir
<b>Price, Trevor D.</b>	Associate Professor	Biology	Muir
<b>Priestley, M. J. Nigel</b>	Professor	AMES	Warren
<b>Printz, Morton P.</b>	Professor	Pharmacology	SchMed
<b>Propp, William H.</b>	Associate Professor	History	Muir
<b>Puckette, Miller S.</b>	Professor	Music	Warren
<b>Quest, Kevin B.</b>	Professor	ECE	Warren
<b>Quirrenbach, Andreas</b>	Associate Professor	Physics	Roosevelt
<b>Rabin, Jeffrey M.</b>	Associate Professor	Mathematics	Revelle
<b>Radcliff, Pamela B.</b>	Associate Professor	History	Roosevelt
<b>Rafael, Vicente L.</b>	Associate Professor	Communication	Marshall
<b>Ramachandran, Vilayanur S.</b>	Professor	Psychology	Marshall
<b>Ramanathan, Ramachandra</b>	Professor	Economics	Revelle
<b>Ramanathan, Veerabhadran</b>	Professor	SIO	SIO
<b>Ramey, Garey</b>	Associate Professor	Economics	Warren
<b>Ramey, Valerie A.</b>	Professor	Economics	Marshall
<b>Rand, Sinai</b>	Associate Professor Emeritus	AMES	Revelle
<b>Randel, Fred V.</b>	Associate Professor	Literature	Revelle
<b>Rangan, Venkat P.</b>	Professor	CSE	Revelle
<b>Rao, Bhaskar D.</b>	Professor	ECE	Revelle
<b>Rao, Ramesh</b>	Associate Professor	ECE	Revelle
<b>Rapaport, Samuel I.</b>	Professor Emeritus	Medicine/Pathology	SchMed
<b>Raphael, Steven</b>	Assistant Professor	Economics	Roosevelt
<b>Rauch, James E.</b>	Professor	Economics	Marshall
<b>Rearden, C. Anne</b>	Professor	Pathology	SchMed
<b>Reid, Joseph L.</b>	Professor Emeritus	SIO	SIO
<b>Reid, Roddey</b>	Associate Professor	Literature	Muir
<b>Remmel, Jeffrey D.</b>	Professor	Mathematics	Muir
<b>Renn, Scot R.</b>	Assistant Professor	Physics	Revelle
<b>Reynolds, Edward</b>	Professor	History	Marshall
<b>Reynolds, Roger L.</b>	Professor	Music	Muir
<b>Rhodes, Jane</b>	Assistant Professor	Ethnic Studies	Marshall
<b>Richman, Douglas D.</b>	Professor-in-Residence	Pathology/Medicine	SchMed

<b>Rickard, Timothy</b>	Assistant Professor	Psychology	Roosevelt
<b>Rickert, Robert</b>	Assistant Professor	Biology	Revelle
<b>Rickett, Barnaby J.</b>	Professor	ECE	Muir
<b>Ride, Sally K.</b>	Professor	Physics	Marshall
<b>Riker, David A.</b>	Assistant Professor	Economics	Roosevelt
<b>Rincón, Patricia A.</b>	Lecturer (SOE)	Theatre and Dance	Roosevelt
<b>Ringgold, Faith</b>	Professor	Visual Arts	Muir
<b>Ringrose, David R.</b>	Professor	History	Revelle
<b>Rinott, Yosef</b>	Professor	Mathematics	Revelle
<b>Rodin, Burton</b>	Professor Emeritus	Mathematics	Muir
<b>Roeder, Philip G.</b>	Associate Professor	Political Science	Marshall
<b>Roemmich, Dean H.</b>	Professor	SIO	SIO
<b>Rohrl, Helmut</b>	Professor Emeritus	Mathematics	Revelle
<b>Rona-Tas, Akos</b>	Associate Professor	Sociology	Roosevelt
<b>Rose, Sharon</b>	Assistant Professor	Linguistics	Roosevelt
<b>Rosenblatt, Murray</b>	Professor Emeritus	Mathematics	Muir
<b>Rosenblatt, Richard H.</b>	Professor	SIO	SIO
<b>Rosenbluth, Marshall N.</b>	Professor Emeritus	Physics	Roosevelt
<b>Rosenfeld, Michael Geoff</b>	Professor	Medicine	SchMed
<b>Ross, Lola R.</b>	Professor	Family and Preventive Medicine	SchMed/Muir
<b>Rotenberg, Manuel</b>	Professor Emeritus	ECE	Muir
<b>Rothenberg, Jerome D.</b>	Professor	Literature/Visual Arts	Roosevelt
<b>Rothschild, Linda P.</b>	Professor	Mathematics	Warren
<b>Rouse, John</b>	Associate Professor	Theatre and Dance	Roosevelt
<b>Roy, Kaustuv</b>	Assistant Professor	Biology	Roosevelt
<b>Rudee, M. Lea</b>	Professor Emeritus	ECE	Warren
<b>Rudnick, Daniel L.</b>	Associate Professor	SIO	SIO
<b>Rudwick, Martin J.S.</b>	Professor	History	Warren
<b>Ruiz, Ramón E.</b>	Professor Emeritus	History	Muir
<b>Rumsey, Victor H.</b>	Professor Emeritus	ECE	Muir
<b>Russell, Percy J.</b>	Associate Professor Emeritus	Biology	SchMed
<b>Sah, Robert L.-Y.</b>	Associate Professor	Bioengineering	Muir
<b>Saier, Milton H., Jr.</b>	Professor	Biology	Muir
<b>Sailor, Michael J.</b>	Professor	Chemistry and Biochemistry	Revelle
<b>Saito, Leland</b>	Assistant Professor	Ethnic Studies	Marshall
<b>Salmon, David P.</b>	Professor-in-Residence	Neurosciences	SchMed
<b>Salmon, Richard L.</b>	Professor/Associate Dean	SIO	SIO
<b>Saltman, Paul D.</b>	Professor	Biology	Revelle
<b>Sanchez, Marta E.</b>	Associate Professor	Literature	Marshall
<b>Sanchez, Rosaura</b>	Professor	Literature	Marshall
<b>Sandwell, David T.</b>	Professor	SIO	SIO
<b>Sarkar, Sutanu</b>	Associate Professor	AMES	Warren
<b>Saville, Jonathan</b>	Associate Professor Emeritus	Theatre and Dance	Revelle
<b>Savitch, Walter J.</b>	Professor	CSE	Muir
<b>Sawrey, Barbara</b>	Senior Lecturer (SOE)	Chemistry and Biochemistry	Revelle
<b>Scanga, Italo</b>	Professor	Visual Arts	Muir
<b>Schaede, Ulrike</b>	Assistant Professor	IRPS	IRPS
<b>Schafer, William</b>	Assistant Professor	Biology	Roosevelt
<b>Schane, Sanford A.</b>	Professor Emeritus	Linguistics	Roosevelt
<b>Scheffler, Immo E.</b>	Professor	Biology	Revelle
<b>Schick, Steven E.</b>	Professor	Music	Muir
<b>Schiller, Daniel T.</b>	Professor	Communication	Muir
<b>Schiller, Herbert I.</b>	Professor Emeritus	Communication	Marshall
<b>Schmid-Schoenbein, Geert W.</b>	Professor	Bioengineering	SchMed
<b>Schmidt, Robert J.</b>	Associate Professor	Biology	Warren

<b>Schneider, Alan M.</b>	Professor Emeritus	AMES	Warren
<b>Schneider, Jerry A.</b>	Professor/Dean	Pediatrics/Academic Affairs	SchMed
<b>Schrauzer, Gerhard N.</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle
<b>Schreibman, Laura E.</b>	Professor	Psychology	Warren
<b>Schroeder, Julian I.</b>	Associate Professor	Biology	Warren
<b>Schuckit, Marc A.</b>	Professor	Psychiatry	SchMed
<b>Schudson, Michael S.</b>	Professor	Communication	Marshall
<b>Schuller, Ivan K.</b>	Professor	Physics	Revelle
<b>Schultz, Sheldon</b>	Professor Emeritus	Physics	Marshall
<b>Schwartz, Theodore</b>	Professor Emeritus	Anthropology	Muir
<b>Sclater, John G.</b>	Professor	SIO	SIO
<b>Scull, Andrew T.</b>	Professor	Sociology	Roosevelt
<b>Sebald, Anthony V.</b>	Associate Professor	ECE	Marshall
<b>Segal, David S.</b>	Professor	Psychiatry	SchMed
<b>Seible, Frieder</b>	Professor	AMES	Marshall
<b>Seiter, Ellen</b>	Professor	Communication	Roosevelt
<b>Sejnowski, Terrence J.</b>	Professor	Biology	Muir
<b>Selverston, Allen I.</b>	Professor Emeritus	Biology	Warren
<b>Semendeferi, Katerina</b>	Assistant Professor	Anthropology	Marshall
<b>Sereno, Martin I.</b>	Associate Professor	Cognitive Science	Warren
<b>Seshadri, Kalyanasundaram</b>	Professor	AMES	Marshall
<b>Severinghaus, Jeffrey</b>	Assistant Professor	SIO	SIO
<b>Shachat, Jason</b>	Assistant Professor	Economics	Marshall
<b>Shadwick, Robert E.</b>	Professor	SIO	SIO
<b>Shafir, Gershon</b>	Professor	Sociology	Roosevelt
<b>Sham, Lu Jeu</b>	Professor	Physics	Warren
<b>Shank, Adele E.</b>	Professor	Theatre and Dance	Marshall
<b>Shank, Theodore J.</b>	Professor Emeritus	Theatre and Dance	Revelle
<b>Shapin, Steven</b>	Professor	Sociology	Revelle
<b>Shapiro, Vitali</b>	Professor	ECE/Physics	Roosevelt
<b>Sharma, Vivek</b>	Associate Professor	Physics	Muir
<b>Sharpe, Michael J.</b>	Professor	Mathematics	Muir
<b>Shearer, Peter M.</b>	Professor	SIO	SIO
<b>Shenk, Norman Al</b>	Lecturer (SOE)	Mathematics	Revelle
<b>Sher, Gila</b>	Associate Professor	Philosophy	Warren
<b>Shevelow, Kathryn</b>	Associate Professor	Literature	Muir
<b>Shiffman, Gary A.</b>	Assistant Professor	Political Science	Roosevelt
<b>Shirk, Susan L.</b>	Professor	IRPS/Political Science	IRPS/Roosevelt
<b>Shor, George G., Jr.</b>	Professor Emeritus	SIO	SIO
<b>Shugart, Matthew F.</b>	Associate Professor	IRPS	IRPS
<b>Shukla, Sandhya R.</b>	Assistant Professor	Ethnic Studies	Marshall
<b>Shuler, Kurt E.</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle
<b>Shults, Clifford W.</b>	Professor	Neurosciences	SchMed
<b>Siegel, Jay S.</b>	Professor	Chemistry and Biochemistry	Muir
<b>Siegel, Paul</b>	Professor	ECE	Roosevelt
<b>Silber, John J.</b>	Professor Emeritus	Music	Roosevelt
<b>Silva, Ernest R.</b>	Professor	Visual Arts	Warren
<b>Silverman, Gregg J.</b>	Associate Professor-in-Residence	Medicine	SchMed
<b>Simon, John D.</b>	Professor	Chemistry and Biochemistry	Revelle
<b>Singer, S. Jonathan</b>	University Professor Emeritus	Biology	Revelle/SchMed
<b>Sinha, Amitabha</b>	Assistant Professor	Chemistry and Biochemistry	Warren
<b>Skelton, Robert</b>	Professor	AMES	Roosevelt
<b>Small, Lance W.</b>	Professor	Mathematics	Revelle
<b>Smallwood, Dennis E.</b>	Associate Professor Emeritus	Economics	Warren
<b>Smith, Donald R.</b>	Professor	Mathematics	Revelle
<b>Smith, Douglas W.</b>	Professor	Biology	Muir

<b>Smith, Harding E.</b>	Professor	Physics	Revelle
<b>Smith, Laurie</b>	Assistant Professor	Biology	Roosevelt
<b>Smith, Peter H.</b>	Professor	Political Science	Marshall
<b>Smith, Susan L.</b>	Associate Professor	Visual Arts	Muir
<b>Sobel, Joel</b>	Professor	Economics	Revelle
<b>Solis, Faustina</b>	Professor Emeritus	Family and Preventive Medicine	Marshall
<b>Sollberger, Harvey</b>	Professor	Music	Muir
<b>Somero, George N.</b>	Professor Emeritus	SIO	SIO
<b>Somerville, Richard C. J.</b>	Professor	SIO	SIO
<b>Sorensen, Harold W.</b>	Professor Emeritus	AMES	Revelle
<b>Souviney, Randall J.</b>	Senior Lecturer (SOE)	TEP	Marshall
<b>Spector, Deborah H.</b>	Professor	Biology	SchMed/Roosevelt
<b>Spector, Stephen A.</b>	Professor	Pediatrics	SchMed
<b>Spiess, Fred N.</b>	Professor Emeritus	SIO	SIO
<b>Spiro, Melford E.</b>	Professor Emeritus	Anthropology	Muir
<b>Spitzer, Nicholas C.</b>	Professor	Biology	Muir
<b>Squire, Larry R.</b>	Professor-in-Residence	Psychiatry/Neurosciences/Psychology	SchMed/Warren
<b>Stanton-Salazar, Ricardo D.</b>	Assistant Professor	Sociology	Muir
<b>Stark, Harold M.</b>	Professor	Mathematics	Muir
<b>Starr, Ross M.</b>	Professor	Economics	Warren
<b>Steiger, Rand</b>	Professor	Music	Warren
<b>Steinberg, Daniel</b>	Professor	Medicine	SchMed
<b>Steinmetz, Phel</b>	Associate Professor	Visual Arts	Revelle
<b>Stevens, Jane</b>	Associate Professor	Music	Revelle
<b>Stewart, John L.</b>	Professor Emeritus	Literature	Muir
<b>Stiles, Joan</b>	Professor	Cognitive Science	Muir
<b>Storms, Lowell H.</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Stramski, Dariusz</b>	Assistant Professor	SIO	SIO
<b>Streeby, Shelley</b>	Assistant Professor	Literature	Roosevelt
<b>Stroll, Avrum</b>	Professor Emeritus	Philosophy	Revelle
<b>Strom, Kaare</b>	Professor	Political Science	Roosevelt
<b>Strong, Tracy B.</b>	Professor	Political Science	Roosevelt
<b>Strum, Shirley C.</b>	Professor	Anthropology	Revelle
<b>Subramani, Suresh</b>	Professor	Biology	Warren
<b>Sugihara, George</b>	Professor	SIO	SIO
<b>Suhl, Harry</b>	Professor Emeritus	Physics	Revelle
<b>Sung, Lanping Amy</b>	Associate Professor	Bioengineering	Warren
<b>Surko, Clifford M.</b>	Professor	Physics	Marshall
<b>Swanson, Robert A.</b>	Professor Emeritus	Physics	Revelle
<b>Swartz, Marc J.</b>	Professor	Anthropology	Muir
<b>Swordlow, Neal R.</b>	Associate Professor	Psychiatry	SchMed
<b>Swinney, David A.</b>	Professor	Psychology	Roosevelt
<b>Sworder, David D.</b>	Professor/Associate Dean	ECE/Graduate Studies & Research	Revelle
<b>Takash, Paule Cruz</b>	Assistant Professor	Ethnic Studies	Marshall
<b>Talbot, Jan B.</b>	Professor	AMES	Muir
<b>Talke, Frank E.</b>	Professor	AMES	Warren
<b>Talley, Lynne D.</b>	Professor	SIO	SIO
<b>Tanaka, Stefan</b>	Associate Professor	History	Roosevelt
<b>Tarin, David</b>	Professor	Pathology	SchMed
<b>Tauxe, Lisa</b>	Professor	SIO	SIO
<b>Tay, William Shu-sam</b>	Professor	Literature	Roosevelt
<b>Taylor, Palmer W.</b>	Professor	Pharmacology	SchMed
<b>Taylor, Susan S.</b>	Professor	Chemistry and Biochemistry	SchMed/Roosevelt
<b>Teichner, Peter</b>	Associate Professor	Mathematics	Roosevelt
<b>Teilhet-Fisk, Jehanne H.</b>	Professor Emeritus	Visual Arts	Roosevelt



<b>Terras, Audrey A.</b>	Professor	Mathematics	Revelle
<b>Terry, Robert D.</b>	Professor Emeritus	Neurosciences/Pathology	SchMed
<b>Thal, Leon J.</b>	Professor	Neurosciences	SchMed
<b>Theodorakis, Emmanouil</b>	Assistant Professor	Chemistry and Biochemistry	Muir
<b>Thiemens, Mark H.</b>	Professor	Chemistry and Biochemistry	Marshall
<b>Thiess, Frank B.</b>	Sr. Lecturer (SOE) Emeritus	Mathematics	Marshall
<b>Ticho, Harold K.</b>	Professor Emeritus/VC Emeritus	Physics/Academic Affairs	Marshall
<b>Timmer, C. Peter</b>	Professor/Dean	IRPS	IRPS
<b>Timmerman, Allan</b>	Associate Professor	Economics	Muir
<b>Tohsaku, Yasu-Hiko</b>	Associate Professor	IRPS	IRPS/Roosevelt
<b>Tokuyasu, Kiyoteru</b>	Professor-in-Res Emeritus	Biology	Revelle
<b>Tomlinson, Barbara</b>	Associate Professor	Literature	Muir
<b>Tonkovich, Nicole</b>	Associate Professor	Literature	Roosevelt
<b>Tor, Yitzhak</b>	Assistant Professor	Chemistry and Biochemistry	Marshall
<b>Trauner, Doris A.</b>	Professor	Neurosciences/Pediatrics	SchMed
<b>Trivedi, Manmohan</b>	Professor	ECE	Warren
<b>Trogler, William C.</b>	Professor	Chemistry and Biochemistry	Revelle
<b>Troupe, Quincy</b>	Professor	Literature	Marshall
<b>Truant, Cynthia M.</b>	Associate Professor	History	Roosevelt
<b>Tsien, Roger K.</b>	Professor	Pharmacology/Chem. and Biochemistry	SchMed/Revelle
<b>Tu, Charles W.</b>	Professor	ECE	Marshall
<b>Tukey, Robert H.</b>	Professor-in-Residence	Pharmacology	SchMed
<b>Tullsen, Dean</b>	Assistant Professor	CSE	Warren
<b>Turetzky, Bertram J.</b>	Professor	Music	Muir
<b>Turner, Christena</b>	Associate Professor	Sociology	Roosevelt
<b>Tuzin, Donald F.</b>	Professor	Anthropology	Revelle
<b>Tytler, David R.</b>	Professor	Physics	Muir
<b>Uang, Chia-Ming</b>	Associate Professor	AMES	Warren
<b>Ung, Chinary</b>	Professor	Music	Roosevelt
<b>Vacquier, Victor</b>	Professor Emeritus	SIO	SIO
<b>Vacquier, Victor D.</b>	Professor	SIO	SIO
<b>VanAtta, Charles W.</b>	Professor Emeritus	AMES/SIO	Revelle/SIO
<b>Van der Geer, Peter</b>	Assistant Professor	Chemistry and Biochemistry	Roosevelt
<b>Van Young, Eric</b>	Professor	History	Roosevelt
<b>Varki, Ajit P.</b>	Professor	Medicine	SchMed
<b>Varni, James W.</b>	Professor-in-Residence	Psychiatry	SchMed
<b>Varon, Silvio S.</b>	Professor Emeritus	Biology	SchMed
<b>Vasquez, Olga</b>	Assistant Professor	Communication	Marshall
<b>Vecchio, Kenneth S.</b>	Associate Professor	AMES	Roosevelt
<b>Vehrencamp, Sandra L.</b>	Professor	Biology	Muir
<b>Vendler, Zeno</b>	Professor Emeritus	Philosophy	Muir
<b>Verdicchio, Pasquale</b>	Associate Professor	Literature	Roosevelt
<b>Vernon, Wayne</b>	Professor Emeritus	Physics	Revelle
<b>Vianu, Victor D.</b>	Professor	CSE	Marshall
<b>Vidal, Mary</b>	Assistant Professor	Visual Arts	Revelle
<b>Viterbi, Andrew J.</b>	Professor Emeritus	ECE	Warren
<b>Volcani, Benjamin E.</b>	Professor Emeritus	SIO	SIO
<b>Vold, Regitze R.</b>	Professor	Chemistry and Biochemistry	Revelle
<b>Wadsworth, Adrian R.</b>	Professor	Mathematics	Warren
<b>Wagner, Arthur</b>	Professor Emeritus	Theatre and Dance	Muir
<b>Wagner, Peter D.</b>	Professor	Medicine	SchMed
<b>Wahlen, Martin</b>	Professor	SIO	SIO
<b>Waisman, Carlos H.</b>	Professor	Sociology	Marshall
<b>Walk, Cynthia</b>	Associate Professor	Literature	Roosevelt

<b>Wallach, Nolan R.</b>	Professor	Mathematics	Roosevelt
<b>Walter, Barbara</b>	Assistant Professor	IRPS	IRPS
<b>Walter, Gernot F.</b>	Professor	Pathology	SchMed
<b>Wang, Jean Yin Jen</b>	Professor	Biology	SchMed/Roosevelt
<b>Ward, John F.</b>	Professor Emeritus	Radiology	SchMed
<b>Wasserman, Stephen I.</b>	Professor	Medicine	SchMed
<b>Waters, Les</b>	Professor	Theatre and Dance	Revelle
<b>Watson, Joel</b>	Associate Professor	Economics	Muir
<b>Watson, Joseph W.</b>	Professor/Vice Chancellor	Chemistry and Biochemistry/ Student Affairs	Marshall
<b>Watson, Kenneth M.</b>	Professor Emeritus	SIO	SIO
<b>Wavrik, John J.</b>	Associate Professor	Mathematics	Muir
<b>Wayne, Don E.</b>	Associate Professor	Literature	Muir
<b>Weare, John H.</b>	Professor	Chemistry and Biochemistry	Revelle
<b>Webster, Nicholas J. G.</b>	Associate Professor-in-Residence	Medicine	SchMed
<b>Weiss, Ray F.</b>	Professor	SIO	SIO
<b>Welchman, John C.</b>	Associate Professor	Visual Arts	Muir
<b>Wenkert, Ernest</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle
<b>Wenzl, Hans G.</b>	Professor	Mathematics	Marshall
<b>Werner, Bradley T.</b>	Associate Professor	SIO	SIO
<b>Wesling, Donald T.</b>	Professor	Literature	Roosevelt
<b>West, John B.</b>	Professor	Medicine	SchMed
<b>Westman, Robert S.</b>	Professor	History	Muir
<b>Wheeler, John C.</b>	Professor	Chemistry and Biochemistry	Revelle
<b>White, Fred N.</b>	Professor Emeritus	Medicine	SchMed/SIO
<b>White, Halbert L.</b>	Professor	Economics	Revelle
<b>Whitehead, Mark C.</b>	Associate Professor	Surgery	SchMed
<b>Wieder, Harry H.</b>	Professor-in-Residence Emeritus	ECE	Muir
<b>Wiederholt, Wigbert C.</b>	Professor	Neurosciences	SchMed
<b>Wienhausen, Gabriele</b>	Senior Lecturer (SOE)	Biology	Marshall
<b>Williams, Ben A.</b>	Professor	Psychology	Muir
<b>Williams, Forman A.</b>	Professor	AMES	Marshall
<b>Williams, Ruth J.</b>	Professor	Mathematics	Warren
<b>Williams, Sherley A.</b>	Professor	Literature	Marshall
<b>Williamson, S. Gill</b>	Professor	CSE	Roosevelt
<b>Wills, Christopher</b>	Professor	Biology	Warren/SchMed
<b>Wilson, Kent R.</b>	Professor	Chemistry and Biochemistry	Revelle
<b>Winant, Clinton D.</b>	Professor	SIO	SIO
<b>Winker, James R.</b>	Professor	Theatre and Dance	Marshall
<b>Winterer, Edward L.</b>	Professor Emeritus	SIO	SIO
<b>Wiseman, Jacqueline P.</b>	Professor Emeritus	Sociology	Warren
<b>Witztum, Joseph L.</b>	Professor	Medicine	SchMed
<b>Wixted, John T.</b>	Associate Professor	Psychology	Revelle
<b>Wolf, Jack K.</b>	Professor	ECE	Roosevelt
<b>Wolfe, Arthur M.</b>	Professor	Physics	Warren
<b>Wong, David Y.</b>	Professor Emeritus	Physics	Warren
<b>Wong-Staal, Flossie</b>	Professor	Biology/Medicine	Revelle/SchMed
<b>Woodhull, Winifred</b>	Associate Professor	Literature	Warren
<b>Woodruff, Christopher M.</b>	Assistant Professor	IRPS	IRPS
<b>Woodruff, David S.</b>	Professor	Biology	Roosevelt
<b>Woods, Virgil L.</b>	Associate Professor	Medicine	SchMed
<b>Woolard, Kathryn A.</b>	Associate Professor	Sociology	Muir
<b>Wright, Andrew</b>	Professor Emeritus	Literature	Revelle
<b>Wulbert, Daniel E.</b>	Professor	Mathematics	Marshall
<b>Xu, Yang</b>	Assistant Professor	Biology	Marshall

<b>Yaffe, Michael P.</b>	Associate Professor	Biology	Marshall
<b>Yaksh, Tony L.</b>	Professor	Anesthesiology	SchMed
<b>Yalowitz, Steven</b>	Assistant Professor	Philosophy	Roosevelt
<b>Yanofsky, Martin F.</b>	Professor	Biology	Warren
<b>Yayanos, Aristides</b>	Professor-in-Residence	SIO	SIO
<b>Yee, Bennet S.</b>	Assistant Professor	CSE	Muir
<b>Yen, Samuel S.C.</b>	Professor	Reproductive Medicine	SchMed
<b>Yguerabide, Juan</b>	Professor	Biology	Marshall
<b>Yip, Wai-Lim</b>	Professor	Literature	Muir
<b>Yoneyama, Lisa</b>	Assistant Professor	Literature	Roosevelt
<b>York, Herbert F.</b>	Professor Emeritus	Physics	Warren
<b>Young, William R.</b>	Professor	SIO	SIO
<b>Yu, Edward</b>	Associate Professor	ECE	Marshall
<b>Yu, Paul K. L.</b>	Professor	ECE	Revelle
<b>Yuasa, Joji</b>	Professor Emeritus	Music	Warren
<b>Yun, Kenneth Y.</b>	Assistant Professor	ECE	Revelle
<b>Zamosc, Leon</b>	Associate Professor	Sociology	Roosevelt
<b>Zanetti, Maurizio</b>	Professor-in-Residence	Medicine	SchMed
<b>Zeger, Kenneth A.</b>	Associate Professor	ECE	Roosevelt
<b>Zhao, Yuezhi</b>	Assistant Professor	Communication	Revelle
<b>Zhiri, Oumelbanine</b>	Associate Professor	Literature	Roosevelt
<b>Zimm, Bruno H.</b>	Professor Emeritus	Chemistry and Biochemistry	Revelle
<b>Zipser, David</b>	Professor	Cognitive Science	Roosevelt
<b>Zisook, Sidney</b>	Professor	Psychiatry	SchMed
<b>Zivin, Justin A.</b>	Professor	Neurosciences	SchMed
<b>Zola, Stuart M.</b>	Professor-in-Residence	Psychiatry/Neurosciences	SchMed
<b>Zuker, Charles</b>	Professor	Biology/Neurosciences	Revelle/SchMed
<b>Zweifach, Benjamin W.</b>	Professor Emeritus	Bioengineering	Warren/SchMed



# Interviews

THE DISTINGUISHED FACULTY, EXCELLENT  
ACADEMIC PROGRAMS, AND HIGH QUALITY  
OF THE STUDENT BODY, TOGETHER WITH  
THE SPLENDID PHYSICAL SETTING OF THE  
UCSD CAMPUS, OFFER AN INCOMPARABLE  
UNIVERSITY EXPERIENCE. THE FOLLOWING  
INTERVIEWS PROVIDE INTERESTING INSIGHTS  
BY FACULTY, STAFF, AND STUDENTS.

ASSOCIATE PROFESSOR

SCRIPPS INSTITUTION

*of*

OCEANOGRAPHY



**PETER FRANKS** WAS BORN IN

TORONTO, CANADA, IN 1959. HE GREW UP IN KINGSTON, ONTARIO, AND SPENT TIME ROAMING THE WOODS AND STREAMS ON HIS GRANDPARENTS' 100-ACRE PROPERTY

NORTH OF TORONTO. HIS CHILDHOOD INTEREST IN NATURE LED HIM TO

A CAREER IN BIOLOGY. AN ASSOCIATE PROFESSOR OF BIOLOGICAL OCEANOGRAPHY IN SCRIPPS INSTITUTION OF OCEANOGRAPHY'S MARINE LIFE RESEARCH GROUP, FRANKS USES FIELD SAMPLING AND COMPUTER MODELS TO STUDY THE INTERACTION OF PHYSICAL AND BIOLOGICAL DYNAMICS IN THE OCEAN, INCLUDING THE STUDY OF "RED TIDES" AND MICROSCOPIC ALGAE KNOWN AS PHYTOPLANKTON.

HIS MAIN INTERESTS LIE IN STUDYING THE PATTERNS OF PHYTOPLANKTON, PARTICULARLY THE DETAILS OF THEIR TRANSPORT MECHANISMS AND SOURCE POPULATIONS. FRANKS INVESTIGATED A RECURRENT RED TIDE IN THE GULF OF MAINE AND CONCLUDED, AFTER CONDUCTING EXTENSIVE FIELD SURVEYS AND ANALYZING HISTORICAL DATA, THAT TOXIC CELLS WERE BEING TRANSPORTED ALONG THE COAST IN A FRESHWATER CURRENT ORIGINATING FROM THE ANDROSCOGGIN AND KENNEBEC RIVERS. THIS OBSERVATION WAS CONTRARY TO EARLIER HYPOTHESES THAT THE TOXIC BLOOMS ORIGINATED IN LOCAL WATERS, AND NOW FORMS THE BASIS FOR PREDICTIONS OF TOXIC OUTBREAKS IN THIS REGION.

FRANKS RECEIVED A BACHELOR OF SCIENCE DEGREE IN BIOLOGY IN 1981 FROM QUEEN'S UNIVERSITY IN KINGSTON. HE RECEIVED A MASTER'S DEGREE IN OCEANOGRAPHY IN 1984 FROM DALHOUSIE UNIVERSITY IN HALIFAX, NOVA SCOTIA, AND A DOCTORAL DEGREE IN 1990 FROM THE JOINT PROGRAM IN OCEANOGRAPHY AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY/WOODS HOLE OCEANOGRAPHIC INSTITUTION. IN 1992 HE ACCEPTED AN APPOINTMENT AT SCRIPPS, A MOVE HE REGARDS AS ONE OF THE TOP SCIENTIFIC MOMENTS OF HIS CAREER.

**Q. How did you become interested in science?**

**A.** I think I was always interested in science; if I had known what engineering was, I probably would have done that. I had no idea what engineers did, but as a kid I was always taking things apart, and I was never satisfied with putting together models the way they came in the box. I'd always take pieces of one and put it together with pieces of another in funny ways. The best Christmas presents my parents ever gave me were packages of motors and batteries and stuff just to build things.

obvious subject combining all of them is physical-biological interactions in the plankton.

There are some really interesting issues related to how toxic phytoplankton blooms occur. Did they grow up locally or were they brought there from somewhere else? Through a lot of field work, and a lot of data analysis and interdisciplinary types of measurements, I was able to show that the blooms on the East Coast, in Massachusetts and New Hampshire, actually came from quite a bit farther north and were brought down the coast each year in a current of relatively fresh water that originated from rivers in Maine. And for the first time

**Q. What do you like most about being a scientist?**

**A.** It lets me be a kid. Kids are always asking questions and have unfettered curiosity; being a scientist lets me ask those questions and be curious. And that's what I'm paid to do: to be curious, but in a rigorous way, which is really fun. But I must say, I'm doing a lot more administrative duties these days.

**Q. What advice do you have for students interested in becoming oceanographers?**

**A.** My advice might seem very contrary, and may not be the general view of my colleagues, but I would advise you, if you want to go into oceanography, not to do an undergraduate degree in oceanography. Rather, get a good ecological background; study ecology, evolution, vertebrate zoology, botany. Get a really good grounding in the basic fields of biology and then bring those tools to oceanography.

So take a lot of physics courses, take mathematics courses. In my opinion, biological oceanography is a field in which you will do much better if you're good at physics and good at mathematics. Don't see oceanography as a haven away from these other rigorous disciplines.

*Kids are always asking questions and have unfettered curiosity; being a scientist lets me ask those questions and be curious.*

I was surrounded by scientific opportunities and my parents were always encouraging me to learn. So for me science seemed a natural thing.

**Q. What was behind your decision to come to Scripps?**

**A.** Hah. I got a job! Need I say more? Jobs like this don't come up very often. This is absolutely the best position I could have in the world: I'm at the number one oceanographic institution, and we have probably the best, or certainly among the best, students we could possibly have. I have an office practically on the beach and I'm surrounded by brilliant colleagues, who are very interesting and wonderful people. It's just an absolutely great job to have. I can't imagine going anywhere from here, unfortunately. The weather is too nice.

**Q. How did you come from general oceanography to these specific areas?**

**A.** My real joy in oceanography is that I combine biology, physics, and mathematics, so the

now, we have the ability to predict when and where these toxic blooms will occur.

**Q. Now for the million-dollar question: Is the level of toxicity in the ocean increasing?**

**A.** Well, that's a difficult statement to make definitively. I would hedge a little bit. Certainly the human impact of the toxic algae is increasing, there's no question about that. But there are also a lot more people out there, and so the potential for interactions between humans and toxic algae is increasing. The communication system is better, so if toxic blooms occur, they're probably going to be better and more widely reported. All these sorts of things can give a perception of an increase in the occurrence or virulence of toxic algae.

But when all these things are taken into account, I think there's still a good case to be made that the frequency and intensity of toxic blooms is increasing globally. And it's probably related to human effects, such as pumping nutrients into the ocean and altering the ratios of nutrients by creating dams or by sewage treatment.



# Williams

ASSISTANT

CHANCELLOR

UCSD



**LINDA M. WILLIAMS** IS THE ASSISTANT CHANCELLOR AT UCSD, A POSITION THAT INVOLVES ASSISTING THE CHANCELLOR IN THE ADMINISTRATIVE OVERSIGHT OF THE CAMPUS, MOST ESPECIALLY IN THE AREAS OF STAFF AND STUDENT ISSUES AND INITIATIVES. PRIOR TO ASSUMING THIS POST SHE HAS SERVED IN VARIOUS ADMINISTRATIVE CAPACITIES AT UCSD, INCLUDING DIRECTOR OF ADMINISTRATION FOR ACADEMIC AFFAIRS, SINCE 1988. A NATIVE CALIFORNIAN, WILLIAMS GRADUATED FROM SAN DIEGO STATE UNIVERSITY WITH A BACHELOR OF SCIENCE DEGREE IN BUSINESS ADMINISTRATION SPECIALIZING IN INFORMATION SYSTEMS. HER PATH TO INFORMATION SERVICES AS A CAREER CHOICE BEGAN IN JUNIOR HIGH SCHOOL, WHERE THE IDEA OF INPUTTING INFORMATION INTO A MACHINE IN A SYSTEMATIC ORDER, AND HAVING RESULTS PRODUCED ON THE OTHER END, CAPTURED HER ANALYTICAL PERSONALITY. EVEN THOUGH, AT THAT TIME, THE PROCESS OF USING COMPUTERS REQUIRED PUNCH CARDS.

IN 1993 WILLIAMS TRAVELED TO TAIPEI, TAIWAN, AND BEIJING, CHINA, AS THE UCSD REPRESENTATIVE ON A DELEGATION PARTICIPATING IN THE YOUNG LEADERS FORUM SPONSORED BY THE SASAKAWA PEACE FOUNDATION FOR THE PURPOSE OF DISCUSSING CHALLENGES OF THE TWENTY-FIRST CENTURY.

WILLIAMS HAS SERVED AS A VOLUNTEER FOR A NUMBER OF COMMUNITY NONPROFIT GROUPS AND CURRENTLY IS A BOARD MEMBER OF THE SAN DIEGO URBAN LEAGUE, THE SAN DIEGO BRAILLE INSTITUTE ADVISORY COUNCIL, AND THE MURRIETA VALLEY SCHOLARSHIP FOUNDATION.

AFTER A CHALLENGING DAY AT THE OFFICE OR EVENING SERVICE WITH A COMMUNITY ORGANIZATION, HER RELAXATION IS FOUND IN SEWING, ARTS AND CRAFTS, AND READING BOOKS. MOST OF ALL, WILLIAMS NOTES, SHE ENJOYS SPENDING TIME WITH HER FAMILY.

**Q. What led to your current role as assistant chancellor at UCSD?**

**A.** Early in my career I displayed a genuine interest in helping people and organizations succeed in reaching their goals and objectives. My analytical skills, along with my fascination with problem solving and my ability to interact effectively with a broad range of people and situations, afforded me various opportunities throughout my career. These opportunities exposed me to high levels of responsibility that eventually led to my appointment as assistant chancellor.

representatives because of my personal and professional interest in building relationships among diverse groups.

**Q. What is your view on volunteerism, since you obviously serve on a number of community boards?**

**A.** Early in my career, I made a decision and set my goals to be able to give back to my community. I feel it's important to always leave things a little better than you found them.

**Q. What advice would you give to undergraduate students trying to define their career paths?**

**A.** I'd advise them to pursue a career in which their talents and skills allow them to have fun and achieve personal and professional fulfillment. Select a career that maximizes your talents. Remember, you will probably change careers at least three to four times during your lifetime. Don't be afraid to take risks and make mistakes along the way. See each mistake as an opportunity to learn something new.

*Don't be afraid to seek advice; you will be amazed at how many people are out there who want to help you succeed.*

**Q. What trends do you see for women in administrative positions such as yours?**

**A.** The doors of opportunity have been opened, but not widely. The glass ceiling still exists. However, more today than at any other time in our history, we can point to many women as role models. I think that women must continue to set the pace, influence the trend, and be prepared to mentor other women and young adults.

**Q. How did you come to be selected as a UCSD representative to Taiwan and China?**

**A.** The Sasakawa Peace Foundation approached fifty institutions and asked them to select two individuals from their institutions to be representatives as part of the Young Leaders Forum. UCSD's Graduate School of International Relations and Pacific Studies (IR/PS) selected me as one of its rep-

**Q. What would be the most valuable bit of information you could offer high school students at this time?**

**A.** I have two daughters in high school and I take the opportunity to talk with high school students as often as possible. The most valuable advice: Take advantage of every opportunity you can. Set your goals. Evaluate your goals and determine if you are making the right choices in achieving them. If not, make the necessary changes to allow yourself to be successful. Don't be afraid to seek advice; you will be amazed at how many people are out there who want to help you succeed.

**Q. What do students heading for the university these days need to think about?**

**A.** The only place that success comes before work is in the dictionary. Students need to take their education seriously and be prepared to face challenges, which come in many forms. For some students this may be the first time away from family and friends. For others this may be the first time they no longer are the brightest in their class, but one among the brightest. Be prepared, stay focused, and have fun!

**Q. Do you think young people are prepared to inherit the mantle of leadership in this society?**

**A.** I think young people today genuinely care about the issues facing our society and are committed to contributing to the success of our country. They're not afraid to ask questions, which is the first step in understanding a problem and identifying solutions. I feel the world will continue to be in good hands.

**Q. How would you describe the UCSD campus?**

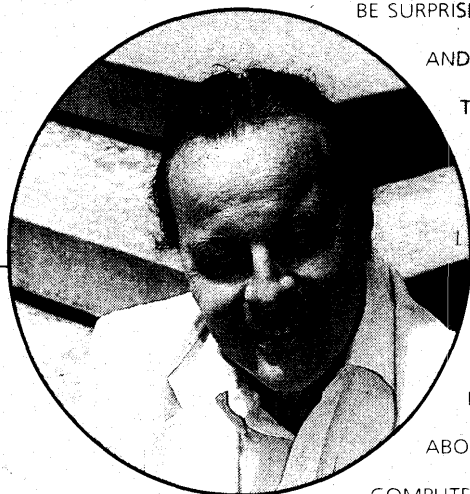
**A.** UCSD is a place where you are exposed to so many diverse issues and are among some of the world's leading scholars. It also is a place that embraces you on both academic and emotional levels. I've been at UCSD for over ten years and I still continue to discover new and exciting things about the campus, its people and its surroundings. The best way to appreciate UCSD is to take the time to discover its richness.

CHAIR

DEPARTMENT

of

MUSIC



**RICHARD MOORE,** CHAIR OF THE DEPARTMENT

OF MUSIC, CAN'T REMEMBER A TIME WHEN HE WASN'T MAKING MUSIC. "I REMEMBER WHEN MY GRANDMOTHER TAUGHT ME THREE CHORDS ON THE PIANO WHEN I WAS THREE OR FOUR, AND SAID, 'NOW THERE ARE MORE CHORDS THAN THIS, BUT YOU'D BE SURPRISED HOW MANY SONGS YOU CAN PLAY WITH JUST THESE THREE.'

AND, BY GOLLY, SHE WAS RIGHT."

THOSE THREE CHORDS STARTED PIANIST, PERCUSSIONIST, AND COMPUTER MUSICIAN MOORE ON A MERRY CHASE—AND AN INVESTIGATIVE ONE AT THAT. THE SELF-TAUGHT YOUNG PIANIST, WHOSE

FATHER PLAYED TROMBONE AND MOTHER SANG, TOOK FORMAL PIANO LESSONS PRIOR TO ENROLLING IN COLLEGE. AT CARNEGIE-MELLON UNIVERSITY HE RECEIVED A BACHELOR'S DEGREE IN COMPOSITION AND ANOTHER IN PERFORMANCE. WHILE THERE HE READ

ABOUT A MUSICIAN AT THE UNIVERSITY OF ILLINOIS WHO WAS WRITING

COMPUTER PROGRAMS THAT WOULD COMPOSE MUSIC. OFF HE WENT TO STUDY AT

ILLINOIS WHERE HE HEARD A TALK BY MAX MATHEWS OF AT&T BELL LABORATORIES.

MATHEWS WAS WRITING COMPUTER PROGRAMS THAT ALLOWED THE COMPUTER TO BE USED AS A MUSICAL INSTRUMENT. SOON MOORE WAS WORKING FOR BELL LABORATORIES HELPING LAY FOUNDATIONS FOR COMPUTER MUSIC SOUND SYNTHESIS.

EAGER TO LEARN HOW TO DESIGN THE DIGITAL MACHINES, HE WENT TO STANFORD UNIVERSITY TO STUDY DIGITAL REAL-TIME MUSIC SYNTHESIS AND HOW TO MAKE IT WORK. HE EARNED A MASTER'S IN ELECTRICAL ENGINEERING AND A DOCTORATE IN COMPUTER ENGINEERING. HE THEN RETURNED TO BELL. TODAY, MOORE PLAYS PIANO, DOES PERCUSSION, CONTINUES HIS INVESTIGATION AND EXPERIMENTATION IN COMPUTER MUSIC—AND MUCH OF HIS TIME IS SPENT CHAIRING A VERSATILE, PROGRESSIVE UCSD DEPARTMENT OF MUSIC CONTINUALLY LOOKING TO THE FUTURE OF MUSIC.

**Q. How would you describe the Department of Music at UCSD?**

**A.** Unlike typical academic music departments that act primarily as conservators of past traditions of music, the University of California, San Diego music department was founded by scientists and is a unique combination of musical arts, sciences, and technologies. Its faculty consists of internationally acclaimed composers, performers, scientists, engineers, and scholars, each dedicated to the creation of the future of music in an increasingly diverse and technological world. Students from all over the world work in

ways of looking at music from around the world is very much on our minds.

way that you can explain it to a willing and obedient, but not insightful "student," namely, a computer? It always comes back to the question of what do you know how to explain.

**Q. What do you consider the major applications of computers in the field of music?**

**A.** There are two major applications. One, to produce cheaper substitutes for old technology. I call this the substitutive application. In music, this is where we use synthesizers to replace rooms full of musicians. It's cheaper.

ways of looking at music from around the world is very much on our minds.

**Q. What do you feel are the music department's major draws for prospective students?**

**A.** We have a rich musical environment for students who have interest not just in the past and tradition of music—though one can learn that here very well—but also for students who have a curiosity about what music might become. That can be addressed in the context of this department much more readily than the majority of teaching institutions. We have

*At UCSD, music is at once an art, a science, and a vital means of human expression.*

close collaboration with faculty doing musical-creation research including performance techniques, experimental studies in composition, and computer-mediated improvisations. At UCSD, music is at once an art, a science, and a vital means of human expression.

**Q. Can you elaborate upon your feeling that experimentation is not only characteristic of computer music, it is essential?**

**A.** The computer is just a tool, like a microscope for a biologist. It's not in itself an answer to anything. But it allows us to pose questions and investigate potential answers, to build models of what potential musical universes would be like. What you do in the process of programming the computer is to understand things about how you do something that you didn't realize was going on. How to compose a piece of music is a question you have to answer in order to write a computer program that does that. It was the first problem I ever encountered that made me begin to think like a researcher: How do you compose music, but answered in such a

An entire soundtrack for a TV program can be done with one person and a synthesizer. The second application is what interests me. It's the augmentation application. It's 'what can we do with computers that we cannot do without them?' It's going to a place we couldn't get to otherwise. It's harnessing our best technology to increase the possibilities for people to express themselves.

**Q. Last year, India's virtuoso sitarist and composer Ravi Shankar accepted a Regents' Professor appointment at UCSD. How does he fit into the Department of Music?**

**A.** This is an unprecedented situation. Ravi Shankar's proximity to UCSD (now living in Encinitas) was just too wonderful an opportunity to pass up. As a true cultural innovator in the world, Ravi Shankar wants to pass on what he has learned over his 78 years to people really interested in learning. He offers important insights into the basics of an area of music where many people are relative neophytes. The music of India is a tradition that goes back 4,000 years. It is a connection to the past of music. Our department has great interest in extending its research proclivities into many different areas. Concern for new

a large number of people here who have that kind of questioning on their mind. It's not that the answers are here, but it's an open field of musical investigation, whether a student is interested in writing, performing, jazz improvisation, computer music, the music of India, or world music.

We now have a doctoral degree in performance as well as one in composition, and performance research is on a par with composition research. Performers, like athletes, are pushing barriers, raising the level of possibilities.

We also will be offering a new computing in the arts major in 1998-99 to accommodate students who have broad interests in both the arts and computing. What used to be exotic knowledge with computers is now relatively commonplace, and students—with years of computer experience—show up eager to apply their knowledge to artistic and cultural questions.

ASSISTANT

PROFESSOR.

DEPARTMENT

*of*

BIOLOGY



**IT POGLIANO** GREW UP IN THE CENTRAL WASHINGTON TOWN OF WENATCHEE, AN APPLE-GROWING COMMUNITY NEAR THE COLUMBIA RIVER. AFTER ATTENDING HIGH SCHOOL IN SEATTLE, POGLIANO ENROLLED IN THE UNIVERSITY OF WASHINGTON, WHERE BIOLOGY CLASSES OPENED HER EYES TO THE WORLD OF MICROBIAL GENETICS. POGLIANO WAS IMMEDIATELY DRAWN TO LABORATORY RESEARCH, SPENDING FOUR OF HER FIVE UNDERGRADUATE YEARS IN THE LAB AND EARNING THE JOHN AND DOROTHY FRANCO AWARD FOR EXCELLENCE IN UNDERGRADUATE RESEARCH. AFTER COMPLETING HER DOCTORATE AT HARVARD MEDICAL SCHOOL, POGLIANO CONDUCTED POST-DOCTORAL RESEARCH IN HARVARD UNIVERSITY'S DEPARTMENT OF CELLULAR AND MOLECULAR BIOLOGY. POGLIANO PINPOINTS SOME OF THE MOST REWARDING MOMENTS OF HER SCIENTIFIC CAREER TO THIS TIME. WHILE STUDYING SPORE FORMATION IN THE BACTERIUM *BACILLUS SUBTILIS*, POGLIANO HELPED SUCCESSFULLY CREATE A HYPOTHESIS ABOUT HOW BIOLOGICAL CELLS DIFFERENTIATE, EXPRESS DIFFERENT PROTEINS, AND THEREBY ACQUIRE DIFFERENT FATES. THE RESEARCH HAS BECOME RELEVANT TO ANYONE WHO STUDIES THE DEVELOPMENT OF MULTICELLULAR ORGANISMS AND MICROBIOLOGY. POGLIANO BELIEVES HER EXPERIENCE IN COMPETITIVE SPORTS HAS PREPARED HER FOR THE INTENSE COMPETITION IN THE FIELD OF BIOLOGY. WHILE GROWING UP, POGLIANO WAS BOTH A SKI RACER AND SKIING INSTRUCTOR. IN GRADUATE SCHOOL, SHE PICKED UP BICYCLE RACING AS A HOBBY. SINCE THE BIRTH OF HER FIVE-YEAR-OLD SON, POGLIANO AND HER HUSBAND HAVE TUNED THEIR HOBBIES TO MORE FAMILY-ORIENTED ACTIVITIES, INCLUDING CAMPING, HIKING, ORCHID GROWING, AND EVEN AN OCCASIONAL FOSSIL-HUNTING TRIP.

**Q. How important is teaching to you?**

**A.** When I was in college and graduate school people spent a lot of time training me in research, which helped to lay the foundation for my scientific career. That, in turn, has had a huge effect on me and my decision to teach at an undergraduate institution, rather than at a medical school or to go into industry. It was a conscious decision for me to continue working with students, so that I can help prepare some of them for their future careers. Perhaps this way all that I've learned just doesn't stop with me, but continues.

**Q. What was it about genetics that appealed to you?**

**A.** Genetics seemed to me a very elegant and powerful way to study how organisms work. In genetics you make a mutation in a gene to eliminate the protein it encodes and then you see what happens to the organism. It requires logical, puzzle-solving skills to understand changes based on the behavior of the mutant.

**Q. Where does the field of microbiology stand today?**

**A.** Microbiology is in the middle of a renaissance. In the past, people would look at bacterial cells through a powerful microscope and be able to see very tiny structures within the cell, yet they failed to observe the organization of these structures within each bacterial cell. To see the organization within bacterial cells, they needed to use a less powerful microscope, but a more powerful method that allowed them to look at just a few components of the cell at a time.

It is like standing in the middle of a forest—you may know that you're surrounded by pine trees, but you may not know that just over the knoll there are birch trees and that the forest is actually made up of patches of differ-

ent kinds of trees, each of which prefers to grow in a particular environment. You need to step back and observe where each different kind of tree grows to discover the inherent organization of a forest or, in my research, a bacterial cell.

**Q. What do you study here at UCSD?**

**A.** It's becoming apparent that bacterial cells have the ability to move things around within their cells, and that this ability is essential for them. I study the spore-formation pathway of a soil bacterium, *Bacillus subtilis*. During the formation of spores, one bacterial cell swallows up another, and the cell inside will eventually become the spore cell. This is very simi-

lar to processes that go on in our own bodies. For example, when you have a bacterial infection, some of the cells of your immune system engulf and destroy the invading bacteria.

However, bacterial cells lack the machinery that allows our cells to do this, so it's quite a mystery how they accomplish engulfment. I want to solve the mystery.

**Q. What kinds of things can you envision from solving the mystery?**

**A.** My hope is that bacteria have evolved only a limited number of ways to move things around within their cells. If so, then it is possible that by studying engulfment, we may understand similar events that are essential for bacteria. We may then be able to design novel antibiotics that inhibit these processes.

**Q. What do you like most about being a scientist?**

**A.** Undoubtedly, it is discovering new things—when you suddenly discover something and you realize that either you're the first person to see something, or to understand what you're seeing. In my own experience, many people have observed a certain phenomenon

and not realized that it is an important phenomenon that they should try to understand. So, first, one must be prepared to observe something and to realize that it is important.

**Q. What are the tools that you use for your research?**

**A.** We use a microscope, but a very specialized one called a deconvolution microscope. This microscope takes sections through the bacteria. It moves the lens through the bacteria in very tiny steps, about .05 microns. In a bacterial cell you can get twenty or thirty different images throughout the cell.

All the images are collected directly into the computer, which has a program to remove the

light that comes from different points. You get a very crisp, processed image. You can develop a three-dimensional reconstruction of what you're looking at, and you can rotate it around, right on the computer screen. It's been incredibly useful to us because the bacteria we study are so tiny, so small that with traditional microscopes it is very hard to see details. It's a new technology and a very useful, very wonderful tool.

**Q. What advice do you have for students interested in going into this field?**

**A.** My advice is to take advantage of the wealth of opportunities here, both inside the classroom and outside the classroom. If you want to go into research, you should get into a research lab as soon as possible. You should devote as much time as you can to research, starting with your sophomore or junior year. The biology that goes on in this town is just great—this is an incredible place for science.

*My advice is to take advantage of the wealth of opportunities here, both inside the classroom and outside the classroom...this is an incredible place for science.*

CHAIR

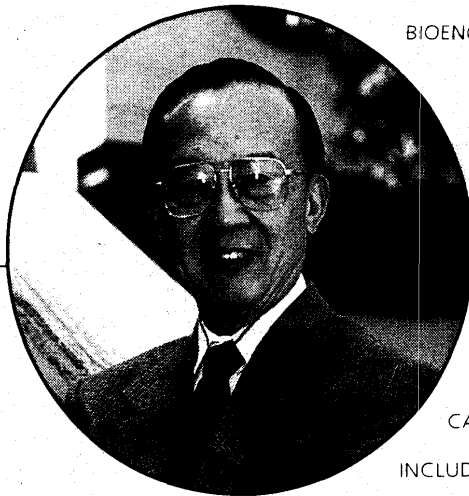
DEPARTMENT

of

BIOENGINEERING

**HU CHIEN** GREW UP IN THE CHINESE

CITIES OF BEIJING AND SHANGHAI. NOW A LEADING AUTHORITY IN THE GROWING FIELD OF BIOENGINEERING, CHIEN SPLITS HIS TIME AS A PROFESSOR OF BIOENGINEERING AND MEDICINE, DIRECTOR OF THE INTERDISCIPLINARY INSTITUTE FOR BIOMEDICAL ENGINEERING, AND CHAIRMAN OF THE DEPARTMENT OF BIOENGINEERING AT THE JACOBS SCHOOL OF ENGINEERING.



ALTHOUGH HE GREW UP WITH AN INTEREST IN SCIENCE AND MATH, CHIEN BEGAN HIS CAREER IN PREMEDICINE AT THE NATIONAL PEKING UNIVERSITY. HE GRADUATED FROM NATIONAL TAIWAN UNIVERSITY'S SCHOOL OF MEDICINE AND WENT ON TO COLUMBIA UNIVERSITY TO EARN HIS DOCTORATE IN PHYSIOLOGY.

CHIEN IS CONSIDERED A PIONEER IN UNDERSTANDING HOW MECHANICAL FORCES IMPACT THE CARDIOVASCULAR SYSTEM AND CAUSE PROBLEMS SUCH AS HEART DISEASE. HIS RESEARCH INTERESTS INCLUDE THE EFFECTS OF MECHANICAL FORCES ON GENE EXPRESSION AND SIGNAL TRANSDUCTION; THE BIOMECHANICAL PROPERTIES AND MOLECULAR ORGANIZATION OF CELL MEMBRANES; AND THE ENERGY BALANCE AND MOLECULAR MECHANISMS OF CELL-TO-CELL INTERACTIONS.

ALTHOUGH CHIEN SPENT THIRTY-FOUR YEARS ON COLUMBIA'S FACULTY, IT WAS THE OPPORTUNITY AND THE CHALLENGE TO LEAD UCSD'S BIOENGINEERING PROGRAM THAT BROUGHT HIM FROM NEW YORK TO LA JOLLA IN 1988. TODAY CHIEN CONTINUES TO GUIDE THE FAST-GROWING BIOENGINEERING PROGRAM, RANKED THIRD IN THE NATION IN 1998 BY "U.S. NEWS & WORLD REPORT," AND IS DEVELOPING CHANGES IN THE FOCUS OF BIOENGINEERING GRADUATE AND UNDERGRADUATE CURRICULA TO MEET MODERN DEMANDS.



**Q. What is your definition of "bioengineering?"**

**A.** Bioengineering is a new branch of engineering that applies engineering principles and methodologies to solve biomedical problems. These problems can be very basic, for example: How does an organ perform its function? Or it can be clinical: How can we create new methods to fight disease?

Let me give you an example. How does the heart function to pump blood out? It's a mechanical phenomenon that involves chemistry and physics, and we use engineering techniques to solve it. We link the physics and chemistry to the biology.

**Q. How much has bioengineering grown since you've been here?**

**A.** When I came ten years ago we had six faculty members and bioengineering was part of the Department of Applied Mechanics and Engineering Sciences. There was a great opportunity to develop bioengineering at UCSD into a bigger and better organization, and that was the challenge.

Now the bioengineering faculty has grown to ten. And we're still growing. The steady number will be about fifteen or sixteen in four or five years. Our student numbers are also increasing. We had about forty to fifty graduate students in 1988, and now we have seventy. Undergraduate students ten years ago

**Q. Can you touch briefly on the curricula changes at the undergraduate level?**

**A.** We have a major change going on. We now have two undergraduate tracks. One is a premedical track, in which the students go on to medical school. The other is a strict bioengineering track in which they go on to industry or to graduate school. Our emphasis there is more on biomechanics, which is our strength in the Department of Bioengineering.

We are also developing a new track in biotechnology to educate students who can meet the growing need for workers in this industry. We are currently waiting for official

*UCSD is a major strength within the biomechanics community, especially in research on the cardiovascular system. But now we're expanding into other areas also.*

As an example of a clinical application, David Gough in our department has developed a sensor for monitoring glucose in the blood. Eventually, it will be linked with a pump for insulin so we can control blood-sugar problems in diabetes. But that is just one of the examples of what bioengineering can do. There's a bioengineering relevance to most everything.

**Q. Where is UCSD positioned in this field?**

**A.** UCSD is a major strength within the biomechanics community, especially in research on the cardiovascular system. But now we're expanding into other areas also. We are developing methods for tissue engineering, understanding how tissue is organized in terms of its structure and function, through a combination of biomedical and engineering knowledge. Also, we're linking molecular and genetics approaches with engineering. We have many superb molecular geneticists at UCSD, and a lot can be gained by using a bioengineering approach.

numbered probably a couple hundred—now we're at 500.

**Q. Can you tell us about the new internship program for engineering students?**

**A.** The formal program started in 1996 with a grant from the Whitaker Foundation, with Geert Schmid-Schonbein as the principal investigator.

We have an industrial advisory board and industry liaisons from close to twenty companies. There's an exchange of information between the company and the student, a relationship that makes it very effective. We have a fairly large number of companies, around forty, that are now expressing interest. It's a great experience for the students, and it's great for their resume. When they go out and look for jobs they'll have this big plus already going for them. In fact, some of them are employed by the companies where they do internships because the companies sometimes say, "They're so good, why don't we just keep them?"

approval of the curriculum, but we're already offering some of the courses to get a head start.

**Q. What's your advice for someone who might be interested in going into bioengineering?**

**A.** They have to have a strong interest in the physical sciences, chemistry and mathematics, and, of course, biology. So they have to have this interdisciplinary approach. The underpinnings of bioengineering are physics, chemistry, and mathematics. If they have these strengths, then bioengineering is not a problem. And biology is also critical. So students have to be really strong in these fundamental subjects.

And finally, I think the humanities and language are other areas that should not be ignored. Bioengineering requires well-rounded individuals.

ASSOCIATE

PROFESSOR.

DEPARTMENT

of

LINGUISTICS



**ARIA POLINSKY,** AN ASSOCIATE PROFESSOR OF LINGUISTICS,

IS AN AUTHORITY ON LINGUISTIC TYPOLOGY AND THE DYNAMICS

OF LANGUAGE LOSS. AS A COLLEGE STUDENT IN THE FORMER SOVIET

UNION, POLINSKY—A NATIVE OF RUSSIA—STARTED OUT AS A

LITERATURE MAJOR BUT WAS SCARED OFF, SHE SAYS, BY

THE FIELD'S "VAGUENESS." WHILE PONDERING THE MYRIAD

POSSIBILITIES—RANGING FROM A CAREER IN MEDICINE

TO DROPPING OUT OF COLLEGE—SHE HAPPENED UPON

THE BOOK "LANGUAGE," BY THE GREAT AMERICAN LINGUIST

EDWARD SAPIR. THE BOOK, SHE RECALLS, STARTS WITH THE

WORDS "SPEECH IS SO FAMILIAR A FEATURE OF DAILY LIFE

THAT WE RARELY PAUSE TO DEFINE IT." AS A SEVENTEEN-YEAR-OLD

READY TO TAKE THE WORLD BY STORM, SHE THOUGHT "SURE, I'LL DEFINE IT

IN FIVE MINUTES." SHE FAILED, BUT WAS SO ENGROSSED WITH THE BOOK—AND

INTERESTED IN FINDING OUT SAPIR'S ANSWER—THAT SHE READ IT IN ONE SITTING.

ALTHOUGH SAPIR DIDN'T GIVE HER THE DEFINITIVE ANSWER, HE SHOWED HER

WHERE TO LOOK FOR ANSWERS, AND PERHAPS MOST IMPORTANTLY, SOLD HER ON

BECOMING A LINGUIST.

**Q. What are the challenges facing a linguist in today's world?**

**A.** A linguist working today faces a world that is much smaller than it was only a few years ago. So there is a lot more information available about languages from all over the world. While this is a blessing, because it allows us to create better theories of the way

language works, it is also a challenge to create adequate tools for capturing all the relevant information and keeping up with it. One of the recurrent ideas within the last few years has been creating a mega database of information about the world's languages. It is estimated that there are about six thousand languages in the world, and we have sketchy knowledge of a couple hundred at best—this goes to show you the enormity of this task. This task is particularly important because many languages in the world are under the threat of extinction, and we may be the last generation of linguists to do research on these languages.

theory that should account for more phenomena.

**Q. Tell us about your current research.**

**A.** I am currently working on three large projects that will probably take me into the twenty-first century. My first project involves the collection of grammars of several endangered languages spoken in the Northeast Caucasus. These languages have hardly been studied at all. In working on them, I have already discovered several intriguing structural traits that pose a challenge for current theories of syntax. My second project is an investiga-

optimistic these days because linguistics has become economically critical to technology and business. Linguists will be playing an increasingly important role in speech recognition and synthesis, and other computational uses, as well as advertising and multimedia. If you look up the Web pages of various computer companies, starting with Microsoft, there is always a posting for a linguist. Linguists also play a crucial role in the field of law, where expert judgments on the obvious and implied meaning of a text are so important. More and more, linguists will also find themselves teaming up with cognitive psychologists, working on the issues of language

*It is estimated that there are about six thousand languages in the world, and we have sketchy knowledge of a couple hundred at best.*

**Q. The UCSD Department of Linguistics is known for its faculty who study exotic, rare languages. Why is it important to study these languages? What do they tell us?**

**A.** There are two main reasons for that. The first is the richness of the human language potential. As I said earlier, there are about 6,000 languages in the world, and we know of just a handful of them. This means that 90 percent of the world's languages can be considered exotic. Finding out about these languages and recording them is an important humanitarian mission, as important as recording folklore, collecting exotic flora, or monitoring the migrations of species. Languages are becoming extinct at an alarming rate, succumbing to the influence of more prestigious, "large" languages such as English, Spanish, Russian, Tagalog, Mandarin, Swahili, and others, which adds urgency to this task. The second reason is that by looking at more languages, linguists are able to discover certain features that they are likely to miss if they concentrate on a smaller group of languages. This enables us to construct a more powerful

tion of the ways children learn grammatical gender. How does a three-year-old speaker of French know that the word for day (*jour*) is masculine and the word for week (*semaine*) is feminine? This project brings together recent advances in child language acquisition, psycholinguistic experiments, my own findings from the languages of the Caucasus, and connectionism, a particular strength of our campus. Last, but not least, I am working on a book describing the structural characteristics that are found again and again across languages that undergo attrition [reduction of the vocabulary and grammar due to limited use]. I currently have data on at least seven different languages. My goal is to show that there are recurrent patterns in language loss, similar to the patterns observed in pidgins and creoles, and also in speech disorders induced by brain damage.

**Q. Are there many professional opportunities for students with a linguistics major?**

**A.** As a college student, when I announced to my grandmother that I was going to be a linguist, she said, "That's good, but what is your real job going to be?" I am much more

acquisition and development.

**Q. What do you find most rewarding about being a linguist?**

**A.** I have worked on a number of languages, some widespread, some rare. In each of the projects, working with a native speaker of that language, there was a moment when I had an intuition of how they were going to say the next thing, and I was usually right! It took much longer than that to explain why they said something the way they did, and nothing could be more rewarding than that. Looking at languages the way I do has also allowed me to meet interesting people and learn about their culture and their view of the world.

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PROFESSOR

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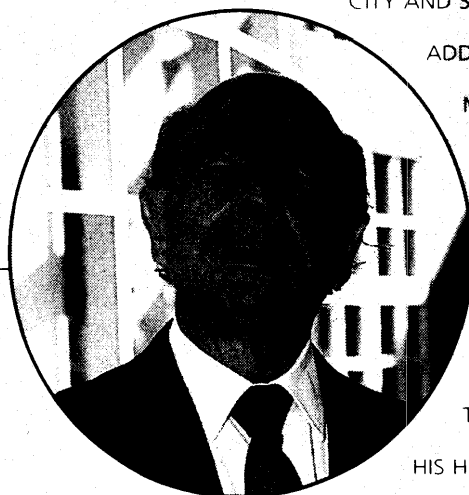
of

MEDICINE

**R. HORACIO JINICH**

TRULY PERSONIFIES A TALE OF TWO CITIES AS HE TRAVELS BETWEEN MEXICO CITY AND SAN DIEGO TO TREAT PATIENTS IN BOTH COUNTRIES.

ADDITIONALLY, HE HOLDS APPOINTMENTS AS A PROFESSOR OF MEDICINE AT BOTH THE UNIVERSITY OF MEXICO AND UCSD SCHOOL OF MEDICINE. JINICH HAS BEEN A PRACTICING PHYSICIAN AT UCSD SCHOOL OF MEDICINE AND MEDICAL CENTER FOR MORE THAN A DOZEN YEARS, WHERE HE TREATS A WIDE RANGE OF GASTROENTEROLOGY AND LIVER DISEASES. PRIOR TO PRACTICING MEDICINE IN THE UNITED STATES, JINICH CARED FOR THE SICK IN MEXICO, HIS HOMETLAND. ASIDE FROM BEING INTERNATIONALLY RENOWNED



IN HIS FIELD, HE HAS AUTHORED SEVERAL BOOKS FOCUSING ON THE DOCTOR/PATIENT RELATIONSHIP AS WELL AS ON GASTROENTEROLOGY. HIS MOST RECENT BOOK, *THE PATIENT AND HIS PHYSICIAN*, IS A BEST SELLER IN LATIN AMERICAN COUNTRIES.

**Q. What are the differences between practicing medicine in Mexico and in the United States?**

**A.** There are many differences between how medicine is practiced across borders. As far as in the United States, a positive—and sometimes negative—aspect is that medicine is more scientific, more technical, more advanced in general than it is in Mexico.

**Q. How do you feel medicine has changed since you began practicing?**

That is becoming increasingly difficult in the United States, but I have longstanding relationships with my patients in Mexico. I also have some patients who will travel from Mexico to see me in San Diego.

**Q. If there were a single piece of advice you could give medical students, what would it be?**

**A.** I would tell them, "Don't forget the human being behind the symptoms." I stick by that moral every day of my life. Although they should take advantage of the techno-

*I have a loyalty to my patients in Mexico City. Instilling a close patient/physician relationship is very important to me.*

**A.** The biggest change is parallel to the advancements made in medicine in the United States. With technological advances there has been an unnecessary devaluation of classical clinical skill, which poses serious danger to the quality of medical care. To me, that trend is worrisome.

**Q. Why did you decide to leave Mexico and practice in the United States?**

**A.** The severe social and ecological problems in Mexico made me look for a better environment for me and my family, but I did not leave Mexico City altogether. I have an appointment as a professor of medicine at the University of Mexico and a practice in Mexico City which I visit five days each month. I have a loyalty to my patients in Mexico City. Instilling a close patient/physician relationship is very important to me.

logical advances, they should not become a slave to them. There must be a balance between technological and clinical medicine. I would also tell students that it is important to remember there is a difference between disease (structural and molecular abnormalities) and illness. The latter involves a more complex set of symptoms—biological, psychological, and social. Those are the factors we should never forget.

Carol Macleod

PROFESSOR-IN-RESIDENCE,

SCHOOL

of

MEDICINE



**CAROL L. MACLEOD** KNOWS THAT THERE ARE

CERTAIN LIFE EXPERIENCES THAT RUN THROUGH US LIKE A RIVER, SHAPING AND GUIDING US. ALTHOUGH SHE WAS AN EXCELLENT HIGH SCHOOL STUDENT GROWING UP IN THE EARLY 1960S, SHE DID NOT EVEN CONSIDER A CAREER IN SCIENCE BECAUSE

WOMEN WERE GENERALLY NOT ENCOURAGED TO ENTER THE FIELD. HER CURIOSITY ABOUT TECHNICAL MATTERS DID NOT GO COMPLETELY UNNOUR-

ISHED, HOWEVER. A HIGH SCHOOL BIOLOGY TEACHER, JUNIOR HIGH

MATH TEACHER, AND HER MOTHER NOTICED HER APTITUDE AND

STOKED HER INTEREST.

TAKING A SOMEWHAT CIRCUITOUS ROUTE TO CANCER

RESEARCH, MACLEOD ATTENDED ONE YEAR OF NURSING

SCHOOL, EARNED A BACHELOR'S DEGREE *SUMMA CUM LAUDE*

FROM SAN FRANCISCO STATE UNIVERSITY, AND WORKED AS A

LABORATORY TECHNICIAN FOR SIX YEARS BEFORE RECEIVING HER

GRADUATE DEGREE IN GENE REGULATION.

BORN IN OAKLAND, CALIFORNIA, MACLEOD MOVED TO SAN DIEGO WITH HER

LAWYER-HUSBAND IN 1966. SHE WAS A VISITING GRADUATE STUDENT AT

WASHINGTON UNIVERSITY, ST. LOUIS, AND EARNED HER DOCTORATE IN GENE REGULA-

TION AT UCSD IN 1979. SHE DID HER POSTDOCTORAL TRAINING IN REGULATORY BIOL-

OGY AT THE SALK INSTITUTE. SHE HAS SINCE GONE ON TO PERFORM GROUNDBREAK-

ING RESEARCH IN THE GENETIC BASIS OF CANCER, SPECIFICALLY TUMOR GROWTH

AND METASTASIS.

TODAY SHE HOLDS THREE POSITIONS AT THE UCSD CANCER CENTER: PROFESSOR

OF MEDICINE, ASSOCIATE DIRECTOR, AND LEADER OF THE GENETICS PROGRAM. HER

OTHER PROFESSIONAL ENDEAVORS INCLUDE SERVING AS VICE-CHAIR OF THE

CALIFORNIA BREAST CANCER RESEARCH PROGRAM COUNCIL AND SPONSOR OF THE

(SAN DIEGO) HIGH SCHOOL STUDENTS RESEARCH LABORATORY EXPERIENCE.

**Q. As we approach the new millennium, what excites you about your work at UCSD and about biomedical research in general?**

**A.** Biomedical research and certainly cancer investigation are in a period equivalent to the Renaissance for art. That's how exciting I think it is. Thanks to highly sophisticated genomic research and information systems, we have the tools to identify a solution and take it to the point of application in a matter of a few years instead of a lifetime. I envy the graduate

**Q. How important was your family to you in shaping your career?**

**A.** Very important. I came from a family of six children. My father was an auto mechanic and my mother a homemaker. We didn't have much, but in many ways, coming from a working-class family was a great advantage to me because I was not afraid of hard work. I think that's why it was relatively easy for me to go to graduate school for so long while raising two children with my husband, because I was not used to a lot of luxury. I think it helped me stay focused and to use my time wisely.

Although the mammalian system of choice is still the mouse (mainly because it is cheaper to use and has a quicker gestation period), other systems are being or have been developed. These include flies, worms, and zebra fish (which are quickly replacing frogs as vertebral models).

**Q. What advice would you give students considering a career in biomedical research?**

**A.** I think preparation in mathematics and physical sciences is very important for them.

*Biomedical research and certainly cancer investigation are in a period equivalent to the Renaissance for art. That's how exciting I think it is.*

students I am training now, because they are going to be a part of a whole new age of biomedical discovery. I envision UCSD to be at the forefront, especially with its interdisciplinary approach to life sciences.

**Q. If you could name one achievement at UCSD—personal or professional—of which you are particularly proud, what would that be?**

**A.** I think it would have to be my work with both cancer education and research. I am associate director for research education for the Cancer Center. I was given the responsibility because of my love for communicating ideas about science at all levels. So I work with high school students, undergraduates, medical students, graduate students, and postdoctoral and oncology fellows. My interest is in exciting people about the opportunities available in cancer research and motivating them toward working on this very challenging problem. Equally important to me is my research and the understanding I have gained about cancer and how specific molecules and specific genetic changes lead to the disease and to its progression. That's why I eventually chose science over medicine as a career. It's the discovery of research that excites me.

**Q. What are some notable cancer research projects that you and your research team are working on?**

**A.** We are currently investigating the natural and potential pathological function of Pem, a novel homeobox gene discovered in our lab. Gene knockout technology (removing a normal gene and replacing it with a defective one) and transgenic approaches (artificially or naturally incorporating dissimilar genes into chromosomes) are underway in this study—and other studies—using mouse model systems. We are also seeking to define the role of nitric oxide in the metastasis, or spread, of breast cancer.

**Q. How important is the humane use of animal models in your research as opposed to using dishes, cells, and cultures?**

**A.** There are certain aspects that you can test therapeutically in a test tube, dish, or culture. But what you don't get from this is any information about how that substance would be used by any other cell type or another organ system, or how it would be metabolized by the body. Diseases like cancer and arthritis are still diseases of mammals and require the humane use of animal models to verify our theories and understanding for treatment.

Also, they should take every opportunity to participate in the scientific discovery process during their undergraduate years, and earlier if possible, by doing special studies in laboratories to get an idea of how science actually works.

**Q. Why should one consider coming to UCSD to study a biomedical discipline?**

**A.** Again, it would have to be for the university's interdisciplinary approach to the study of life sciences. That's what brought me here and what remains an enormous strength of this institution. For example, the close working relationship between the areas of biology, genetics, epidemiology, ecology, and molecular biology—and their close relationship with bio-engineering, chemistry, the UCSD School of Medicine, and the Cancer Center make for a unique environment in which to exchange information. This, coupled with UCSD's ties with institutions like the Salk Institute and Scripps Clinic, poises the university well for the next century.



# Bethany Lockhart

THURGOOD

MARSHALL

COLLEGE

FRESHMAN



**ETHANY LOCKHART** WAS WEL-

COMED TO UCSD WITH A HEARTY CONGRATULATIONS AND A

HUG FROM JAMES AVERY OF "FRESH PRINCE OF BEL AIR"

FAME. SHE IS THE FIRST RECIPIENT OF THE JAMES AVERY

SCHOLARSHIP, GIVEN BY THE ACTOR/UCSD ALUMNUS

THROUGH UCSD'S BLACK ALUMNI ASSOCIATION.

BETHANY WAS HONORED AT A LARGE RECEPTION

WHERE THE STAR MADE HER FEEL AT HOME WITH HIS

"CONGRATULATIONS! COME GIVE ME A BIG HUG!"

**Q. You chose an unusual combination of majors. Why?**

**A.** I was originally looking at pre-med and working as a neonatologist with babies born with drug problems. I switched to political science because I have a growing interest in the way society is structured. I want to know how things are run and how people deal with issues of power and justice. I'm interested in children's rights and giving children a fair start. I want to become more aware of who I am and my place in the world. There's

a responsibility to give back to the community. I'm considering social work or law as a career.

Dance is my outlet. It's where I find a sense of peace. I love performing, and there are a lot of opportunities at UCSD to perform. It's important to balance your academic classes with something you find happiness in. The new Dance Facility is gorgeous. The windows look out onto the eucalyptus trees. You feel like you're dancing in a forest.

**Q. What led you to choose UCSD?**

**A.** When it came to choosing where I

home. The philosophy of Thurgood Marshall College is in tune with my personal beliefs—honesty, diversity, and opening yourself to learning new things. Any stereotypes you have, any pre-judgements, all go out the door on the first day. I love Marshall's ideas. I felt this was a place I could learn more about myself.

**Q. As a freshman, you've already taken on many leadership activities. Tell us about them.**

**A.** I really love getting involved on campus. UCSD has the most diverse mixture of people you'll ever encounter. No matter where you go, you can find people to connect with—

Know your **priorities**. Each morning I say, "What do I want to **accomplish by the end of the day?**" UCSD is **like a huge candy store**. You want to try a **little of everything** and keep yourself open to **new possibilities**, new people and change. But **don't overburden** yourself or you'll burn out. **Take time** for yourself and find your favorite **spot on campus**. My friends and I found ours **outside Oceanview Terrace** [dining hall] at Thurgood Marshall College. It has a perfect view of the ocean.

**Q. Do you feel you've grown since the beginning of your freshman year?**

*Know your priorities. Each morning I say, "What do I want to accomplish by the end of the day?"*

was going to spend the next four years, I looked at everything. I literally narrowed it down by states and crossed them out! I said, "Do I want to go international? No." I was interested in Oregon because I have family there. Then I talked to a friend who was applying to UCSD. I put it on my application, then I had to make sure that it was a "Bethany decision." You have to choose a college based on where you'll be happy. I fell in love with UCSD when I came to Admit Day. I loved the idea of getting the best of both worlds—a huge university with all the opportunities, and at the same time, the intimacy of a small college.

**Q. How is Thurgood Marshall College special to you?**

**A.** At UCSD you get a personalized college where you can pick the philosophy that best suits you. When you come to college you already have your own sense of

through campus organizations, clubs, and outings. It's more than I expected. As a senator from Marshall in the Associated Students [student government] I'm on a programming committee for campuswide events. We helped plan the huge new Winterfest concert. At Marshall I'm also on SCORE, the student committee on residential enhancement, and on TASK, where we plan social events for the college.

**Q. What tips can you pass along to incoming freshmen?**

**A.** In high school I really procrastinated. But I was used to working under pressure, I was into a lot of activities and always had deadlines. When I came here I was not prepared for the quarter system, but I had a better sense of how to structure my time. At UCSD, even though everyone's busy, you can always find people to support you—professors and academic support staff at your college. Develop a relationship with faculty members, and know they're here to help you.

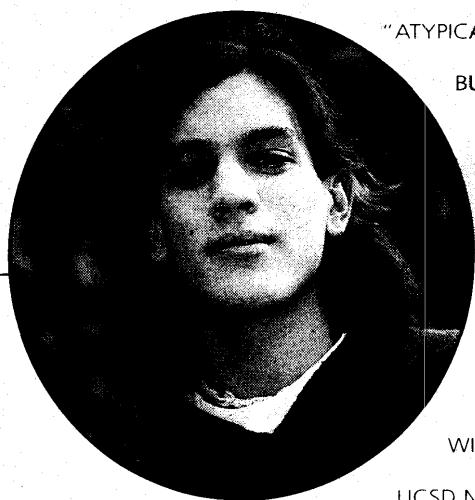
**A.** When you come to UCSD, you totally reevaluate who you are and where you want to be. The minute you walk onto campus your whole world changes. When I went home on my first break, I thought, "Things look so different. The house looks different, the cats look different." You think, "Wow, everything has changed." But it's really you who has changed.

*awa*

REVIEW

COLLEGE

SENIOR



**PETER NANAWA** ADMITS TO BEING AN

"ATYPICAL ENGINEER." PEOPLE MAY SEE HIM AS A LONG-HAIRED SURFER, BUT HE SAYS HE'S AN ENGINEER AT HEART. HE CAME TO UCSD AS A BIOENGINEERING/PRE-MEDICAL MAJOR AND PLANNED TO BE A DOCTOR. HOWEVER, HIS EXPERIENCE IN A CAMPUS ROCK BAND ACTUALLY LED HIM TOWARD ELECTRICAL ENGINEERING. HE STARTED BUILDING GUITAR AMPLIFIERS DURING THE SUMMER OF HIS SOPHOMORE YEAR AND BECAME INSPIRED BY ELECTRONICS. HE DECIDED THAT HIS CAREER SHOULD ALSO BE HIS HOBBY. HE WILL PURSUE A MASTER'S DEGREE IN ELECTRICAL ENGINEERING AT UCSD NEXT YEAR.

**Q. Do you plan to combine your background in bioengineering with your new field of electrical engineering?**

**A.** My engineering professors gave me such good advice: They encouraged me to pursue my master's degree. They gave me insight into what majors will open up job opportunities. I'll end up using electronics to make things for the body. It's called bioinstrumentation. One of my professors is working on an implantable electronic glucose sensor. There are a lot of biotechnology companies, especially in the

San Diego area. I might even go on for a doctorate.

**Q. How do you feel about UCSD after four years here?**

**A.** UCSD was the obvious choice for me. It has a great reputation for engineering and the sciences. The campus with its eucalyptus groves is beautiful. A beautiful campus affects your morale and how you view life. It improves your whole well-being. The ocean cliffs are my favorite place here. I've spent a lot of time out there when I had humanities books to read. Later on in life when I think back about UCSD, I'll remember just hanging out on the ocean cliffs with a couple of friends.

month at a Mexican orphanage. We spent time with the kids and played basketball with them. It was very rewarding. It also allowed us to get to know the rest of the students in our residence hall.

Now I live off-campus with three roommates. It's another step toward independence. We had to learn to cook and pay our bills on time!

**Q. What study skills have you picked up over the years?**

**A.** At first UCSD was difficult for me. I wasn't very good at taking notes. It was definitely something I needed to work on. When finals rolled around I didn't have much to go on.

They make you crawl up a river or through a sand pit and finally you dive in, head and all, into a mud pit ... for fun. A woman won the race and shocked all the marines and Navy Seals!

I love San Diego; the weather's always perfect. I backpack in Cuyamaca State Park. There are a lot of good bike trails around Alpine. One of my newest experiences here is backpacking in the desert. It's such a tranquil environment. When the desert flowers are in bloom, it's the most beautiful time to be in Borrego Springs.

**Q. What wisdom would you like to share with incoming freshmen?**

*There are so many opportunities here, with so many choices and possibilities to explore. Don't hold back. Four years can go by fast.*

Also, for a feeling of independence, UCSD was the perfect distance from home, but still close enough that I could make it home each holiday. I knew I was coming here when I took the campus tour.

**Q. Why did you choose Revelle College?**

**A.** Revelle encourages students to be well-rounded. It has demanding requirements, but I knew how valuable they would be. The most interesting thing about Revelle was that everyone had chosen it for the same reasons. Everyone is eager to make friends. You all live together in the residence halls. You're all just starting life away from home. In my residence hall they encouraged us to take part in programs. We worked once a

The first quarter after I got my grades I realized it wasn't going to be as easy as I thought. When I saw that I had spent too much time surfing, I got a lot of help from my suitemates. Everybody is study-oriented. I just budget my time as well as I can. I get home and get my work done. That way I can go on a backpack trip or go out at night.

**Q. You are a versatile athlete. Do you find UCSD conducive to outdoor activities?**

**A.** During orientation my roommate and I chose each other. We talked about surfing and went surfing a lot during our first year. It definitely worked out.

I got a job at the campus bike shop and the new manager at the shop got us involved in training for triathlons. I was already interested in biking and running. I came in first in my age group in my second triathlon. Our team even did a "mud run."

**A.** Learn for yourself. Learn to live for yourself. See what it's like to be on your own. UCSD is such a diverse place. Just the experience of college is so important. There are so many opportunities here, with so many choices and possibilities to explore. Don't hold back. Four years can go by fast.

# Tina Mohindra

EARL

WARREN

COLLEGE

SOPHOMORE



**TINA MOHINDRA** IS STUDYING FOR HER U.S. CITIZENSHIP, AS IF ACADEMIC LIFE AT UCSD DIDN'T KEEP HER BUSY ENOUGH. HER FAMILY CAME FROM INDIA "FOR THE AMERICAN DREAM"

WHEN SHE WAS A TODDLER. UCSD WAS A NATURAL CHOICE FOR TINA. SHE SAYS THAT HER MIND WAS ALWAYS "GEARED" TO A UC SCHOOL BECAUSE THE UNIVERSITY OF CALIFORNIA IS A POINT OF PRIDE WITHIN THE INDIAN COMMUNITY.

SHE EXPANDS HER CAMPUS SOCIAL LIFE BY PARTICIPATING IN THE INDIAN CLUBS, SUCH AS SANGAM. THEIR PROGRAMS HAVE INCLUDED BANQUETS, A BOAT DANCE, AND A SKI TRIP. SHE ALSO SERVES ON THE INDIAN STUDENT COUNCIL.

**Q. How is your communication major preparing you for a career?**

**A.** It's a versatile major. My classes are very interesting. I learn interesting facts about the media, big corporations, and television bidding wars. I hope to get my M.B.A., then do marketing or media advertising for a large company. I know I'll have to work my way up—I'm not going to be the marketing director of IBM at first!

The communication faculty are all very inviting. They want you to come visit them in

their offices. I made it a point to introduce myself to professors this year. I've also spent more time asking them questions over email. When professors take the time to answer you personally, that's really cool.

**Q. How has Earl Warren College affected your "UCSD experience?"**

**A.** Warren has a hominess to it. We've taken trips to Padres games and Knott's Berry Farm. We've had dances. At Warren you come out a well-rounded person. The general-education requirements are less structured than those at some other colleges. Living on campus is so convenient.

freshmen were so great. They would say to me, "Wow, you seem so much older" and I'd laugh, "I'm just a year older than you!"

**Q. How was the transition from high school to UCSD?**

**A.** Adjusting to college wasn't easy. You can't explain how fast the quarter system moves. Suddenly it's third week and I'm in midterms! I blink an eye and I'm at finals. But I got through it. Also, the classes are harder than high school. But I adjusted very well. I finally realized it's not a "moving on and leaving high school behind," it's moving toward the future.

when to talk. I stayed up so many nights talking last year. This year by second week I was already in the library studying!

**Q. You're already building memories of UCSD. Tell us some of them.**

**A.** For Warren College's annual semiformal dance at the Hilton, we were all nicely dressed. Afterwards, twenty of us came home, changed clothes, and went out to the beach. We just sat on blankets on the sand and talked for hours about everything.

College is a place for experience. Expect that, and come out with 100 times more

*College is a place for experience. Expect that, and come out with 100 times more than you went in with. Make it count.*

All our friends are here. Last year I was in a suite where you automatically meet seven other people. This year four of us share an on-campus apartment. It's kind of a pain to have to cook this year. At first it was macaroni and chips. Now we "do pasta."

Each college has its own academic advisers and deans. It's not like there are 15,000 students waiting to talk with an adviser. I've never had to wait to see one. And being a Warren orientation leader was the experience of a lifetime. The incoming

I came to UCSD knowing no one, zero. It was a good experience. Now I totally love it. And San Diego is beautiful. When I go home to visit I talk with my roommates on the phone. My mom says, "You live with them. You don't need to talk with them on the phone!"

**Q. Do you have any study tips for new students?**

**A.** Don't go out the night before a midterm! I study between classes during the day, and at night I can hang out with my friends. I do everything in increments, not excessively. Learn to balance your life and deal with the quarter system and social life. Then you'll be fine. You learn such time management skills at UCSD—when to study,

than you went in with. Make it count. You're here to experience life. I've already changed so much—the way I talk and answer questions, my ideals, the way I think. In my first year I learned how to adjust, compromise, and manage my time. It's not just classroom learning; it's experience with life. I hope to learn that much every year.

JOHN

MUIR

COLLEGE

JUNIOR



**EAN EDGETT** IS KEEPING

HIS OPTIONS OPEN. HE SAYS HE'S PRE-MED, PRE-LAW, PRE-PH.D. AND

"PRE-EVERYTHING ELSE," AND DOESN'T WANT TO STOP STUDY

ING UNTIL HE HAS "DOCTOR" OR "ESQUIRE" ADDED TO HIS

NAME. SEAN HAS A DOUBLE MAJOR IN COGNITIVE SCI-

ENCE AND PSYCHOLOGY, AND A MINOR IN CHEMISTRY.

HE IS CONSIDERING GOING TO MEDICAL SCHOOL OR

TEACHING AT THE COLLEGE LEVEL.

**Q. What led you to change your major after you came to UCSD?**

**A.** I came here in biology and pre-med. The more I took the hard-core science classes, the more I felt detached from the subjects. Then I took a cognitive science class and it spiked my interest. It's a compilation of neuroscience, computer science, psychology, linguistics, and more. Cognitive science dives into the mind to see how it works in relation to other subjects. It's so great to go to class and say, "I can't wait to see what they teach us next." When you do something you love, you apply it and gain a greater understanding from it.



**Q. What is your experience with UCSD's faculty?**

**A.** UCSD's professors are accessible, knowledgeable, and very approachable. They're very willing to help you out. I recommend going to their office hours and seeing what research your professor is doing. It's kind of unnerving at first; you know there's a dynamic faculty here and you're in awe of them. Then when you see them on a personal basis with a question, they understand because they were once in your position.

This quarter I'm teaching a section of Psychology 60 (statistics) for Professor

you excel. It makes the transition to college so much easier. At Muir we say, "A dorm is a place you eat and sleep; a residence is where you live!" My friends and I love living on campus. People say to me, "Oh, you went to San Diego for the beach." That's not true, but it is an added bonus to have an ocean view from my room.

**Q. You lead a whirlwind life on campus. Tell us about your activities.**

**A.** Get involved on campus. There is so much to do and a great opportunity to meet people and have a social life. I love to make people laugh and feel good. I produce a

I also advise getting into study groups with other students. It helps you see things from other angles.

The workload at UCSD is considerable but very doable. At first, I was saying, "Did they fit sleep into my schedule anywhere?!" But all the students here are in the same boat, and everybody wants to help each other.

And I run with friends as a release. It helps me study and focus. I run like crazy and vent my frustrations.

**Q. You say that UCSD is "liberating." Why?**

*Cognitive science dives into the mind to see how it works in relation to other subjects. It's so great to go to class and say, "I can't wait to see what they teach us next."*

Vincent Stretch. He's a great professor—he tries to make his lectures fun. The whole teaching thing excites me. I would love to teach on the college level.

**Q. You enjoy John Muir College's friendly atmosphere. Tell us more about that.**

**A.** I wanted a "family feeling" from a university and UCSD's five-college system provides it. It gives you the power and prestige of a large university with the personal closeness and interaction of a small facility. John Muir College is so friendly. In the Muir Quad, people walk by and say, "Hey, how are you?"

People envy Muir for its really cool housing system. Every two floors of the residence halls constitute a 'house,' so every week you interact with more than sixty people. It makes you comfortable, and comfort helps

comedy/talk show on Muir TV with professional comedians from the Comedy Store here in La Jolla or from Los Angeles. I also sit on Muir's Judicial Board and its Program Board, which plans fun ways for people to meet. We actually blew fake snow into the Quad for our winter dance. And being a Muir orientation leader is such a great experience. I like to reach out to students and make them feel comfortable about the college they chose. I'm currently a student adviser in the Academic Advising Office at Muir. I help first- or second-year students deal with any anxiety they might be having with their major.

**Q. How do you balance your busy extracurricular life with academics?**

**A.** Time management is the key to getting through college. My suitemates and I take turns being "Motivator of the Week," making sure everyone goes to the library and keeps on task. If we complain, the motivator says, "You get mad at me now, but it's your turn next week!"

**A.** You're on your own, you make your own choices, you're able to experience what you like. In high school, the system pushes you; here, you utilize the system and decide the best route for yourself.

I want to look back at my time at UCSD and say I've gained a lot of life experience. I want to live with a vast bank of knowledge and say I've tried a lot of things and met a lot of interesting people. I thought UCSD was going to be community-oriented and personal and an exciting place. It has gone far beyond my expectations.

ELEANOR

ROOSEVELT

COLLEGE

SENIOR

**ANNA PEREZ**



TAUGHT HER FRIENDS AT UCSD HOW TO CARVE JACK-O-LANTERNS

AND HANG CHRISTMAS LIGHTS. THESE CUSTOMS WERE

ENTIRELY NEW TO MANY OF THE RESIDENTS OF

INTERNATIONAL HOUSE, WHERE ANNA LIVES WITH A

DIVERSE MIX OF EXCHANGE STUDENTS FROM ACROSS

THE WORLD AND THE UNITED STATES WHO HAVE A

DEEP INTEREST IN LIFE FROM A GLOBAL PERSPECTIVE.

I-HOUSE, AS THE RESIDENCE HALL ON THE ELEANOR

ROOSEVELT COLLEGE CAMPUS IS AFFECTIONATELY KNOWN, IS

“A REALLY NEAT EXPERIENCE,” ACCORDING TO THIS SENIOR, AND A

WAY OF GETTING TO KNOW OTHER CULTURES. HER ROOMMATES ARE FROM

ITALY AND HONG KONG. ANNA HERSELF IS AN INTERNATIONAL MIX OF

PERUVIAN, POLISH, AND IRISH.

**Q. What was UCSD like for you as a new freshman?**

**A.** College is such a different experience. I was kind of scared. You can't get up and go to breakfast in your p.j.'s! You have to get used to living with other people. But once I got involved on campus, I felt part of the community. Classes were overwhelming at first. In high school you

have a whole bunch of assignments, so you can raise your grades. Here you have one paper and two tests. I was really shocked. But by the second quarter I got used to it. Now I think about how long a semester was.

UCSD also seemed so big. I got lost on my first day in the building I was actually supposed to be in! When my friends and I realized how much we'd be walking, we said to each other, "We're going to lose so much weight!" People talk about "the freshman fifteen" weight gain and we didn't understand that concept.

career. It forced me to be outgoing and a role model for incoming freshmen. I helped them sign up for classes and took them on campus tours. I had skits about getting used to college life, and even one to help parents avoid being too overprotective.

**Q. You've lived on campus all four years. Have you enjoyed it?**

**A.** I recommend living on campus. I've met a lot of nice people in the residence halls. The students in I-House plan fun activities and trips to get to know each other. Every other week students take turns hosting a "coffee house" where we can take a study

tary school **teaching credential**. As an undergraduate, TEP **requires that students take six classes where you're working with children in classrooms**. Last quarter I **mentored with a fifth grade class**, and I **learned a lot**. We emphasized how hard work **will get you** somewhere in the world and tried to **teach the kids** always to do more than the **minimum**.

**Q. As a senior, how do you feel about your years at UCSD?**

**A.** I value my time at UCSD. I came in unsure of what I'd want to do. I'm leaving happy with what I've done and the choices

*You come here thinking you know everything about yourself. I found that I can be a member of society who can make good decisions based on what I've learned here and the activities I've done.*

**Q. Tell us about being an Eleanor Roosevelt College student.**

**A.** UCSD's five-college system is excellent. At Eleanor Roosevelt you're part of a small community where you don't feel overwhelmed or lost in a crowd. I never feel like I can't approach people, even the provost. The staff is great and willing to help you. And there are all sorts of clubs, committees, athletics, and programs. Don't hide in your room. The colleges encourage you to get involved and there definitely is a social life at UCSD.

Being an orientation leader at ERC was the best thing I've done in my college

break. Last night it was our turn and we had at least thirty people over. There are also Culture Nights, dances and "language tables," where you can spend an evening speaking another language.

**Q. Why did you choose urban studies and planning as a major?**

**A.** My first year I had no idea what I wanted to do, so I flipped through the catalog. I had never even heard of urban studies, but found out I could take classes from so many areas. It gave me so many options. The faculty really bring a lot to the classes through their own experiences.

This quarter I have an internship in the Resource Recovery (recycling) program of the County of San Diego's Public Works Department.

I hope to get into UCSD's TEP (Teacher Education Program) next fall for an elemen-

I've made. I've grown a lot and I'm more of an individual. I never thought that would happen. You come here thinking you know everything about yourself. I found that I can be a member of society who can make good decisions based on what I've learned here and the activities I've done. With the broad education I received here, I'll be able to be a more active citizen in the world.



# Courses, Curricula, and Programs of Instruction

## Key to course listings

Courses numbered 1 through 99 are lower-division courses and are normally open to freshmen and sophomores.

Courses numbered 100 through 199 are upper-division courses and are ordinarily open only to students who have completed at least one lower-division course in the given subject, or six quarters of college work.

Courses numbered 200 through 299 are graduate courses and are ordinarily open only to students who have completed at least eighteen upper-division units basic to the subject matter of the course.

Courses numbered 300 through 399 are professional courses for teachers, which are specifically designed for teachers or prospective teachers.

Courses numbered 400 through 499 are other professional courses.

Sample Course Listing:

**100 (see above) Title of Course (4) (number of quarter hours or units of credit)**

Course Description. Prerequisites: [listed]. (F) [Quarter the course is taught].

## Academic Internship Program

OFFICE: Literature Building, Second Floor, Warren College

### THE PROGRAM

The Academic Internship Program (AIP) offers qualified juniors and seniors the opportunity to acquire valuable work experience related to academic and career interests. Although most internships are in the San Diego area, the Academic Internship Program is national in scope including the popular Washington, D.C. program where housing arrangements and orientations are part of the program. An exten-

sive library lists over 1500 available internships in varied settings including but not limited to: TV and radio stations, law offices, medical research labs and clinics, government agencies, high-tech and biotech companies, engineering, advertising and public relations firms, and financial institutions. Students can also work with the internship office to set up their own positions.

The program operates all four quarters; students intern a minimum of ten hours per week and can earn units of upper-division credit ranging from zero to twelve in increments of four. Students may enroll in a maximum of four internships and/or earn sixteen units of internship credit over the course of their junior and senior years. The number of units earned corresponds to the number of hours worked, actual job description and the length of a research paper/project. The research paper/project along with relevant readings comprise the academic component of the program which is directed by a faculty adviser. Zero-unit internships do not require a faculty adviser. All students earn a grade of P/NP and receive a transcript notation.

The AIP services students from all five colleges and handles all undergraduate majors. Students planning to participate in the Academic Internship Program should apply at least one quarter before they wish to be enrolled in the program, or two quarters prior to a Washington, D.C. internship. Students planning to set up their own internships out-of-town are encouraged to apply two quarters in advance.

To be eligible for the program students must have completed at least ninety units of credit with some related upper-division course work and have a minimum 2.5 GPA at the date of application.

### 197. Academic Internship Program (0-12)

Individual placements for field learning which are integrated with academic programs will be developed and coordinated by the program. A written contract involving all parties will include learning objectives, a project outline, and means of supervision and progress evaluation, and must be received prior to the beginning of the internship. Prerequisites: consent of instructor and submission of a written contract.

## Advanced Manufacturing Program

See Engineering, School of.

## African Studies Minor

OFFICE: 3311 Literature Building, Warren Campus  
(619) 822-0265

### PARTICIPATING FACULTY

#### Professors

Bennetta Jules-Rosette, Ph. D., *Sociology*,  
Coordinator

Rae Blumberg, Ph. D., *Sociology*

Robert Cancel, Ph. D., *Literature*

Ivan Evans, Ph. D., *Sociology*

Ann Ducille, Ph. D., *Literature*

Augustin Holl, Ph. D., *Anthropology*

Jonathan Holloway, Ph.D., *Ethnic Studies*

Robert Horwitz, Ph. D., *Communications*

Kathleen Hubbard, Ph.D., *Linguistics*

Thomas E. Levy, Ph. D., *Anthropology*

Maria Polinsky, Ph.D., *Linguistics*

Edward Reynolds, Ph. D., *History*

Sharon Rose, Ph. D., *Linguistics*

Marc J. Swartz, Ph. D., *Anthropology*

Quincy Troupe, B.A., *Literature*

**African Studies** is an interdisciplinary minor that covers African topics and issues through a coordinated set of courses offered in the Departments of Anthropology, Communication, Ethnic Studies, History, Literature, Music, Political Science, Sociology, Theatre Arts, and Visual Arts. In addition to the offerings at UCSD, opportunities for further study in Africa and Europe are available through the University of

California Education Abroad Program, with programs in Ghana and South Africa as well as at the National University of Côte d'Ivoire, the Université de Paris V, the Université de Bordeaux II, and study abroad programs offered through other U.S. universities. A number of African languages are available through the UCSD Department of Linguistics. Students may take independent study units and tutorials with faculty in the program to learn the languages of their respective areas of interest. In addition, students are encouraged to participate in special seminars and presentations offered annually by the African and African-American Studies Research Project. Students may take the seminars for credit by signing up for a 198/199 with a qualified African Studies professor. A minor in African Studies consists of seven total courses. Students may take no more than four courses in any one department. Also, a minimum of one course each from of the following three groups is required: Group A-Traditional Cultures and Pre-Modern Africa, Group B-African Society and Politics, and Group C-African Expressive Culture.

The **African Studies Minor** provides students with a broad background in African history, societies, culture, and politics. Please contact Professor Bennetta Jules-Rosette in the Department of Sociology (Social Science Building, Rm. 471), (619) 534-4790 or the African Studies Office at (619) 822-0265 for more information. Quarterly course offerings are subject to change. Interested students should consult the program faculty for an up-to-date list.

## COURSES

### Group A: Traditional Cultures and Pre-modern Africa

- ANRG 104. Traditional African Societies and Cultures (4)  
 ANRG 105. Ethnoarchaeology (4)  
 ANGN 168. Nature and Nurture: Race Gender, and Culture (4)  
 Com/Cul 118. Oral History (4)  
 Ethnic Studies 142. Languages of Africa (4)  
 HIAF 110. History of Africa to 1880 (4)  
 HIAF 120. History of South Africa (4)  
 HIUS 135. Slavery and the Atlantic World (4)

### Group B: African Society and Politics

- ANGN 101. Chiefdoms, States and the Emergence of Civilizations (4)  
 ANGR 203. Classics in African Ethnographies (4)  
 Com/Cul 179. Colonialism and Culture (4)  
 Ethnic Studies 157. Ethnic Conflict in the Third World (4)  
 HIAF 111. Modern Africa Since 1880 (4)  
 HIAF 130. African Society and the Slave Trade (4)  
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 HIUS 136. Slavery and Freedom in Nineteenth-Century U.S.: Images and Realities (4)  
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 Political Science 136B. Comparative Politics and Political Culture (4)  
 Soc C/148C. Power, Culture, and Social Revolt (4)  
 Soc C/157. Religion in Contemporary Society (4)  
 Soc D/158. Islam in the Modern World (4)  
 Soc D/188A. Community and Social Change in Africa (4)  
 Soc D/188J. Change in Modern South Africa (4)

### Group C: African Expressive Culture

- Com/Cul 127. Folklore and Communication (4)  
 Com/Cul 146. Culture and Thought (4)  
 Com/Cul 181. Colonialism and Culture 181 (4)  
 Ethnic Studies 176. Black Music/Black Text: Communication and Cultural Expression (4)  
 LTGN 130. Novel and History in the Third World (4)  
 LTGN 132. African Oral Literature (4)  
 LTGN 133. Introduction to Literature and Film of Modern Africa (4)  
 LTGN 185. Literature and Ideas (4)  
 LTGN 186A-B-C. Modernity and Literature (4-4-4)  
 LTEN 187. Black Music/Black Text: Communication and Cultural Expression (4)  
 LTEN 188. Contemporary Caribbean Literature (4)  
 MUS 13AF. World Music/Africa (4)  
 MUS 111. World Music Traditions (4)  
 MUS 126. Introduction to Oral Music (4)  
 MUS 127A-B. Music of Black Americans (4-4)  
 Soc A/105. Ethnographic Film (6)  
 Soc D/187. African Societies Through Film (4)  
 TH/HS 109. Modern Black Drama (4)  
 TH/HS153. Dance History-Jazz Dance & Related Ethnic Studies (4)  
 Visual Arts 126A. African and Afro-American Art (4)  
 Visual Arts 127B. Western & Non-Western Rituals & Ceremonies (4)  
 Visual Arts 127D. Primitivism and Exoticism in Modern Art (4)  
 Visual Arts 128E. Topics in Non-Western Art (4)

## Anthropology

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Christena Turner, Ph.D., Associate Professor,  
*Sociology*

Kathryn A. Woolard, Ph.D., Associate  
Professor, *Sociology*

Lisa Yoneyama, Ph.D., Assistant Professor,  
*Literature*

Anthropology is a humanistic social science dedicated to understanding the worldwide diversity of social institutions and cultural traditions. Because there is increasing awareness of the importance of sociocultural factors in domestic and international relations, a bachelor's degree in anthropology has become accepted as a valuable preparation for careers in law, medicine, education, business, government, and various areas of public service. Anthropology majors can qualify for a California teaching credential from UCSD through the Teacher Education Program. The department offers a full range of courses in cultural, social, psychological and biological anthropology, as well as archaeology. Courses include offerings which focus on specific societies or regions of the world as well as more theoretically oriented materials. The department offers undergraduate minor and major programs, a senior thesis program, an undergraduate internship program, and a graduate program leading to the doctoral degree. Students may also enroll in a UCSD Archaeological Field School held in Israel, Jordan, and other regions.

### **The Undergraduate Program**

#### *Lower-Division*

Lower-division offerings in anthropology are concentrated mainly in the core series, ANLD 1, 2, 3. These courses are designed to provide a comprehensive orientation to the ideas and methods of anthropological investigation and a familiarity with case materials from a number of different societies and historical periods.

Students who intend to major or minor in archaeological anthropology are advised to take ANLD 3.

Students who intend to major or minor in biological anthropology must take ANLD 2 (or equivalent), which is prerequisite to most upper-division biological anthropology courses.

ANLD 23, which may not be offered every year, satisfies the campus-wide requirement for a course in American Cultures.

Students who have already completed ANPR 105, 106, and 107 may not receive academic credit for ANLD 1.

Other lower-division courses are offered from time to time and will vary from year to year.

#### *The Minor*

Students may choose a minor in general anthropology, archaeological anthropology, or biological anthropology. Each consists of seven anthropology courses. At least five courses must be upper-division; at least four should be taken at UCSD. The list of courses offered for each minor is available from the undergraduate coordinator. Transfer credits from other anthropology departments are usually accepted. Education Abroad Program credits are acceptable at the discretion of the undergraduate adviser.

#### *The Major*

To receive a B.A. degree with a major in anthropology, the student must meet the requirements of Revelle, John Muir, Thurgood Marshall, Earl Warren, or Eleanor Roosevelt College, including the following requirements of the Department of Anthropology:

1. A minimum of twelve four-unit upper-division courses in the Department of Anthropology must be completed.
2. ANPR 105, 106, and 107 must be completed (included as three of the twelve courses required under No. 1, above). All or some of the courses in this sequence are prerequisites for some other upper-division courses. This sequence consists of:  
105 Social Anthropology  
106 Cultural Anthropology  
107 Psychological Anthropology
3. No courses taken in fulfillment of the above requirements may be taken on a Pass/Not Pass (P/NP) basis. (An exception is made for some courses accepted from other schools and for **one** independent study course (199), **or one** directed group study course (198), **and** a combination of **one** internship seminar (ANBI 187A, C or ANPR 187B) with the corresponding academic internship project (AIP 197). However, this exception does not extend to ANPR 105, 106 and 107, or to transfer credits accepted in lieu of them. These **must** be taken for a letter grade.)

4. For the B.A. degree, a minimum average of 2.0 is required, both as an overall average in all anthropology courses and in the ANPR 105-106-107 sequence considered separately.
5. At least seven of the upper-division courses submitted for the major must be taken at the University of California, San Diego. The seven normally must include ANPR 105, 106, and 107. A transfer course may be accepted in lieu of one of these "core" courses, if, in the opinion of the undergraduate adviser, the content is substantially the same. In no case will transfer credit be accepted in lieu of more than one of these courses.
6. Majors are required to obtain a background in basic statistical techniques. Sociology 60 and BIEB 100 are recommended as courses to fulfill this requirement.

#### *The Major in Anthropology with Concentration in Archaeology*

The department offers an additional B.A. degree, "Anthropology with Concentration in Archaeology." This degree requires the following:

1. The Anthropology Core Sequence: ANPR 105, 106, 107.
2. The Archaeology Core Sequence: ANGN 181, 182, 183 (formerly ANGN 145, 100, 101).
3. An additional upper-division course in sociocultural anthropology.
4. Five elective courses, three of which must be in archaeology, and the remaining two can be either from offerings in archaeology or in related disciplines. A handout listing these courses is available from the department's undergraduate coordinator. Students are encouraged to participate in the department's Archaeological Field School (ANPR 194) opportunities in the eastern Mediterranean region.

#### *The Major in Anthropology with Concentration in Biological Anthropology*

The department offers another B.A. degree, "Anthropology with Concentration in Biological Anthropology." This degree requires the following:



California Education Abroad Program, with programs in Ghana and South Africa as well as at the National University of Côte d'Ivoire, the Université de Paris V, the Université de Bordeaux II, and study abroad programs offered through other U.S. universities. A number of African languages are available through the UCSD Department of Linguistics. Students may take independent study units and tutorials with faculty in the program to learn the languages of their respective areas of interest. In addition, students are encouraged to participate in special seminars and presentations offered annually by the African and African-American Studies Research Project. Students may take the seminars for credit by signing up for a 198/199 with a qualified African Studies professor. A minor in African Studies consists of seven total courses. Students may take no more than four courses in any one department. Also, a minimum of one course each from of the following three groups is required: Group A-Traditional Cultures and Pre-Modern Africa, Group B-African Society and Politics, and Group C-African Expressive Culture.

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Kathryn A. Woolard, Ph.D., *Associate Professor, Sociology*

Lisa Yoneyama, Ph.D., *Assistant Professor, Literature*

Anthropology is a humanistic social science dedicated to understanding the worldwide diversity of social institutions and cultural traditions. Because there is increasing awareness of the importance of sociocultural factors in domestic and international relations, a bachelor's degree in anthropology has become accepted as a valuable preparation for careers in law, medicine, education, business, government, and various areas of public service. Anthropology majors can qualify for a California teaching credential from UCSD through the Teacher Education Program. The department offers a full range of courses in cultural, social, psychological and biological anthropology, as well as archaeology. Courses include offerings which focus on specific societies or regions of the world as well as more theoretically oriented materials. The department offers undergraduate minor and major programs, a senior thesis program, an undergraduate internship program, and a graduate program leading to the doctoral degree. Students may also enroll in a UCSD Archaeological Field School held in Israel, Jordan, and other regions.

### **The Undergraduate Program**

#### ***Lower-Division***

Lower-division offerings in anthropology are concentrated mainly in the core series, ANLD 1, 2, 3. These courses are designed to provide a comprehensive orientation to the ideas and methods of anthropological investigation and a familiarity with case materials from a number of different societies and historical periods.

Students who intend to major or minor in archaeological anthropology are advised to take ANLD 3.

Students who intend to major or minor in biological anthropology must take ANLD 2 (or equivalent), which is prerequisite to most upper-division biological anthropology courses.

ANLD 23, which may not be offered every year, satisfies the campus-wide requirement for a course in American Cultures.

Students who have already completed ANPR 105, 106, and 107 may not receive academic credit for ANLD 1.

Other lower-division courses are offered from time to time and will vary from year to year.

#### ***The Minor***

Students may choose a minor in general anthropology, archaeological anthropology, or biological anthropology. Each consists of seven anthropology courses. At least five courses must be upper-division; at least four should be taken at UCSD. The list of courses offered for each minor is available from the undergraduate coordinator. Transfer credits from other anthropology departments are usually accepted. Education Abroad Program credits are acceptable at the discretion of the undergraduate adviser.

#### ***The Major***

To receive a B.A. degree with a major in anthropology, the student must meet the requirements of Revelle, John Muir, Thurgood Marshall, Earl Warren, or Eleanor Roosevelt College, including the following requirements of the Department of Anthropology:

1. A minimum of twelve four-unit upper-division courses in the Department of Anthropology must be completed.
2. ANPR 105, 106, and 107 must be completed (included as three of the twelve courses required under No. 1, above). All or some of the courses in this sequence are prerequisites for some other upper-division courses. This sequence consists of:  
105 Social Anthropology  
106 Cultural Anthropology  
107 Psychological Anthropology
3. No courses taken in fulfillment of the above requirements may be taken on a Pass/Not Pass (P/NP) basis. (An exception is made for some courses accepted from other schools and for **one** independent study course (199), **or one** directed group study course (198), **and** a combination of **one** internship seminar (ANBI 187A, C or ANPR 187B) with the corresponding academic internship project (AIP 197). However, this exception does not extend to ANPR 105, 106 and 107, or to transfer credits accepted in lieu of them. These **must** be taken for a letter grade.)

4. For the B.A. degree, a minimum average of 2.0 is required, both as an overall average in all anthropology courses and in the ANPR 105-106-107 sequence considered separately.
5. At least seven of the upper-division courses submitted for the major must be taken at the University of California, San Diego. The seven normally must include ANPR 105, 106, and 107. A transfer course may be accepted in lieu of one of these "core" courses, if, in the opinion of the undergraduate adviser, the content is substantially the same. In no case will transfer credit be accepted in lieu of more than one of these courses.
6. Majors are required to obtain a background in basic statistical techniques. Sociology 60 and BIEB 100 are recommended as courses to fulfill this requirement.

#### ***The Major in Anthropology with Concentration in Archaeology***

The department offers an additional B.A. degree, "Anthropology with Concentration in Archaeology." This degree requires the following:

1. The Anthropology Core Sequence: ANPR 105, 106, 107.
2. The Archaeology Core Sequence: ANGN 181, 182, 183 (formerly ANGN 145, 100, 101).
3. An additional upper-division course in sociocultural anthropology.
4. Five elective courses, three of which must be in archaeology, and the remaining two can be either from offerings in archaeology or in related disciplines. A handout listing these courses is available from the department's undergraduate coordinator. Students are encouraged to participate in the department's Archaeological Field School (ANPR 194) opportunities in the eastern Mediterranean region.

#### ***The Major in Anthropology with Concentration in Biological Anthropology***

The department offers another B.A. degree, "Anthropology with Concentration in Biological Anthropology." This degree requires the following:

1. The Core Sequence: ANPR 105, 106, 107.
2. Five four-unit anthropology courses identified as biological anthropology courses; ENVR 110 may be substituted for one of these. A handout listing these courses is available from the department's undergraduate coordinator.
3. Four four-unit courses in the Department of Biology; ECON 131 may be substituted for one of these. Courses which are applicable are also listed in the biological anthropology handout.
4. Items 3 through 6 in the above section ("The Major in Anthropology") also apply to the major in anthropology with concentration in biological anthropology.

### ***Senior Thesis Program***

The senior thesis is prepared during two successive quarters of ANPR 196, senior thesis research, and is counted as two of the twelve upper-division courses required for a major. Students are admitted to the program by invitation of the faculty. Under normal circumstances, eligibility for the program requires the student (1) to have completed eight upper-division courses, including the core sequence, and (2) to have achieved grade point averages of at least 3.6 both overall and in the anthropology major by the end of the junior year. Some of these requirements may be waived by vote of the faculty. During the first quarter of the program (fall quarter), students select their research topic and write a preliminary paper. Those who receive a B+ or better will be invited to continue in the program and complete a thesis on the chosen topic by the end of the winter quarter. The thesis will be evaluated by a committee consisting of the thesis adviser and one other faculty member appointed by the department chair in consultation with the thesis coordinator. The thesis adviser has the sole responsibility for the grade the student receives in the winter quarter. The reading committee advises the faculty on the merit of the thesis for departmental honors.

Students who wish to be considered for the Senior Thesis Program should notify the department's undergraduate adviser by the second week of the spring quarter prior to the senior year.

### ***Internship Program***

The department sponsors an internship program that allows students to gain academic credit for supervised work in the Museum of Man, the San Diego Zoo, or the Wild Animal Park. The three tracks of the program allow internship experience in (1) biological anthropology, (2) ethnology and archaeology at the museum, or (3) primate behavior and conservation at the Zoo or Wild Animal Park. A combination of on-campus and on-site supervision makes these courses intellectually provocative but practical and applied. They are an especially valuable complement to a major or minor in anthropology. One four-unit internship (AIP 197) taken with the corresponding two-unit internship seminar (ANBI 187A, C and ANPR 187B) can be counted as one of the twelve upper-division courses for the anthropology major or minor. Applications to these programs are accepted during the first seven weeks of the quarter before the one in which the internship is to be done.

### **Academic Enrichment Programs**

#### ***Faculty Mentor Program***

The program offers research experience to any junior or senior with a GPA of 2.7 or higher who wants to prepare for graduate or professional school. Participants work as research assistants to UCSD faculty members during the winter and spring quarters. Students present their research papers at the Faculty Mentor Research Symposium at the conclusion of the program in the spring.

#### ***Summer Research Program***

The program offers full-time research experience to under-represented (i.e., minorities, women, and low-income, first-generation college) students who are interested in preparing for careers in research or university teaching. Juniors and seniors who have a 3.0 GPA or above and plan to attend graduate or professional school are eligible to participate.

### **The Graduate Program**

The Department of Anthropology offers graduate training in social, cultural, and psy-

chological anthropology. The graduate program is designed to provide the theoretical background and the methodological skills necessary for advanced research in the study of society and culture, for a career in teaching anthropology at the university level, and for the application of anthropological knowledge to contemporary problems. It is assumed that all students enter with the goal of proceeding to the doctoral degree.

Admission to the graduate program occurs in the fall quarter only, save by special waiver.

### ***Graduate Advising***

One member of the departmental faculty functions as the graduate adviser. The role of graduate adviser is to inform students about the graduate program, approve individual registration forms, and give assistance with respect to administrative matters. After completion of the requirements for the master's degree, the chair of the student's doctoral committee serves as the student's major adviser.

Any decision to waive a requirement for either the master's degree or the Ph.D. must be made by the full faculty.

### ***Evaluation***

In the spring of each year, the faculty evaluate each student's overall performance in course work and in research. A written assessment is given to the student after the evaluation. If a student's work is found to be inadequate, the faculty may determine that the student should not continue in the graduate program.

### ***Teaching***

In order to acquire teaching experience, each student in the graduate program is required to participate as an assistant in the teaching activities designated by the department during two quarters in the student's first two years of residence. This obligation is discharged under the auspices of the course entitled "ANPR 500: Apprenticeship Teaching."

### ***Course Requirements***

Only one 290-level course may be taken in any one quarter until a student attains Ph.D. candidacy.

## The Master of Arts Degree

Students entering the doctoral program must complete a master's degree before continuing toward the doctorate. Entering students who already have a master's degree in anthropology are not permitted by university regulations to receive a second master's degree, but they are required by the department to complete the requirements for the master's degree.

### Requirements for Master's Degree.

#### Required Courses:

230A	Departmental Colloquium (4 quarters, 1 unit each)
280A-B-C	Core Seminars (4 units each)
281A-B	Introductory Seminars (1 unit each)
283A	Fieldwork Seminar (4 units)
295	Master's Thesis Preparation (1-12 units)
500	Apprentice Teaching (2 quarters, 4 units each)

#### Elective Courses

Four elective anthropology courses are required, to be taken for letter grades from at least three different instructors. Required courses may not be counted as elective courses.

#### Master's Thesis

A master's thesis is required. The thesis is to be written during the winter quarter of the student's second year and turned in at the beginning of spring quarter. The thesis is supervised by a thesis committee, appointed in the winter quarter, whose approval of the thesis must be unanimous.

## The Doctoral Degree

Admission to the doctoral portion of the program is open to students who have satisfactorily completed the master's program and who have completed courses and the master's thesis at a level of excellence which indicates promise of professional achievement in anthropology.

### Requirements for the Doctoral Degree

#### 1. Required Courses

In addition to the courses required in the master's program, students are required to complete three additional letter-grade elective courses.

#### 2. Quantitative Methods

Students are required to demonstrate competency in quantitative methods by examination.

#### 3. Foreign Language

Knowledge of one foreign language is required for a doctoral degree. A student planning fieldwork in English-speaking areas is required to pass a departmental examination in a foreign language. The language submitted for examination must receive prior approval by the student's departmental committee. The exam is administered by a member of our faculty appointed by the department chair and consists of an oral translation of part of an anthropology article into English. A student wishing to use a non-English fieldwork language to satisfy this degree requirement must submit a written plan describing (1) the linguistic affiliations of the language(s) to be used in fieldwork, (2) the training necessary to attain a level of proficiency adequate for fieldwork in the language(s), and (3) the student's present proficiency. If the student's proficiency is less than that needed, the plan should also describe (4) reasonably available facilities for studying the language(s), and (5) procedures which the student has followed or will follow to attain the necessary proficiency. The written plan is a requirement for Ph.D. candidacy, but proficiency itself is a requirement for the Ph.D. degree. Successful completion of a dissertation based on fieldwork using the language of the plan is accepted as evidence of successful mastery of the language.

#### 4. Formation of the Doctoral Committee

Students are expected to select the chair of their doctoral committee before registration for the winter quarter of the third year. The chair of the doctoral committee serves as the student's adviser for the remainder of the student's program. In consultation with the chair of the doctoral committee, two more departmental committee members are selected, and two additional faculty members from outside the department. The final composition of the committee must be approved by the Office of Graduate Studies and Research at least three weeks prior to a scheduled qualifying examination.

#### 5. Prefield Qualifying Examination

After completion of the above requirements, the student stands for the doctoral qualifying examination, as required by the Office of Graduate Studies and Research. This examination may contain questions on any aspect of anthropology, but focuses particularly upon the merits of the student's field research proposal (see below). Successful completion of this examination marks the student's advancement to doctoral candidacy.

#### 6. The Fieldwork Proposal

After admission to the doctoral portion of the program, each student prepares a dissertation research proposal to serve as the basis of the prefield oral qualifying examination. The dissertation research proposal sets forth a specific plan of research, normally involving intensive fieldwork. ANGR 296A, B provide an opportunity for the development of such a proposal. Students typically begin these courses in the fall of their third year to allow the fieldwork proposal to be developed in connection with the deadlines of external fieldwork funding agencies.

When the proposal is informally judged by committee members to be ready to be defended, the oral qualifying examination is scheduled. It is administered by the student's full doctoral committee. At least two weeks must elapse between the appointment of the doctoral committee and the qualifying examination.

A copy of the student's field research proposal must be in the hands of all doctoral committee members ten days before the oral qualifying examination and a one-page abstract distributed to all members of the faculty.

#### 7. Dissertation and Dissertation Defense

Upon completion of the dissertation research project, the student writes a dissertation which must be successfully defended in an oral examination conducted by the doctoral committee and open to the public. A full copy of the student's dissertation must be in the hands of each of the student's doctoral committee members four weeks before the dissertation hearing. An abstract of the student's dissertation must be in the hands of all faculty members ten days before the dissertation hearing. It is under-

stood that the edition of the dissertation given to committee members will not be the final typing, and that the committee members may suggest changes in the text at the defense. This examination may not be conducted earlier than three quarters after the date of advancement to doctoral candidacy. Revisions may be indicated, requiring this examination to be taken more than once. Acceptance of the dissertation by the university librarian represents the final step in completion of all requirements for the Ph.D.

### 8. Time Limits

Pre-candidacy status is limited to four years. Candidates for the doctorate remain eligible for university support for eight years. The doctoral dissertation must be submitted and defended within nine years. This is in accordance with university policy.

### Introduction to Required Courses

ANGR 280A-B-C. Core Seminars in Anthropology. This sequence of seminars constitutes the foundation of the first year of graduate study. These seminars are concerned with both contemporary and historical problems in cultural, social, and psychological anthropology. Each seminar will focus upon a series of significant debates concerning anthropological theory and data.

**ANGR 281A-B. Introductory Seminars.** These seminars are held in the first two quarters of the first year of graduate study. Faculty members will present an account of their current research and interests. When appropriate, a short preliminary reading list will be given for the particular lecture.

**ANGR 283A. Fieldwork Seminar.** A seminar is given in the first year to acquaint students with the techniques and problems of fieldwork. Students carry out ethnographic field research in a local community group under faculty supervision.

### The Melanesian Studies Resource Center and Archive

These facilities embody the substantial interests in the Pacific Basin that are represented on the UCSD campus and the special prominence of the UCSD Department of An-

thropology in the study of cultures and societies of Oceania and especially of Melanesia. In cooperation with the UCSD libraries, the Melanesian Studies Resource Center and Archive has two major projects. First, there is an ongoing effort to sustain a library collection of monographs, dissertations, government documents, and journals on Melanesia that make UCSD the premier center for such materials in the United States. Second, there is an endeavor to collect the extremely valuable unpublished literature on Melanesia, to catalog such materials systematically, to produce topical bibliographies on these holdings, and to provide microfiche copies of archival papers to interested scholars and to the academic institutions of Melanesia. This innovative archival project is intended to be a model for establishing special collections on the traditional life of tribal peoples as dramatic social change overtakes them. In the near future, anthropological research on tribal peoples will take place largely in archives of this kind. These complementary collections will support a variety of research and teaching activities and are already attracting students of Melanesia to this campus. The Melanesian Studies Resource Center and Archive are directed by members of the Department of Anthropology faculty, in collaboration with Geisel Library.

### The Archaeological Research Laboratory

An archaeological laboratory was established at UCSD in 1995. The facility is geared to the study of lithics, ceramics, biological remains, and other small finds retrieved on faculty expeditions in West Africa, Anatolia, Israel, and Jordan. Multimedia research, AutoCAD, and other computer based studies are carried out in the lab. Undergraduate and graduate students are encouraged to participate in lab studies.

### The Biological Anthropology Laboratory

The biological anthropology laboratory has twin missions in teaching research. It houses a collection of modern skeletal material and fossil hominid casts used for teaching both at the lab and in local outreach presentations. The pri-

mary research focus involves a large collection of histological sections and computerized images of living and postmortem human and non-human primate brains that were obtained through magnetic resonance scans. These are reconstructed in 3D using state-of-the-art equipment for comparative analysis and study of the evolution of the human brain. Undergraduate and graduate student involvement in the lab is welcomed.

### The Anthropology of Modern Society

The Anthropology of Modern Society is an interdepartmental project of graduate training and research dedicated to the study of modernity and its counterpoints in the late twentieth century. The group sees the social life of cities as making manifest this problem in issues of citizenship and democracy, social formations in tension with the nation-state, modern subjectivities, social and religious movements, transnational markets and migrations, and relations of local to global processes. Participants are committed to reorienting anthropological theory and ethnographic practice towards such contemporary social and political problems.

Refer to *Comparative Studies in Language, Society, and Culture* for more information.

## COURSES

**Note:** Not all courses are offered every year. Please check the quarterly Schedule of Classes for specific courses issued fall 1998, winter 1999, and spring 1999.

### ANTHROPOLOGY: LOWER-DIVISION

**ANLD 1. Introduction to Culture (4)**  
(Formerly ANLD 22: Cultural Anthropology: Introduction)  
An introduction to the anthropological approach to understanding human behavior, with an examination of data from a selection of societies and cultures.

**ANLD 2. Human Origins (4)**  
(Formerly ANLD 10: Human Origins: Human Evolution)  
An introduction to human evolution from the perspective of physical anthropology, including evolutionary theory and the evolution of the primates, hominids, and modern humans. Emphasis is placed on evidence from fossil remains and behavioral studies of living primates. (Prerequisite for upper-division biological anthropology courses.)

**ANLD 3. World Prehistory (4)**

**(Formerly ANLD 11: Human Origins: World Prehistory)**

This course examines theories and methods used by archaeologists to investigate the origins of human culture. A variety of case studies from around the world are examined. (Recommended for many upper-division archaeology courses.)

**ANLD 8. Freshman Honors Seminar (4)**

Special seminar for a select group of outstanding first-year undergraduates. Course content will shift according to the interests of the instructor. Prerequisites: freshman standing, ANLD 1 or Making of the Modern World 1, and by invitation.

**ANLD 23. Debating Multiculturalism: Race, Ethnicity, and Class in American Societies (4)**

This course focuses on the debate about multiculturalism in American society. It examines the interaction of race, ethnicity, and class, historically and comparatively, and considers the problem of citizenship in relation to the growing polarization of multiple social identities.

**ANLD 27. Primate Brains (4)**

Introduction to the field of primate comparative neuroanatomy and brain evolution. Emphasis on structures involved in cognitive behaviors and responses to social stimuli that are known to exhibit species-specific patterns of organization. Laboratory assignments accompany weekly readings.

**ANLD 42. The Study of Primates in Nature (4)**

Major primate field studies will be studied to illustrate common features of primate behavior and behavioral diversity. Topics will include communication, female hierarchies, protocultural behavior, social learning and tool use, play, cognition and self-awareness. (Prerequisite for several upper-division biological anthropology courses.)

**ANLD 57. Children and Culture (4)**

Explores the ways various cultures shape the lives and social development of children. Topics include cultural concepts of childhood, the acquisition of culture, socialization, and moral development; cognition, emotion, and behavior in childhood, children's language and play.

**ANLD 90. Undergraduate Seminar (1)**

The seminar will focus on a variety of issues and special areas in the field of anthropology. The seminar will meet a total of eight hours during the quarter.

**ANTHROPOLOGY:  
PROGRAM COURSES**

**ANPR 105. Social Anthropology (4)**

A systematic analysis of social anthropology and of the concepts and constructs required for cross-cultural and comparative study of human societies. Prerequisite: upper-division standing. (Required for all majors in anthropology.)

**ANPR 106. Cultural Anthropology (4)**

A web of problematic meanings lies behind social relationships and institutional frameworks. This perspective plays an important role in the discussion of human affairs. Course considers the concept of culture in anthropology as a particularly forceful statement of such a perspective. (Required for all majors in anthropology.)

**ANPR 107. Psychological Anthropology (4)**

Interrelationships of aspects of individual personality and various aspects of sociocultural systems are considered. Relations of sociocultural contexts to motives, values, cognition, personal adjustment, stress and pathology, and qualities of personal experience are emphasized. (Required for all majors in anthropology.)

**ANPR 187B. Intern Seminar in Ethnography and Archaeology (2)**

Seminar complements students' research in the Academic Internship Program in ethnography and archaeology at the Museum of Man. Readings and discussions focus on problems in the analysis of material culture and classifications of artifacts and site excavations. Research paper required. Prerequisites: ANPR 106 and simultaneous enrollment in Warren 197: Ethnography Archaeology-Museum of Man. (P/NP grades only.) Department approval required.

**ANPR 194. Archaeological Field School (4-8)**

This course takes place on UCSD archaeological expeditions in Israel, Turkey, and the eastern Mediterranean lands. It is an introduction to the design of research projects, the techniques of data collection, and the methods of excavation. Prerequisite: none.

**ANPR 195. Instructional Apprenticeship in Anthropology (4)**

Course gives students experience in teaching of Anthropology at the lower-division level. Students, under direction of instructor, lead discussion sections, attend lectures, review course readings, and meet regularly to prepare course materials and evaluate examinations and papers. Course not counted toward minor or major. Prerequisites: consent of instructor and department stamp, upper-division standing, grade of A in course to be taught or equivalent.

**ANPR 196A. Thesis Research (4)**

Independent preparation of a senior thesis under the supervision of a faculty member. Completion of this course with a grade of at least B+ is a prerequisite to ANPR 196B. Prerequisites: students will be admitted by invitation of the department. Department approval required.

**ANPR 196B. Thesis Research (4)**

Independent preparation of a senior thesis under the supervision of a faculty member. Students begin two-quarter sequence in fall quarter. Prerequisite: completion of ANPR 196A with grade of B+ or better.

**ANPR 197. Field Studies (4)**

Individually arranged field studies giving practical experience outside the university. Prerequisites: consent of instructor and department approval required. (P/NP grades only.)

**ANPR 198. Directed Group Study (2-4)**

Directed group study on a topic or in a field not included in the regular departmental curriculum by special arrangement with a faculty member. Prerequisites: consent of instructor and upper-division standing. (P/NP grades only.) Department approval required.

**ANPR 199. Independent Study (2-4)**

Independent study and research under the direction of a member of the faculty. Prerequisites: consent of instructor. (P/NP grades only.) Department approval required.

**ANTHROPOLOGY:  
BIOLOGICAL ANTHROPOLOGY**

These courses can be counted for the biological anthropology minor or concentration.

**ANBI 100. In Search of Ourselves (4)**

An approach to understanding human behavior through the investigation of the social behavior of living monkeys and apes. Historical review of primate studies with emphasis on changes in interpretation of social patterns. Prerequisite: ANLD 2.

**ANBI 110. Perspectives on Human Evolution (4)**

Special seminar for students who wish to explore advanced topics in biological anthropology. Course focus will change year to year. May be repeated one time for credit. Prerequisites: ANLD 2, one other course in biological anthropology, and consent of instructor. Department approval required.

**ANBI 132. Conservation and the Human Predicament (4)**

(Same as BIEB 176.) Interdisciplinary discussion of the human predicament, biodiversity crisis, and importance of biological conservation. Examines issues from biological, cultural, historical, economic, social, political, and ethical perspectives emphasizing new approaches and new techniques for safeguarding the future of humans and other biosphere inhabitants. Prerequisite: ANLD 2 or consent of instructor.

**ANBI 133. The Cultural Ecology of Health (4)**

The goal of this course is to place health in a cultural and ecological framework, using an evolutionary (through time) and worldwide perspective.

**ANBI 140. The Evolution of the Human Brain (4)**

Introduction to the organization of the brain of humans and apes. Overview of the theoretical perspectives on the evolution of the primate cortex and limbic system. Exposure to contemporary techniques applied to the comparative study of the hominoid brain. Prerequisite: ANLD 27 or consent of instructor.

**ANBI 148. Primate Behavioral Ecology (4)**

The course examines various behaviors (e.g., group formation, dispersal, parenting, coalition formation) from a comparative and evolutionary perspective. Observational methodology and analytical methods will also be discussed. Lab sections are required. Prerequisites: ANLD 42. Strongly recommended: BIEB 100, Biometry or comparable statistics course, and BIEB 164, Sociobiology.

**ANBI 159. Biological and Cultural Perspectives on Intelligence (4)**

Attitudes toward other individuals (and species) are often shaped by their apparent "intelligence." This course discusses the significance of brain size/complexity, I.Q. tests, communication in marine mammals and apes, complex behavioral tactics, and the evolution of intelligence. Prerequisites: any one of the following: ANLD 2, 42, BILD 3, or consent of instructor.

**ANBI 161. Human Evolution (4)**

Interpretation of fossil material—its morphology, variation, phylogenetic relationships, reconstruction of ecological settings and cultural patterns of early human life—demands the integration of many disciplines. Lectures cover major stages of human evolution, time ranges, distribution, archaeology, and distinctive morphology. Prerequisite: ANLD 2.

**ANBI 173. Cognition in Animals and Humans (4)**

(Previously titled: The issues of consciousness in animals and humans.) The last divide between humans and other animals is in the area of cognition. A comparative perspective to explore recent radical reinterpretations of the cognitive abilities of different primate species, including humans and their implications for the construction of evolutionary scenarios. Prerequisite: ANLD 2 or introductory course in evolution/animal behavior or consent of instructor.

**ANBI 175. Modeling the Behavior of our Early Ancestors (4)**

Models of human evolution combine science and myth. This course examines methods used in reconstructions of human evolution. Models such as "man the hunter" and "woman the gatherer" are examined in light of underlying assumptions, and cultural ideals. Prerequisite: ANLD 2 or equivalent.



**ANBI 180. Anthropology of Aging (4)**

This course examines aging from an anthropological perspective. Course material includes evolutionary theories regarding life span and senescence, overviews of biological and social aspects of aging in humans, and studies of aging in other societies from biological and cultural perspectives.

**ANBI 187A. Intern Seminar in Physical Anthropology (2)**

Seminar complements students' research in the Academic Internship Program in physical anthropology at the Museum of Man. Readings and discussions focus on anatomy, pathology, and classification and x-ray analyses of skeletal remains. Research paper required. *Prerequisites: ANLD 2 and simultaneous enrollment in Warren 197: Physical Anthropology-Museum of Man. (P/NP grades only.) Department approval required.*

**ANBI 187C. Intern Seminar in Ethology (2)**

Seminar complements students' research in the Academic Internship Program at the San Diego Wild Animal Park and/or Zoo. Focus on problems of analysis in observational study of animal behavior and conservation in relation to ethological studies. Research paper required. *Prerequisites: ANLD 2 and one upper-division course in animal behavior, either in anthropology or biology. To qualify, must be last-quarter junior or senior with a 3.3 GPA. Simultaneous enrollment in Warren 197: Ethology Zoo. (P/NP grades only.) Department approval required.*

**ANTHROPOLOGY: GENERAL**

**ANGN 102. Early Urbanism (4)**

The origins of the earliest cities in the Old (Mesopotamia) and the New World (Mesoamerica and the Andes) are investigated. Cross-cultural similarities and differences are highlighted in both the form and nature of early cities in these contrasting areas. *Prerequisite: ANLD 3 is recommended.*

**ANGN 103. The Archaeology of Hunters-Gatherers (4)**

Course examines current theoretical issues in the field of hunter-gatherer archaeology. Considerable emphasis is given to ethnographic and ethnoarchaeological sources for understanding such topics as prehistoric hunter-gatherer adaptation, culture change, social organization, and intergroup interaction. *Prerequisite: ANLD 3 is recommended.*

**ANGN 104. Anthropology of Fantasy (4)**

A theoretical examination of the sources and relationships of public and private fantasy, based on cross-cultural studies of dreams, myths, and ritual. *Prerequisites: permission of instructor. Anthropology majors only.*

**ANGN 105. Ethnoarchaeology (4)**

Ethnoarchaeology is a recently developed field where archaeologists live and work among contemporary societies like ethnographers, with the aim of understanding how such communities use material culture. Course examines the impact of ethnoarchaeology with case studies from the Middle East and Africa. *Prerequisite: ANLD 3 is recommended.*

**ANGN 106. General Theory (4)**

This course will consider theories in anthropology and related fields which treat culture, society, and personality as causal factors in explaining human action. Emphasis will be on the propositional structures of such theories rather than the comparison of particular theorists.

**ANGN 110. The Study of Society (4)**

Readings and discussion of selected books addressing different problems in modern society and culture: the state, colonialism, underclass, democracy, nationalism, and capitalism. Examples of authors are Hobsbawm, B. Anderson, Foucault, Said, Rogin, de Tocqueville, Jencks, A. Hirschman. *Prerequisite: major in anthropology or consent of instructor.*

**ANGN 113. Theories of Modern Subjectivity (4)**

The course will examine selected writings that have influenced anthropological theories of modern subjectivity. Topics will include capitalism, religion, and nationalism. Readings will include excerpts from the work of major theories of society as well as ethnographic studies.

**ANGN 118. Cognitive Anthropology (4)**

This course explores the relation between culture and cognition. Topics include cultural influences on belief systems, reasoning, perception, and motivation. The teaching style for the course is discussion and lecture, with simple classroom demonstrations.

**ANGN 120. Anthropology of Religion (4)**

Explores religious life in various cultures. Topics addressed include the problem of religious meaning, psychocultural aspects of religious experience, religious conversion and revitalization, contrasts between traditional and world religions, religion and social change.

**ANGN 123. National Character (4)**

The course surveys work done on the national character of a selection of modern nations, including the United States. A variety of types of data will be examined, including movies and novels. Theoretical and methodological issues will be discussed. *Prerequisite: ANLD 1 or consent of instructor.*

**ANGN 127. Economic Archaeology (4)**

Focus on behavioral patterns recovered from archaeological records regarding procurement, processing, allocation, distribution and consumption of varying resources using case studies from early hominid scavenging tactics, prehistoric hunting strategies, agriculture, and pastoralism to centralized exchange systems.

**ANGN 128. The Anthropology of Medicine (4)**

(Same as Cont. Issues 136.) We examine the medical profession, the sick and the healers, and culture as communication in the medical event through aspects of medical practice and medical research of medicine as well as primitive and peasant systems.

**ANGN 130. The Political Economy of Early Empires (4)**

Archaeological and textual evidence for selected early empires of pre-Columbian America and the Ancient Near East will be used to illuminate cross-cultural similarities and differences in the ways complex pre-capitalistic societies acquired, produced, and distributed wealth. *Prerequisite: ANLD 3 is recommended.*

**ANGN 134. Paleolithic Cultures of the World (4)**

Examines the archaeological background to human evolution and the foundation of regional prehistoric cultures in the Old World and the peopling of the Americas. *Prerequisites: ANLD 2 and ANLD 3 are recommended.*

**ANGN 135. Bodies and Boundaries: Symbols in Ritual and Everyday Life (4)**

This course looks at symbols in sacred and mundane spheres of life. Topics include ritual and religious symbolism; the symbolism of gender, sex, and body; representations in popular culture; and the manipulation of symbols to establish and transgress boundaries.

**ANGN 140. Anthropology and History (4)**

Course explores long-standing debates concerning the character of sociocultural anthropology as historical inquiry, the nature of historiography in anthropology, and analyses of non-Western "people without history." It attends to history, myth, and time in ethnographies conceived as historical constructions.

**ANGN 142. Pastoralism in Archaeological and Ethnographic Perspective (4)**

Pastoralism is a distinctive form of human subsistence which evolved and is often intertwined with farming societies. These societies are examined using archaeological and ethnographic materials from the Near East and Africa. *Prerequisite: ANLD 3 is recommended.*

**ANGN 147. Ritual and Symbolism (4)**

An examination of the place of symbols in the ritual systems of small-scale societies, and a critical evaluation of theoretical models commonly applied to their analysis and interpretation.

**ANGN 149. Language in Society (4)**

After a brief introduction to linguistic concepts, the course covers the relations between culture and language, how languages reflect culture, how languages change, language and social life, language and political policy.

**ANGN 156. Kinship and Descent (4)**

This course reviews the approaches of British, French, and American anthropology to the subjects of kinship and descent, while also incorporating the relevant findings of behavioral biology and an historical perspective.

**ANGN 163. Technological Revolutions and Evolution (4)**

While not really existing outside the social order, technological systems are basic to civilization. Across six millennia, this course examines their growth—complex, largely indeterminate, and marked by irregular spurts of acceleration. While comparative, it concentrates on England and America.

**ANGN 171. Culture and Identity: Cultural Constructions of Person, Self, and Individual, and Their Social and Personal Significance (4)**

This course will explore the interconnections of various facets of cultural understandings of identity and the social and psychological significance and force they come to have in community life and for individuals. The focus will be ethnographic and cross-cultural.

**ANGN 172. Life-History Seminar and Practicum (4)**

Examines life-history research as a method for understanding the cultural and psychological experience of people. Combines reading of life-histories with training in life-history research methods. Students develop a life-history project, conduct interviews, and analyze data. *Prerequisites: upper-division. ANPR 107 or concurrent enrollment in ANPR 107. Consent of instructor.*

**ANGN 175. The Archaeology of Death (4)**

This course examines the cognitive and social implications of burial practices from their remote Middle Paleolithic origins to the more recent periods of human history.

**ANGN 177. Adolescence (4)**

Examines adolescence as a stage of life by exploring adolescent experience in various cultures. Course will investigate the socialization and development of adolescents in cultural context, and address questions of identity, social integration, and conflict with adult social institutions.

**ANGN 180. The Culture of Children (4)**

This course explores the interrelationships of cultural, psychological, and social aspects of socialization and enculturation with respect to contemporary views of child development in psychological anthropology. Emphasis is given to examining the cultural world of children's experience.

**ANGN 181. Anthropological Archaeology (4) (Formerly ANGN 145)**

As part of the broad discipline of anthropology, archaeology provides the long chronological record needed for investigating human and social evolution. The theories and methods used



in this field are examined. (Archaeology core sequence course.)  
*Prerequisite: ANLD 3 is recommended.*

**ANGN 182. Origins of Agriculture and Sedentism (4)**  
**(Formerly ANGN 100)**

Varying theoretical models and available archaeological evidence are examined to illuminate the socio-evolutionary transition from nomadic hunter-gathering groups to fully sedentary agricultural societies in the Old and New World. (Archaeology core sequence course.) *Prerequisite: ANLD 3 is recommended.*

**ANGN 183. Chiefdoms, States, and the Emergence of Civilizations (4)**  
**(Formerly ANGN 101)**

The course focuses on theoretical models for the evolution of complex societies and on archaeological evidence for the development of various pre- and protohistoric states in selected areas of the Old and New Worlds. (Archaeology core sequence course.) *Prerequisite: ANLD 3 is recommended.*

**ANTHROPOLOGY: REGIONAL**

**ANRG 101. Near Eastern Prehistory (4)**

The earliest agricultural villages and complex civilizations in the world arose in the Near East. This course will review archaeological evidence for these processes and the varying theoretical models that have been proposed to explain them. *Prerequisite: ANLD 3 is recommended.*

**ANRG 104. Traditional African Societies and Cultures (4)**

Attention to three main sociopolitical types of societies: egalitarian hunting and gathering groups, loosely organized agricultural and herding groups, and centrally organized kingdoms. Representatives are considered, and societies from all parts of sub-Saharan Africa studied intensively.

**ANRG 106. Food Production in Africa (4)**

The course focuses on the last 10,000 years in Africa, and will examine the varied patterns of development and expansion of new subsistence systems, as well as social change.

**ANRG 108. Hinduism (4)**

An anthropological introduction to Hinduism, focusing on basic religious concepts and practices. Topics include myth, ritual, and symbolism; forms of worship; gods and goddesses; the roles of priest and renouncer; pilgrimages and festivals; the life cycle; popular Hinduism, Tantrism.

**ANRG 115. The Foundations for Social Complexity in the Near East (4)**

This course critically examines the theoretical models and archaeological evidence for nascent social complexity and inequality in the Near East. The time period under consideration encompasses the shift from generalized hunting and gathering through complex hunter-gatherers to large scale agricultural communities.

**ANRG 116. The Archaeology of Society in Syro-Palestine (4)**

Syro-Palestine, the area which includes Israel and adjacent regions, provides a microcosm of social evolution in the eastern Mediterranean. Course examines the archaeological evidence for social change from the emergence of complex societies (ca. 10,000 B.C.E.) to the Israelite kingdoms (ca. 586 B.C.E.).

**ANRG 117. Gender across Cultures (4)**

This course explores gender, as a principle of social and symbolic differentiation, cross-culturally. Using case studies from Asia, Africa, the Middle East, Oceania and the Americas, we examine relationships among gender, kinship, economics, politics, and social change.

**ANRG 121. The Archaeology of South America (4)**

This course will examine archaeological evidence for the development of societies in the South American continent. From the initial arrival of populations through to the Inca period and the arrival of the Spaniards.

**ANRG 124. Paths to European Hegemony (4)**

Diverse, mostly traumatic cultural encounters accompanied European expansion across most of the world from the later Middle Ages onward. Historically and geographically wide-ranging, this course examines how the asymmetric patterns of interaction then imposed are only slowly being replaced.

**ANRG 126. The Rise of New World Civilizations: Mesoamerica and the Andes (4)**

This course is a comparative introduction to the prehistory of the great ancient civilizations of Central and South America. It will focus on the development of complex societies in Central Mexico, the Mayan areas, and the Andes. *Prerequisite: ANLD 3 is recommended.*

**ANRG 133. Politics and Modernity: Urban Cultures in Latin America (4)**

Course explores four interrelated themes of urban culture in Brazil, Argentina, and Chile: social inequalities, violence and everyday life, political culture and citizenship, and new social movements in relation to democracy and legal pluralism. Comparative, historical, and anthropological readings emphasized.

**ANRG 134. The Cultures of Mexico (4)**

(Same as Cult. Trad. 134.) Various aspects of the multiple cultures of Mexico from the anthropological perspective will include field studies by anthropologists, focusing on changing emphases in investigative style and analyses, peasant communities, ejidos, studies of elites, indigenous "Indian" cultures, and culture change. *Prerequisite: consent of instructor.*

**ANRG 137. Societies and Cultures of Melanesia (4)**

Consideration of the history and development of Melanesia and of selected societies within that area of the Pacific, with particular reference to the cultures and social structures which have developed there.

**ANRG 138. Saharan Prehistory in Anthropological Perspective (4)**

The Saharan archaeological record spanning from the Early to Late Stone Age is examined, with emphasis on site-location strategies, settlement patterns, subsistence systems as well as synchronic and diachronic variability of stone tool assemblages.

**ANRG 150. The Rise and Fall of Ancient Israel (4)**

(Previously titled: The Archaeology of Israel in the Iron Age.) The emergence and consolidation of the state in ancient Israel is explored by using archaeological data, Biblical texts, and anthropological theories. The social and economic processes responsible for the rise and collapse of ancient Israel are investigated. *Prerequisite: ANLD 3 is recommended.*

**ANRG 162. Peoples of the Middle East (4)**

An introduction to the social and political traditions of the tribal and peasant peoples of the Middle East. Some attention will be devoted to an interpretation of the oral literature of these peoples as a means for understanding these traditions.

**ANRG 170. Traditional Chinese Society (4)**

Course examines major institutions and culture patterns of traditional China, especially as studied through ethnographic sources. Topics include familism, religion, agriculture, social mobility, and personality. (This introductory course is a prerequisite to other upper-division anthropology courses on China.) *Prerequisite: consent of instructor.*

**ANRG 173. Chinese Popular Religion (4)**

The religious world of ordinary Chinese of precommunist times, with some reference to major Chinese religious traditions. Par-

ticular emphasis on the relation between popular religion and other aspects of Chinese personality or culture. *Prerequisite: ANRG 170 or consent of instructor.*

**ANRG 173-L. Chinese Popular Religion: Language Maintenance Annex Course (2)**

Anthropology discussion section intended as a Chinese language maintenance course for returning EAP students, *not* for native speakers of Chinese. This section, conducted mostly in Mandarin, discusses Chinese texts of varying difficulty linked to ANRG 173. *Prerequisite: co-registration in ANRG 173.*

**ANRG 182. Ethnography of Island Southeast Asia (4)**

This is an introduction to the diverse cultures of island and peninsular Southeast Asia, including those of Indonesia, the Philippines, and Malaysia. We look at ritual, politics, gender, popular culture, and social change in agrarian and urban societies. *Prerequisite: lower-division anthropology or consent of instructor.*

**ANTHROPOLOGY: GRADUATE**

**ANRG 206. New Ethnography and Anthropological Prose (4)**

This course has two goals: to understand how anthropologists are choosing to write their ethnographies, and the debates around those new styles, postmodern and otherwise; and to teach students how to write effective anthropological prose. *Prerequisite: graduate standing.*

**ANRG 207. Taiwan (4)**

History and ethnography of Chinese society in Taiwan. This seminar includes discussions of a shared reading list and papers by seminar participants on specialized topics relating to Taiwan. *Prerequisite: graduate standing or consent of instructor.*

**ANRG 208. Person, Self, and Individual: The Sociocultural Shapes of Identity and Their Psychological Force (4)**

This seminar will explore contemporary debates in anthropology concerning the confluence of the cultural construction of ideas of identity, their social significance in community life, and their psychological salience and force for individuals. Readings will be drawn from anthropology, philosophy, and psychology. *Prerequisite: graduate standing.*

**ANRG 211. Human Nature (4)**

This seminar will examine the anthropological and related literatures with respect to theories and data about human nature. Biological, psychological, and cultural facets of the controversy about the nature of human nature will be reviewed. *Prerequisite: graduate standing or consent of instructor.*

**ANRG 212. Character and Institutions (4)**

This seminar will examine the literature concerning the effects of sociocultural institutions on the formation of character. The emphasis will be on data from complex societies. Problems concerning character assessment under field conditions will be considered. *Prerequisite: graduate standing.*

**ANRG 213. Anthropological Understanding and Philosophy of Social Science (4)**

The seminar focuses on current anthropological debates concerning interpretation and explanation, relativism, rationality, agency and personhood, and related concerns from perspectives of philosophy of social science. Readings are drawn from works of Gellner, Hempel, Popper, Putnam, Taylor, Winch, and others. *Prerequisite: graduate standing in anthropology (or other graduate standing with the explicit permission of the instructor).*

**ANRG 214. Writing Proposals for Dissertation Research (2)**

This seminar is intended to guide graduate students in writing dissertation research proposals. Students will learn how to write

proposals that are theoretically, ethnographically, and methodologically sound. The processes of preparing for and conducting fieldwork will also be discussed. (S/U grades only.) *Prerequisite: graduate standing in anthropology.*

**ANGR 215. Exchange Theory (4)**

This course will examine recent work on exchange theory in linguistics, economics, and psychoanalysis, beginning with an introduction to the topic through the works of Simmel, De Saussure, and Mauss. *Prerequisite: graduate standing.*

**ANGR 216. Law and Society (4)**

This course emphasizes the importance of social conflict and cultural values in constituting legal systems. It also examines the role of law in defining forms of rule and processes of change, especially in the context of democratization. *Prerequisites: graduate standing. Undergraduates with permission of instructor.*

**ANGR 218. Cognitive Anthropology (4)**

This seminar will consider the relation between cognition and culture. Topics will include cultural influences on categorization, reasoning, and motivation. *Prerequisite: graduate standing.*

**ANGR 219. Seminar in Political Anthropology (4)**

The focus here is "politics," broadly construed, in various societies. Analysis is from the perspective of the resources deployed by all involved, including but not limited to power, with emphasis on the role of culture and social structure. *Prerequisite: graduate standing.*

**ANGR 221. Community and Morality: Modernist Subjectivities and the Problem of Affiliation (4)**

The course will explore the organization of community, with attention to the institutional, social, psychological, and moral analysis of group behavior. *Prerequisite: graduate standing.*

**ANGR 223. Anthropological Interviewing (4)**

(Formerly called Intensive Interviewing in Anthropology.) The course teaches techniques of long-term, intensive interviewing in fieldwork settings, with an emphasis on psychodynamic inference and its usefulness in different cultural settings. *Prerequisite: graduate standing in anthropology.*

**ANGR 224. Advanced Topics in the Anthropology of Gender (4)**

A critical analysis of ethnographic and theoretical texts focusing on the sociocultural study of gender. We will also draw on studies of gender and feminist theory from other disciplines (e.g., history, philosophy) to illuminate issues relevant to anthropology. *Prerequisite: graduate standing in anthropology or permission of instructor.*

**ANGR 225. Rhetorical Tradition and Social Experience (4)**

The course reviews ethnographies of rhetorical traditions which explore the connection of rhetoric with social institutions and experiences. *Prerequisite: graduate standing.*

**ANGR 226. Ethnography of Christianity (4)**

Directed to graduate students planning ethnographic work in Christian societies, this course explores variations in the interpretation and expression of Christianity using historical and ethnographic sources. *Prerequisite: graduate standing or consent of instructor.*

**ANGR 230A. Department Colloquium (1)**

A forum to present work by faculty, students, and guests. Course will be offered quarterly. *Prerequisite: anthropology graduate student at pre-candidacy level. (S/U grades only.)*

**ANGR 230B. Department Colloquium (1)**

A forum to present work by faculty, students, and guests. Course will be offered quarterly. *Prerequisite: anthropology graduate student at candidacy level. (S/U grades only.)*

**ANGR 231. The Social and Cultural Works of Sigmund Freud (4)**

In this seminar we shall examine Freud's works on culture, gender, morality, religion, sex, society, and the arts, and assess their contemporary anthropological relevance. *Prerequisite: graduate standing.*

**ANGR 232. Current Research Topics in Psychological Anthropology (2)**

Discussion of current work in psychological anthropology. Topics will include research by faculty and students as well as work reported in conferences and recent publications. *Prerequisite: graduate standing. (S/U grades only.)*

**ANGR 233. Research Seminar on Aspects of Ancient Complex Society (4)**

This course will take an explicitly interdisciplinary and comparative approach to the analysis of early complex societies. Literacy, militarism, the organization of labor, and the state's role in subsistence management and resource procurement are examples of topics to be explored. *Prerequisite: graduate standing.*

**ANGR 234. Dynamics of Culture (4)**

Examination of the actual operation of culture with attention to the importance of cultural products and social structure. Course goal is to develop skill in understanding the influence, direct and indirect, of culture on behavior. *Prerequisite: graduate standing.*

**ANGR 235. The Anthropology of Modernity (4)**

The seminar considers the theorizing of modern society as an anthropological project. Topics include issues of modernity current theory and method, their place in the foundations of anthropology, and prospects for future work. Lectures and readings change yearly. *Prerequisite: graduate standing.*

**ANGR 236. Images of History in Anthropology (4)**

This seminar explores long-standing and recent debates in anthropology on the nature of history and historiography in the constitution of theories of culture and society. Complementarily, it also examines how sociocultural theory has been appropriated in historical studies. *Prerequisite: graduate standing.*

**ANGR 238. Citizenship and the Nation State (4)**

This course examines various conceptions of citizenship, nation, and state and considers their historical development as fundamental to the organization of most contemporary societies. It covers a range of theoretical readings, recent debates, and case studies. *Prerequisite: graduate standing.*

**ANGR 239. Person-Centered Ethnography (4)**

Person-centered ethnography takes the person as a unit of analysis and description, exploring personal experience in sociocultural context. This course examines selected works in this tradition and assesses the descriptive and theoretical contributions these studies make. *Prerequisite: graduate standing.*

**ANGR 243. Voice and Text in the Practice of Authority (4)**

A claim to social or political legitimacy is founded on presuppositions about the relationship of voice and text. The seminar will explore this proposition by considering recent ethnographic and theoretical works on oral and written media in different societies. *Prerequisite: graduate standing.*

**ANGR 246. Humans in Evolutionary Perspective (4)**

Human behavior and culture are the result of 60 million years of primate evolutionary history. This seminar will examine the important events in that history, with an emphasis on evolutionary processes and adaptive aspects of behavior. *Prerequisite: graduate standing in anthropology.*

**ANGR 248. Research Practicum in the Assessment of Personality in Cross-Cultural Context (4)**

This practicum will be devoted to developing the techniques and skills needed for personality assessment in anthropological field

work. A variety of assessment models will be used and problems of reliability and validity stressed. *Prerequisites: graduate standing in anthropology. Completion of ANGR 280C.*

**ANGR 250. Anthropology and "The Web" (2)**

Critically examines the resources for anthropology through the World Wide Web and other electronic databases. Course also includes an introduction to HTML, and each student will be guided in developing an individual web page including information about anthropological interests. *Prerequisite: graduate standing in anthropology. (S/U grades only.)*

**ANGR 253. History of Anthropology (4)**

A synoptic treatment of the intellectual currents affecting anthropology during its premodern period, between approximately 1880 and 1940. Coverage will include developments in American, British, and Continental traditions of the discipline. *Prerequisite: graduate standing.*

**ANGR 255. Political Culture and Market Institutions (4)**

The course considers the way in which social relations are affected by the evolution of market institutions and associated political traditions, with a special emphasis on the United States. Readings will include selections from Polanyi, de Tocqueville, Hartz, Rogin, and Simmel. *Prerequisite: graduate standing.*

**ANGR 259. Europeans and Others (4)**

Interaction between peoples and powers of Europe and those of Asia, Africa, and the Americas until the end of the colonial epoch. Varying character of the encounter, modes of maintenance of European hegemony, and representations and rationalizations of the process.

**ANGR 270A-B-C. Psychiatry and Anthropology (0-4)**

Introduction to interviewing and diagnostic techniques in psychiatry and their application to anthropological research. Content will vary from quarter to quarter. Students must begin the program in the fall quarter. (Fall and winter, S/U grades only. Spring quarter S/U optional.) *Prerequisites: graduate standing in anthropology and consent of instructor.*

**ANGR 273. General Theory in Anthropology (4)**

This seminar will focus on theorists who have attempted to integrate social, cultural, and psychobiological factors into general theories of society. Models of classical and current theorists will be examined. Current research will be evaluated with respect to these theories.

**ANGR 280A-B-C. Core Seminar in Anthropology (4-4-4)**

The core seminar is taken by all first-year graduate students. The first quarter focuses on individual action and social institutions; the second on personal consciousness and cultural experiences; and the third on motives, values, cognition, and qualities of personal experience. *Prerequisite: first-year graduate student in anthropology.*

**ANGR 281A-B. Introductory Seminar (1)**

These seminars are held in the first two quarters of the first year of graduate study. Faculty members will present an account of their current research and interests. When appropriate a short preliminary reading list will be given for the particular lecture. *Prerequisite: first-year graduate standing in anthropology.*

**ANGR 283A. Fieldwork Seminar (4)**

A seminar given in the first year to acquaint students with the techniques and problems of fieldwork. Students carry out ethnographic field research in a local community group under faculty supervision. *Prerequisite: first-year graduate student in anthropology. Offered in the winter quarter of the first year.*

**ANGR 295. Master's Thesis Preparation (1-12)**

The student will work on the master's thesis under the direction of the departmental committee chair. The course will normally be taken in the winter of the student's second year.

*Prerequisites: graduate student in anthropology and permission of master's thesis chair. (S/U grades only.)*

**ANGR 296A. Fieldwork Proposal Preparation (4)**

The student will work in cooperation with his or her departmental committee to develop a research proposal for the doctoral research project. *Prerequisites: graduate standing in anthropology and permission of departmental committee chair. (S/U grades only.)*

**ANGR 296B. Fieldwork Proposal Preparation (4)**

The student will work in cooperation with his or her departmental committee to develop a research proposal for the doctoral research project. *Prerequisites: advanced graduate standing in anthropology and permission of departmental committee chair. (S/U grades only.)*

**ANGR 297. Research Practicum (1-4)**

Supervised advanced research studies with individual topics to be selected according to the student's special interests. *Prerequisite: for anthropology graduate students who have returned from their field research. (S/U grades permitted.)*

**ANGR 298. Independent Study (1-4)**

Supervised study of individually selected anthropological topics under the direction of a member of the faculty. *Prerequisite: graduate standing. (S/U grades only.)*

**ANGR 299. Dissertation Research (1-12)**

*Prerequisite: Ph.D. candidacy in anthropology. (S/U grades only.)*

**ANGR 500. Apprentice Teaching (4)**

Anthropology graduate students participate in the undergraduate teaching program during two quarters in the student's first two years of residence. Equivalent to duties expected of a 50 percent T.A. Enrollment in four units documents the Ph.D. requirement. *Prerequisite: graduate standing in anthropology. (S/U grades only.)*

## Applied Mechanics and Engineering Sciences (AMES)

See Engineering, School of.

## Applied Ocean Science

OFFICE: 22 Old Scripps Bldg., Scripps Institution of Oceanography

### ASSOCIATED FACULTY

#### Professors

Michael J. Buckingham, Ph.D., SIO; MPL  
LeRoy M. Dorman, Ph.D., SIO; GRD  
Carl H. Gibson, Ph.D., AMES; SIO

Robert T. Guza, Ph.D., SIO; CCS  
John A. Hildebrand, Ph.D., SIO; GRD; MPL  
William S. Hodgkiss, Ph.D., SIO; MPL  
William A. Kuperman, Ph.D., SIO; MPL  
W. Kendall Melville, Ph.D., SIO; MPL  
Robert Pinkel, Ph.D., SIO; MPL  
Richard C.J. Somerville, Ph.D., SIO; CRD  
Clinton D. Winant, Ph.D., SIO; CCS

#### Professors Emeritus

Hugh Bradner, Ph.D., AMES; IGPP  
Douglas L. Inman, Ph.D., SIO; CCS  
George G. Shor, Jr., Ph.D., SIO; MPL  
Fred N. Spiess, Ph.D., SIO; MPL  
Charles W. Van Atta, Ph.D., AMES; SIO  
Kenneth M. Watson, Ph.D., SIO; MPL

#### Associate Professor

Bradley T. Werner, Ph.D., SIO; IGPP

#### Assistant Professor

Dariusz Stramski, Ph.D., SIO; MPL

#### Lecturers

Jules S. Jaffe, Ph.D., SIO; MPL  
John L. Largier, Ph.D., SIO; CCS  
Spahr C. Webb, Ph.D., SIO; MPL

#### Associated Research Staff

Christian P. de Moustier, Ph.D., SIO; MPL

#### Associated Research Groups

Marine Physical Laboratory, MPL  
Institute of Geophysics and Planetary Physics, IGPP  
Marine Research Division, MRD  
Geological Research Division, GRD  
Center for Coastal Studies, CCS  
Climate Research Division, CRD

### The Graduate Program

Applied Ocean Science (AOS) is an interdepartmental Ph.D. program concerned with humans' purposeful and useful intervention in the sea. It is administered by an interdepartmental group composed of members of the faculties of cooperating departments: the Graduate Department of the Scripps Institution of Oceanography (SIO), the Department of Applied Mechanics and Engineering Sciences (AMES), and the Department of Electrical and Computer Engineering (ECE).

This interdepartmental curriculum combines the resources of these departments to produce

oceanographers who are knowledgeable about modern engineering and instrumentation, as well as marine oriented engineering scientists who are familiar with the oceans. Since physical, chemical, geological, and biological aspects of the oceans and all forms of engineering may be involved, the curriculum provides maximum flexibility in meeting the needs of each individual student.

Candidates for admission should apply directly to one of the departments participating in the Applied Ocean Science program, listing Applied Ocean Science as an area of specialization. The choice of department should be based on the individual student's planned area of major emphasis. The necessary undergraduate preparation for admission will be that required by the department to which the student applies.

The program is primarily directed toward the Ph.D. degree. However, both the candidate of philosophy and master of science degree (either Plan I, thesis, or Plan II, comprehensive examination) also will be offered under special circumstances. Students applying for a terminal master's program should be aware of any special requirements for the department to which they apply.

The degrees completed under this program in the Department of SIO will carry the title "Oceanography." Those degrees completed in the other cooperating departments will have the parenthetical title "(Applied Ocean Science)" appended to the appropriate authorized title.

### COURSES

All students enrolled in the program are required to take or demonstrate proficiency in the following core courses or their equivalent:

SIO 210 (Physical Oceanography)

SIO 240 (Marine Geology)

SIO 260 (Marine Chemistry)

SIO 280 (Biological Oceanography)

AMES 294A-B-C (Methods in Applied Mechanics) or

Math. 210A-B-C (Mathematical Methods in Physics and Engineering) or

SIO 203A-B-C (Methods of Applied Analysis)

The students are expected to enroll in the Applied Ocean Science Seminar (SIO 208) throughout their period of residency. This seminar will make use of outside speakers, faculty members, and students in presenting various topics on applied ocean science and related fields. It provides a central forum in which all AOS students can participate. In addition to these basic requirements,

the student will be subject to whatever additional requirements are prescribed by his or her department.

Since the first year's course work is almost entirely devoted to the AOS core courses, that time provides an excellent opportunity for students to investigate the research programs of the various research groups on the campus, and cultivate association with professors and research groups which can provide support and guidance for thesis research in their selected field of specialization. In consultation with an adviser, students will plan a curricular path of courses which will adequately prepare them in their field of specialization. The courses may be selected from the entire catalog of courses available on the UCSD campus or where appropriate from other UC campuses and other universities.

## Biochemistry

Students wishing to major in biochemistry should refer to programs offered by the Department of Biology, which has an undergraduate major in biochemistry and cell biology, or the Department of Chemistry and Biochemistry, which has an undergraduate major in biochemistry/chemistry.

Both the Department of Biology and the Department of Chemistry and Biochemistry offer graduate programs with specialization in biochemistry. Those programs are described in the biology and chemistry and biochemistry sections of this catalog.

## Bioengineering

See Engineering, School of.

## Biology

STUDENT AFFAIRS OFFICE  
1128 Pacific Hall  
(619) 534-2786 (undergraduate)  
(619) 534-3835 (graduate)

FINANCIAL AND ADMINISTRATIVE OFFICES  
1610 Urey Hall, Revelle College  
<http://www-biology.ucsd.edu/>

### Professors

Darwin K. Berg, Ph.D.  
Jack W. Bradbury, Ph.D.  
Stuart Brody, Ph.D.  
Ted J. Case, Ph.D.  
Maarten J. Chrispeels, Ph.D.  
Russell F. Doolittle, Ph.D., *Research Professor*  
Richard A. Firtel, Ph.D.  
Douglass J. Forbes, Ph.D.  
Morris E. Friedkin, Ph.D., *Emeritus*  
E. Peter Geiduschek, Ph.D., *Research Professor*  
Michael E. Gilpin, Ph.D.  
Melvin H. Green, Ph.D.  
Clifford Grobstein, Ph.D., *Emeritus*  
Masaki Hayashi, Ph.D., *Emeritus*  
Stephen M. Hedrick, Ph.D.  
Donald R. Helinski, Ph.D., *Research Professor*  
John J. Holland, Ph.D., *Emeritus*  
James T. Kadonaga, Ph.D.  
William B. Kristan, Jr., Ph.D.  
Dan L. Lindsley, Ph.D., *Emeritus*  
William F. Loomis, Jr., Ph.D.  
William D. McElroy, Ph.D., *Emeritus*  
William J. McGinnis, Ph.D., *Chair*  
Stanley E. Mills, Ph.D., *Emeritus*  
S. Mauricio Montal, M.D., Ph.D.  
Cornelis Murre, Ph.D.  
John W. Newport, Ph.D.  
Xuong Nguyen-Huu, Ph.D.  
Mu-Ming Poo, Ph.D.  
James W. Posakony, Ph.D.  
Paul A. Price, Ph.D.  
Milton H. Saier, Ph.D.  
Paul D. Saltman, Ph.D., *Academic Senate Career Distinguished Teaching Award*  
Immo E. Scheffler, Ph.D., *Academic Senate Distinguished Teaching Award*  
Julian I. Schroeder, Ph.D.  
Terrence J. Sejnowski, Ph.D.  
S. Jonathan Singer, Ph.D., *Research Professor*  
Douglas W. Smith, Ph.D.  
Deborah H. Spector, Ph.D.  
Nicholas C. Spitzer, Ph.D.  
Suresh Subramani, Ph.D.  
Kiyoteru Tokuyasu, Ph.D., *Emeritus*  
Silvio S. Varon, M.D., *Research Professor*  
Sandra L. Vehrencamp, Ph.D.  
Jean Y. J. Wang, Ph.D.  
Christopher J. Wills, Ph.D.  
Flossie Wong-Staal, Ph.D.  
David S. Woodruff, Ph.D.

Juan Yguerabide, Ph.D.  
Charles S. Zuker, Ph.D.

### Associate Professors

Ethan Bier, Ph.D.  
Willie C. Brown, Ph.D., *Emeritus, Academic Senate Career Distinguished Teaching Award*  
Nigel M. Crawford, Ph.D.  
P.A.G. Fortes, M.D., Ph.D.  
Joshua R. Kohn, Ph.D.  
Vivek Malhotra, Ph.D.  
Muriel N. Nesbitt, Ph.D.  
Ramon Piñon, Ph.D., *Emeritus*  
Trevor D. Price, Ph.D.  
Percy J. Russell, Ph.D., *Emeritus*  
Robert J. Schmidt, Ph.D.  
Michael P. Yaffe, Ph.D.  
Martin F. Yanofsky, Ph.D.

### Senior Lecturer (LSOE)

Gabriele K. Wienhausen, Ph.D., *Academic Senate Distinguished Teaching Award*

### Assistant Professors

Raffi Aroian, Ph.D.  
Michael David, Ph.D.  
Yukiko Goda, Ph.D.  
Randolph Y. Hampton, Ph.D.  
Randall S. Johnson, Ph.D.  
Kit J. Pogliano, Ph.D.  
Robert C. Rickert, Ph.D.  
Kaustuv Roy, Ph.D.  
William R. Schafer, Ph.D.  
Laurie G. Smith, Ph.D.  
Yang Xu, Ph.D.

### Adjunct Faculty

Suzanne H. Bourgeois, Ph.D.  
Frederic Bushman, Ph.D.  
Edward M. Callaway, Ph.D.  
Seunghyon Choe, Ph.D.  
Joanne Chory, Ph.D.  
Walter Eckhart, Ph.D.  
Beverly Emerson, Ph.D.  
Scott Emr, Ph.D.  
Ronald M. Evans, Ph.D.  
Susan Forsburg, Ph.D.  
Fred Gage, Ph.D.  
Meredith Gould, Ph.D.  
Martyn D. Goulding, Ph.D.  
Douglas R. Green, Ph.D.  
Michael Gribskov, Ph.D.  
Martin Haas, Ph.D.  
Thomas J. Hope, Ph.D.  
Anthony R. Hunter, Ph.D.

Juan Carlos Izpisua-Belmonte, Ph.D.  
 Katherine Jones, Ph.D.  
 Gary Karpen, Ph.D.  
 Christopher Kintner, Ph.D.  
 Norman R. Klinman, Ph.D.  
 Mitchell Kronenberg, Ph.D.  
 Christopher J. Lamb, Ph.D.  
 Martin Latterich, Ph.D.  
 Kuo-Fen Lee, Ph.D.  
 Michael McKeown, Ph.D.  
 Joseph Noel, Ph.D.  
 Dennis D.M. O'Leary, Ph.D.  
 Samuel Pfaff, Ph.D.  
 Thomas Pollard, Ph.D.  
 Michael Geoffrey Rosenfeld, M.D.  
 Oliver A. Ryder, Ph.D.  
 Bartholomew M. Sefton, Ph.D.  
 Jonathan Sprent, Ph.D.  
 John B. Thomas, Ph.D.  
 Didier Trono, Ph.D.  
 Wylie W. Vale, Ph.D.  
 Inder Verma, Ph.D.  
 Geoffrey M. Wahl, Ph.D.  
 Carl Ware, Ph.D.  
 Detlef Weigel, Ph.D.  
 William O. Weigle, Ph.D.  
 David J. Western, Ph.D.  
 Darcy B. Wilson, Ph.D.

### Major Programs in Biology

For more information, please see biology's web page, <http://www-biology.ucsd.edu/>

The UCSD Department of Biology is structured around the different levels of biological organization—biochemical, cellular, physiological, and ecological. The research and teaching of the department emphasize the fundamentally important processes that occur at each of these levels. With a solid foundation in these processes future training and study in any area of biology is possible, from plant breeding to genetic counseling, from medical microbiology to ecological epidemiology, from veterinary science to cancer research. The UCSD campus is situated among some of the finest research institutions in the world. The Department of Biology is fortunate in having close ties with the Scripps Institution of Oceanography, the Salk Institute of Biological Studies, and the Scripps Clinic and Research Foundation, all of which open interesting avenues for motivated students.

The department offers six different major programs, each of which provides an excellent background for future graduate or professional study. They are (1) general biology, (2) animal physiology and neuroscience, (3) biochemistry and cell biology, (4) molecular biology, (5) microbiology, and (6) ecology, behavior, and evolution. The requirements of each of the majors are designed to meet the needs of a different group of students. These requirements are quite concordant, reflecting the department's philosophy that familiarity with certain basic aspects of the subject is fundamental to all specialized understanding. Bachelor of science degrees granted in each of these majors will be so designated.

The Student Affairs Office (1128 Pacific Hall) administers the undergraduate biology program for all five colleges. For complete details regarding policies and procedures pertaining to the biology programs, please contact Biology Student Affairs.

### Admission to the Department of Biology

Student demand exceeds program capacity in all biology majors. Therefore, admission to a biology major is based on academic excellence demonstrated either in high school and standardized testing or as a pre-major at UCSD.

#### Freshmen

Freshmen entering in fall 1998 who have indicated the desire to major in biology will either be admitted directly to the biology major of their choice, or admitted to the biology pre-major, depending upon their UCSD admission credentials. Undeclared and other majors who wish to major in biology will be designated as pre-majors. Those designated as pre-majors must complete the following screening courses within six quarters (by the end of the sophomore year) and achieve a GPA of 2.75 or better in these courses in order to be formally admitted to a biology major:

Math 10A and 10B (or 20A and 20B)  
 Physics 1A and 1B (or 2A and 2B)  
 Chemistry 6A and 6B  
 BILD 1 and 2 (or 1 and 3)

At the end of their sophomore year, those who desire to enter the biology major must formally apply at the Biology Student Affairs

Office. (**Note:** These are the minimal screening requirements, and do not satisfy all of the lower division requirements of any biology major. Please consult the section regarding your particular major to ensure that you satisfy all lower-division and upper-division requirements.)

#### Continuing Students

Students admitted to UCSD prior to fall 1998 may continue to declare any of the six biology majors by submitting a completed Change of Major form at the Registrar's Office.

#### Transfer Students

Transfer students are not subject to biology admission requirements until fall 2000. Transfer students entering in fall 1998 may declare the biology major of their choice.

#### Satisfactory Progress

All students admitted into a biology major must maintain satisfactory progress in order to remain in a biology program. If the GPA in biology courses for such a student falls below 2.0, he or she will be placed on probation during the quarter after the average fell below the line. If the GPA is not brought above the 2.0 level during the quarter on probation, the student will be dropped from the major.

#### Prerequisites

All students are expected to have completed all prerequisites prior to enrolling in any biology course.

#### Exceptions

The department will accept petitions from pre-majors for admission to the major with less than the required GPA, and the success of such petitions will be evaluated based upon academic promise that is not reflected in the GPA. Exceptions might also be made to accommodate students who showed exceptional promise in laboratory experimentation, or students who had overcome extraordinary hardship while taking the lower-division courses.

#### Enrollment in Upper Division Biology Classes by Non-Biology Students

Because biology is an impacted major, enrollment in upper-division biology courses is limited to biology majors, and those majors for which upper-division biology courses are required for

graduation. Every effort will be made, on a space available basis, to enroll students from other majors in those biology lecture and laboratory courses which may be required for post-graduate study.

### ***Department of Biology Residency Requirement***

To receive a bachelor of science degree in biology from UCSD, **all students must complete at least nine upper-division biology courses (four-units each) in the Department of Biology while officially enrolled at UCSD.** (Students participating in the Education Abroad Program (EAP), UCSD Opportunités Abroad Program (OAP), courses at other UC campuses, and certain courses at other U.S. institutions may petition up to three of these courses to count toward their residency minima.) Biology courses completed through the UC Extension program (concurrent enrollment) **will not** be counted toward this residency requirement.

### ***Grade Requirements for the Majors***

The minimum GPA requirement (for both the major and overall UC) for graduation is 2.0. D grades in courses required for the major are acceptable, providing that the student's major GPA and overall UC GPA is at least 2.0. Students who received D and/or F grades should contact one of the Department of Biology's undergraduate advisers to determine the effect of such grades on their GPAs. The biology major GPA calculation is based on upper-division courses required for the major and any additional upper-division UCSD Department of Biology courses taken. (Upper-division courses from other UCs, other UCSD departments, and EAP **which have been approved via petition to count toward the major** are counted into the major GPA. Other transfer courses do not count toward the UC or major GPA.) **All courses, required for any of the six majors, must be taken for a letter grade with the exception of BISP 195, 196, or 199.**

### ***Students with Transfer Credit***

All courses (including prerequisites) taken at other institutions must be reviewed by the Department of Biology before they can be applied

toward any major requirement. Students must obtain approval from the Biology Student Affairs office prior to taking courses outside of UCSD (for example, students wishing to take a Chem. 6BL equivalent at another institution must consult with Biology Student Affairs *before enrolling in the substitute course*). In addition, any student wishing to satisfy a major requirement with upper-division transfer work (with the exception of organic chemistry) must first submit a General Petition. Contact Biology Student Affairs (1128 Pacific Hall) for specific information regarding transfer documentation and petition procedures.

### ***UCEAP Courses (Education Abroad Program)***

It is very important that students who plan to participate in the U.C. Education Abroad Program (including the Costa Rica Tropical Ecology program) or the UCSD Opportunities Abroad Program obtain the name of a faculty adviser from the Biology Student Affairs Office in order to discuss the proposed program of study. For most EAP programs, it is strongly recommended that biology majors complete biochemistry (BIBC 100 or 102) and genetics (BICD 100) and their prerequisites before going abroad.

### ***Special Studies Courses***

Only one quarter of BISP 195 and one quarter of BISP 196 or 199 may be counted toward any biology major. For information on requirements and application procedures for special studies courses students should go to the Biology Student Affairs Office (1128 Pacific Hall).

### **BISP 195**

Being a teaching assistant is an important task and can provide students with experience and faculty contact which can be valuable when applying for graduate school. Students who are interested in being a T.A. should have received a strong grade in the course which they want to teach, have an overall GPA of 3.0, and have taken at least ninety total units. Students should apply very early in the quarter prior to the quarter they wish to teach. Applications are available at the Biology Student Affairs Office.

### **BISP 199**

Independent Study BISP 199 is intended to provide interested and qualified biology students with an opportunity to work closely with faculty and professionals in their chosen field and can be a valuable contribution to the student's preparation for graduate school or career goals. To enroll in BISP 199, students must have accrued at least ninety quarter-units with an overall UC GPA of at least 3.0. Students may select for their instructor any professor at UCSD, but the BISP 199 application must be submitted for approval to the Department of Biology. The deadline to apply for BISP 199 is the eighth week of the quarter prior to the quarter in which the research will begin.

### **AIP 197**

Because the undergraduate research conducted through the Academic Internship Program is generally done at a site not affiliated with the UCSD Department of Biology, students who wish to request that an AIP 197 course be counted toward their major must submit a General Petition for their request before the end of the eighth week of the quarter prior to the quarter in which research will begin. This early deadline allows time for the biology faculty to review and contribute to the student's research proposal and ascertain the project's compatibility with the student's academic goals. If an AIP 197 course is approved for the student's major, no other special studies course (BISP 196 or 199) can be used toward the major.

### **General Biology Major**

**Please refer to the "Admission to the Majors" notice detailed earlier in the Department of Biology section of this catalog.**

This program allows the most diversified exposure to biology of any of the majors offered by the Department of Biology. It is designed for students with broad interests who do not wish to be constrained by the specialized requirements of the other majors and who desire maximum freedom to pursue their particular educational goals.



### Lower-Division Requirements

Lower-division requirements are designed to provide the foundations in mathematics, physics, and chemistry that are fundamental to the study of biology. In addition, an introduction to biology is required to provide the appropriate background for upper-division biology courses. The lower-division requirements are subsumed in large part under those of the various colleges.

Mathematics 10A, B, C or 20A, B, C

Chemistry 6A, B, C, **and** one lab

Physics 1A, B, C or 2A, B, C **and** one lab  
BILD 1 and 2 or BILD 1 and 3

### Upper-Division Requirements

Listed below are the upper-division course requirements for the general biology major. Specific requirements have been held to a minimum for this major in order to allow students maximum freedom in fitting course schedules to their particular educational goals. Because of the central positions of biochemistry and genetics in all of modern biological thought, only Biochemistry (BIBC 100 or 102), its organic chemistry prerequisites (Chemistry 140A and B), and Genetics (BICD 100) are prescribed requirements for general biology majors.

1. Organic Chemistry (Chemistry 140A and 140B)
2. Either Structural Biochemistry (BIBC 100) or Metabolic Biochemistry (BIBC 102) is required. Both are recommended.
3. Genetics (BICD 100)
4. One upper-division biology lab to be chosen from the following: BIBC 103, 105, BICD 101, 111, 123, 131, BIEB 121, 165, 167, 179, BIMM 101, 103, 121, 127, BIPN 105, or 145. Independent Research (BISP 196, 199) is encouraged, but may not replace one of the formal laboratory courses listed above.
5. Nine additional upper-division courses (each course must be at least four units) taken through the UCSD Department of Biology are required. Only one quarter of BISP 195 and one quarter of either BISP 196 or 199 may be applied toward this requirement. (Subsequent quarters of 195, 196, or 199 may be applied toward college and university requirements.)

Although students are free to design upper-division curricula which meet their individual educational goals, Molecular Biology (BIMM 100) and Cell Biology (BICD 110) are strongly recommended for those contemplating applying to graduate or professional schools.

### Animal Physiology and Neuroscience Major

**Please refer to the "Admission to the Majors" notice detailed earlier in the Department of Biology section of this catalog.**

The animal physiology and neuroscience major provides a program for studying the bodily and neural functions of complex organisms. Within this major, a student may concentrate upon more specialized areas of study, such as human biology, neurobiology, or endocrinology. This major is most directly applicable to health-related professions such as medicine, nursing, dentistry, veterinary medicine, pharmacy, physical therapy, and medical technology. Animal physiology and neuroscience majors are also well prepared to enter other professions such as physiological research, physical education, agriculture, and wildlife management.

### Lower-Division Requirements

Mathematics 10A, B, C, or 20A, B, C

Chemistry 6A, B, C, **and** one lab

Physics 1A, B, C or 2A, B, C, **and** one lab  
BILD 1 and 2 or BILD 1 and 3

### Upper-Division Requirements

Listed below are the upper-division courses required for the animal physiology and neuroscience major. The first four requirements provide exposure to the current understanding of subcellular function that should be at the command of all modern biologists. Requirements 5 and 6 constitute the core of the animal physiology and neuroscience major. By choosing four optional four-unit upper-division biology courses (requirement 7), a program geared to the needs of the individual student can be formulated.

1. Organic Chemistry (Chemistry 140A, 140B, and 143A)

2. Either Structural Biochemistry (BIBC 100) or Metabolic Biochemistry (BIBC 102) is required. Both are recommended.
3. Molecular Biology (BIMM 100)
4. Genetics (BICD 100)
5. Four from the following six courses:
  - a. Mammalian Physiology I (BIPN 100)
  - b. Mammalian Physiology II (BIPN 102)
  - c. Comparative Physiology (BIPN 106)
  - d. Cellular Neurobiology (BIPN 140)
  - e. Systems Neurobiology (BIPN 142)
  - f. Developmental Neurobiology (BIPN 144)
  - g. Computational Neurobiology (BIPN 146)
6. One of three Physiology Laboratories (BIPN 105, BICD 131, or BIPN 145). BISP 196 or 199 or an AIP 197 may substitute for a laboratory upon approval by the faculty adviser.
7. Four additional upper-division courses (each course must be at least four units) taken through the UCSD Department of Biology are required and may include the above (number 5-6). These may include no more than one quarter of BISP 195 and one quarter of either BISP 196 or 199 (AIP 197 may be used in place of BISP 196 or 199 upon approval by the faculty adviser). (Subsequent quarters of 195, 196, or 199 may be applied toward college and university requirements.)

### Biochemistry and Cell Biology Major

**Please refer to the "Admission to the Majors" notice detailed earlier in the Department of Biology section of this catalog.**

This major is designed to provide students with the fundamental courses required for entry into a school of medicine or into postgraduate training in a wide variety of areas of biological and biomedical sciences: biochemistry, biophysics, genetics, molecular biology, cell biology, developmental biology, microbiology, virology, human biology (physiology, metabolism, genetic disorders), cancer biology, pharmacology, and others. The emphasis is on basic principles which help us understand those processes unique to living organisms at the molecular level.



The program includes two required upper-division biology laboratory courses to provide practical experience with modern techniques and useful technology for those seeking positions as lab technicians in clinical and basic research laboratories. The opportunity to select five elective courses allows students either to seek a still broader background in a variety of biology courses or to begin specialization in a chosen field of study.

### Lower-Division Requirements

Mathematics 10A, B, C, or 20A, B, C  
 Chemistry 6A, B, C, **and** one lab  
 Physics 1A, B, C or 2A, B, C, **and** one lab  
 (Mathematics 20A, B, C, and Physics 2A, B, C are recommended)  
 BILD 1 and 2 or BILD 1 and 3

### Upper-Division Requirements

1. Organic Chemistry (Chemistry 140AB)
2. One chemistry laboratory: Organic Chemistry (Chemistry 143A) or Physical Chemistry (Chemistry 105A)
3. Structural Biochemistry (BIBC 100) or Physical Biochemistry (BIBC 110) or Physical Chemistry (Chemistry 126)
4. Metabolic Biochemistry (BIBC 102)
5. Biochemical Techniques (BIBC 103)
6. Molecular Biology (BIMM 100)
7. Cell Biology (BICD 110)
8. Genetics (BICD 100)
9. One upper-division biology lab to be chosen from the following: Signal Transduction (BIBC 105), Eukaryotic Genetics (BICD 101), Cell Biology (BICD 111), Plant Molecular Genetics and Biotechnology (BICD 123), Embryology (BICD 131), Recombinant DNA Techniques (BIMM 101), Advanced Techniques in Molecular Genetics (BIMM 103), Microbiology (BIMM 121), Environmental Microbiology (BIMM 127), Animal Physiology Lab (BIPN 105), Neurobiology Lab (BIPN 145), or Organic Chemistry (Chemistry 143C). A BISP 199 research project may satisfy this upper-division lab requirement.
10. Five additional upper-division courses (each course must be at least four units) taken through the UCSD Department of Biology are required. Only one quarter of BISP 195

and one of BISP 196 or 199 may be applied toward the fulfillment of this requirement. Students may use only one BISP 199 for meeting major requirements. (Subsequent quarters of BISP 195, 196, or 199 may be applied toward college and university requirements.)

### Molecular Biology Major

Please refer to the "Admission to the Majors" notice detailed earlier in the Department of Biology section of this catalog.

The program for molecular biology is designed to provide an intensive exposure to the theoretical concepts and experimental techniques of molecular biology. The concepts and techniques of molecular biology are the foundation for the studies of all aspects of biology in modern time. A focus on molecular biology, therefore, provides an excellent preparation for a wide range of advanced studies including basic research, medicine, bioengineering, and biotechnology. Considerable emphasis is placed on chemistry, biochemistry, and genetics for students enrolled in the program. As such, it is recommended for those students who have a particularly strong interest in this field of study.

### Lower-Division Requirements

Mathematics 20A, B, C  
 Chemistry 6A, B, C, **and** lab  
 Physics 1A, B, C or 2A, B, C, and one lab.  
 The two sequence is recommended.  
 BILD 1 and 2 or BILD 1 and 3

### Upper-Division Requirements

1. Organic Chemistry (Chemistry 140A and B)
2. Organic Chemistry Laboratory (Chemistry 143A) or Physical Chemistry Laboratory (Chemistry 105A)
3. Genetics (BICD 100)
4. Structural Biochemistry (BIBC 100)
5. Metabolic Biochemistry (BIBC 102)
6. Molecular Biology (BIMM 100)
7. Cell Biology (BICD 110)
8. Microbial Genetics (BIMM 122)
9. Regulation of Gene Activity in Eukaryotic Cells (BIMM 112)

10. Biochemical Techniques (BIBC 103)
11. Recombinant DNA Techniques (BIMM 101).
12. Four additional upper-division courses (each course must be at least four units) taken through the UCSD Department of Biology are required. Attention is drawn to BICD 120, BICD 122, BICD 140, BIMM 110, and BIMM 114. Only one quarter of BISP 199 or 196 and one of BISP 195 may be used to fulfill this requirement. (Subsequent quarters of BISP 195, 196, or 199 may be applied toward college and university requirements.)

### Microbiology Major

Please refer to the "Admission to the Majors" notice detailed earlier in the Department of Biology section of this catalog.

The microbiology major is designed to prepare students for graduate studies and for professional careers in a variety of health-related programs. The specialization in microbiology can provide the basic background for work in medical technology, or for further training in public health or other health-related specialties. The program is also designed to provide a foundation for graduate studies in microbiology, virology, and a variety of allied fields as well as for medical and dental school.

### Lower-Division Requirements

Mathematics 10A, B, C, or 20A, B, C  
 Chemistry 6A, B, C, **and** one lab  
 Physics 1A, B, C, or 2A, B, C **and** one lab  
 BILD 1 and 2 or BILD 1 and 3

### Upper-Division Requirements

1. Organic Chemistry (Chemistry 140A-B)
2. Organic Chemistry Laboratory (Chemistry 143A)
3. Either Structural Biochemistry (BIBC 100) or Metabolic Biochemistry (BIBC 102) is required. Both are recommended.
4. Biochemical Techniques (BIBC 103)
5. Molecular Biology (BIMM 100)
6. Immunology (BICD 140)
7. Genetics (BICD 100)
8. Bacteriology (BIMM 120)

9. Laboratory in Microbiology (BIMM 121)
10. Virology (BIMM 114)
11. Medical Microbiology (BIMM 124)
12. Three additional upper-division courses (each course must be at least four units) taken through the UCSD Department of Biology are required. These may include no more than one quarter of BISP 195 and one quarter of BISP 196 or 199. (Subsequent quarters of 195, 196, or 199 may be applied toward college and university requirements.) Other courses of special interest to microbiology majors are listed below:

Cell Biology (BICD 110)

Regulation of Gene Activity in Eucaryotic Cells (BIMM 112)

Microbial Genetics (BIMM 122)

Recombinant DNA Techniques (BIMM 101)

### Ecology, Behavior, and Evolution Major

Please refer to the "Admission to the Majors" notice detailed earlier in the Department of Biology section of this catalog.

See the biology World Wide Web home page under undergraduate program for more details of the EBE major.

This major includes the fields of population biology, ecology, conservation biology, animal behavior, population genetics, biogeography, and evolution. These fields have in common a focus on evolutionary processes and whole organisms in relation to each other and to their environments. Research careers in ecology, behavior, and evolution can be found in universities, government agencies, and the biotechnology industry. More applied careers for ecologists are equally varied: recent graduates now work in forestry and wildlife management, as ecological consultants for U.S. and foreign governments and private industry, as teachers, or in new fields such as ecological medicine and epidemiology, environmental design and planning, and conservation biology. Because organismal biology spans such a wide variety of topics, this major has been designed to provide the basic fundamentals while allowing maximum flexibility within the general topic areas.

### Lower-Division Requirements

**Mathematics:** Three quarters of calculus are required. Mathematics 20A, 20B, and 20C are strongly recommended, but Mathematics 10A, 10B, and 10C are acceptable.

**Chemistry:** Chemistry 6A, 6B, and 6C. Laboratories in chemistry are not required.

**Physics:** Physics 1A, 1B, and 1C OR Physics 2A, 2B, and 2C. Laboratories in physics are not required.

BILD 1 and 3

### Upper-Division Requirements

1. Genetics (BICD 100). This course should be taken at the end of the second year.
2. Biometry (BIEB 100). This course is a prerequisite for the laboratory courses in ecology, behavior, and conservation, and should be taken in the fall of the second or third year.
3. Either Structural Biochemistry (BIBC 100) or Metabolic Biochemistry (BIBC 102) is required. Please note that organic chemistry (Chemistry 140A and 140B) is a prerequisite for biochemistry. These prerequisite courses may be applied as elective courses under requirement number five listed below.
4. Ecology, Behavior, and Evolution. Seven courses to be chosen from BIEB 120–179 are required. At least two of these courses must be laboratory or field courses (BIEB 121, 165, 167, and/or 179). BIEB 120, 126, 130, 140, 150, 164, 166, and 178 are designed to be taken by third-year students; BIEB 121, 154, 156, 165, 167, 176, and 179 are designed to be taken by more advanced students. Laboratory courses may be taken either concurrently with the prerequisite lecture course *if Biometry (BIEB 100) has been taken, or during the subsequent academic year.* Note that some of the laboratory courses may not be offered every year. For that reason, it is recommended that students take as many required courses as possible *when the courses are offered.*
5. Four additional upper-division courses (each course must be at least four units) in biology, chemistry, mathematics, or related sciences are required. Courses to be completed outside of the UCSD Department of Biology **must be petitioned** (prior to commencement of the course) to satisfy this requirement. Transfer courses are considered to be outside of the department. Students participating in the Education Abroad Program should refer to the biology section of that topic or contact the undergraduate adviser. Courses outside the Department of Biology that are particularly appropriate and that have been approved in the past include: Chemistry 122, 140A-B, and 149A, Mathematics 111A-B-C, 180A-B-C, and 181A-B-C; Biological Anthropology (most courses); and Earth Sciences (most courses); Economics 131; Scripps Institute of Oceanography (consent of instructor required). Only one quarter of BISP 196 or 199 and one quarter of BISP 195 may be used to fulfill this requirement. (Subsequent quarters of 195, 196, or 199 may be applied toward college and university requirements.) Certain intensive spring and summer session courses offered at various universities and field stations throughout the country may be used to help satisfy this requirement if prior approval is obtained from the faculty adviser of the major by petition. A good example is the field course in tropical biology offered in Costa Rica each spring and fall quarter. Prerequisites for the Costa Rica program are: BIEB 100, 120 and familiarity with Spanish; some type of field research experience, such as BIEB 121, 165 and/or 167, a field oriented BISP 199, or participation in a field research project, is strongly recommended. Biology courses taken through the Costa Rica program will be counted toward the major as one core course, one laboratory/field course, and one elective. These courses must be petitioned upon completion. Consult the Education Abroad Program Office at the UCSD International Center for details.

A new systemwide supercourse in environment biology held at the White Mountain Research station provides another attractive alternative to gaining field experience. For more information, consult <http://www.wmrs.edu/>

### Honors Thesis in Biology

Students in any one of the six biology major programs who have a 3.7 grade-point average or above in upper-division science courses, the biology major, and overall UC at the end of their junior year are eligible to undertake the

honors thesis. This program covers the senior year of undergraduate study and involves a maximum of twelve units of senior thesis research (BISP 196) taken in addition to the major requirements for graduation. (Four units of senior thesis research BISP 196 are to be taken during three consecutive quarters.) Research is conducted under the supervision of a faculty member of the Department of Biology *only* and cannot be performed in the research labs of other departments such as the School of Medicine, SIO, etc. If there are any questions as to which faculty members are eligible, students should consult with the honors thesis adviser. The research will culminate in a senior thesis and an oral report (see below). Students who complete the program satisfactorily will have "Distinction in Biology" recorded on their transcript. Students who fail to make satisfactory progress will be advised to withdraw from the program and, if eligible, will receive four units per quarter of BISP 199. Students may also withdraw voluntarily from the program and, if eligible, receive appropriate credit for BISP 199. Grades for BISP 196 are P, NP, or I only.

### APPLICATION TO THE HONORS THESIS PROGRAM

1. Students interested in the program who are eligible as of the end of the spring quarter of their junior year (the fourth quarter prior to graduation) need to find a Department of Biology faculty member willing to act in the capacity of thesis adviser and inform the Biology Student Affairs Office of their intent.
2. After an adviser is selected, the student and the adviser should complete the Special Studies application form (available from the Biology Student Affairs Office, 1128 Pacific Hall). The form should contain the research proposal.
3. The application form should then be submitted to the Biology Student Affairs Office. The deadline for submitting this form is the end of the eighth week of the quarter prior to the quarter the research will begin.
4. The application will be submitted to the honors thesis coordinator after eligibility has been determined.
5. If the student is approved for admission to the program, he or she will then be authorized to register for BISP 196.

Entry into the second quarter of the program will require submission to the honors thesis adviser of a written report in which the student summarizes the data obtained in the first quarter. A brief oral interview with the student on this report can also be expected. If the progress made appears reasonable for an honors student, then the 196 petition will be signed. If not, conversion of the 196 credit to BISP 199 will be recommended. Entry into the third quarter will also require a report and interview of the student. Completion of the program will require a final written report by the student at the end of the third quarter in addition to an oral presentation in the middle of the quarter to a suitable group of faculty and students, including the honors thesis adviser.

### Minor in Biology

To receive a minor from the Department of Biology, a student must complete at least seven four-unit biology courses, including at least five four-unit upper-division biology courses (for a total of at least twenty-eight units of course work). Students may apply transferable biology courses from another institution toward the lower-division requirement, after obtaining approval from both the UCSD Department of Biology and the student's college. Upper-division course must be taken for letter grade. No courses taken outside of the Department of Biology may be applied toward the biology minor (i.e., Chemistry 140A, Psychology 106, etc.). Advanced placement biology scores of four or five may be counted in lieu of two lower-division biology courses for the department.

### Secondary School Biology Teaching

UCSD's biology department is committed to the education of future biology teachers and offers an excellent preparation for teaching biology in secondary schools. If you are interested in earning a California teaching credential from UCSD, contact the Teacher Education Program for information about the prerequisite and professional preparation requirements. It is recommended that you contact TEP and the Biology Student Affairs Office early in your aca-

demical career to help you plan a suitable biology curriculum. If you plan to get your credential at another institution, keep in mind that a broad education in biology is the best preparation to become a teacher.

We suggest that students take courses in plant and animal biology, microbiology, ecology, population biology, evolution, marine biology, genetics, and biochemistry. Courses in cellular and molecular biology are also advisable. After completion of BILD 1, 2, and 3, a suggested program of upper-division courses would be: BIBC 100 or 102, BICD 100, 120, 130, BIEB 120, 150, BIPN 106, SIO 275B (or BILD 82). This would give you as a prospective teacher the required breadth of education.

### Integrated Bachelor's/ Master's Degree Program

An integrated program leading to a bachelor of science degree and a master of science degree in biology is offered to those undergraduate students who are enrolled in any of the major programs offered by the Department of Biology at UCSD. During the last quarter of their junior year (the fourth quarter **prior** to the receipt of the B.S. degree), students interested in obtaining the M.S. degree within one year following receipt of the B.S. degree may apply to the department for admission to the program. (Contact the Department of Biology Student Affairs Office for precise residency requirements and application dates. Petitions for late (senior year) admission to the program are considered only when the candidate has established a record in academic research equivalent to that of students enrolled as juniors.)

The program is open only to UCSD undergraduates. The Department of Biology does not have financial aid available for students enrolled in this program.

### Eligibility and Enrollment

To be eligible, students must have completed the first two quarters of their junior year in residence at UCSD and must have a GPA of at least 3.0 in both the major and overall UC. It is the responsibility of the prospective B.S./M.S. student to select a faculty member (from the Department of Biology) who would be willing to serve as the student's adviser and in whose

laboratory the student would complete at least twenty-four units of research over a two-year period as described below. The twelve units of research (BGGN 271), which must be completed during the student's senior undergraduate year, must be taken IN ADDITION to the requirements for the bachelor's degree; these twelve units will count toward the requirements for the master's degree only and may be taken for a letter grade with the approval of the faculty adviser. The student must confirm that the selected faculty adviser will not be on off-campus sabbatical leave during any quarter of the scheduled B.S./M.S. project. The student will also arrange (with the adviser's guidance) a schedule of courses for the senior year that will fulfill the requirements for the B.S. degree while also serving the program planned for the M.S. degree. Students are expected to meet the requirements for the M.S. degree in one year (three consecutive, contiguous, academic quarters) from the date of receipt of the B.S. degree. Any deviation from this plan, such as a break in enrollment for one or more quarters, will be cause for the student to be dropped from the program.

Application due dates are as follows:

Expected Date of Receipt of B.S.	Application Due Date
Fall 1999	November 1998
Winter 2000	January 1999
Spring 2000	August 1999

Students who have been approved (by both the Department of Biology and the UCSD Office of Graduate Admissions) for the program must enroll in a Special Studies Course, BGGN 271, for each, and every, quarter of participation in the B.S./M.S. program. Students can obtain the appropriate course code and department stamp at the Biology Student Affairs Office.

Research work (BGGN 271) will be credited toward the B.S./M.S. program requirements only if it is completed during the time a student is officially enrolled at UCSD and has paid tuition for that quarter.

### Requirements for the Master of Science Degree

1. Completion of thirty-six units of graduate course work (BGGN 200-level or higher, or

approved [via petition] graduate courses offered by related departments at a similar level) during the senior undergraduate year and the graduate year. The course of study must be approved by the faculty adviser and must include the following:

- a. Completion of four units of research (BGGN 271) during each of the final three quarters of the senior year. **Note:** It is mandatory that students complete three complete, separate, and consecutive academic quarters (with four units of research [BGGN 271] during each of the final three quarters), TO COMMENCE THE QUARTER IMMEDIATELY FOLLOWING THE QUARTER IN WHICH THE STUDENT HAS RECEIVED OFFICIAL ACCEPTANCE INTO THE PROGRAM and prior to the receipt of the B.S. degree.
  - b. Completion of at least four units of research (BGGN 271) during each of the three quarters of the subsequent graduate year.
  - c. Completion of four units of teaching (BGGN 500) during the graduate year. **Note:** Undergraduate Teaching (BISP 199) may not be used to satisfy the graduate year teaching requirement.
  - d. Completion of at least eight additional units of graduate-level course work in biology or related disciplines, approved by faculty adviser. If BGGN 500 is not taken during the graduate year, the student must complete at least twelve additional units of graduate-level course work. (BGGN 297 MAY NOT be used to satisfy this requirement.)
2. Maintenance of a grade-point average (both overall and in the major) of at least 3.0 for all course work, both cumulatively and for each quarter of enrollment in the B.S./M.S. program. If the student's GPA falls below 3.0 (for either overall or in the major), he or she will be automatically dropped from the program.
  3. Completion of a thesis, with an oral presentation to, and approval of, a three-member committee from the Department of Biology (the faculty adviser and two other faculty members).
  4. Three complete, separate, and consecutive quarters of residency as a graduate student

which will commence the quarter immediately following the quarter in which the B.S. degree is awarded. (**Note:** The Summer Session is not considered an official quarter during the graduate year.)

5. Students who have been approved for the B.S./M.S. program must provide the Office of Graduate Admissions with a copy of their official UCSD transcripts with the B.S. degree posted, PRIOR TO THE COMMENCEMENT OF THE GRADUATE YEAR IN THE PROGRAM. Also, students are expected to contact the biology graduate coordinator prior to each quarter of the graduate year to verify that appropriate forms have been completed. The completed Application for Candidacy for the Thesis is to be submitted to the biology graduate coordinator during the quarter preceding the final quarter of the graduate year. Students must pay fees and be officially enrolled at UCSD during the quarter that the master's degree is to be awarded. The thesis draft should be submitted to the Office of Graduate Studies and Research for review before the final copy is officially submitted.

### Non-Degree Program

The Department of Biology will accept applicants into the non-degree program for a maximum of one year only. Qualified applicants must have at least a 3.0 GPA in their upper-division work to be accepted. Justification will not be made for those who fall below the GPA minimum.

Students who wish to apply to the UCSD biology Ph.D. program at a later date should *not* apply for this program. However, students who have applied to graduate or medical schools elsewhere, but have not yet been accepted, are welcome to apply.

Once accepted into this program, the student has graduate status for the academic year. Courses may be taken on the undergraduate or graduate level with consent of the instructor. Students will not be assigned faculty advisers and must make their own academic plans.

### The Doctoral Program

Graduate studies for a Ph.D. degree in the Department of Biology in association with the

Salk Institute are oriented mainly toward the development of the capacity for independent research and for teaching in the biological sciences.

The requirements for entrance to graduate study in the Department of Biology are flexible, but a strong background in mathematics, chemistry, and physics is recommended.

Formal course work and opportunities for dissertation research include most basic areas of experimental biology, with emphasis in the general areas of biochemistry, biophysics, cell biology, developmental biology, genetics, immunology, molecular biology, neurobiology, plant molecular biology, ecology, behavior and evolution, virology, and cancer biology.

During the first year of graduate study, each student undertakes a research project in the laboratory of each of four to six different faculty members, and is expected to spend a major portion of his or her academic time on this project. The laboratories are selected by the student in consultation with the first year adviser to provide a broad view of the research interests of the department. The student is also expected to enroll in the first-year graduate biology sequence which includes advanced material in genetics, developmental biology, plant biology, neurobiology, molecular biology, cell biology, virology, and immunology. The only other general course requirement for the Ph.D. is a minimum of twelve units of BGGN 500 (Apprentice Teaching in Biology). A program of further study, including seminars and courses appropriate to a student's background and interests, is arranged through consultation between the student and the faculty. Much reliance is placed on informal instruction through early and close association of the student with the faculty and research staff, and through regular seminars. After becoming familiar with the research activities of the faculty through the laboratory rotation program, the student begins work on a thesis research problem of his or her choice no later than the end of the first year. The student is free to choose for the thesis adviser a regular member of the UCSD faculty or an adjunct member of the Department of Biology faculty. The student is required to have completed a two-part examination in order to be admitted to candidacy for the Ph.D. degree. The purpose of the examinations is for the student to demonstrate competence in the

field of major interest and in related fields of biology. The major remaining requirement for the Ph.D. degree is the satisfactory completion of a dissertation consisting of original research carried out under the guidance of a faculty member.

Close collaboration with members of the Department of Chemistry and Biochemistry is a vital and stimulating aspect of the biology program. Additional strength and breadth in biology are gained by collaborating with the Department of Marine Biology of the Scripps Institution of Oceanography, with the Scripps Clinic and Research Foundation, and with the Salk Institute for Biological Studies.

### *Departmental Ph.D. Time Limit Policies*

Students must be advanced to candidacy by the end of five years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed seven years.

### *Joint Doctoral Program with San Diego State University*

The Department of Biology at UCSD participates in a joint graduate program with the Department of Biology at SDSU, primarily in the areas of cell and molecular biology, and leading to the Ph.D. degree in biology. Graduate student participants in the joint doctoral program are required to spend one year enrolled at UCSD; thesis research is carried out under the supervision of the SDSU faculty.

Information regarding admission is found in the current edition of the San Diego State University Graduate Bulletin. Applicants to the UCSD Department of Biology graduate program who check the square marked "joint doctoral program" as well as the one marked "doctorate" will be considered for admission to both programs.

## COURSES

**Note: The department will endeavor to offer the courses as outlined below; however, unforeseen circumstances sometimes mandate a change of scheduled offerings, especially the quarter offered (F,W,S). Students are strongly advised to check**

**the Schedule of Classes or with the department's Student Affairs Office (1128 Pacific Hall, (619) 534-0557) before relying on the following schedule. This is of particular importance in planning schedules for graduation requirements. It is the student's responsibility to contact the Student Affairs Office to determine the specific quarter that certain courses will be offered. The following schedule is tentative for the academic year 1998-99 only. It should not be assumed that the same schedule will continue after this academic year.**

**Students who have satisfied the prerequisites for labs at another college or by AP credit need to be pre-authorized to T-Reg the lab. Please come to the Biology Student Affairs Office before your T-Reg time to be authorized. If the class is full on T-Reg please place your name on the waitlist via T-Reg and attend the first class meeting.**

**Students who do not attend the first thirty minutes of the first scheduled meeting (be it lab or lecture) will be considered not enrolled in the course. Prior written notification to the instructor regarding an anticipated absence will ensure a space. However, responsibility for officially dropping the lab from the registrar's records belongs to the student.**

**IF A STUDENT DROPS A LAB COURSE AFTER THE END OF THE SECOND SESSION, THE DEPARTMENT WILL REPORT A "W" FOR THE COURSE.**

### LOWER-DIVISION

#### **BILD 1. The Cell (4)**

An introduction to cellular structure and function, to biological molecules, bioenergetics, to the genetics of both prokaryotic and eukaryotic organisms, and to the elements of molecular biology. Three hours of lecture and one hour of recitation. *Prerequisites: two quarters of general chemistry (second quarter of chemistry may be taken concurrently).* (F,W,S)

#### **BILD 2. Multicellular Life (4)**

An introduction to the development and the physiological processes of plants and animals. Included are treatments of reproduction, nutrition, respiration, transport systems, regulation of the internal environment, the nervous system, and behavior. Three hours of lecture and one hour of recitation. *Prerequisite: BILD 1.* (F,W,S)

#### **BILD 3. Organismic and Evolutionary Biology (4)**

The first principles of evolutionary theory, classification, ecology, and behavior; a phylogenetic synopsis of the major groups of organisms from viruses to primates. Three hours of lecture

and one hour of lab. *Prerequisite: a full year of high school biology or BILD 1.* **Note: E.B.E. majors should complete this course during their first year at UCSD.** (F,S)

#### **BILD 10. Fundamental Concepts of Modern Biology (4)**

An introduction to the biochemistry and genetics of cells and organisms; illustrations are drawn from microbiology and human biology. Three hours of lecture and one hour of discussion. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major. (Students may not receive credit for BILD 10 after receiving credit for BILD 1.) (W,S)

#### **BILD 12. Neurobiology and Behavior (4)**

An introduction to the organization and functions of the nervous system; topics include molecular, cellular, developmental, systems, and behavioral neurobiology. Three hours of lecture and one hour of discussion. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major. *Prerequisite: BILD 1, 2, 3, 10, 24, 26, 30, 32, or any equivalent.* (W)

#### **BILD 14. Introduction to Plant Biology (4)**

Plant biology for non-majors with emphasis on human concerns. Plants as food for a growing population; plant growth, development and reproduction; the soil ecosystem; genetically engineered plants; organic farming; environmental concerns of agriculture. Three hours of lecture and one hour of discussion. (W)

#### **BILD 20. Human Genetics in Modern Society (4)**

Fundamentals of human genetics and introduction to modern genetic technology such as gene cloning and DNA fingerprinting. Applications of these techniques, such as forensic genetics, genetic screening, and genetic engineering. Social impacts and ethical implications of these applications.

#### **BILD 22. Human Nutrition (4)**

A survey of our understanding of the basic chemistry and biology of human nutrition; discussions of all aspects of food: nutritional value, diet, nutritional diseases, public health, and public policy. Three hours of lecture and one hour of discussion. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major. **Note: Students may not receive credit for BILD 22 after having completed BIBC 120.** (S)

#### **BILD 24. Biology of Human Reproduction (4)**

The topics covered are: sexual development in embryo and fetus, the nature and regulation of changes at puberty, the functioning of the mature sexual system. Three hours of lecture. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major. *Prerequisite: BILD 10.* (W)

#### **BILD 26. Human Physiology (4)**

Introduction to the elements of human physiology and the functioning of the various organ systems. The course presents a broad, yet detailed, analysis of human physiology, with particular emphasis towards understanding disease processes. Three hours of lecture and one hour of discussion. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major. *Prerequisite: BILD 10 or equivalent.* (W)

#### **BILD 30. Biomedicine/Microbes (4)**

General principles of microbiology with emphasis on the cell biology of microorganisms and of the cells with which they interact in causing diseases of man and animals. A discussion of infection by bacteria, fungi and viruses, and host responses to infection. Three hours of lecture and one hour of discussion. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major. (F)

#### **BILD 32. Biomedicine/Cancer (4)**

An introduction to molecular, cellular, and immunological aspects of cancer and a consideration of the sociological and psychological impact of cancer on the individual and general society. Three hours of lecture. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major. (S)

#### **BILD 36. AIDS Science and Society (4)**

An introduction to all aspects of the AIDS epidemic. Topics include the epidemiology, biology, and clinical aspects of HIV infection; HIV testing; education and approaches to therapy; and the social, political, and legal impacts of AIDS on the individual and society. In order to count for their major, biology majors must take the upper-division course, BICD 136. (F)

#### **BILD 60. Classic Experiments in Modern Biology (2)**

Experiments from outstanding research papers and fundamental procedures in areas of modern biology, including biochemistry, cell and molecular biology, and cellular differentiation, will be discussed in lecture. Students will be expected to read a text and journal articles related to lecture. Two hours of lecture. **This course will not satisfy any requirements for the biology major, biology minor, or college general-education purposes.** *Prerequisite: BILD 1.* (Not offered in 1998-99.)

#### **BILD 90. Undergraduate Seminar (1)**

This seminar is restricted to lower-division undergraduate students (freshmen and sophomores). The course introduces current biological topics. The topics vary with instructors and for each quarter. Examples of topics which may be discussed are: wildlife conservation, signalling within and between cells, mapping the human genome, etc. **This course does not satisfy any requirement for the biology major, biology minor, or college general/education.** (F,W,S)

#### **BILD 95. Undergraduate Workshops (1)**

The workshops will be restricted to lower-division undergraduates. The course will introduce students to the methods of scientific research and to a variety of research topics in the biological/biomedical sciences. Examples of topics are: Introduction to Scientific Research, AIDS, Medical and Social Aspects, Is the Mind the Same as the Brain, Wildlife Conservation. (F,W,S)

#### **BILD 99. Horticulture and Animal Husbandry (4)**

The practical and theoretical aspects of plant and animal propagation, maintenance, and behavior in a typical Southern California farm community. Animals to be studied include bees, rabbits, sheep, goats, pigs, horses, chickens, ducks, geese, and turkeys. Behavioral and social aspects are emphasized. Plants to be studied include a variety of fruit trees, bushes, and vegetables. Emphasis is on propagation and culture conditions. Each student chooses a principal project and area of study. One hour of lecture and fourteen hours of farm work, research and/or study per week. Oral reports and final paper required. (S)

## UPPER-DIVISION

### Biochemistry

#### **BIBC 100. Structural Biochemistry (4)**

The structure and function of biomolecules. Includes proteins conformation, dynamics, and function; enzymatic catalysis and allosteric regulation, lipids and membranes, sugars and polysaccharides, and nucleic acids. Three hours of lecture and one hour of recitation. *Prerequisites: two quarters of organic chemistry (second quarter may be taken concurrently).* **Note: Students may not receive credit for both BIBC 100 and Chem. 114A.** (F,W,S)

#### **BIBC 102. Metabolic Biochemistry (4)**

Energy-producing pathways—glycolysis, the TCA cycle, oxidative phosphorylation, photosynthesis, and fatty acid oxidation; and biosynthetic pathways—gluconeogenesis, glycogen synthesis, and fatty acid biosynthesis. Three hours' lecture and one hour recitation. *Prerequisites: two quarters of organic chemistry (second quarter may be taken concurrently).* *BIBC 100 is strongly recommended, but not required.* **Note: Students may not receive credit for both BIBC 102 and Chem. 114B.** (F,W,S)

#### **BIBC 103. Biochemical Techniques (6)**

A laboratory-lecture course in the application of biochemical methods to biological problems. Three hours of lecture and eight hours of laboratory each week. In addition to the formal lab hours, there will be at least eight hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. *Prerequisite: BIBC 100 or 102 (may be taken concurrently).* **Note: Students may not receive credit for both BIBC 103 and Chem. 112A.** (F,W,S) Attendance at the first lecture/lab is required. Non-attendance will result in the student's being dropped from the course roster. It is the student's responsibility to officially drop the course at the Registrar's Office.

#### **BIBC 105. Signal Transduction Laboratory (6)**

A laboratory course involving the application of molecular, cellular, and biochemical techniques to explore signal transduction mechanisms in mammalian cells. The events between ligand-binding to a cell surface receptor and activation of gene transcription in the nucleus will be studied. *Prerequisites: BIBC 100, BIBC 103 and BIMM 100.* (S)

#### **BIBC 110. Physical Biochemistry (4)**

The theory and applications of physical chemistry to biological molecules, process and systems and techniques used in biochemistry and physiology. Topics include reversible and irreversible thermodynamics, bioenergetics, energy coupling and transduction, solutions of macromolecules, sedimentation, chromatography, electrophoresis, passive and active membrane transport, spectroscopy, and chemical kinetics. Three hours of lecture and one hour of recitation. *Prerequisites: calculus and organic chemistry.* (S)

#### **BIBC 115. Computer Programming in Biology (4)**

Use of computer programming in the analysis and presentation of biological data (computation of best value and standard deviation, histogram, least squares fitting procedure, simulation of genetic experiments, etc.) Students learn the FORTRAN computer language and run their programs at the Computer Center. There are some visits to laboratories and hospitals to see applications of computers in biology and medicine. Three hours of lecture and about ten hours of homework per week; limited enrollment. *Prerequisite: upper-division standing or consent of instructor.* **Note: Students may not receive credit for both BIBC 115 and Chem. 134.** (F)

#### **BIBC 116. Protein Evolution (4)**

Protein structure and function. Topics include: the domain structure of proteins and the evolution of new protein activities; proteases and the regulation of biological processes such as blood coagulation; extracellular matrix proteins, including collagens, elastin, proteoglycans, fibronectin, and laminin; antibodies and the immunoglobulin superfamily; hormones and the mechanisms of hormone action. Continuation of Biochemistry 1. *Prerequisite: BIBC 102.*

#### **BIBC 120. Nutrition (4)**

Emphasis is on the biochemical aspects of nutrition. The known functions of vitamins, minerals, fats, carbohydrates, and protein are discussed in terms of experiments in nutrition and an evaluation of the relation of the knowledge to nutrition in man. Three hours of lecture. *Prerequisite: BIBC 102.* *BIBC 100 (strongly recommended).* (F,S)



**BIBC 130. Marine Biochemistry (4)**

This course examines the adaptations of marine animals on different and changing environments. The effects of deep-sea pressures, water temperature, availability of oxygen, salinity, and hydrothermal vent environments are discussed. Three hours of lecture and one hour of discussion. *Prerequisite: BIBC 100 or 102 or Chem. 114B or consent of instructor.* (F)

**BIBC 153. Topics in Biophysics/Photobiology (4)**  
**(Same as Chemistry 153 and Physics 153.)**

Basic principles of photobiology and photochemistry. Photochemical mechanisms in photosynthesis. Photoreceptor pigment systems and photobiological control mechanisms in living organisms. *Prerequisite: upper-division standing in biology, chemistry or physics, or consent of instructor.* (S)

**BIBC 180. Topics in Biochemistry (4)**

An advanced course which covers in depth a specialized topic in biochemistry. Three hours of lecture. *Prerequisite: BIBC 100 or 102.* (Not offered in 1998–99.)

**Genetics, Cellular and Developmental Biology of Plants and Animals****BICD 100. Genetics (4)**

An introduction to the principles of heredity in diploid organisms, fungi, bacteria, and viruses. Mendelian inheritance; population genetics; quantitative genetics; linkage; sex determination; meiotic behavior of chromosome aberrations, gene structure, regulation, and replication; genetic code. Three hours of lecture and one hour of recitation. *Prerequisite: BILD 1 or the equivalent.* (F,W,S)

**BICD 101. Eucaryotic Genetics Laboratory (4)**

This course emphasizes the principles of Mendelian inheritance and requires the student to apply both cytological and genetic analysis to the solution of problems in transmission genetics. One hour of lecture and seven hours of laboratory. *Prerequisite: BICD 100 (may not be taken concurrently).* (Not offered in 1998–99.) Attendance at the first lecture/lab is required. Non-attendance will result in the student's being dropped from the course roster. It is the student's responsibility to officially drop the course at the Registrar's Office.

**BICD 110. Cell Biology (4)**

The structure and function of cells and cell organelles, cell growth and division, motility, cell differentiation and specialization. Three hours of lecture and one hour of recitation. *Prerequisites: BILD 1, BIBC 100 or BIBC 102, and BICD 100.* (F,W,S)

**BICD 111. Cell Biology Laboratory (4)**

A laboratory course in the application of cellular techniques to biological problems. Ten hours of laboratory. In addition to the formal lab hours listed above, there will be an average of two hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. *Prerequisites: consent of instructor and BICD 110 (may be taken concurrently); BIBC 103 is strongly recommended.* (F) Attendance at the first lecture/lab is required. Non-attendance will result in the student's being dropped from the course roster. It is the student's responsibility to officially drop the course at the Registrar's Office.

**BICD 120. Fundamentals of Plant Biology (4)**

An introduction to the biology of plants. Basic principles of plant anatomy, physiology, development, and diversity are covered as well as specialized topics, including plant genetics engineering, plant disease and stress, medicinal plants, plants and the environment, and sustainable agriculture. *Prerequisites: BILD 1 and 2.* (F)

**BICD 122. Plant Cellular and Molecular Biology (4)**

The cellular and molecular basis of plant development, including plant hormones, signal transduction mechanisms, light and plant growth, plant microorganism interaction, plant transformation, genetic engineering of plants. *Prerequisites: BIBC 102 required, BICD 120 recommended.* (W)

**BICD 123. Plant Molecular Genetics and Biotechnology Laboratory (6)**

Techniques in plant cell and tissue culture, plant transformation, genetic selection and screening of mutants, host pathogen interactions, gene regulation, organelle isolation, membrane transport. Two hours of lecture and eight hours of laboratory each week. In addition to the formal lab hours, there will be at least eight hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. *Prerequisites: BIBC 103 and BICD 120 strongly recommended.* (S) Attendance at the first lecture/lab is required. Non-attendance will result in the student's being dropped from the course roster. It is the student's responsibility to officially drop the course at the Registrar's Office.

**BICD 130. Embryos, Genes, and Development (4)**

Developmental biology of animals at the tissue, cellular, and molecular levels. Basic processes of embryogenesis in a variety of invertebrate and vertebrate organisms. Cellular and molecular mechanisms that underlie cell fate determination and cell differentiation. More advanced topics such as pattern formation and sex determination are discussed. Open to upper-division students only. Three hours of lecture and one hour of recitation. *Prerequisites: BIMM 100, BICD 100.*

**BICD 131. Embryology Laboratory (6)**

Descriptive and experimental embryology of marine organisms and of vertebrates. One and one-half hours of lecture and ten hours of laboratory each week. In addition to the formal lab hours, there will be at least six and a half hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. *Prerequisites: upper-division standing, BILD 1 and 2 or BIPN 100 or the equivalent, and consent of the instructor. BICD 110 and/or BICD 130 recommended.* (F,S) Attendance at the first lecture/lab is required. Non-attendance will result in the student's being dropped from the course roster. It is the student's responsibility to officially drop the course at the Registrar's Office.

**BICD 132. Molecular Basis of Development (4)**

Explores the molecular mechanisms that underlie cell fate determination and cell differentiation during animal development. Emphasizes the action of key regulatory networks in directing developmental events in a variety of vertebrate and invertebrate systems. This course is open to upper-division students only. Three hours of lecture and one hour of recitation. *Prerequisite: BIMM 100.* (Not offered in 1998–99.)

**BICD 134. Human Reproduction and Development (4)**

This course is addressed to the development of the human sexual system, including gametogenesis, fertilization, and embryo implantation. Emphasis is placed on the physiology of reproductive functions. Three hours of lecture and one hour of discussion. *Prerequisites: BIBC 102 and BICD 100.* (F)

**BICD 136. AIDS Science and Society (4)**

An introduction to all aspects of the AIDS epidemic. Topics will include the epidemiology, biology, and clinical aspects of HIV infection, HIV testing, education and approaches to therapy, and the social, political, and legal impacts of AIDS on the individual and society. In order to count for their major, biology majors must take the upper-division course, BICD 136. *Prerequisites: BIBC 100 or BIBC 102, and BICD 100.* (F)

**BICD 140. Immunology (4)**

Formation and function of the mammalian immune system, molecular and cellular basis of the immune response, infec-

tious diseases and autoimmunity. *Prerequisites: BIBC 100 or BIBC 102, BICD 100, and upper division standing. BIMM 100 and BICD 110 recommended.*

**BICD 142. Topics in Immunology (4)**

This course covers selected topics in molecular and cellular immunology at a more advanced level, and is a sequel to Immunology (BICD 140). *Prerequisites: BICD 140 and upper-division standing.* (Not offered in 1998–99.)

**BICD 150. Endocrinology (4)**

Topics are hormone biosynthesis, metabolism and mechanisms of action, neuroendocrinology, regulation of intermediary metabolism and body size, water and electrolyte, calcium and phosphate homeostasis. This course is restricted to upper-division students. Three hours of lecture and one hour of discussion. *Prerequisite: BIBC 102 (may be taken concurrently).* (F)

**BICD 170. Topics in Human Genetics (4)**

An advanced course covering aspects of human genetics in detail and using papers from the scientific literature as the major source of information. A review of basic genetics as applied to the human species is followed by the consideration of recent genetic insights into a number of human conditions which illustrate the principles covered in the first part of the course. *Prerequisite: BICD 100 (may not be taken concurrently); BIMM 100 is strongly recommended.* (F)

**Ecology, Behavior, and Evolution****BIEB 100. Biometry (4)**

Application of statistics in biological problems. Topics: parametric statistics, (t-test, correlation, regression, ANOVA), non-parametric statistics resampling methods, experimental design. Mandatory homework to apply theory using statistical Macintosh-based programs. Instructor conducts mandatory two-hour discussion session in computer lab. Three hours of lecture and two hours of laboratory section. *Prerequisite: BILD 3.*

**BIEB 120. General Ecology (4)**

A study of the factors affecting species' distributions and abundances, with a special emphasis on population dynamics. Three hours of lecture and one hour of section. *Prerequisite: BIEB 100 (may be taken concurrently).* (W)

**BIEB 121. Ecology Laboratory (6)**

A laboratory course to familiarize students with ecological problem solving and methods. Sections will use the Macintosh computer and also perform outdoor field work. Two hours of lecture and eight hours of laboratory each week. In addition to the formal lab hours, there will be at least nine hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. *Prerequisites: BIEB 100 and 120. (BIEB 120 may be taken concurrently).* (F,W,S)

**BIEB 126. Plant Ecology (4)**

This course begins with an introduction to plant population biology including whole-plant growth and physiology. We then focus on three classes of ecological interactions: plant-plant competition, plant-herbivore coevolution, and plant reproductive ecology including animal pollination and seed dispersal. *Prerequisite: BILD 3.* (W)

**BIEB 130. Introductory Marine Ecology (4)**

An introduction to the marine environment—its physics and chemistry, the organisms which live there, and the ecological processes affecting the distributions and abundances of these organisms. *Prerequisites: BILD 3, high school physics, and chemistry.* (F)

**BIEB 140. Biodiversity (4)**

An introduction to the patterns of geographic distribution and natural history of plants and animals living in terrestrial and



marine ecosystems. We will explore: ecological and evolutionary processes responsible for generating and maintaining biological diversity; and the nature of extinction both in past and present ecosystem. *Prerequisite: BILD 3. (S)*

**BIEB 150. Evolution (4)**

Evolutionary processes are discussed in their genetic, historical, and ecological contexts. Microevolution, speciation, macroevolution, and the evolution of adaptations. Three hours of lecture and one hour of recitation. *Prerequisite: BILD 3 or equivalent. (F)*

**BIEB 154. Molecular Evolution (4)**

This course deals with the evolution of genes and the molecules they encode. The role of mutation, selection, and drift at the molecular level are discussed. Molecular phylogenies, jumping genes, viral evolution, and searches for molecular homologies are a few of the topics covered. Three hours of lecture and one hour of discussion. *Prerequisites: BIBC 102, BICD 100, and BIMM 100. (S)*

**BIEB 156. Population Genetics (4)**

The first two-thirds of the course will cover the basic theory of population genetics, including selection, genetic drift, mutation, and migration. The last one-third of the course provides an introduction to quantitative genetics, including measurements of heritability and selection. The theory is illustrated throughout with biological examples. *Prerequisite: BICD 100; BIEB 100 recommended. (F)*

**BIEB 164. Behavioral Ecology (4)**

A survey of the patterns of social behavior in animals and a discussion of the ecological principles underlying the evolution of animal societies. Three hours of lecture and one hour of discussion. *Prerequisite: BILD 3 recommended. (F)*

**BIEB 165. Sociobiology Laboratory (6)**

This course will deal with quantitative methods for the study of animal social behaviors. Topics include spatial patterns, mating systems, and cooperation. The course includes both lab exercises and field trips. Two hours of lecture and eight hours of laboratory each week. In addition to the formal lab hours, there will be at least nine hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. *Prerequisites: BIEB 100 and BIEB 164. (F)*

**BIEB 166. Animal Communication (4)**

An integrated approach to animal communication, including the physics and physiology of signals, optimal strategies for signalling and receiving, and the ecological and social contexts of signal evolution. Three hours of lecture and one hour of section. *Prerequisite: BILD 3 recommended. (W)*

**BIEB 167. Animal Communication Laboratory (6)**

Laboratory exercises will introduce students to quantitative methods of visual, auditory, and olfactory signal analysis and to lab and field studies of animal signalling. Two hours of lecture and eight hours of laboratory each week. In addition to the formal lab hours, there will be at least nine hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. *Prerequisites: BIEB 100 and BIEB 166. (BIEB 166 may be taken concurrently.) (W)*

**BIEB 170. Field Ecology (4)**

Designed to instruct and demonstrate to students the value and approaches of experimental field research using hypothetico-deductive experimental approach. *May be taken only as part of the White Mountain Research Supercourse. Prerequisite: consent of instructor.*

**BIEB 171. Physiological Ecology (4)**

An examination of the functional means by which animals and plants cope with their environments, the physiological limits

that determine the boundary conditions of various ecological riches. Unifying principles that describe the regulatory features of all animals and plants are emphasized. *May be taken only as part of the White Mountain Research Supercourse. Prerequisite: consent of instructor.*

**BIEB 172. Applied Conservation Biology (4)**

Designed to introduce students to the complexities, and realities, of natural resource exploitation and preservation, emphasizing the trade-offs between economic benefits and ecosystem stability and sustainability. *May be taken only as part of the White Mountain Research Supercourse. Prerequisite: consent of instructor.*

**BIEB 176. Conservation and the Human Predicament (4)**

(Cross-listed with ANTH/BIO 132; however, biology majors must take the course as Biology 176.) An interdisciplinary discussion of the human predicament, the biodiversity crisis, and the importance of biological and environmental conservation in sustaining future societies. We explore the consequences of habitat destruction and species extinctions on the biosphere and human welfare. Three hours of lecture and one hour of discussion. *Prerequisite: BILD 3 or consent of instructor. (S)*

**BIEB 178. Principles of Conservation Ecology (4)**

Biodiversity will ultimately be preserved in "islands" of natural habitat. The principles of community ecology, island biogeography, and metropopulation dynamics will underlay the management decisions regarding the number, size, and locations of such reserves. Case studies are emphasized.

**BIEB 179. Conservation Biology Laboratory (6)**

Students will utilize, modify, and create computer software to solve conservation biology management problems. Topics included are pedigree analysis, stochastic population dynamics, community structure, and island biogeography. Two hours of lecture and eight hours of laboratory each week. In addition to the formal lab hours, there will be at least seven hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. *Prerequisite: BIEB 178, (may be taken concurrently). (S)*

**BIEB 180. Principle of Conservation Genetics (4)**

Species preservation depends on the maintenance of genetic diversity, which involves many aspects of population behavior. Inbreeding, heterozygosity loss, genetic divergence, and pedigree analysis are emphasized. Case studies involve zoo and reserve management. *Prerequisites: BIEB 100 and BIEB 120 or BIEB 156.*

**Molecular Biology, Microbiology**

**BIMM 100. Molecular Biology (4)**

Molecular analysis of gene action: DNA structure, replication, transcription, protein synthesis. Regulation of gene activity. Recombination, mutation, and introduction to genetic engineering. Emphasis on prokaryotes, but with discussion of eukaryotes. Three hours of lecture and one hour of recitation. *Prerequisites: BIBC 100 or 102 and BICD 100. (Note: Students may not receive credit for both BIMM 100 and Chem. 114C.) (F,W,S)*

**BIMM 101. Recombinant DNA Techniques (4)**

Theory and practice of DNA cloning. This course aims at providing practical knowledge in the field of genetic engineering. Techniques covered include construction of plasmid and phage DNA libraries, screening libraries for desired DNA clones by hybridization methods, plasmid and phage DNA preparation, and DNA sequencing. Two hours of lecture, one hour of discussion, and eight hours of laboratory. *Prerequisite: BIMM 100. (S) Attendance at the first lecture/lab is required. Non-attendance will result in the student's being*

dropped from the course roster. It is the student's responsibility to officially drop the course at the Registrar's Office.

**BIMM 103. Modern Techniques in Molecular Biology (4)**

This course focuses upon a combined biochemical and molecular genetic approach to study current biological problems. Techniques include amplification of rare nucleic acids with the polymerase chain reaction, purification and characterization of a eukaryotic protein expressed in bacteria, in vitro mutagenesis of DNA. One hour of lecture and eleven hours of laboratory. *Prerequisite: BIBC 103. (W) Attendance at the first lecture/lab is required. Non-attendance will result in the student's being dropped from the course roster. It is the student's responsibility to officially drop the course at the Registrar's Office.*

**BIMM 110. Molecular Basis of Disease (4)**

An examination of the molecular basis of human diseases. Course emphasizes inherited human disorders, and some important diseases caused by viruses. Focus on the application of genetic, biochemical, and molecular biological principles to an understanding of the diseases. Three hours of lecture. Course restricted to upper-division biology majors. *Prerequisites: BIMM 100 and BICD 100. (S)*

**BIMM 112. Regulation of Gene Activity in Eucaryotic Cells (4)**

This course explores problems in the regulation of gene activity in eucaryotic cells approached at the molecular level. The course includes the organization, structure, transcription, and regulation of eucaryotic genes; mechanism of hormonal regulation in controlling gene activity; induction of gene expression in eucaryotic cells; role of signal transduction in controlling gene expression; and regulation of gene activity during differentiation in developing systems. Examples are taken from eucaryotic microorganisms, invertebrates, as well as mammalian and other vertebrate systems. Three hours of lecture and one hour of discussion. *Prerequisite: BIMM 100. (S)*

**BIMM 114. Virology (4)**

An introduction to eucaryotic virology, with emphasis on animal virus systems. Topics discussed include the molecular structure of viruses; the multiplication strategies of the major virus families; and viral latency, persistence, and oncology. Three hours of lecture and one hour of discussion. *Prerequisite: BIMM 100. (W)*

**BIMM 120. Bacteriology (4)**

A discussion of the structure, growth, molecular genetics, and physiology of prokaryotic microorganisms, with emphasis on the diverse activities of bacteria and on the interaction of various bacterial species with their environment. Three hours of lecture and one hour recitation. *Prerequisites: organic chemistry; BIBC 100 or BIBC 102 (may be taken concurrently). (F)*

**BIMM 121. Laboratory in Microbiology (4)**

This course emphasizes fundamental principles of microbiology. Studies with bacteria include comparative morphology and physiology; pure culture techniques; bacterial growth; spore germination; and bacteriophage infection, replication, and release. Additional studies on antibiotics and the use of bioassays are included. One hour of demonstration and seven hours of laboratory. *Prerequisites: BIMM 120 and consent of instructor. (W) Attendance at the first lecture/lab is required. Non-attendance will result in the student's being dropped from the course roster. It is the student's responsibility to officially drop the course at the Registrar's Office.*

**BIMM 122. Microbial Genetics (4)**

Organization and function of prokaryotic genetic systems including sex factors, transduction, transformation, phage genetics, transposons, genetic engineering. Three hours of lecture. *Prerequisites: BIMM 100, BICD 100, or consent of instructor. (W)*

**BIMM 124. Medical Microbiology (4)**

This course covers basic principles and detailed aspects of microbial infectious diseases. Biochemical properties underlying microbial spread, host antimicrobial and inflammatory response, immunity, and recovery are emphasized. Emphasis is placed upon viral and bacterial diseases, including molecular principles of pathogenesis, of host immune responses, of drug resistance, and of viral and plasmid replication. Three hours of lecture and one hour of discussion. *Prerequisites: BIMM 100 and 120; recommended: BICD 140.* (W)

**BIMM 126. Environmental Microbiology (4)**

The role of microorganisms in environmental processes; fundamental aspects of Microbiology, interaction of microbes with plants, animals and other microbes, biogeochemical cycles, pollution, water quality, mineral recovery, biomass energy production, microbial control of pest and disease, genetic exchange. *Prerequisites: BIBC 102 and BIMM 120.* (Summer Session only)

**BIMM 127. Environmental Microbiology Laboratory (4)**

This course emphasizes advanced techniques and theory in environmental microbiology. Students will perform experiments concerning: (a) enrichment of diverse microbes, (b) microbial enumeration and identification, (c) metabolic and physiochemical adaptations, and (d) biotechnology, along with an independent project. *Prerequisites: BIMM 120 and BIMM 121.* (W)

**BIMM 130. Microbial Biochemistry (4)**

Unifying and unique biochemical capabilities of prokaryotes. Topics will vary from year to year but will include: energy interconversion; photosynthesis; cell adhesion; intercellular communication; differentiation; drug sensitivities; multidrug resistance; antibiotic production and excretion; photo-, magneto-, machino-, and chemo-reception; signal transduction; bioluminescence; nitrogen fixation; cellulose degradation. Three hours of lecture and one hour of discussion. *Prerequisite: BIBC 102 or equivalent.* (S)

**BIMM 132. Molecular Biology of Human Retroviruses (3)**

Replication cycle and gene regulation of HIV. Molecular approaches to therapy and vaccines. Three hours of lecture. *Prerequisite: BIMM 100 or equivalent.* (S)

**BIMM 134. Biology of Cancer (4)**

This course covers basic processes of transformation and tumor formation in a two-part format. The first section is focused on molecular and cellular mechanisms of carcinogenesis. The second section discusses tumor pathology and metastasis. Open to upper-division students only. *Prerequisites: BILD 1 and BILD 2.*

**BIMM 140. Computer Analysis of Genome Information (4)**

Lecture and lab are three hours. Information on genome projects via computer analysis of genome information, emphasizing DNA, RNA, and protein sequence analysis. Use of DNASYSTEM and GCG programs and databases on VAX computers; analysis of program algorithms and statistical criteria. *Prerequisites: BIBC 100 or 102, BIMM 100, and BICD 100.* (BIMM 100 may be taken concurrently.) (W)

**Animal Physiology and Neuroscience****BIPN 100. Mammalian Physiology I (4)**

This course introduces the concepts of physiological regulation, controlled and integrated by the nervous and endocrine systems. It then examines the muscular, cardiovascular, and renal systems in detail and considers their control through the interaction of nervous activity and hormones. Three hours of lecture and one hour of discussion. *Prerequisites: BILD 1, 2, and BIBC 100 or 102.* (F,W,S)

**BIPN 102. Mammalian Physiology II (4)**

This course completes a survey of organ systems begun in BIPN 100, by considering the respiratory and gastrointestinal systems. Consideration is then given to interactions of these systems in weight and temperature regulation, exercise physiology, stress, and pregnancy and reproduction. Three hours of lecture and one hour of section per week. *Prerequisite: BIPN 100.* (W,S)

**BIPN 105. Animal Physiology Lab (6)**

Experiments are performed on membrane physiology; nerve muscle function; cardiovascular physiology; respiratory, gastrointestinal and renal physiology. Subjects include experimental animals and humans. *Prerequisites: BIPN 100, 102, or 106 may be taken concurrently.* (Students who have received credit for Biol. 152 or 154 may not receive credit for BIPN 105.) Three hours of lecture and ten hours of laboratory each week. In addition to the formal lab hours, there will be at least eight hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. (W,S) Attendance at the first lecture/lab is required. Non-attendance will result in the student's being dropped from the course roster. It is the student's responsibility to officially drop the course at the Registrar's Office.

**BIPN 106. Comparative Physiology (4)**

Adaptation and evolution of the structure and function of physiological systems of animals. Three hours of lecture and one hour of section. *Prerequisites: BILD 1, 2 (BILD 3 recommended), and Chem. 6A-B-C.* (W)

**BIPN 140. Cellular Neurobiology (4)**

This course covers the biophysics of the resting and active membranes of nerve cells. It also covers the mechanisms of sensory transduction and neuromodulation, as well as the molecular basis of nerve cell function. *Prerequisites: BILD 1, 2, and BIBC 100 or 102.* (F)

**BIPN 142. Systems Neurobiology (4)**

This course covers integrated networks of nerve cells, including simple circuits like those involved in spinal reflexes. We will study how information and motor output is integrated and processed in the brain. We will also discuss higher-level neural processing. *Prerequisites: BILD 1, 2, and BIBC 100 or 102.* (W)

**BIPN 144. Developmental Neurobiology (4)**

We will examine the cellular and molecular basis of cell determination, neurite outgrowth, specificity, synaptogenesis, and cell death in the brain. *Prerequisites: BILD 1, 2, and BIBC 100 or 102.* (S)

**BIPN 145. Neurobiology Laboratory (4)**

Basic principles of nerve and muscle physiology will be taught through weekly exercises and individual projects. One hour of lecture and nine hours of laboratory each week. *Prerequisite: BIPN 140 or BIPN 142 or BIPN 146 (may be taken concurrently).* (F)

**BIPN 146. Computational Neurobiology (4)**

An exploration of computational brain models, including biophysical models of single neurons, small neural circuits, and larger scale network models. *Prerequisite: BILD 12 or BIPN 140 or Psych. 106 or Cog. Sci. 107.* (S)

**Special Courses****BISP 190. Advanced Biology Seminars for Seniors (2)**

Experts in diverse areas of biology from major universities in the U.S. and abroad will describe current research activities being conducted in their laboratories. Relevant readings will be assigned. P/NP grades only. *Prerequisites: seniors only; concurrent enrollment in BISP 199 or consent of instructor.* (F,W,S)

**BISP 195. Introduction to Teaching in Biology (4)**

Introduction to the teaching of the basic course in biology. A student under the direction of the instructor of the course is assigned one class section and will meet one time per week with the section. A student is required to attend the course lecture and meet with the instructor of the course at least one time per week. Limited to upper-division students who have a B average or higher. Three hours' lecture. (P/NP grades only.) *Prerequisites: consent of instructor and approval of department chair.* (Note: Applications for a Biology 195 are to be submitted to, and approved by, the Department of Biology prior to the eighth week of the quarter preceding the quarter in which the BISP 195 will be completed.) (F,W,S) **This course may be counted as one of the upper-division electives for a biology major.**

**BISP 196. Honors Thesis in Biology (4)**

Senior thesis research program. Research is conducted under the supervision of a biology faculty member. This one-year program is taken in addition to the major requirements for graduation. Upon satisfactory completion of the program, students will receive "Distinction in Biology" on their transcripts. *Prerequisites: senior standing, 3.7 GPA or above; prior selection for the program by a faculty member and approval by program coordinator. A department stamp will be used to monitor during registration.* (F,W,S)

**BISP 199. Independent Study for Undergraduates (4)**

Independent reading or research on a problem by special arrangement with a faculty member. (P/NP grades only.) *Prerequisites: overall UCSD GPA of at least 3.0, minimum of ninety units, consent of instructor, and approval by department chair.* (Note: Applications for a BISP 199 must be submitted to, and approved by, the Department of Biology prior to the eighth week of the quarter preceding the quarter in which the Biology 199 will be completed.) (F,W,S) **This course may be counted as one of the upper-division electives for a biology major, providing that no other special studies courses have already been counted toward the major.**

**GRADUATE****BGGN 204. Topics in Community and Population Ecology (3)**

This course teaches a different topic each quarter on the theoretical or conceptual side of community and population ecology. Students will read materials in depth, attend weekly discussions, and explore theories and models with statistical, analytical, and algorithmic tools of the trade. *Prerequisite: graduate standing or consent of instructor.* (S/U grades only) (Quarter offered varies and course is not offered every year.)

**BGGN 206. Topics in Biophysics and Physical Biochemistry (4)**

Selection of topics of current interest. Examples: primary processes of photosynthesis; membrane biophysics; applications of physical methods to problems in biology and chemistry, e.g., magnetic resonance, X-ray diffraction, fluctuation spectroscopy, optical techniques (fluorescence, optical rotary dispersion, circular dichroism). Topics may vary from year to year. *Prerequisite: consent of instructor.* (S/U grades permitted.) This course is cross-listed with Physics 206 and Chemistry 206. (W)

**BGGN 212. Special Topics in Microbiology (3)**

Recent developments in prokaryotic and eukaryotic microbial research. Topics vary from year to year but may include the following subjects: the molecular basis of (a) sex determination, expression, and interconversion; (b) differentiation, morphogenesis, and programmed death; (c) transcriptional and metabolic regulation; and (d) chemical macromolecular and energy-mediated reception, transmission, and response processes. The main thesis of the course is that examples of com-

plex regulatory phenomena in higher organisms can be found in single celled organisms. This course is open to enrollment by undergraduates. *Prerequisites: BIBC 102 and BICD 100.* (S/U grades permitted.) (Not offered in 1998-99)

**BGGN 213. Topics in Conservation Biology (3)**

Provides in depth coverage of topics in population genetics and ecology, community ecology, biogeography, human ecology, and ecosystem management relevant to conservation biology. Topics vary from year to year and have included pedigree analysis, inbreeding depression, minimum viable population size, problems of overabundance, fragmented populations, keystone species, in-situ and ex-situ conservation techniques. One two-hour meeting weekly. *Prerequisite: graduate standing or consent of instructor.* (S/U grades only.) (S)

**BGGN 214. Workshop in Behavioral Ecology (3)**

Hands-on experience in the analysis, modeling, and testing of hypothesis in behavioral ecology. Weekly group discussions and out-of-class projects will focus on a different theme (e.g., sexual selection, quantitative genetics, game theory, etc.) each year. *Prerequisite: open to qualified undergraduates and graduate students with consent of instructor.* (S/U grades only.) (Quarter offered varies and course is not offered every year.)

**BGGN 220. Advanced Molecular Biology (6)**

Provides a broad, advanced-level coverage of modern molecular biology for first-year graduate students. Topics include prokaryotic and eukaryotic gene structure and regulation, chromatin structure, DNA replication, translation, mechanisms of transcription, and an introduction to viruses. OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (F)

**BGGN 221. Advanced Protein Biochemistry (3)**

Topics include general aspects of protein structure and biochemical approaches to the isolation and study of proteins. This course also covers the relationship between the structure and function of selected proteins. Detailed discussion of modern biophysical methods to study protein-protein interactions will be included. *BGGN 220 is a co-requisite.* OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) *Corequisite: BGGN 220.* (F)

**BGGN 222. Advanced Cell Biology (6)**

A coverage of modern cell biology for first year graduate students. There is an up-to-date discussion of topics such as: structure and function of membranes; ion pumps, ion channels, transmembrane signalling; receptor mediated endocytosis; protein targeting; the role of RER and Golgi apparatus; the biosynthesis of intracellular organelles in animal and plant cells; the cytoskeleton, motility, molecular motors, cell-cell interactions, mitosis; and the control of cell division. Also included are extensive coverage of cell signalling mechanisms and discussions on molecular approaches to cell biology. *Prerequisites: BGGN 220 and 221.* OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (W)

**BGGN 223. Advanced Genetics (6)**

Provides a broad and extensive advanced-level coverage of molecular and formal aspects of genetics for first-year graduate students. Topics covered include: bacterial genetics, recombination in prokaryotes and eukaryotes, mammalian somatic-cell genetics, developmental genetics, sex determination, dosage compensation, and immunogenetics. Extensive coverage of the use of model systems like *Drosophila* and *C. elegans* is included. General and specific aspects of cellular signalling mechanisms will be covered. *Prerequisites: BGGN 220, 221 and 222* OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (S)

**BGGN 224. Advanced Neurobiology (3)**

Course covers modern molecular, cellular, developmental, and physiological aspects of neurobiology. Extensive discussion of original research articles will be included. *Prerequisites: BGGN 220 and 221.* OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (F)

**BGGN 225. Advanced Immunology (3)**

The course is devoted to immunology and is organized as a combined lecture-tutorial course stressing classical as well as current literature. Each week will compose an independent section. Topics will include cellular interactions involved in the immune response and the molecular biology unique to lymphoid factor and receptors. *Prerequisites: BGGN 220 and 221.* OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (W)

**BGGN 226. Advanced Animal Virology (3)**

This course consists of a review of fundamental concepts together with an in-depth analysis of the structure, genetics, multiplication and oncogenicity of animal viruses. Particular emphasis will be given to the DNA and RNA tumor viruses. The format of this section includes lectures and discussion of selected papers. *Prerequisites: BGGN 220 and 221.* OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (W)

**BGGN 227. Advanced Topics in Plant Biology (3)**

This course covers advanced topics in plant biology in the areas of molecular genetic developmental, and physiological biology. We will discuss plant-microbe interactions, transposable elements, protein trafficking, ion transport, and organ development. The format of this section includes lectures and discussion of selected papers. *Prerequisites: BGGN 220, 221, and 222.* OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (S)

**BGGN 228. Advanced Developmental Biology (3)**

This course covers graduate level lectures on developmental biology, emphasizing the use of genetically tractable model systems. Discussion of recent research articles is an integral aspect of this course. Students are introduced to classical experiments and given detailed coverage of recent fundamental findings in developmental biology. *Prerequisites: BGGN 220 and 221.* (Letter grades only.) (S)

**BGGN 229. Advanced Oncogenes (3)**

This course provides detailed coverage of the cellular and molecular basis of cellular transformation and oncogenesis. There will be extensive discussion on the role of oncogenes and their cellular counterparts. The course also provides in-depth analysis of intracellular signal transduction mechanisms. *Prerequisites: BGGN 220, 221, and 222.* (Letter grades only.) (S)

**BGGN 232. Human Retrovirology (3)**

This course consists of both lectures and journal reviews on replication, genetic regulation and pathogenesis of HIV and TLV, and on recent developments of vaccine and therapy against AIDS. Open to upper-division students with consent of instructor. *Prerequisite: BIMM 100 or equivalent.* (S/U grades only) (S)

**BGGN 233. Cellular Immunology (3)**

This course covers the molecular and cellular events in the humoral and cellular response to antigen, transplantation biology, the structure and function of the major histocompatibility gene complex, the T-cell receptor, lymphokines, and the induction of immunological tolerance. It serves as the second course in a two-part sequence. May be taken by undergraduates who have taken Part 1 (BICD 140) and by graduate students (S/U grades only.) (Quarter offered varies and course is not offered every year.)

**BGGN 235. Biology and Biochemistry of Cancer Cells (2)**

This course covers recent advances in cell biology, biochemistry, immunology, and virology as they relate to cancer cells and their interaction with the host. Cancer research specialists from outside will be brought in to discuss the most recent evidence and interpretations in key areas of cancer research. This course meets two hours per week for lecture and discussion. It will be at an advanced graduate level but open to a limited number of seniors (with permission of instructor) on a P/NP basis. (S/U grades only) (Quarter offered varies, and course is not offered every year.)

**BGGN 236. Essentials of Glycobiology (2)**

Molecular glycobiology encompasses studies of the structure, biosynthesis, and biological roles of oligosaccharide units on glycoconjugates. This course provides an overview of this rapidly evolving field with an emphasis on the glycoconjugates of eukaryotic organisms in the animal kingdom. (S/U grades only.) (S) This course is cross-listed with Medicine 222.

**BGGN 240. Cellular Neurobiology (2)**

Students read classic and modern papers that form the basis of the undergraduate lectures (BIPN 240), which they are encouraged to attend. These papers are presented by the students at weekly discussion sessions. *Prerequisite: consent of instructor.* (S/U grades only.) (F)

**BGGN 241. Neurobiology Seminar (3)**

Presentation of current research by local and visiting neurobiologists. (S/U grades only.) (F,W,S)

**BGGN 242. Systems Neurobiology (2)**

Students read classic and modern papers that form the basis of the undergraduate lectures (BIPN 142), which they are encouraged to attend. These papers are presented by the students at weekly discussion sessions. *Prerequisite: consent of instructor.* (S/U grades only.) (W)

**BGGN 244. Molecular/Developmental Neurobiology (2)**

Students read classic and modern papers that form the basis of the undergraduate lectures (BIPN 144), which they are encouraged to attend. These papers are presented by the students at weekly discussion sessions. *Prerequisite: consent of instructor.* (S/U grades only.) (S)

**BGGN 246. Systems Neurophysiology (3)**

Ways in which neurons are assembled into circuits to achieve perception and patterned movement. (S/U grades only.) (S)

**BGGN 249A-B-C. Basic Neuroscience (4-4-4)**

These courses are designed for graduate students in the neurosciences and other departments that are part of the interdisciplinary program (i.e. Biology, Cog. Sci.). These courses have been designed to cover as much basic neuroscience as possible in three quarters of study. They will combine two three-hour meetings each week with a 1.5 hour lecture and a 1.5 hour discussion of papers. These are required courses for all first-year neurosciences graduate students. *Prerequisite: graduate student or consent of instructor.* (F,W,S)

**BGGN 251. Molecular Biology (3)**

The first section of this course consists of a review of fundamental concepts in molecular biology together with an in-depth analysis of molecular biological topics of medical importance. The second section covers the structure, genetics, and multiplication of animal viruses, with particular emphasis on the DNA and RNA tumor viruses. Other subjects discussed include viral persistence, latency, and approaches to viral chemotherapy. Three hours of lecture. *Prerequisite: biochemistry.* (Not open to undergraduates.) (S/U grades only) (F)

**BGGN 252. Genetics (3)**

Human genetics, with emphasis on basic principles. Topics covered include chromosome abnormalities, the mechanisms of

dominant and recessive diseases, pedigree analysis, ascertainment of linkage, the interaction of genotype with diseases. Mechanisms of maintaining genetic diversity in human populations will be discussed along with recent approaches to genetic counseling and intervention. *Prerequisite: consent of instructor.* (Not open to undergraduates.) (S/U grades only) (F)

#### BGGN 253. Immunology (3)

Graduate students will explore topics in specialized areas of immunochemistry and cellular immunology, antigenic and molecular structure of immunoglobulin molecules; antigen-antibody interactions; cellular events in the humoral and cellular immune responses; translation immunology. *Prerequisite: consent of instructor.* The course is similar in content to BICD 140 but is accelerated in pace. (S/U grades permitted.) This course is cross-listed with Chemistry 217.(F)

#### BGGN 254. Cell and Membrane Physiology (3)

This course is a survey covering current subjects in membrane biology relevant to medicine. Subjects are: 1) membrane isolation, composition, and structure; 2) consequences of membrane fluidity (mode of action of anesthetics, intercellular communication, exo- and endo-cytosis biogenesis); 3) sensory perception and response (chemo- and energy reception, cellular neurophysiology, muscle; physiology); 4) regulation of membrane function (hormone reception, intercellular adhesion, neoplastic transformation). *Prerequisites: biochemistry and genetics.* (S/U grades only) (Not offered in 1998-99.)

#### BGGN 255. Clinical Correlates (2)

Clinical correlates stress the close ties between clinical medicine and basic science and the two-way interactions among practicing doctors and research scientists. Most sessions start with the presentation of a clinical case by an attending practitioner and an analysis by the clinician of the basic principles demonstrated by each case. There will follow an extended period of open discussion between basic scientists, clinicians, and students. *Prerequisites: graduate students only, BGGN 251, 252, 253, 254 to be taken simultaneously.* (S/U grades only.) This course is cross-listed with Chemistry 277. (F)

#### BGGN 271. Advanced Experimental Methods in Biology (4-12)

Advanced laboratory and/or field experience in contemporary biological methodology. Open only to students enrolled in the integrated Bachelor's/Master's Degree Program. *Prerequisites: consent of instructor and approval of department chair.* (letter grades only.) (F,W,S) (**Note:** Applications for a BGGN 271 are to be submitted to, and approved by, the Department of Biology prior to the eighth week of the quarter preceding the quarter in which the BGGN 271 will be completed. No BGGN 271 application form will be accepted after that date.)

#### BGGN 297. Research Conference (1-3)

Group and individual discussion of research activities and of current literature. *Prerequisite: graduate standing.* (S/U grades only.) (F,W,S)

#### BGGN 298. Laboratory Projects in Biology (3-12)

An introduction to contemporary laboratory techniques and research interests through independent, original projects under the direction of individual faculty members. *Prerequisite: consent of instructor.* (Letter grades only) (F,W,S)

#### BGGN 299. Thesis Research in Biology (1-12)

(F,W,S)

#### BGGN 500. Apprentice Teaching (4)

This course involves participation in upper-division undergraduate teaching at the level of assuming responsibility for recitation sections or laboratories under the supervision of the responsible faculty member. Some experience in lecturing to upper-division classes will occasionally be provided. (S/U grades only.) (F,W,S)

#### BGJC 201. Journal Club in Cell Biology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (F,W,S)

#### BGJC 202. Journal Club in Developmental Biology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (Quarter offered is varies, and course is not offered every year.)

#### BGJC 203. Journal Club in HIV Molecular Biology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (F,W,S)

#### BGJC 204. Journal Club in Molecular and Cellular Immunology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (F,W,S)

#### BGJC 205. Journal Club in Cellular Immunology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (F,W,S)

#### BGJC 206. Journal Club in Microbial Physiology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (S)

#### BGJC 207. Journal Club in Neurobiology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (F,W,S)

#### BGJC 208. Journal Club in Plant Molecular Biology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (F,W,S)

#### BGJC 209. Journal Club in Molecular and Cellular Regulation in Biology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (F,W,S)

#### BGJC 210. Journal Club in Cell Cycle Regulation (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (F,W,S)

#### BGJC 211. Journal Club in Molecular Immunology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (F,W,S)

#### BGJC 212. Journal Club in Genetics (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.) (F,W,S)

#### BGRD 202. Research Discussion in Early Amphibian Neurogenesis (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.)

#### BGRD 203. Research Discussion in Development of Dictyostelium (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.)

#### BGRD 204. Molecular Biology of the Cell (1)

Research reports and discussions based on recent experimental results in cell biology, oncogenesis, genetics, molecular biology and development. Students are expected to present and discuss their own new data and the recent data of others. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.)

#### BGRD 205. Research Discussion in Plant Membrane Biology (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.)

#### BGRD 206. Research Discussion in Metals in Biology (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.)

#### BGRD 207. Research Discussion in Neuronal Pattern Generation (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.)

#### BGRD 208. Research Discussion in Mammalian Molecular Biology (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.)

#### BGRD 209. Research Discussion in AIDS (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.)

#### BGRD 210. Research Discussion in Virology (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. *Prerequisites: none for graduate students. Undergraduates must be seniors or enrolled in BISP 199.* (S/U grades only.)

#### BGRD 211. Research Discussion in Developmental Cellular Neurobiology (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report





## Biomedical Sciences

OFFICE: 5008 Basic Science Building, School of Medicine

### Professors

Kim E. Barrett, Ph.D., *Medicine*  
Roland C. Blantz, M.D., *Medicine*  
Colin M. Bloor, M.D., *Pathology*  
Richard C. Boland, M.D., *Medicine*  
Gerry R. Boss, M.D., *Medicine*  
Robert A. Brace, Ph.D., *Reproductive Medicine*  
Joan Heller Brown, Ph.D., *Pharmacology*  
Laurence L. Brunton, Ph.D., *Pharmacology/*  
*Medicine*  
Dennis A. Carson, M.D., *Medicine*  
Webster K. Cavenee, Ph.D., *Medicine*  
Cecilia Y. Cheung, Ph.D., *Reproductive*  
*Medicine*  
Kenneth R. Chien, M.D., Ph.D., *Medicine*  
Shu Chien, M.D., Ph.D., *Bioengineering and*  
*Medicine*  
Mario Chojkier, M.D., *Medicine*  
Don W. Cleveland, Ph.D., *Medicine and*  
*Neurosciences*  
James W. Covell, M.D., *Medicine and*  
*Bioengineering*  
Edward Dennis, Ph.D., *Chemistry and*  
*Biochemistry*  
Wolfgang H. Dillmann, M.D., *Medicine*  
Mark H. Ellisman, Ph.D., *Neurosciences*  
Scott D. Emr, Ph.D., *Medicine*  
Jeffrey Esko, Ph.D., *Medicine*  
Gregory F. Erickson, Ph.D., *Reproductive*  
*Medicine*  
Ronald M. Evans, Ph.D., *Adjunct/Mathematics*  
Darrell D. Fanestil, M.D., *Medicine*  
Marilyn G. Farquhar, Ph.D., *Pathology*  
James R. Feramisco, Ph.D., *Medicine and*  
*Pharmacology*  
Theodore Friedmann, M.D., *Pediatrics*  
Gordon N. Gill, M.D., *Medicine*  
Lawrence S. B. Goldstein, Ph.D., *Pharmacology*  
Philip M. Groves, Ph.D., *Psychiatry*  
Vivian Hook, Ph.D., *Medicine (In-Residence)*  
Stephen B. Howell, M.D., *Medicine*  
Paul A. Insel, M.D., *Pharmacology and*  
*Medicine*  
Martin F. Kagnoff, M.D., *Medicine*

Michael Karin, Ph.D., *Pharmacology*  
Thomas J. Kipps, M.D., Ph.D., *Medicine*  
Richard Kolodner, Ph.D., *Medicine*  
Ronald Kuczenski, Ph.D., *Psychiatry*  
*(In-Residence)*  
Hyam L. Leffert, M.D., *Pharmacology*  
Richard Lieber, Ph.D., *Orthopedics*  
Carol L. MacLeod, Ph.D., *Medicine*  
James Andrew McCammon, Ph.D., *Chemistry*  
*and Biochemistry/Pharmacology*  
Odile Mathieu-Costello, Ph.D., *Medicine*  
*(In-Residence)*  
Pamela L. Mellon, Ph.D., *Reproductive Medicine*  
Daniel T. O'Connor, M.D., *Medicine*  
*(In-Residence)*  
Jerrold M. Olefsky, M.D., *Medicine*  
George Palade, Ph.D., *Medicine*  
Frank L. Powell Jr., Ph.D., *Medicine*  
Morton P. Printz, Ph.D., *Pharmacology*  
Douglas D. Richman, M.D., *Pathology/Medicine*  
*(In-Residence)*  
Michael G. Rosenfeld, M.D., *Medicine*  
Geert Schmid-Schoenbein, Ph.D.,  
*Bioengineering*  
David S. Segal, Ph.D., *Psychiatry*  
Stephen A. Spector, M.D., *Pediatrics*  
Daniel Steinberg, M.D., Ph.D., *Medicine*  
Charles F. Stevens, Ph.D., *Adjunct/*  
*Pharmacology*  
Palmer W. Taylor, Ph.D., *Pharmacology*  
Roger Y. Tsien, Ph.D., *Pharmacology and*  
*Chemistry and Biochemistry*  
Robert H. Tukey, Ph.D., *Pharmacology and*  
*Medicine*  
Wylie W. Vale, Ph.D., *Adjunct/Medicine*  
Ajit P. Varki, M.D., *Medicine*  
Peter D. Wagner, M.D., *Medicine*  
John F. Ward, Ph.D., *Radiology (Emeritus)*  
John B. West, M.D., Ph.D., *Medicine and*  
*Physiology*  
Joseph L. Witzum, M.D., *Medicine*  
Flossie Wong-Staal, Ph.D., *Biology and*  
*Medicine*  
Tony L. Yaksh, Ph.D., *Anesthesiology (and*  
*Adjunct/Pharmacology)*  
Maurizio Zanetti, M.D., *Medicine (In-Residence)*

### Associate Professors

Christopher K. Glass, M.D., Ph.D., *Medicine*  
Michael C. Hogan, Ph.D., *Adjunct/Medicine*  
Connie Holm, Ph.D., *Medicine (In-Residence)*  
Carolyn J. Kelly, M.D., *Medicine-Nephrology*  
*(In-Residence)*

Elizabeth A. Komives, Ph.D., *Chemistry and*  
*Biochemistry*  
Diana L. Marquardt, M.D., *Medicine*  
*(In-Residence)*  
Jamey D. Marth, Ph.D., *Medicine*  
Alexandra Newton, Ph.D., *Pharmacology*  
Renate B. Pilz, M.D., *Medicine (In-Residence)*  
Gregg J. Silverman, M.D., *Medicine*  
*(In-Residence)*  
Nicholas J.G. Webster, Ph.D., *Medicine*  
*(In-Residence)*  
David S. Williams, Ph.D., *Adjunct/Pharmacology*  
Virgil L. Woods, Jr., M.D., *Medicine*

### Assistant Professors

Jerold J. M. Chun, M.D., Ph.D., *Pharmacology*  
Xiang-Dong Fu, Ph.D., *Medicine*  
Steffan Ho, M.D., Ph.D., *Pathology*  
Fred Levine, M.D., Ph.D., *Pediatrics/*  
*Molecular Genetics (In-Residence)*  
Paul T. Martin, Ph.D., *Neurosciences*  
Oswald Quehenberger, Ph.D., *Adjunct/Medicine*  
Judith A. Varner, Ph.D., *Adjunct/Medicine*  
Francisco Villarreal, M.D., Ph.D., *Adjunct/*  
*Medicine*

### The Graduate Program

The graduate program offered by the Group in Biomedical Sciences is designed to lead to the Ph.D. degree through a combination of didactic study, laboratory rotations, and thesis research in basic biomedical sciences. Research experiences are wide and varied, permitting students the options of selecting molecular, cellular, or organ and integrated systems approaches in their research programs. Students are encouraged to design and execute investigation in a self-critical and independent manner. Undergraduate preparation must include courses in mathematics (through calculus), chemistry (including organic, physical, and biochemistry), and if possible, participation in undergraduate research. Students whose undergraduate backgrounds are significantly different will be considered provided there is sufficient evidence of interest in cell and molecular biology, physiology, pharmacology, or eukaryotic regulatory biology, and a desire to enter a field of active research and academic excellence.

## Doctoral Degree Program

During the first year, the students take basic courses in cell biology, molecular biology, pharmacology, and physiology. In a required laboratory rotation program, students develop laboratory skills and the ability to formulate scientific hypotheses and become familiar with the research activities of the faculty. Required advanced courses and electives in subsequent years are chosen to develop the students' interest and specialized knowledge in the thesis research area. The thesis laboratory is usually selected by the end of the first year of graduate study.

The graduate program is interdepartmental and interdisciplinary; it involves faculty of the Departments of Medicine, Pharmacology, Neurosciences, Reproductive Medicine, Chemistry, Pathology, Bioengineering, the Cancer Center, and the Division of Cellular and Molecular Medicine. Physiological studies include molecular to whole animal approaches to cardiovascular, microcirculatory, respiratory, renal, gastrointestinal and fetal physiology and their neural and hormonal control. Pharmacologic studies of drug action at the molecular and biochemical levels include studies of receptor structure and function, genetic and recombinant DNA methods to analyze ligand-receptor interactions, regulation of gene expression and signal transduction, and biophysical approaches to defining neurotransmitter and hormone action. Molecular and cell biological approaches are being applied to the study of major issues in cell biology, including the regulation of protein targeting and intracellular membrane traffic, hormone and growth factor receptors, endothelial cell biology, molecular motors, RNA splicing, and mitosis, among others. Eukaryotic regulatory biologists are using the most advanced molecular biological techniques to study developmental and homeostatic regulation of gene expression in primarily mammalian systems. As evidence of the research strength of the group, faculty within the program are the directors of four specialized centers of research at the university focusing on cancer, myocardial ischemia, hypertension, and atherosclerosis. Other faculty are directors of training grants for programs in pulmonary physiology, oncogenes, cardiovascular physiology, cellular and molecular pharmacology, hy-

pertension, metabolic diseases, cell and molecular biology, and cancer cell biology.

The graduate program in biomedical sciences is also designed to educate physician-scientists through the School of Medicine's Medical Scientist Training Program. Students already admitted to the School of Medicine are eligible for admission to our program for Ph.D. training. Such students generally apply in the first or second year of their medical studies and enter graduate studies following completion of their second year of medical school. Normative time for M.D./Ph.D. students is seven years.

## Examinations

Students obtain letter grades in the program's basic courses. Candidacy for the Ph.D. degree is determined by a two-part examination. The first part, the minor proposition examination, tests the student's competence and ability to design a pertinent research problem in an area unrelated to his or her major interest. The second part, the major proposition examination, deals with the dissertation problem and should be completed between the spring of the third year and the beginning of the fourth year of residence in the program. After the preparation of the dissertation, an oral defense of the thesis completes the requirement for the Ph.D. degree.

## COURSES

### 202. Carcinogenesis and Drug Metabolism (3)

This elective will explore relationships between drug metabolism and carcinogenesis at cellular, molecular and etiological levels. Guided by faculty, students will research and present key papers and principles underlying the biochemistry, genetics, biophysics, and computer-assisted aspects of several assigned topics. *Prerequisites: biology and chemistry. Cell biology, biochemistry, and molecular biology may be taken concurrently.*

### 204. Evolution of Modern Concepts in Pharmacology (2)

This course details the evolution of modern principles of pharmacology from first evidences to the present level of knowledge. The course will be independent of but compliment general principles of pharmacology courses for medical and graduate students. *Prerequisites: prior or concurrent Principles of Pharmacology, or equivalent course.*

### 206. Organ Physiology (9)

Building on the student's basic knowledge of cellular biology and biochemistry, this course develops fundamental concepts of organ physiology. Major areas include autonomic, cardiovascular, gastrointestinal, renal, and respiratory physiology. Clinical correlation sessions relate physiological principles to clinical situations. *Prerequisites: BMS 210, 211, 212, 213 or*

*equivalent background in biology and chemistry. For students not in the School of Medicine, consent of instructor. (W)*

### 206L. Organ Physiology and Pharmacology, Laboratory Course (3)

Selected laboratory exercises demonstrating basic principles of pharmacology and organ physiology. Subjects covered include electrocardiography, hemodynamics, myocardial control mechanisms, pulmonary function, dose-response relationships in pharmacology, autonomic mechanisms, and other aspects of physiology and pharmacology. *Prerequisites: cell biology and biochemistry or equivalent, and consent of instructor. (W)*

### 207. Using Internet Resources in Molecular Biology (2)

Increasing the Internet is a source both of data and analysis tools in molecular biology. A hands-on series of instructional lectures is proposed that uses these resources to work through problems found in many molecular biology research situations. Topics include: DNA and protein sequence analysis, genome analysis, constructing and using phylogenetic trees, RNA structure prediction, protein structure, analysis, classification, and prediction. *Prerequisite: consent of instructor.*

### 208A-B. Topics in Medical Therapeutics (1-2)

Students attend pharmacology (medical therapeutics) lectures given in conjunction with those presented in core courses. Correlation with pathophysiology of diseases will be stressed including organ malfunction as causes of drug toxicity. Other topics will include chemotherapeutic agents and cardiovascular drugs. (W,S)

### 210. Cellular Biology (6)

The course focuses on fundamentals of the biology of eukaryotic cells. Topics include: Cell structure and cytoskeleton, biosynthesis of macromolecules, transport across cell membranes, receptors and signal transduction, regulation of the cell growth cycle, early development and differentiation. (F)

### 211. Molecular Biology (6)

The course covers concepts and techniques of molecular biology. Topics include: DNA and chromosome structuring, the eukaryotic genome, gene transcription units and their regulation, RNA processing, RNA and DNA viruses, development and methodologies of molecular biology. (W)

### 212. Cellular and Molecular Pharmacology (6)

Topics include: Analysis of ligand-macromolecule interactions, biochemistry and pharmacology of chemical transmission and signal transduction, cellular responses to environmental stress (cyto P-450, P-glycoprotein, etc.), and bases of selective toxicity (viruses, bacteria, insects, mammalian tumor cells). Emphasis is on basic principles, on analysis of recent experimental data, and on integration in mammalian systems. (W)

### 213. Systemic Physiology (6)

General principles of organ physiology including mass transport, tissue and fluid mechanics, membrane transport, energetics, structure-function relations, and homeostasis applied to cardiovascular, gastrointestinal, muscle, renal, and respiratory systems. Emphasis on integrative properties of cells in organs and organismic responses. (F)

### 220A-B. Principles of Pharmacology (2-3)

Building on the student's knowledge in cell biology and biochemistry, this course examines the principles of pharmacology and therapeutics and relates them to clinical practice. The portion of the course given in the winter quarter is closely integrated with the organ physiology course. *Prerequisites: same as 206. (W,S)*

### 222. Molecular Glycobiology (2)

Molecular Glycobiology encompasses studies of the structure, biosynthesis, and biological roles of oligosaccharide units on



glycoconjugates. The course will provide an overview of this rapidly evolving field with an emphasis on the glycoconjugates of eukaryotic organisms in the animal kingdom. (S)

**223. Genetics, Metabolism, and Inherited Disease (2)**

Detailed discussions of the molecular aspects of certain in-born errors of intermediary metabolism selected to illustrate principles of biochemical genetics applicable to a wider variety of clinically important genetic diseases. Individual sessions will include faculty presentations followed by student-led discussions of the particular principles illustrated by the disorders reviewed. (S)

**224. Topics in Cancer Research (2)**

Each quarter will focus on an important area of cancer research such as immunology (fall), growth regulation (winter), and cancer genetics (spring). One-hour lecture coordinated with a one-hour seminar with the opportunity to meet with the invited speaker. *Prerequisites: senior undergraduates, graduate students, medical students.* (W,S)

**225. Physiological Aspects of the Ovary (3)**

This course deals with recent concepts concerning structure-function relationships in the mammalian ovaries. Contents include: history, development, cytology, steroid biosynthesis and function, hormone receptor interactions, oogenesis, folliculogenesis, ovulation, corpus luteum formation/regression, menstrual cycle, menopause, pathophysiology. (W)

**226. Frontiers in Endocrinology and Metabolism (3)**

The course covers recent advances of research in lipid, lipoprotein metabolism, carbohydrate metabolism, reproductive medicine, diabetes mellitus, and atherosclerosis. (F)

**227. Neuroendocrinology (4)**

This course will examine the role of the CNS in controlling reproductive functions, stress, growth, biological rhythm, and behavior. Materials to be covered include: the evolution of neuroendocrine hormones; development and maturation of the neuroendocrine system; neuroendocrine techniques; neuroanatomy; physiological actions of neuropeptides; the nature of aminergic and peptidergic neurotransmission in the brain in modulating the output of hormones of the pituitary; cellular and molecular mechanisms of neuroendocrine function. (S)

**228. Basic Science Research Seminar (1)**

The objective is to provide an opportunity for cardiology research fellows, postgraduate students and undergraduate students to interact with faculty in the Division of Cardiology in a faculty-sponsored basic research seminar. This will take place once a month for ten sessions at a faculty member's home. It will be in the format of a journal club where a faculty member or a faculty-sponsored individual will present and discuss one recent article deemed to have considerable scientific importance. The content of the course will be determined by the faculty member who is assigned the session. *Prerequisite: bachelor's degree in a science discipline.* (F,W,S)

**229. Methods in Pharmacology (3)**

A combination of lecture and lab exercises presented by the faculty of the Group in Biomedical Sciences, designed to introduce biomedical science graduate students to the essential techniques employed in molecular and cellular pharmacology. *Prerequisites: BMS 212, OP, CBB, biochemistry, molecular biology, biomedical sciences or consent of instructor.* (S)

**230. Receptors and Signal Transduction (3)**

An examination of the molecular and biochemical bases of drug and neurotransmitter action. Topics include molecular basis of drug specificity, receptor mechanisms, neuropharmacology, signal transduction from the cell surface to the nucleus, and drug action on excitable tissues. *Prerequisite: course in biochemistry.* (F)

**231. Contemporary Topics in Pharmacology (2)**

A selection of short courses in the biomedical and pharmacological sciences offered by resident experts. Topics will vary annually. Each short course will last one to two weeks, meeting five hours a week. *Prerequisite: consent of instructor.* (F,W,S) (Not offered in fall 1997.)

**233. Molecular Biology of Human Retroviruses (3)**

Replication cycle and gene regulation of HIV. Molecular approaches to therapy and vaccines. *Prerequisites: undergraduates lower-division courses in Biology, BIMM 100, BICD 100, BIBC 100, BIBC 102.*

**236. Maternal and Placental Physiology (2)**

This course provides a broad based coverage of the physiology of maternal changes during pregnancy as well as physiology of the placenta. Included are endocrine, cardiovascular, respiratory, fluid balance, metabolism, nutrition, lactation, immune and postpartum aspects as well as problems of pregnancy. *Prerequisites: Med. 206 (OPP) and Med. 209 (ERM), or equivalent.* (F)

**237. Fetal Physiology (2)**

This course provides a broad based coverage of the physiology of the fetus, including growth and development, metabolism, neurologic and endocrine development, regulation of the cardiovascular, endocrine, renal, and gastrointestinal systems, development of the lungs, immune system, abnormal development genetic problems, and diseases. *Prerequisites: same as 236.* (W)

**239. Practical Design and Evaluation of Biomedical Research (2)**

Strategy, tactics, and critical analysis of biomedical research including 1) how to evaluate whether an idea for an experiment is worth pursuing, 2) fundamentals of experimental design, 3) experimental analysis, and most importantly, 4) how to read and critically evaluate biomedical research reports. *Prerequisite: SOM 203, equivalent, or consent of instructor.* (W)

**240. Critical Reading in Cell Biology (3)**

This course will focus on critical reading and understanding current areas in Cell and Molecular Biology. The exact topic will vary, but will include such topics as Protein Trafficking, Cell Division, Intracellular Movement, Cell Interaction, and Cell Cycle.

**241. Neuroreflex Control of Cardiovascular and Respiratory Systems (3)**

Topics covered in this course include experimental techniques, CNS respiratory and cardiovascular mechanisms, reflex modulation of breathing, arterial, visceral and somatic cardiovascular reflexes, pathophysiology, cardiorespiratory interactions, control systems theory. The course emphasizes the experimental basis of our knowledge and general principles applicable to other physiological systems. (S)

**242. Seminar in Genetics (1)**

Intended for graduate students interested in principles of classical and molecular genetics. Will attend weekly genetics seminar and participate in didactic/discussion preparatory session. *Prerequisite: consent of instructor.*

**243. Human Genetics (3)**

Advanced aspects of human genetics and human genetics disease, including principles of Mendelian and non-Mendelian inheritance, monogenic and polygenic traits, anticipation, penetrance, and genomics. Course will consist of alternating didactic sessions and seminars in which students will present papers.

**244. Development of Ideas in Physiology and Pharmacology (2)**

Course will cover aspects of the development of ideas in physiology and pharmacology. (W)

**250. Molecular and Modern Methodologies in Physiological Sciences (2)**

This course emphasizes modern approaches and methodologies for investigating physiological processes in normal and pathological conditions. This includes the application of transgenic, knockout, adenovirus gene therapy, antisense, and cellular imaging technologies in animal models.

**262. Neurophysiology (4)**

An overview of neurophysiological systems, emphasizing mammalian neurophysiology and related model vertebrate systems and concepts. (W)

**271. Cardiovascular Physiology (4)**

Physical concepts of behavior of heart, large blood vessels, vascular beds in major organs, and the microcirculation. Physical and physiological principles of blood flow, blood pressure, cardiac work, electrophysiology of the heart. Special vascular beds, including their biological and hemodynamic importance. Integration through nervous and humoral controls. *Prerequisites: BIPN 100, 102 and BE 231A, or consent of instructor.*

**285. Statistical Inference in the Medical Sciences (2)**

An introduction to basic techniques used in biomedical literature: t tests, ANOVA, chi-square, linear and nonlinear regression. Emphasis will be on understanding the appropriate use and interpretation of the tests, rather than on the calculations.

**294. Pharmacology and Molecular Biology Journal Club (0-1)**

Current literature in molecular pharmacology and molecular biology is reviewed. Two papers are chosen per week for oral presentation by students. Faculty critique the student presentations. *Prerequisite: enrollment in Ph.D. program at year two and above.* (F,W,S)

**295. Pharmacology Research Discussions (0-1)**

Student, faculty, and fellow discussion groups on research projects. Students are expected to present research findings to fellows, other Ph.D. students, and faculty. Written critiques are provided by the faculty. *Prerequisites: completion of minor proposition examination and two years of graduate work.* (F,W,S)

**296. Directed Reading (1-4)**

Reading of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases. *Prerequisite: consent of instructor.*

**297. Progress in Signal Transduction (1)**

Papers describing recent progress in signal transduction from the cell-surface to the nucleus will be chosen from recent research literature. Two papers will be discussed and criticized in detail each week for one hour. *Prerequisites: graduate level Biochemistry, Cell Biology, and Molecular Biology; registered as second year and above graduate student in Biomedical Sciences, Biology, or Chemistry.* (F,W,S)

**298. Directed Study (1-12)**

Reading and laboratory study of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases. (F,W,S)

**299. Independent Study or Research (1-12)**

Independent study or research. *Prerequisite: consent of instructor.* (F,W,S)

## Biophysics

See "Physics" for more information.

### OFFICES:

General Administration—1110-113 Urey Hall Addition

Graduate Student Affairs—1110-121 Urey Hall Addition

Undergraduate Student Affairs—1110-115 Urey Hall Addition

Chair's Office—1110-113 Urey Hall Addition

Web site: <http://physics.ucsd.edu/>

The Department of Physics offers an undergraduate and graduate program which prepares students for a career in biophysics and which leads to the following degrees:

B.S. in physics with specialization in biophysics

B.S. in physics with specialization in biophysics-premedical

C.Phil. in physics

Ph.D. in physics (biophysics)

A grade-point average of 2.0 or higher in the upper-division major program is required for graduation. All courses (lower and upper division) required for the major must be taken for a letter grade. Students must receive a grade of C- or better in any course to be counted toward fulfillment of the major requirements. In exceptional cases, students with a grade-point average in the major of 2.5 or greater may petition to have one grade of D accepted.

### The Undergraduate Program

#### Physics Major with Specialization in Biophysics

The upper-division program for physics majors with specialization in biophysics is essentially the same as the standard physics major, with some modification to provide the education in biology and chemistry needed for advanced work in biophysics. Students entering the program with deficient backgrounds in mathematics or chemistry will be required to

remedy the deficiency in their junior year. The consequent re-arrangement of the upper-division program will be devised by consultation between the student and the departmental adviser for biophysics.

Students are encouraged to incorporate Mathematics 110 into their lower-division studies.

The following courses are required for the physics major with specialization in biophysics.

#### a. Lower-division:

1. Physics 4A-B-C-D-E and 2CL-DL; or Physics 2A-B-C-D and 2CL-DL (Physics 4 sequence is strongly recommended).
2. Chemistry 6A-B-C and 6BL-CL.
3. BILD 1.
4. Mathematics 20C, 20D, 20E, 20F, or 21C, 21D, 20E, 20F.

#### b. Upper-division:

1. Physics 100A-B-C, 105, 110A, 120A-B, 130A-B, 153.
2. Chemistry 127 or 131, 140A-B, 143A.
3. BIBC 100, BIBC 103, BIMM 100, BICD 110, BICD 100.\*
4. Mathematics 110.

#### c. Suggested schedule is:

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Phys. 100A	Phys. 100B	Phys. 100C
Phys. 105	Phys. 120A	Phys. 120B
Phys. 110A	Chem. 140B	Phys. 130A
Chem. 140A		Chem. 143A
<b>SENIOR YEAR</b>		
Phys. 130B	BIBC 103	Phys. 153
BIBC 100	Chem. 127*	BIMM 100
BICD 100		BICD 110
Chem 131*		

\*Students choose Chemistry 127 or 131

#### Physics Major with Specialization in Biophysics-Premedical

The upper-division program for physics majors with specialization in biophysics-premedical is essentially the same as the standard physics major, with some modification to provide the education in biology and chemistry needed for the study of medicine. Students entering the program with deficient backgrounds in mathematics or chemistry will be required to remedy

the deficiency in their junior year. The consequent arrangement of the upper-division program will be devised by consultation between the student and the physics departmental adviser for biophysics.

Students are encouraged to incorporate Mathematics 110 into their lower-division studies.

The following courses are required for the physics major with specialization in biophysics-premedical:

#### a. Lower-division:

1. Physics 4A-B-C-D-E and 2CL-DL; or Physics 2A-B-C-D and 2CL-DL (Physics 4 sequence is strongly recommended).
2. Chemistry 6A-B-C and Chemistry 6BL-CL.
3. BILD 1.
4. Mathematics 20C, 20D, 20E, 20F, or 21C, 21D, 20E, 20F.

#### b. Upper-division:

1. Physics 100A-B-C, 105, 110A, 120A-B, 130A, 153.
2. Chemistry 127 or 131, 140A-B, 143A.
3. BIBC 100, BIMM 100, BICD 110, BICD 100.
4. Mathematics 110.
5. Restricted elective: one biology course (BICD 130, BICD 134, or BIMM 112).

#### c. Suggested schedule:

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Phys. 100A	Phys. 100B	Phys. 100C
Phys. 105	Phys. 120A	Phys. 120B
Phys. 110A	Chem. 140B	Phys. 130A
Chem. 140A		Chem. 143A
<b>SENIOR YEAR</b>		
BIBC 100	Chem. 127*	Phys. 153
BICD 100	Restr. Elec.	BICD 110
Chem. 131*		BIMM 100

\*Students choose Chemistry 131 or 127

### The Graduate Program

Research in biophysics is being actively pursued in several departments (e.g., physics, chemistry, biology), which also offer courses in or relevant to biophysics.

Graduate students specializing in the area of biophysics within the Department of Physics receive the Ph.D. in physics (biophysics).

## Doctoral Degree Program

The Ph.D. program consists of graduate courses, apprenticeship in research, teaching experience, and thesis research.

Entering students are assigned a faculty adviser to guide them in their program. Many students spend their first year as teaching assistants or fellows and begin apprentice research in their second year. When a student's association with a research area and research supervisor is well established, a faculty research progress committee is formed with the responsibility of conducting an annual review of progress and, at the appropriate time, initiating the formation of a doctoral committee. After three years of graduate study, or earlier, students complete the departmental examinations and begin thesis research. There is no foreign language requirement.

### Entrance Testing

An entrance test covering undergraduate physics is given to entering students during the first week of orientation to give better guidance to students in their graduate program. The results are not entered in the student's file. Entering students are encouraged, but not obliged, to bring the results to the first meeting with their academic adviser. Entering students may elect to take the departmental examination instead of taking the entrance test.

### Requirements for the Ph.D.

Students are required to pass a departmental examination, advanced graduate courses, an oral topic examination, a qualifying examination, and a final defense of the thesis as described below.

#### 1. Departmental Examination

Biophysics students are required to take a departmental examination after completing two years of graduate work at UCSD. The examination is on the level of material usually covered in upper-division courses and the graduate courses listed below:

##### Fall

Phys. 200A (Theoretical Mechanics)  
Phys. 201 (Mathematical Physics)  
Phys. 212A (Quantum Mechanics)

##### Winter

Phys. 200B (Theoretical Mechanics)  
Phys. 203A (Adv. Classical Electrodynamics)  
Phys. 212B (Quantum Mechanics)

##### Spring

Phys. 203B (Adv. Classical Electrodynamics)  
Phys. 210A (Equilibrium Statistical Mechanics)  
Phys. 212C (Quantum Mechanics)

The examination is offered twice a year, at the beginning of the fall and spring quarters, and lasts two days, four hours per day. The examination may be repeated once, the next time it is offered.

#### 2. Advanced Graduate Courses

Biophysics students are required to pass five courses (with a grade of C or better) from biology, biochemistry, chemistry, or physics in consultation with their adviser no later than the end of the third year of graduate work. At least three of these courses must be graduate courses. A 3.0 average in four of the five courses is required. (In lieu of the course requirement, students may petition to take an oral examination covering three areas of physics.)

#### 3. Oral Topic Examination

Biophysics students are required to take an oral topic examination no later than the spring of the third year of graduate work. Three topics of current interest in physics or biophysics are announced two weeks prior to the examination week, and a list of relevant references is supplied. Students select one of the topics and present a 30–45 minutes talk on it to a faculty examination committee. The oral presentation is followed by approximately one hour of questioning generally related to the topic. This examination is offered twice a year, at the beginning of the fall and spring quarters, and may be repeated once, the next time it is offered.

#### 4. Qualifying Examination and Advancement to Candidacy

In order to be advanced to candidacy, students must have met the departmental requirements and obtained a faculty research supervisor. At the time of application for advancement to candidacy, a doctoral committee responsible for the remainder of the student's graduate program is appointed by the Graduate Council. Members of the research progress

committee are usually included as members of the doctoral committee. The committee conducts the Ph.D. qualifying examination during which students must demonstrate the ability to engage in thesis research. Usually this involves the presentation of a plan for the thesis research project. The committee may ask questions directly or indirectly related to the project and questions on general physics which it determines to be relevant. Upon successful completion of this examination, students are advanced to candidacy and are awarded the Candidate of Philosophy Degree.

#### 5. Instruction in Physics Teaching

All graduate students are required to participate in "Instruction in Physics Teaching" under the supervision of a professor as part of their training for future careers. Students will participate in teaching recitation sections, problem sessions, or laboratory sections. Students are required to take a total of two units of Physics 500.

#### 6. Thesis Defense

When students have completed their theses, they are asked to present and defend them before their doctoral committees.

### Time Limits for Progress to the Ph.D.

In accordance with university policy, the Department of Physics has established the following time limits for progress to the Ph.D. A student's research progress committee helps ensure that these time limits are met.

	Theorists	Experimentalists
Advancement to Candidacy	4 years	5 years
Total Registered Time and Support	7 years	8 years

## COURSES

Please refer to listings in the Departments of Biology, Chemistry and Biochemistry, and Physics.

## Chemistry and Biochemistry

Chair's Office: 2040 Urey Hall Addition  
(619) 534-3575

Undergraduate Student Affairs  
4010 York Hall  
(619) 534-4856

Graduate Student Affairs  
4010 York Hall  
(619) 534-6870  
Revelle College

### Professors

William S. Allison, Ph.D.  
James R. Arnold, Ph.D., *Professor Emeritus*  
Marjorie C. Caserio, Ph.D., *Professor Emeritus*  
Leigh B. Clark, Ph.D., *Professor Emeritus*  
Edward A. Dennis, Ph.D.  
Daniel J. Donoghue, Ph.D.  
Russell F. Doolittle, Ph.D., *Research Professor*  
Robert C. Fahey, Ph.D., *Research Professor*  
Murray Goodman, Ph.D.  
Elvin Harper, Ph.D., *Professor Emeritus*  
David N. Hendrickson, Ph.D.  
Martin D. Kamen, Ph.D., *Professor Emeritus*  
David R. Kearns, Ph.D., *Professor Emeritus*  
Joseph Kraut, Ph.D., *Research Professor*  
Andrew C. Kummel, Ph.D.  
Jack Kyte, Ph.D.  
Katja Lindenberg, Ph.D.  
Douglas Magde, Ph.D.  
Kurt Marti, Ph.D.  
J. Andrew McCammon, Ph.D.  
Trevor C. McMorris, Ph.D.  
Stanley L. Miller, Ph.D., *Research Professor*  
W. E. Moerner, Ph.D.  
Xuong Nguyen-Huu, Ph.D.  
K.C. Nicolaou, Ph.D.  
Hans Oesterreicher, Ph.D.  
Charles L. Perrin, Ph.D., *Academic Senate  
Distinguished Teaching Award*  
Michael J. Sailor, Ph.D.  
Gerhard N. Schrauzer, Ph.D., *Professor Emeritus*  
Kurt E. Shuler, Ph.D., *Professor Emeritus*  
Jay Siegel, Ph.D.  
Susan Taylor, Ph.D.  
Mark Thiemens, Ph.D., *Chair*  
William C. Troglor, Ph.D.  
Roger Y. Tsien, Ph.D.  
Regitze R. Vold, Ph.D.

Joseph W. Watson, Ph.D., *Vice Chancellor,  
Student Affairs*  
John H. Weare, Ph.D.  
Ernest Wenkert, Ph.D., *Professor Emeritus*  
John C. Wheeler, Ph.D.  
Kent R. Wilson, Ph.D.  
Bruno H. Zimm, Ph.D., *Professor Emeritus*

### Senior Lecturer (LSOE)

Barbara A. Sawrey, Ph.D., *Academic Senate  
Distinguished Teaching Award*

### Associate Professors

F. Thomas Bond, Ph.D., *Provost,  
Revelle College*  
Robert E. Continetti, Ph.D.  
John E. Crowell, Ph.D.  
Daniel F. Harvey, Ph.D.  
Elizabeth A. Komives, Ph.D.  
Joseph O'Connor, Ph.D.

### Assistant Professors

Nathaniel S. Finney, Ph.D.  
Gourisankar Ghosh, Ph.D.  
Partho Ghosh, Ph.D.  
Patricia A. Jennings, Ph.D.  
Timothy B. Karpishin, Ph.D.  
Amitabha Sinha, Ph.D.  
Emmanuel A. Theodorakis, Ph.D.  
Yitzhak Tor, Ph.D.  
Peter van der Geer, Ph.D.

### Adjunct Professors

Leslie E. Orgel, Ph.D.  
Peter R. Taylor, Ph.D.

### Associate Adjunct Professor

Kim K. Baldrige, Ph.D.

### Assistant Adjunct Professors

Seunghyon Choe, Ph.D.  
Joseph Noel, Ph.D.

### Introduction

The UCSD Department of Chemistry and Biochemistry was founded in the 1950s by the late Professor Harold Urey and a group of colleagues who strove to create a department that would stress the fundamentals of chemistry and, at the same time, embrace diverse applications of those principles at the frontiers of knowledge.

Degrees offered include:

### Biochemistry

B.S. Biochemistry/Chemistry  
M.S. Chemistry  
Ph.D. Chemistry

### Chemistry

B.A. Environmental Chemistry  
B.S. Chemistry  
B.S. Chemical Physics  
B.S. Chemistry/Earth Sciences  
B.S. Chemical Education  
B.S. Pharmacological Chemistry  
M.S. Chemistry  
Ph.D. Chemistry

(The department does not accept students who desire a terminal M.S. degree.)

### Chemistry-Premedical Majors

Either a biochemistry/chemistry major or a chemistry major with appropriate choice of electives provide a strong background for students intending to pursue careers in the medical sciences. Premedical students are encouraged to complete the three-quarter 140 organic sequence in their sophomore year. Most medical schools require a full year of organic chemistry. Biology BILD 1 is strongly recommended, along with certain upper-division biology courses, which can be counted toward the major requirements in chemistry.

### General Chemistry

The General Chemistry Chem. 6 sequence (6A-6B-6C) is intended for science and engineering majors as well as others who need a quantitative course. It satisfies all preprofessional programs. Chem. 4 is a one-quarter preparation for 6A which should be taken only by those whose college adviser so recommends. A student intending to major in chemistry can thus begin with 4 or 6A, depending on the level of preparation. A student intending to major in a discipline other than chemistry should consult his or her adviser in the appropriate department to determine which chemistry course is recommended.

Chem. 11, 12, 13 is a terminal sequence for non-science/non-engineering majors. Chem. 15

and 16 are one-quarter survey courses suitable for non-science majors. Students should check with their college adviser to determine applicability toward general-education requirements.

### General Information on Undergraduate Major Programs

The minimum passing grade is a D, and a minimum of a 2.0 average GPA in the major is required for the degree. All courses for the major, except for independent research (Chem. 199) and chemistry instruction (Chem. 195), must be taken for a letter grade. Chem. 195 and Chem. 199 must be taken on a P/NP basis.

Transfer students must pass at least twenty-four units of upper-division courses required for the major while officially enrolled at UCSD.

In addition to the requirements, Math. 20F (required for chemical physics majors) and a course in computer programming are also recommended.

Any departure from the requirements outlined below must be approved by petition. This applies to lower- and upper-division requirements.

The suggested programs following each of the major descriptions are only examples.

### Biochemistry/Chemistry Major

The following program is designed for biochemistry and premedical students desiring a strong background in chemistry. The core biochemistry offering is a sequence of three quarters of lecture plus one laboratory in the junior year. This is followed by three advanced biochemistry courses in the senior year.

#### Lower-Division Requirements

The following courses must be taken for a letter grade:

1. General chemistry including laboratory (Chem. 6A-6C, 6BL, and 6CL, or equivalent).
2. Calculus through Math. 20D (differential equations), either Math. 20A-20D or Math. 10A-10C, 20C (two units), 20D.
3. Phys. 2A-2B and 2D. Phys. 1A-1C and Phys. 2D (two units) are acceptable only by petition. Two units of physics laboratory. Phys.

2CL is recommended and is accessible without Phys. 2C (Phys. 2BL and 2DL are also acceptable.)

#### Upper-Division Requirements

1. Three quarters of organic chemistry (Chem. 140A-C).
2. Two quarters of physical chemistry (Chem. 126, 127 recommended; 131, 132 acceptable).
3. One quarter of inorganic chemistry (Chem. 120A).
4. Three quarters of biochemistry (Chem. 114A-C).
5. Five laboratory courses (Chem. 143AM or 143A, 143B, 105A, either 112A or 112B and one additional chemistry lab).
6. Two elective courses from the following list: Chem. 107, 112B, 113/213, 115/215, 124/225, 116/216, 117, 118, 122, 142/242, 147, 148/248, 167/267.
7. One additional elective course chosen from among all of the upper-division and graduate courses offered by the Department of Chemistry and Biochemistry (except non-letter-graded courses) **or** from the following list of courses offered by the Department of Biology: BICD 100, BICD 110, BICD 140, BIMM 114, BIMM 120, BIPN 100, BIPN 102, BIPN 140. Other electives may be arranged by petition.

#### Suggested Program for Biochemistry/Chemistry B.S. Major:

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Chem. 6A	Chem. 6B	Chem. 6C
Math. 20A	Math. 20B BILD 1*	Math. 20C Chem. 6BL
<b>SOPHOMORE YEAR</b>		
Chem. 140A	Chem. 140B	Chem. 140C
Math. 20D	Chem. 143AM	Chem. 143B
Phys. 2A	Phys. 2B	Phys. 2D
<b>JUNIOR YEAR</b>		
Chem. 114A	Chem. 114B	Chem. 114C
Chem. 126	Chem. 127	Chem. 105A
Chem. 6CL	Phys. 2CL	
<b>SENIOR YEAR</b>		
Chem. 120A	Elective Lab	Elective Lab
Elective	Elective	Elective

\* Recommended, but not required.

### Chemistry Major

#### Lower-Division Requirements

The following courses must be taken for a letter grade:

1. General chemistry including laboratory (Chem. 6A-6C, 6BL, and 6CL, or equivalent).
2. Calculus through Math. 20D (differential equations), either Math. 20A-20D or Math. 10A-10C, 20C (two units), 20D.
3. Phys. 2A-2B and 2D. Phys. 1A-1C and Phys. 2D (two units) are acceptable only by petition. Two units of physics laboratory. Phys. 2CL is recommended and is accessible without Phys. 2C (Phys. 2BL and 2DL are also acceptable.)

#### Upper-Division Requirements

1. One year of organic chemistry (140A-C).
2. One year of physical chemistry (131-133).
3. Two quarters of inorganic chemistry (120A, 120B).
4. One quarter of biochemistry (Chem. 114A).
5. Five laboratory courses (Chem. 143AM or 143A, 143B, 105A and two of the following: Chem. 105B, 106, 112A, 112B, 123, or 143C).
6. Three additional four-unit upper-division or graduate courses in chemistry and biochemistry or related areas. At least two of these courses must be other than Chem. 195 or 199.

#### Suggested Program for Chemistry B.S. Major:

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Chem. 6A	Chem. 6B	Chem. 6C
Math. 20A	Math. 20B	Math. 20C Chem. 6BL
<b>SOPHOMORE YEAR</b>		
Chem. 140A	Chem. 140B	Chem. 140C
Chem. 6CL	Chem. 143AM	Chem. 143B
Math. 20D	Phys. 2A	Phys. 2B
<b>JUNIOR YEAR</b>		
Chem. 131	Chem. 132	Chem. 133
Chem. 120A	Chem. 120B	Chem. 105A
Phys. 2D	Phys. 2CL	
<b>SENIOR YEAR</b>		
Chem. 114A	Elective Lab	Elective
Elective Lab	Elective	Elective

**Chemical Physics Major**

Chemical physics applies the concepts and quantitative methods of physics to the descriptions of atoms and molecules, analyzes matter as a statistical assembly of molecular building blocks, and develops and exploits physical (largely spectroscopic) experimental tools with which to test and refine such theories.

The chemical physics major is designed as a preparation for graduate work.

**Lower-Division Requirements**

The following courses must be taken for a letter grade:

1. General chemistry including laboratory (Chem. 6A-6C, 6BL, and 6CL, or equivalent).
2. Math. 20A-20F.
3. Phys. 2A-D and a two-unit physics laboratory course. Phys. 2CL is recommended (Phys. 2BL and 2DL are acceptable).

It is recommended that the above requirements be completed by the end of the sophomore year.

**Upper-Division Requirements**

1. Two quarters of organic chemistry (140A-B).
2. One year of physical chemistry (131-133).
3. Two quarters of inorganic chemistry (120A-120B). Chem. 114A can substitute for Chem. 120B.
4. Five upper-division chemistry labs: Chem. 105A, 106, 143AM or 143A, 143B or 143C and one of the following: 105B, 112A, 112B, 123, or 143B or 143C.
5. Chem. 135.
6. Math. 110.
7. Phys. 110A-110B, or Phys. 100A-100B.
8. One additional course in physical chemistry or related areas as approved by an adviser. This course may be Chem. 199.

**Suggested Program for Chemical Physics B.S. Major:**

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Chem. 6A Math. 20A	Chem. 6B Math. 20B	Chem. 6C Math. 20C Phys. 2A Chem. 6BL

**SOPHOMORE YEAR**

Chem. 140A	Chem. 140B	
Math. 20D	Math. 20E	Math. 20F
Phys. 2B	Phys. 2C	Phys. 2D
Chem. 6CL	Chem. 143AM	

**JUNIOR YEAR**

Chem. 131	Chem. 132	Chem. 133
Chem. 143C	Phys. 2CL	Chem. 105A
Phys. 110A or Phys. 100A or Chem. 120A	Phys. 110B or Phys. 100B or Chem. 120B	Math. 110

**SENIOR YEAR**

Chem. 120A or Phys. 110A or Phys. 110B	Chem. 120B* or Phys. 100A or Phys. 100B	Chem. 135
Elective Lab	Chem. 106	

\*Chem. 114A (fall quarter) may be substituted.

**Chemistry/Earth Sciences Major**

Earth sciences is a major available in cooperation with UCSD's Scripps Institution of Oceanography. It requires course work for a major in chemistry, plus additional courses in geology. It will appeal to students who plan to go on to graduate school in related fields, or to those students who plan to go into professional geologic work with their undergraduate degree.

**Lower-Division Requirements**

The following courses must be taken for a letter grade:

1. General chemistry including laboratory (Chem. 6A-6C, 6BL, and 6CL, or equivalent).
2. Calculus through Math. 20D (differential equations), either Math. 20A-20D or Math. 10A-10C, 20C (two units), 20D.
3. Phys. 2A-2B and 2D. Phys. 1A-1C and Phys. 2D (two units) are acceptable only by petition. Two units of physics laboratory. Phys. 2CL is recommended and is accessible without Phys. 2C (Phys. 2BL and 2DL are also acceptable).

**Upper-Division Requirements**

1. Two quarters of organic chemistry (140A-B).
2. One year of physical chemistry (131-133).
3. Two quarters of inorganic chemistry (120A-120B). Chem. 114A can substitute for Chem. 120B.
4. Five upper-division labs: Chem. 105A, 106, 143AM or 143A, ES 162L and one of the

following: Chem. 105B, 112A, 112B, 123, 143B, or 143C.

The specific upper-division earth sciences courses required are:

1. ES 101, Introduction to Geology.
2. ES 102, Introduction to Geochemistry.
3. ES 103, Introduction to Geophysics.
4. ES 120, Introduction to Mineralogy.
5. ES 162A, Introduction to Field Geology.
6. One other course from the following list is required: SIO 244, 245A, 245B, 253, Chem. 170, 171, 173. Petrology is essential for geology students. SIO 245A and 253 should be taken by students planning to go on to graduate school or to do professional geologic work with their undergraduate degrees. Students are encouraged to take at least one quarter of Chem. 199.

**Suggested Program for Chemistry/Earth Sciences B.S. Major:**

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Chem. 6A Math. 20A	Chem. 6B Math. 20B	Chem. 6C Math. 20C Chem. 6BL
<b>SOPHOMORE YEAR</b>		
Chem. 140A Math. 20D Chem. 6CL	Chem. 140B Phys. 2A Chem. 143AM	Phys. 2B Phys. 2CL
<b>JUNIOR YEAR</b>		
Earth. Sci. 101 Chem. 131 Phys. 2D	Earth. Sci. 102 Chem. 132 Earth. Sci. 120	Earth. Sci. 103 Chem. 133 Chem. 105A
<b>SENIOR YEAR</b>		
Chem. 114A* Chem. 120A	Earth. Sci. 120 Earth. Sci. 162 Chem. 106	Elective Elective Lab

\*Chem. 120B (winter quarter) may be substituted.

**Chemical Education Major**

This program offers an excellent preparation for teaching physical science in secondary schools, including chemistry, physics, earth science, biology, and mathematics. The chemical education program has American Chemical Society accreditation.

The chemical education program is sufficiently intensive that students with this degree should be admissible as graduate students to most universities. This program is also excellent

preparation for students interested in a career in science writing.

The program is basically a chemistry major with earth science and biochemistry as electives, combined with three courses in the Teacher Education Program.

If you are interested in earning a California teaching credential through UCSD, contact the Teacher Education Program for information about the prerequisite and professional preparation requirements. It is recommended that you contact TEP as early as possible in your academic career.

### Lower-Division Requirements

The following courses must be taken for a letter grade:

1. General chemistry including laboratory (Chem. 6A-6C, 6BL, and 6CL or equivalent).
2. Math. 20A-20C.
3. Phys. 2A-2B and 2D. Phys. 1A-1C and Phys. 2D (two units) are acceptable only by petition. Two units of physics laboratory. Phys. 2CL is recommended and is accessible without Phys. 2C (Phys. 2BL and 2DL are acceptable.)
4. Biol. BILD1.
5. A course in computer programming is recommended.

### Upper-Division Requirements

1. Three quarters of organic chemistry (Chem. 140A-C).
2. Two quarters of physical chemistry (Chem. 126-127 recommended; 131-132 acceptable).
3. One quarter of inorganic chemistry (Chem. 120A).
4. One quarter of biochemistry (Chem. 114A).
5. Five laboratory courses (Chem. 143AM or 143A, 143B, 105A, and two of the following: 105B, 106, 112A, 112B, 123, or 143C).
6. One chemistry elective course.
7. Two earth science courses, ES 101 and ES 102 or 103. (Other biology or chemistry courses may be arranged by petition.)
8. Chem. 195 or Chem. 196 or Chem. 199.
9. TEP 129A-B-C.

### Suggested Program for Chemical Education B.S. Major:

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Chem. 6A	Chem. 6B	Chem. 6C
	Biol. BILD 1	Chem. 6BL
Math. 20A	Math. 20B	Math. 20C
<b>SOPHOMORE YEAR</b>		
Chem. 140A	Chem. 140B	Chem. 140C
Math. 20D	Chem. 143AM	Chem. 143B
Phys. 2A	Phys. 2B	Phys. 2D
<b>JUNIOR YEAR</b>		
Chem. 126	Chem. 127	Phys. 2CL
Chem. 6CL	Elective Lab	Chem. Elective
Earth Sci. 101	Earth Sci. 102	
<b>SENIOR YEAR</b>		
Chem. 120A	Chem. 105A	Elective Lab
Chem. 114A	Chem. 195/196/199	
TEP 129A	TEP 129B	TEP 129C

### Environmental Chemistry Major

The environmental chemistry major requires a strong chemistry background, but also includes breadth courses from other disciplines related to environmental concerns. The elective courses allow specialization in a student's area of interest, such as economics, political science, biology, earth science, or additional chemistry. The program is designed to prepare students to enter the burgeoning industry surrounding waste management or to continue studies in the environmental sciences. Students fulfilling their elective requirements with chemistry and biochemistry courses would be prepared to attend graduate school in a chemical science.

The following courses must be taken for a letter grade:

### Lower-Division Requirements

1. General chemistry including laboratory (Chem. 6A-6C, 6BL, and 6CL or equivalent).
2. Phys. 2A-2B and 2D. Phys. 1A-1C and Phys. 2D (two units) are acceptable only by petition.
3. Math. 20A-20D.

### Upper-Division Requirements

1. Two quarters of organic chemistry (Chem. 140A-B).
2. Two quarters of physical chemistry (Chem. 126-127 recommended; 131-132 acceptable).

3. One quarter of inorganic chemistry (Chem. 120A) or a third quarter of organic chemistry (Chem. 140C).
4. One quarter of biochemistry (Chem. 114A).
5. Two laboratory courses (Chem. 143AM or 143A, 106).
6. Two quarters of environmental chemistry (Chem. 149A-B).
7. Atmospheric chemistry (Chem. 173).

### Elective Requirements

1. Four elective courses chosen from the following list (**at least one course** must be upper-division): Econ. 2A, Econ. 2B, Econ. 10 (was 2C), Econ. 131, Econ. 132, History US 154, Philosophy 186, Poli. Sci. 160AA, Poli. Sci. 160AB, Soc. 184, Soc. 185, USP 2, USP 105, USP 175.
2. Three elective courses chosen from the following list (**at least two courses** must be upper-division): Chem. 105A, Chem. 105B, Chem. 112A, Chem. 112B, Chem. 114B, Chem. 114C, Chem. 120A, Chem. 120B, Chem. 122, Chem. 123, Chem. 140C, Chem. 143B, Chem. 143C, Chem. 170, Chem. 171, Chem. 199, ES 40, ES 101, ES 102, ES 103, BILD 1, BILD 2, BILD 3, BIEB 120, BIEB 121, BIEB 176, BIEB 178, BIEB 179, AMES 119A, AMES 119B, AMES 119C.

### Suggested Program for Environmental Chemistry B.A. Major

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Chem. 6A	Chem. 6B	Chem. 6C
Math. 20A	Math. 20B	Math. 20C
	Phys. 2A	Chem. 6BL
<b>SOPHOMORE YEAR</b>		
Chem. 140A	Chem. 140B	Chem. 140C or
Chem. 6CL	Chem. 143AM	
Math 20D	Phys. 2B	Phys. 2D
<b>JUNIOR YEAR</b>		
Chem. 126	Chem. 127	Elect.
Chem. 149A	Chem. 149B	Chem. 173
Elect.	Elect.	Elect.
<b>SENIOR YEAR</b>		
Chem. 114A	Chem. 106	Elect.
Chem. 120A or	Elect.	Elect.



### Pharmacological Chemistry Major

The pharmacological chemistry major provides a strong background in chemistry and includes most courses required by California pharmacy schools. The major is intended primarily to prepare students for training as pharmacists in pharmacy school, but students fulfilling their elective requirements with appropriate courses would be prepared for graduate school to obtain a Ph.D. in pharmacology or other areas of science. Degree recipients would also be prepared for most jobs in the biotechnology and chemical industries.

The following courses must be taken for a letter grade:

#### Lower-Division Requirements

1. Biology BILD 1,2 and 3, together with one Biology lab (BICD 101, 111, 131, or BIPN 105), or a year of biology with laboratory at a community college.
2. General chemistry (Chem. 6A-C) including laboratory (Chem. 6BL-CL or equivalent).
3. One year of physics plus one physics laboratory. Phys. 2A-2B, 2D and 2CL. Phys. 1A-1C and Phys. 2D (two units) and 2CL are acceptable only by petition.
4. Calculus through differential equations (Math. 20A-20D, or equivalent).
5. One quarter of economics (1A or 1B or equivalent).
6. Pharmacology seminar (Chem. 92, one unit).

The Schools of Pharmacy at the University of the Pacific and at the University of Southern California require a course in public speaking for admission to the school. Students planning to apply to UOP or USC should take Introduction to Speech, Theatre THGE 25, or an appropriate course at a community college.

#### Upper-Division Requirements

1. Two quarters of physical chemistry (Chem. 126-127 recommended; 131-132 acceptable).
2. Three quarters of organic chemistry (Chem. 140A-B-C).

3. Three quarters of biochemistry (Chem. 114A-B-C).
4. Three laboratory courses (Chem. 143AM or 143A, 143B and either 112A, 112B or 143C).
5. One quarter of pharmacology and toxicology (Chem. 118).
6. One chemistry elective course.
7. If ACS certification is desired, Chem. 120A, plus two additional laboratory courses, are required. Any of these courses would satisfy #6. above.

#### Suggested Program for Pharmacological Chemistry B.S. Major:

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Chem. 6A Math. 20A	Chem. 6B Math. 20B Biol. BILD 1	Chem. 6C Math. 20C Chem. 6BL Chem. 92
<b>SOPHOMORE YEAR</b>		
Chem. 140A Chem. 6CL Math. 20D	Chem. 140B Chem. 143AM Phys. 2A	Chem. 140C Chem. 143B Phys. 2B
<b>JUNIOR YEAR</b>		
Chem. 114A Phys. 2D Chem. 143C	Chem. 114B Econ. 1A/1B Biol. BILD 2	Chem. 114C Biol. BILD 3 Phys. 1CL
<b>SENIOR YEAR</b>		
Chem. 120A Chem. 126	Bio. lab* Chem. 127	Chem. 118 (Elective)

\*Bio. BICD 101, 111, 131, or BIPN 105.

#### Honors Program

The Department of Chemistry and Biochemistry offers an Honors Program to those students who have demonstrated excellence in any of the seven majors. Students are eligible for Departmental Honors at graduation when they have:

1. Achieved a GPA of 3.2 overall and 3.4 in chemistry courses.
2. Completed a minimum of eight units of Chem. 199, distributed over at least two quarters. A student who registers for 199 and subsequently fails to complete the Honors Program may apply up to four units to any major that normally allows 199 as elective credit.

3. Submitted a final honors research report to three UCSD faculty members, including their research adviser, for approval.
4. Presented of an oral report about their research before a group of at least three faculty. This can be at an undergraduate research conference or at a seminar involving honors students and faculty.

Students who are interested in the Honors Program should contact the Undergraduate Coordinator in 4010 York Hall, and are invited to do so at any time.

#### Education Abroad

Majors are encouraged to explore the programs that allow students to study abroad or at other U.S. universities for a term or longer. See an adviser for details.

#### Minor Programs in Chemistry

A typical minor in chemistry consists of three lower-division lecture courses and at least one laboratory course, followed by a minimum of five upper-division courses, including at least one laboratory course, focused in physical, inorganic, organic, environmental chemistry, or biochemistry. Courses required by a student's major may not be applied toward a minor. Upper-division courses for the minor must be taken at UCSD and must be taken for a letter grade. The minimum GPA requirement for the minor is a 2.0.

#### Contiguous Bachelor's/Master's Degree Program

The department offers a contiguous bachelor's/master's degree program. It is limited to students with a bachelor's degree from the Department of Chemistry and Biochemistry at UCSD. A minimum undergraduate GPA of 3.0 is required for admission. Contact the Undergraduate Student Affairs Office in 4010 York Hall for more information.

#### The Graduate Program

Graduate students are accepted to the Department of Chemistry and Biochemistry for

study toward the Ph.D. in chemistry. The goal of the graduate program is to prepare students for careers in science by expanding their knowledge of chemistry while developing their ability for critical analysis, creativity, and independent study. The program is designed to encourage initiative and to stimulate enjoyment and development of the student's area of research expertise as well as the broader aspects of scientific inquiry and enlightenment.

### **Research**

Students choose their research concentration from programs in biochemistry, biophysics, inorganic, organic, physical and theoretical chemistry, surface and materials chemistry, and atmospheric and environmental chemistry. Opportunities for scientific discovery are also abundant through the department's extensive collaborations with investigators in the physical, biological, and engineering sciences. This includes on-campus collaborations with faculty in the Material Science Program, School of Medicine, and Scripps Institution of Oceanography. There are also off-campus interactions with scientists at nearby research facilities such as the Salk Institute and the Scripps Research Institute. Excellent state-of-the-art facilities and equipment support all the research programs. The department's Industrial Relations Program interfaces with national and local chemical, biotechnology, and pharmaceutical industries to encourage technology transfer and to assist postgraduates interested in industrial careers.

### **Research Adviser**

A first-year adviser guides students until a research adviser is chosen. Most of a student's efforts in graduate school are directed toward research for the doctoral dissertation, and selection of a research adviser is of utmost importance. To assist students with this critical decision, all chemistry and biochemistry faculty present research seminars in the fall quarter. Inorganic, organic, and physical chemistry students then consult with faculty to discuss research opportunities. Biochemistry students do research rotations with various faculty members. Although students have until the end of the first year to join a laboratory, most start their research studies by mid-year.

## **Requirements for the Ph.D.**

### **Placement Examinations and Course Work**

Entering students take written placement examinations in biochemistry, inorganic, organic, and physical chemistry. The purposes of these exams are to assist with advising and to assure that students have the breadth and level of competence needed for graduate studies. Deficiencies must be remedied in the first year. Three of four exams must be passed, including the one in the student's research area.

First-year students normally take at least six of the graduate courses listed below based on the results of their placement examinations, their research programs, and their specialized interests. Chem. 250 is required. Undergraduate courses and courses offered through other departments may also be taken, depending on the student's research area. By the second year, the emphasis is on thesis research, and a lighter load of courses is taken, although participation in seminars and informal study groups continues.

### **Departmental Examination**

In the winter quarter of the second year, a student's progress in research and graduate studies is evaluated through the departmental examination, which includes presentation and critical discussion of a recent research article. Students are also evaluated on their general knowledge of their particular field of study. Students may also be asked about progress on their dissertation.

### **Qualifying Examination**

By the end of the third year, students defend the topic, preliminary findings, and future research plans of their dissertation. Passing this defense qualifies the student to advance to candidacy for the dissertation. A dissertation committee composed of five faculty, one of whom is the research adviser, provides consultation and evaluation for the dissertation project.

### **Dissertation**

The dissertation is normally completed in the fourth or fifth year. This body of research is expected to make an innovative contribution to

the field of chemistry. Ph.D. candidates present a seminar summarizing their research accomplishments and defend their thesis in an oral examination before their dissertation committee.

### **Teaching**

Experience in teaching is a vital and integral part of every graduate student's training, and all students participate in the instructional activities of the undergraduate curriculum. Course credit for the teaching apprenticeship is earned by enrolling in Chem. 500. Excellence in teaching is stressed, and the department provides a thorough training program covering the fundamentals of teaching as well as other useful information and techniques for effective instruction. Further training is provided by the campus's Center for Teaching Development. Faculty and the students taught evaluate the performance of teaching assistants every quarter and awards are bestowed annually for outstanding performance as a teaching assistant.

### **Language Requirement**

Students whose native language is not English must demonstrate a mastery of English adequate to complete the teaching requirement. Deficiencies must be remedied by the end of the first year of academic residency. For native English speakers, there is no foreign-language requirement, but it is recommended that a student acquire at least a reading knowledge of one foreign language, preferably German or Russian.

## **Time Limits**

In accordance with UCSD policy, students must advance to candidacy by the end of four years. Total university support cannot exceed six and one-third years. Total registered time at UCSD cannot exceed seven and one-third years.

## **Seminars**

Seminars by researchers from other universities, national laboratories, and industry are another basic and important aspect of the graduate curriculum. Seminars are presented weekly in biochemistry, inorganic, organic, and physical chemistry. Department colloquia are

given on topics of general interest to the department. Seminars are also sponsored by many other departments and institutes.

### Financial Support

The department supports all first-year students in good academic standing from a variety of sources, including teaching and research assistantships, training grants, fellowships, and awards. A stipend is paid in addition to fees and, if applicable, tuition. Continuing students who do not have fellowships or awards are normally supported as research assistants by their thesis adviser.

### Admissions

The department seeks bright, motivated students and welcomes all such applications. To make admissions decisions, the department considers an applicant's statement of purpose and research interests, GRE scores on the general test plus either the advanced chemistry or advanced biochemistry test, undergraduate record, quality of the undergraduate university, letters of recommendation, and research experience and publications. Applicants whose native language is not English must also submit TOEFL scores. Admissions to the graduate program is for fall quarter. Applications received by January 15 receive priority consideration.

### Joint Doctoral Program with San Diego State University

The Department of Chemistry and Biochemistry at UCSD and the Department of Chemistry at San Diego State University offer a joint program of graduate study leading to the Ph.D. degree in chemistry. More information is available in the current edition of the *Bulletin of the Graduate Division* of San Diego State University.

## COURSES

### LOWER-DIVISION

#### 4. Basic Chemistry (4)

Chemistry 4 is a one-quarter course for science majors with insufficient preparation to start the Chem. 6 sequence. Em-

phasis is on learning how to solve quantitative problems. Topics include nomenclature, stoichiometry, and the periodic table. Cannot be taken for credit after any other chemistry course. Includes a combined laboratory and discussion-recitation each week. *Prerequisite: Math. 4C. Cannot be taken for credit after any other chemistry course.* (F)

#### 6A. General Chemistry (4)

First quarter of a three-quarter sequence intended for science and engineering majors. Topics include: stoichiometry, gas laws, bonding, atomic theory, quantum theory, and thermochemistry. Three hours' lecture, one hour recitation. *Prerequisites: proficiency in high school chemistry or physics. Math 1A (may be taken concurrently).* (F,W,S)

#### 6AH. Honors General Chemistry (4)

First quarter of a three-quarter honors sequence intended for well-prepared science and engineering majors. Topics include: stoichiometry, gas laws, bonding, atomic theory, quantum theory, and thermochemistry. Three hours lecture, one hour recitation. *Prerequisites: proficiency in high school chemistry, physics and mathematics. Concurrent enrollment in Math. 20A or higher level calculus required.* (F)

#### 6B. General Chemistry (4)

Second quarter of a three-quarter sequence intended for science and engineering majors. Topics include: molecular geometry, condensed phases and solutions, chemical equilibrium, acids and bases and thermodynamics. Three hours' lecture, one hour recitation. *Prerequisites: Chem. 6A; Math. 20A or 1A.* (F,W,S)

#### 6BH. Honors General Chemistry (4)

Second quarter of a three-quarter honors sequence intended for well-prepared science and engineering majors. Topics include: molecular geometry, condensed phases and solutions, chemical equilibrium, acids and bases and thermodynamics. Three hours lecture, one hour recitation. *Prerequisites: Chem. 6AH; Math. 20A.* (W)

#### 6BL. Introductory Inorganic Chemistry Laboratory (3)

Introduction to experimental procedures used in synthetic, analytical, and physical chemistry. If 6BL is a requirement for your major, it should be taken concurrently with 6B, or 6C. (F,W,S)

#### 6C. General Chemistry (4)

Third quarter of a three-quarter sequence intended for science and engineering majors. Topics include: electrochemistry, kinetics, coordination chemistry, nuclear chemistry, and an introduction to organic and biochemistry. Three hours' lecture, one hour recitation. *Prerequisite: Chem. 6B; Chem. 6BL may be taken concurrently.* (F,W,S)

#### 6CH. Honors General Chemistry (4)

Third quarter of a three-quarter honors sequence intended for well-prepared science and engineering majors. Topics include: electrochemistry, kinetics, coordination chemistry, nuclear chemistry, and an introduction to organic and biochemistry. Three hours lecture, one hour recitation. *Prerequisites: Chem. 6BH; Math. 20B. Chem. 6BL may be taken concurrently.* (S)

#### 6CL. Introductory Analytical Chemistry (4)

A laboratory course with emphasis on safe, accurate, and precise experimental techniques in chemistry, including quantitative analysis and instrumental methods, usually taken concurrently with Chem. 6C, but required for only certain majors. *Prerequisite: Chem. 6BL.* (F,W,S)

#### 11. The Periodic Table (4)

Introduction to the material world of atoms and small inorganic molecules. Intended for nonscience majors. Can be skipped by students with good knowledge of high school chemistry. Cannot be taken for credit after any other general chemistry course. (F)

#### 12. Molecules and Reactions (4)

Introduction to molecular bonding and structure and chemical reactions, including organic molecules and synthetic polymers. Intended for nonscience majors. *Prerequisite: Chem. 11 or good knowledge of high school chemistry.* Cannot be taken for credit after any organic chemistry course. (W)

#### 13. Chemistry of Life (4)

Introduction to biochemistry for nonscience majors. *Prerequisite: Chem. 12.* Cannot be taken for credit after any biochemistry course. (S)

#### 15. Chemistry of the Universe (4)

This is a one-quarter, nonmathematical chemistry course for nonscience majors covering the origin of the universe, the elements, and the formation of the solar system. The evolution of the Earth's atmosphere, hydrosphere, geosphere, and biosphere will be covered, as well as contemporary problems in environmental chemistry. Cannot be taken for credit after any other chemistry course.

#### 16. Chemistry and Society (4)

This course examines the importance of chemistry to our modern society. Topics covered include nuclear chemistry and nuclear power, medical applications, polymers and materials, ozone depletion, global warming, water chemistry, and cancer. Cannot be taken for credit after any other chemistry course. To be taken for a letter grade ONLY. (May not be offered every year.) (S)

#### 90. Undergraduate Seminar (1)

The seminar will focus on a variety of issues and special areas in the field of chemistry.

#### 91. Undergraduate Honors Seminar (1)

A seminar intended for exposing undergraduate students, especially freshmen and sophomores, to exciting research programs conducted by the faculty. Enrollment is limited.

#### 92. Undergraduate Pharmacology Seminar (1)

Selected topics in pharmacology and toxicology.

## UPPER-DIVISION

#### 105A. Physical Chemistry Laboratory (5)

Laboratory course in experimental physical chemistry. *Prerequisites: Chem. 6CL and Phys. 2CL or equivalent, Chem. 131 or 133 or 126 or 127.* (F,W,S)

#### 105B. Physical Chemistry Laboratory (4)

Laboratory course in experimental physical chemistry. *Prerequisites: Chem. 105A and 133.* (F,W,S)

#### 106. Instrumental Analysis Laboratory (4)

Instrumental methods for analytical chemistry emphasizing physical principles underlying both the instruments and the analytical methods. *Prerequisite: Chem. 105A.* (W)

#### 107. Synthetic Macromolecules (4)

The organic and physical chemistry of high polymers with emphasis on synthesis, structure, characterization, and properties. Polymers as materials are important as films, fibers, and elastomers. They play an ever-increasing role in science, technology, and medicine. *Prerequisites: Chem. 126 or 131 and 140B or 141B.* (May not be offered every year.)

#### 112A. Molecular Biochemistry Laboratory (6)

The application of techniques, including electrophoresis, peptide mapping and sequencing, affinity chromatography, amino acid analysis, gas-liquid chromatography, and enzyme functions and the chemistry of lipids, carbohydrates, and nucleic acids. *Prerequisites: Chem. 141A-B-C, 143A-B, 114A-B.* (Some of these courses may be taken concurrently.) (Note: Students may not receive credit for both Chem. 112A and BIBC 103.) (W)

**112B. Molecular Biochemistry Laboratory (6)**

This laboratory will introduce the students to the tools of molecular biology and will involve experiments with recombinant DNA techniques. *Prerequisites:* Chem. 114A-B, Chem. 114C (may be taken concurrently); Chem. 143A and 143B. (**Note:** Students may not receive credit for both Chem. 112B and BMM 101.) (S)

**113. Chemistry of Biological Macromolecules (4)**

A discussion of the structural principles governing biological macromolecules, the techniques used in their study, and how their functional properties depend on three-dimensional structure. *Prerequisites:* elementary organic and physical chemistry. (May not be offered every year.)

**114A. Biochemical Structure and Function (4)**

Introduction to biochemistry from a structural and functional viewpoint. *Prerequisite:* elementary organic chemistry strongly recommended (Chem. 141A or 140A). (**Note:** Students may not receive credit for both Chem. 114A and BIBC 100.) (F)

**114B. Biochemical Energetics and Metabolism (4)**

This course is an introduction to the metabolic reactions in the cell which produce and utilize energy. The course material will include energy-producing pathways: glycolysis, Krebs cycle, oxidative phosphorylation, fatty-acid oxidation. Biosynthesis—amino acids, lipids, carbohydrates, purines, pyrimidines, proteins, nucleic acids. *Prerequisite:* Chem. 114A. (**Note:** Students may not receive credit for both Chem. 114B and BIBC 102) (W)

**114C. Biosynthesis of Macromolecules (4)**

This course is a continuation of the introduction to biochemistry courses (114A and 114B). This quarter reviews the mechanisms of biosynthesis of macromolecules—particularly proteins and nucleic acids. Emphasis will be placed on how these processes are controlled and integrated with the metabolism of the cell. *Prerequisite:* Chem. 114B. (**Note:** Students may not receive credit for both Chem. 114C and BMM 100.) (S)

**115. Modeling Biological Macromolecules (4)**

Use of computer graphics and modeling methods in the study of biological macromolecules. The course will cover basic methods and techniques. The objective is to provide a good working knowledge of the critical features of the methods and to provide a foundation for further study for those who wish to pursue these methods as research topics. *Prerequisite:* Chem. 114A or equivalent. May not be offered every year.

**116. Chemistry of Enzyme Catalyzed Reactions (4)**

A discussion of the chemistry of representative enzyme catalyzed reactions is presented. Enzyme reaction mechanisms and their relation to enzyme structure are emphasized. *Prerequisites:* elementary physical chemistry, organic chemistry, and biochemistry. (May not be offered every year.)

**117. Biochemistry of Human Disease (4)**

An advanced course in biochemistry which will deal primarily with the molecular basis of human disorders. *Prerequisite:* elementary biochemistry. (May not be offered every year.)

**118. Pharmacology and Toxicology (4)**

A survey of the biochemical action of drugs and toxins as well as their absorption and excretion. *Prerequisites:* Chem. 141A-B-C (or Chem. 140ABC), Chem. 114A-B-C and admission to Pharmacological Chemistry major, or consent of instructor.

**120A. Inorganic Chemistry (4)**

The chemistry of the main group elements is presented in terms of atomic structure, ionic and covalent bonding. Structural theory involving s, p, and unfilled d orbitals is described. Thermodynamic and spectroscopic criteria for structure and stability of compounds are presented and chemical reactions of main group elements discussed in terms of molecular structure and

reactivity. *Prerequisites:* a general chemistry course. Chem. 141A or equivalent course is recommended. (F)

**120B. Inorganic Chemistry (4)**

A continuation of the discussion of structure, bonding, and reactivity with emphasis on transition metals and other elements using filled d orbitals to form bonds. Coordination chemistry is discussed in terms of valence bond, crystal field, and molecular orbital theory. The properties and reactivities of transition metal complexes including organometallic compounds are discussed. *Prerequisite:* Chem. 120A. (W)

**122. Biochemical Evolution (4)**

This course emphasizes the chemical aspects of evolution, including the origin of living systems on earth, primitive energy acquisition devices, the coupling of information storage and replication catalysis, protein evolution, and the biochemical unity and diversity of extant organisms. *Prerequisites:* organic chemistry and introductory biochemistry. (May not be offered every year.)

**123. Advanced Inorganic Chemistry Laboratory (4)**

Synthesis, analysis, and physical characterization of inorganic chemical compounds. *Prerequisite:* Chem. 120A, 120B, 143A, and 143B.

**124. Bioinorganic Chemistry (4)**

The role of metal ions in biological systems, with emphasis on transition metal ions in enzymes that transfer electrons, bind oxygen, and fix nitrogen. Also included are metal complexes in medicine, toxicity, and metal ion storage and transport. *Prerequisites:* Chem. 6A-B-C, 114A; or equivalent. (May not be offered every year.)

**126. Physical Chemistry (4)**

An introduction to physical chemistry with emphasis on biochemical and environmental applications. Quantum mechanics, atomic and molecular structure, spectroscopy. *Prerequisites:* Chem. 6C, Math. 20D, and Phys. 2D; or consent of instructor.

**127. Physical Chemistry (4)**

An introduction to physical chemistry with emphasis on biochemical and environmental applications. Thermodynamics, first and second laws, thermochemistry, chemical equilibrium, solutions, kinetic theory, reaction kinetics. *Prerequisite:* Chem. 126 or consent of instructor. (W)

**128. Physical Chemistry—Applied Spectroscopy (4)**

The electromagnetic spectrum: rotational, vibrational, and electronic spectra, nuclear and electron magnetic resonance. X-ray diffraction. *Prerequisites:* Chem. 6C, Math. 20C and 20D, Chem. 127 or 132, or consent of instructor. (S)

**131. Physical Chemistry (4)**

Thermodynamics, chemical equilibrium, phase equilibrium, chemistry of solutions. *Prerequisites:* Chem. 6C, Math. 20D, and Phys. 2D (may be taken concurrently); or consent of instructor. (F)

**132. Physical Chemistry (4)**

Chemical statistics, kinetic theory, reaction kinetics. *Prerequisites:* Chem. 131 or consent of instructor. (W)

**133. Physical Chemistry (4)**

Quantum mechanics, atomic and molecular spectroscopy, molecular structure. *Prerequisites:* Chem 132; or Chem. 6C, Math. 20D and Phys. 2D; or consent of instructor. (S)

**134. Computer Programming in Chemistry (4)**

Use of computer programming in the analysis and presentation of chemical data (statistical analysis, least squares fitting procedures, titration curve interpretation, analysis of radioactive decay series, chemical kinetics, organic synthesis, etc.) *Prerequisites:* Math. 20A and 20B or equivalent. (**Note:** Students

may not receive credit for both Chem. 134 and BIBC 115.) (May not be offered every year.)

**135. Molecular Spectroscopy (4)**

Time-dependent behavior of systems; interaction of matter with light; selection rule. Radiative and nonradiative processes, coherent phenomena, and the density matrices. Instrumentation, measurement, and interpretation. *Prerequisites:* Chem. 133 or equivalent; Math. 20D or Chem. 190/290. (May not be offered every year.)

**140A. Organic Chemistry (4)**

An introduction to organic chemistry, with emphasis on material fundamental to biochemistry. Topics include bonding theory, isomerism, stereochemistry, chemical and physical properties, and an introduction to substitution, addition, and elimination reactions. *Prerequisite:* Chem. 6C or equivalent course in general chemistry. (**Note:** Students may not receive credit for both 140A and 141A.) (F,W,S)

**140B. Organic Chemistry (4)**

A continuation of 140A; acid/base reactions, chemistry of the carbonyl group, sugars, peptides, nucleic acids and other natural products. *Prerequisite:* Chem. 140A (a grade of C or higher in Chem. 140A is strongly recommended). (**Note:** Students may not receive credit for both 140B and 141B.) (F,W,S)

**140C. Organic Chemistry (4)**

A continuation of Chemistry 140A-B. Organic chemistry of biologically important molecules: carbohydrates, proteins, fatty acids, biopolymers, natural products, drugs; models for enzymatic reactions, synthetic methods, and methods of analysis. *Prerequisite:* Chem. 140B. (**Note:** Students may not receive credit for both 140C and 141C.) (F,W,S)

**141A. Organic Chemistry (4)**

Chem. 141A introduces theoretical and experimental studies of structure and properties of covalent molecules. Both resonance and simple molecular orbital descriptions of organic compounds are introduced and spectroscopic methods for determining electronic and molecular structure are discussed. Organic reactions are introduced with synthetic and mechanistic examples. *Prerequisites:* Chem. 6C (6C may be taken concurrently by good students). Prior or concurrent physics recommended. (**Note:** Students may not receive credit for both Chem. 141A and Chem. 140A.) (F)

**141B. Organic Chemistry (4)**

A continuation of 141A, this course applies the structure-reactivity, spectroscopy, and electronic theories introduced in 141A to organic reactions. *Prerequisite:* Chem. 141A. (**Note:** Students may not receive credit for both Chem. 141B and Chem. 140B.) (W)

**141C. Organic Chemistry (4)**

A continuation of 141A-B, this course treats selected topics such as carbon-metal bonds, organometallic chemistry, electrophilic reactions, free radical reactions, alkane chemistry, polymerization, molecular orbital theory and electrocyclic reactions, photochemistry, unstable intermediates such as carbenes, benzyne, etc., and metal oxidation reactions, and an introduction to carbohydrate and protein chemistry. *Prerequisite:* Chem. 141B. (**Note:** Students may not receive credit for both Chem. 141C and Chem. 140C.) (S)

**142. Natural Products Chemistry (4)**

An outline of the chemistry of terpenes, steroids, alkaloids, and plant phenols developed on the basis of modern biogenetic theory. Special emphasis will be given to biologically active substances such as hormones and antibiotics. *Prerequisites:* Chem. 140A-B-C, or 141A-B-C. (May not be offered every year.)

**143A. Organic Chemistry Laboratory (4)**

Introduction to laboratory techniques needed in organic chemistry. Stresses physical methods including separation and purification, spectroscopy, product analysis and effects of reaction

conditions. *Prerequisites:* Chem. 6BL, Chem. 141A or Chem. 140A. (**Note:** Students may not receive credit for both Chem. 143A and Chem. 143AM.) (F,W,S)

#### 143AM. Majors Organic Chemistry Laboratory (4)

An organic chemistry laboratory intended for chemistry majors only. It is similar to Chem. 143A, but with emphasis on instrumental methods of product identification, separation, and analysis. *Prerequisites:* Chem. 6BL; Chem. 141A. (**Note:** Students may not receive credit for both Chem. 143AM and Chem. 143A.) (W)

#### 143B. Organic Chemistry Laboratory (4)

Continuation of 143AM or 143A, emphasizing synthetic methods of organic chemistry for chemistry majors only. *Prerequisites:* Chem. 143A; 141B or 140B (may be taken concurrently). (W,S)

#### 143C. Organic Laboratory (5)

Identification of unknown organic compounds by a combination of chemical and physical techniques for chemistry majors only. *Prerequisites:* Chem. 6CL, 143A, 141C (may be taken concurrently); 143B suggested. (F)

#### 144. Synthesis of Complex Molecules (4)

This course discusses planning economic routes for the synthesis of complex organic molecules. The uses of specific reagents and protecting groups will be outlined as well as the control of stereochemistry during a synthesis. Examples will be selected from the recent literature. *Prerequisites:* Chem. 148 or 248. (May not be offered every year.)

#### 147. Mechanisms of Organic Reactions (4)

A qualitative approach to the mechanisms of various organic reactions; substitutions, additions, eliminations, condensations, rearrangements, oxidations, reductions, free-radical reactions, and photochemistry. Includes considerations of molecular structure and reactivity, synthetic methods, spectroscopic tools, and stereochemistry. The topics emphasized will vary from year to year. This is the first quarter of the advanced organic chemistry sequence. *Prerequisite:* Chem. 141C or 140C. (May not be offered every year.)

#### 148. Synthetic Methods in Organic Chemistry (4)

A survey of reactions of particular utility in the organic laboratory. Emphasis is on methods of preparation of carbon-carbon bonds and oxidation reduction sequences. *Prerequisite:* Chem. 141C or consent of instructor. (May not be offered every year.)

#### 149A. Environmental Chemistry (4)

The chemical basis of air and water pollution, chlorofluorocarbons and the ozone hole, the environmental impact of radioactive waste disposal, mineral resource usage, and nuclear energy. *Prerequisites:* Chem. 6A-B-C. (F)

#### 149B. Environmental Chemistry (4)

Agricultural productivity, biological impact on the environment, deforestation, environmental disasters (fires, nuclear winter, and volcanoes), and organic waste handling. *Prerequisite:* Chem. 149A. (W)

#### 153. Topics in Biophysics/Photobiology (4)

Basic principles of photobiology and photochemistry. Photochemical mechanisms in photosynthesis. Photoreceptor pigment systems and photobiological control mechanisms in living organisms. *Prerequisite:* upper-division standing in biology, chemistry, or physics, or consent of the instructor. (Same as BIBC 153, Phys. 153.)

#### 167. Biochemistry of Lipid Diseases (4)

The central theme of this course will be to develop a broad understanding of the basic biochemical aspects of lipid metabolism, the regulation of lipid metabolism and application to the treatment of specific human diseases. *Prerequisite:* biochemistry. (May not be offered every year.)

#### 170. Cosmochemistry (4)

Composition of stars, of planets, of meteorites, and the earth and moon. Nuclear stability rules and isotopic composition of the elements. Chemical properties of solar matter. Origin of the elements and of the solar system *Prerequisite:* general chemistry sequence.

#### 171. Nuclear and Radiochemistry (4)

Radioactive decay, stability systematics, neutron activation, nuclear reactions. Szilard-Chalmers reactions, hot-atom chemistry, radiation chemistry, effects of ionizing radiation. *Prerequisite:* general chemistry sequence.

#### 173. Atmospheric Chemistry (4)

Chemical principles applied to the study of atmospheres. Atmospheric photochemistry, radical reactions, chemical lifetime determinations, acid rain, greenhouse effects, ozone cycle, and evolution are discussed. *Prerequisites:* Chem. 6A-6C. (S)

#### 185. Introduction to Computational Chemistry (4)

This course in computational methods builds on a background in mathematics and physical chemistry. After a brief introduction and background in computational theory, topics will include molecular mechanics, semi-empirical methods, and ab initio-based methods of increasing elaboration. Emphasis will be on applications and reliability. *Prerequisites:* Chem. 126 or 133 (formerly 130) and Math. 20C. (May not be offered every year.)

#### 190. Mathematical Methods of Chemistry (4)

Applied mathematics useful for kinetics, thermodynamics, statistical mechanics and quantum mechanics. Topics include ordinary and partial differential equations, special functions, probability and statistics, vector functions and operators, linear algebra, and group theory. *Prerequisites:* general chemistry, one year of calculus. (May not be offered every year.)

#### 195. Methods of Teaching Chemistry (4)

An introduction to teaching chemistry. Students are required to attend a weekly class on methods of teaching chemistry, and will teach a discussion section of one of the lower-division chemistry courses. Attendance at lecture of the lower-division course in which the student is participating is required. (P/NP grades only.) *Prerequisite:* consent of instructor. (F,W,S)

#### 196. Reading and Research in Chemical Education (2 or 4)

Independent literature or classroom research by arrangement with, and under the direction of, a member of the Department of Chemistry faculty. Students must register on a P/NP basis. *Prerequisites:* upper-division standing, 2.5 minimum GPA, consent of instructor and department.

#### 199. Reading and Research (2 or 4)

Independent literature or laboratory research by arrangement with, and under the direction of, a member of the Department of Chemistry faculty. Students must register on a P/NP basis. *Prerequisites:* upper-division standing, 2.5 minimum GPA, consent of instructor and department. (F,W,S)

## GRADUATE

#### 206. Topics in Biophysics and Physical Biochemistry (4)

Selection of topics of current interest. Examples: primary processes of photosynthesis; membrane biophysics; applications of physical methods to problems in biology and chemistry, e.g., magnetic resonance, x-ray diffraction, fluctuation spectroscopy, optical techniques (fluorescence, optical rotary dispersion, circular dichroism). Topics may vary from year to year. *Prerequisite:* consent of instructor. (W)

#### 207. Modern NMR Methods (4)

Treats varied pulse sequences, one- and two-dimensional methods, interpretation of relaxation rates, spin-decoupling, multiple quantum filtering, and solvent suppression with application to liquid crystals, membranes, small molecules, proteins, and nucleic acids. (May not be offered every year.)

#### 208. Modern Methods in Protein NMR (4)

This course covers modern methods in protein NMR including multinuclear, multidimensional (2-, 3-, and 4D) and gradient enhanced spectroscopy. Experiments covered include, but are not limited to, 1H-15N HSQC, 15N edited Tocsy and Noesy, HDDH-Tocsy and 1H-15N-13C correlated experiments. Students will be able to write complete pulse sequences from the primary literature for implementation on a Bruker spectrometer by the end of the quarter. *Prerequisite:* Chem. 207. (May not be offered every year.) (S)

#### 211. Metabolic Biochemistry (4)

A comprehensive course in biochemistry emphasizing metabolic and human biochemistry. *Prerequisites:* physical and organic chemistry; graduate-student standing. (F)

#### 212. Biochemistry of Growth Regulation and Oncogenesis (4)

An introduction to the biochemistry of growth regulation and oncogenesis. Topics include: tyrosine protein kinases; growth factor receptors; control of cell proliferation; transformation by papovaviruses and retroviruses. Designed for graduate students, but suitable for undergraduates with consent of instructor. *Prerequisite:* biochemistry, molecular biology, or equivalent. (May not be offered every year.)

#### 213. Chemistry of Macromolecules (4)

A discussion of the structural principles governing biological macromolecules, the techniques used in their study, and how their functional properties depend on three-dimensional structure. *Prerequisites:* elementary physical and organic chemistry. (May not be offered every year.)

#### 215. Modeling Biological Macromolecules (4)

Use of computer graphics and modeling methods in the study of biological macromolecules. The course will cover basic methods and techniques. The objective is to provide a good working knowledge of the critical features of the methods and to provide a foundation for further study for those who wish to pursue these methods as research topics. *Prerequisite:* Chem. 114A or equivalent. (May not be offered every year.)

#### 216. Chemistry of Enzyme Catalyzed Reactions (4)

A discussion of the chemistry of representative enzyme catalyzed reactions is presented. Enzyme reaction mechanisms and coenzyme chemistry are emphasized. *Prerequisite:* organic chemistry. (May not be offered every year.)

#### 217. Immunology (3)

Graduate students will explore topics in specialized areas of immunochemistry and cellular immunology, antigenic and molecular structure of immunoglobulin molecules; antigen-antibody interactions; cellular events in the humoral and cellular immune responses; translation immunology. *Prerequisite:* consent of instructor. (F)

#### 218. Macromolecular Biochemistry (4)

A comprehensive course in biochemistry emphasizing structural biochemistry. *Prerequisites:* physical and organic chemistry; graduate-student standing. (F)

#### 219A-B-C. Special Topics in Biochemistry (4-4-4)

This special topics course is designed for first-year graduate students in biochemistry. Topics presented in recent years have included protein processing, the chemical modification of proteins, the biosynthesis and function of glycoproteins, lipid biochemistry and membrane structure, and bioenergetics.



*Prerequisites: undergraduate courses in biochemistry. (May not be offered every year.)*

### 223. Organometallic Chemistry (4)

A survey of this field from a synthetic and mechanistic viewpoint. Reactivity patterns for both main group and transition element organometallic compounds will be discussed and organized to periodic trends. (May not be offered every year.)

### 224. Spectroscopic Techniques (4)

Application of physical techniques to the elucidation of the structure of inorganic complex ions and organometallic compounds. Topics covered include group theory, and its application to vibrational, magnetic resonance and Raman spectroscopy. (May not be offered every year.)

### 225. Bioinorganic Chemistry (4)

The role of metal ions in biological systems, with emphasis on transition metal ions in enzymes that transfer electrons, bind oxygen, and fix nitrogen. Also included are metal complexes in medicine, toxicity, and metal ion storage and transport. (May not be offered every year.)

### 226. Mechanistic Aspects of Catalytic Reactions (4)

Mechanisms of substitution and electron transfer reaction of inorganic complexes will be examined from an experimental point of view. A quantitative treatment of rate laws, the steady state approximation and multistep mechanisms of reactions that are catalyzed by soluble transition metal complexes. (May not be offered every year.)

### 227. Seminar in Inorganic Chemistry (2)

Seminars presented by faculty and students on topics of current interest in inorganic chemistry, including areas such as bioinorganic, organometallic and physical-inorganic chemistry. The course is designed to promote a critical evaluation of the available data in specialized areas of inorganic chemistry. Each quarter three or four different topics will be discussed. *Prerequisite: graduate standing or consent of instructor.*

### 228. Solid State Chemistry (4)

Survey of the chemistry of semiconductors, superconductors, molecular magnetic materials, zeolites, fast ion conductors, electronically conducting polymers, and ceramics. Synthetic techniques such as molecular precursor design, the sol-gel process, electrosynthesis, and high-temperature thermolysis will be covered. (May not be offered every year.)

### 229. Special Topics in Inorganic Chemistry (2-4)

(May not be offered every year.)

### 230. Quantum Mechanics (4)

Concepts and mathematical formalism that are useful for problems of chemical interest: states, representations, operators, eigenvalues and eigenfunctions, time evolution, observables, and measurements. Time-independent perturbation theory. *Prerequisites: Chem. 133 or equivalent; Math. 20D or equivalent; Chem. 190 may be taken concurrently.* (May not be offered every year.)

### 231. Chemical Kinetics and Molecular Reaction Dynamics (4)

Classical kinetics, transition state theory, unimolecular decomposition, potential energy surfaces; scattering processes and photodissociation processes. *Prerequisite: Chem. 230.* (May not be offered every year.)

### 232. Statistical Mechanics of Chemical Systems (4)

Equilibrium statistical mechanics, distribution functions, and partition functions. Boltzmann, Bose, and Fermi statistics. The different ensembles; ensemble averages and QM expectation values; derivation of thermodynamic properties of simple systems. *Prerequisites: Chem. 133, 131 and 132, or equivalent.* (May not be offered every year.)

### 233. Nonequilibrium Statistical Mechanics (4)

Linear response theory, time correlation functions, and spectral densities. Schmoluchowski, Langevin, and Fokker-Planck equations; nonlinear behavior. Newtonian and Brownian molecular dynamics calculations. *Prerequisite: Chem. 232.* (May not be offered every year.)

### 234. Thermodynamics (4)

Thermodynamics of chemical systems; the three laws, with emphasis on the formal structure of thermodynamics. Chemical equilibrium, stability theory, heterogeneous equilibrium, solutions. *Prerequisites: Chem. 131, 132 or equivalent.* (May not be offered every year.)

### 235. Molecular Spectroscopy (4)

Time-dependent behavior of systems; interaction of matter with light; selection rule. Radiative and nonradiative processes, coherent phenomena and the density matrices. Instrumentation, measurement, and interpretation. *Prerequisites: Chem. 133 or equivalent; Math. 20D or Chem. 190/290.* (May not be offered every year.)

### 236. Atherosclerosis (2)

This multidisciplinary course integrates the studies of the pathogenesis of atherosclerosis, with emphasis on lipoprotein metabolism, and the cellular and biochemical mechanisms of lesion development. Two-hour lectures. Same as Medicine 236. *Prerequisite: biochemistry.* (May not be offered every year.)

### 237. Molecular Glycobiology (2)

Molecular glycobiology encompasses studies of the structure, biosynthesis and biological roles of oligosaccharide units on glycoconjugates. This course will provide an overview of this rapidly evolving field with an emphasis on the glycoconjugates of eucaryotic organisms in the animal kingdom. (May not be offered every year.)

### 238. Current Topics in Physical Chemistry (4)

Critical reading of current literature; training and practice in presenting oral reports, writing scientific papers and proposals. (May not be offered every year.)

### 239. Special Topics in Chemical Physics (4)

Topics of special interest will be presented. Examples include NMR, solid-state chemistry, phase transitions, stochastic processes, scattering theory, nonequilibrium processes, tensor transformations, and advanced topics in statistical mechanics, thermodynamics, and chemical kinetics. (May not be offered every year.)

### 240. Electrochemistry (4)

Application of electrochemical techniques to chemistry research. Basic electrochemical theory and instrumentation: the diffusion equations, controlled potential, and current methods. Electro-chemical kinetics, Butler-Volmer, Marcus-Hush theories, preparative electrochemistry, analytical electrochemistry, solid and polymer electrolytes, semiconductor photoelectrochemistry. (May not be offered every year.)

### 242. Natural Products Chemistry (4)

An outline of the chemistry of terpenes, steroids, alkaloids, and plant phenols developed on the basis of modern biogenetic theory. Special emphasis will be given to biologically active substances such as hormones and antibiotics. *Prerequisites: Chem. 140A-B-C or 141A-B-C.*

### 244. Synthesis of Complex Molecules (4)

This course discusses planning economic routes for the synthesis of complex organic molecules. The uses of specific reagents and protecting groups will be outlined as well as the control of stereochemistry during a synthesis. Examples will be selected from the recent literature. *Prerequisite: Chem. 148 or 248.*

### 245. Structure and Properties of Organic Molecules (4)

Introduction to the measurement and theoretical correlation of the physical properties of organic molecules. Topics to be covered include molecular orbital theory, bond lengths, bond energies, dipole moments, ionization potentials, infrared and ultraviolet spectra, nuclear magnetic resonance, and electron spin resonance.

### 246. Kinetics and Mechanism (4)

Methodology of mechanistic organic chemistry; integration of rate expressions, determination of rate constants, transition state theory; catalysis, kinetic orders, isotope effects, substitute effects, solvent effects, linear free energy relationship; product studies, stereochemistry; reactive intermediates; rapid reactions. (May not be offered every year.)

### 247. Mechanisms of Organic Reactions (4)

A qualitative approach to the mechanism of various organic reactions; substitutions, additions, eliminations, condensations, rearrangements, oxidations, reductions, free-radical reactions, and photochemistry. Includes considerations of molecular structure and reactivity, synthetic methods, spectroscopic tools, and stereochemistry. The topics emphasized will vary from year to year. This is the first quarter of the graduate organic chemistry sequence. *Prerequisite: Chem. 141C.*

### 248. Synthetic Methods in Organic Chemistry (4)

A survey of reactions of particular utility in the organic laboratory. Emphasis is on methods of preparation of carbon-carbon bonds and oxidation-reduction sequences. *Prerequisite: Chem. 141C or consent of instructor.*

### 249. Special Topics in Organic Chemistry (2-4)

(May not be offered every year.)

### 250. Seminar in Chemistry (2)

Regularly scheduled seminars by first-year graduate students provide opportunities for practice in seminar delivery and for the exploration of topics of general interest. (S/U grades only.) (S)

### 251. Research Conference (2)

Group discussion of research activities and progress of the group members. *Prerequisite: consent of instructor.* (S/U grades only.) (F,W,S)

### 267. Biochemistry of Lipid and Lipoprotein Diseases (4)

The central theme of this course will be to develop a broad understanding of the basic biochemical aspects of lipid metabolism, the regulation of lipid metabolism, and application to the treatment of specific human diseases. (May not be offered every year.)

### 270A-B-C. Current Topics in Environmental Chemistry (2-2-2)

Formal lecture series on the current topics in the field of environmental chemistry. Emphasis is on current research topics in atmospheric, oceanic, and geological environments. *Prerequisite: consent of instructor.* (May not be offered every year.)

### 285. Introduction to Computational Chemistry (4)

This course in computational methods builds on a background in mathematics and physical chemistry. After a brief introduction and background in computational theory, topics will include molecular mechanics, semi-empirical methods, and ab initio-based methods of increasing elaboration. Emphasis will be on applications and reliability. *Prerequisites: Chem. 126 or 133 and Math. 20C.* (May not be offered every year.)

### 290. Mathematical Methods in Chemistry I (4)

Applied mathematics useful in kinetics, spectroscopy, thermodynamics, statistical mechanics, and quantum mechanics; ordinary and partial differential equations, vector spaces,

operators, linear algebra, numerical analysis. *Prerequisites: general chemistry, calculus.* (May not be offered every year.)

**293. Cosmochemistry Seminar (2)**

Formal seminars or informal sessions on topics of current interest in cosmochemistry as presented by visiting lecturers, local researchers, or students. *Prerequisite: advanced graduate-student standing.* (S/U grades only.)

**294. Organic Chemistry Seminar (2)**

Formal seminars or informal puzzle sessions on topics of current interest in organic chemistry, as presented by visiting lecturers, local researchers, or students. *Prerequisite: advanced graduate-student standing.* (S/U grades only.) (F,W,S)

**295. Biochemistry Seminar (2)**

Formal seminars or informal puzzle sessions on topics of current interest in biochemistry, as presented by visiting lecturers, local researchers, or students. *Prerequisite: advanced graduate-student standing.* (S/U grades only.)

**296. Chemical Physics Seminar (2)**

Formal seminars or informal sessions on topics of current interest in chemical physics as presented by visiting lecturers, local researchers, or students. *Prerequisite: advanced graduate-student standing.* (S/U grades only.) (F,W,S)

**298. Special Study in Chemistry (1-4)**

Reading and laboratory study of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases. (S/U grades only.) Credit is limited to four units per quarter. (F,W,S)

**299. Research in Chemistry (1-12)**

*Prerequisites: graduate standing and consent of instructor.* (S/U grades only.) (F,W,S)

**500. Teaching in Chemistry (4)**

A doctoral student in chemistry is required to assist in teaching undergraduate chemistry courses. One meeting per week with instructor, one or more meetings per week with assigned class sections or laboratories, and attendance at the lecture of the undergraduate course in which he or she is participating. *Prerequisites: graduate standing and consent of instructor.* (S/U grades only.) (F,W,S)

William S. Tay, Ph.D., *Literature*  
Wai-Lim Yip, Ph.D., *Literature*

**Associate Professors**

Barry J. Naughton, Ph.D., *IR/PS*

**Adjunct Associate Professor**

Suzanne Cahill, Ph.D., *History*

**Assistant Professors**

Marta E. Hanson, Ph.D., *History*

Yuezhi Zhao, Ph.D., *Communication*

**Lecturer WSOE**

Ping C. Hu, M.A., *Chinese*

**Lecturers**

Xiaogang Cha, M.A., *Chinese*

Qian He, *Chinese*

Miao-Ling Hsieh, M.A., *Chinese*

Chinese studies is an interdisciplinary program that allows the student interested in China to utilize the university's offerings in various departments to build a major leading to a B.A. degree. In addition to coordinating courses in the various departments, the Program in Chinese Studies offers courses directly under its own auspices to round out the available offerings.

Many of the participating faculty in the program have a converging interest in contemporary China. For this reason, this is one of the strongest programs on modern Chinese society now available. Another focal point of research interest is visual culture and cultural history in modern and pre-modern China. The interdisciplinary nature of the program (see departmental affiliation of the participating faculty) can accommodate students of a wide range of interests. In addition to our local resources, the University of California Education Abroad Program (EAP) and Opportunities Abroad Program (OAP) are affiliated with various universities and language institutes in China, Taiwan, and Hong Kong. This, together with other academic exchange programs with a number of Chinese universities, provides the possibility of a junior year abroad, including both language courses and courses dealing with various aspects of Chinese studies. Subject to final approval by the program chair, EAP credits may be transferred back to UCSD to coordinate with on-campus offerings.

**The Major Program**

The student choosing a major in Chinese studies must meet the following requirements:

1. Two years of Mandarin Chinese (Chinese Studies 11-12-13 and 21-22-23 or equivalent).
2. History 10-11-12 (East Asian History)
3. Twelve upper-division courses in Chinese studies, including courses taken in at least three departments. At least one of these courses should be a seminar in which students would be expected to write a substantial term paper. No more than six upper-division language courses count toward the major requirement.
4. As a rule, only courses taken for a letter grade can satisfy program requirements (major, minor). Exceptions are granted for Chinese Studies 198 and 199.

In principle, the courses included in the Program in Chinese Studies are those campus offerings dealing with China or the Chinese language. Most of the courses listed below are planned by participating departments for the 1998-1999 academic year.

**Honors Program**

Requirements for admission to the program are:

1. Junior standing
2. A GPA of 3.5 or better in the major
3. Overall GPA of 3.2 or better
4. Recommendation of a faculty sponsor familiar with the student's work
5. Completion of at least four upper-division courses approved by the Program in Chinese Studies
6. Completion of at least one year of Chinese language study

Students who qualify for honors take a two-quarter sequence of directed study during which they define a research project, carry out the research, and complete a senior thesis.

The completed thesis will be evaluated by a committee consisting of the student's thesis adviser and one other faculty member appointed by the Chinese studies program coordinator.

**Chinese Studies**

OFFICE: 3084 Humanities and Social Sciences Building, Muir College

**Professors**

Joseph C.Y. Chen, Ph.D., *Physics*

Matthew Y. Chen, Ph.D., *Linguistics*

Joseph W. Esherrick, Ph.D., *History*

Germaine A. Hoston, Ph.D., *Political Science*

Chalmers Johnson, Ph.D., *IR/PS, Emeritus*

David K. Jordan, Ph.D., *Anthropology*

Richard P. Madsen, Ph.D., *Sociology*

Paul G. Pickowicz, Ph.D., *History*

Susan L. Shirk, Ph.D., *Political Science*



## The Minor Program

A minor in Chinese studies consists of at least two lower-division courses (a minimum of eight units) and five upper-division courses (a minimum of twenty units) taken for a letter grade. These courses should be chosen from three programs or departments. No more than three language courses may apply toward the minor requirement. Only one non-language course taken abroad may be approved for fulfillment of the minor. A list of approved courses is available quarterly from the Program in Chinese Studies.

## COURSES

### COMMITTEE-SPONSORED COURSES

11-12-13. **First-Year Chinese** (5-5-5)

21-22-23. **Second-Year Chinese** (4-4-4)

111-112-113. **Third-Year Chinese** (4-4-4)

121-122-123. **Fourth-Year Chinese** (4-4-4)

All Chinese language courses have A, D and E tracks for students with no Chinese language background; B track for students with some Chinese language background; C track for students with Chinese language background other than Mandarin.

150. **Intensive Summer Language and Culture Program in China** (4)

Intensive language and cultural study at one or more sister institutions in China. Program includes regularly scheduled language classes taught by UCSD staff members; a cultural program of films, stage performances and lectures; and field trips to villages, urban industrial communities, and places of historical interest. The entire program will be conducted in Chinese. *Prerequisites: Chinese Studies 13 or equivalent and consent of instructor.* (Summer)

160. **Late Imperial and Twentieth-Century Chinese Historical Texts** (5)

This course introduces the primary sources used by historians of Late Imperial and Twentieth-Century Chinese history. Reading material includes diaries, newspaper articles, Qing documents, gazetteers, essays, speeches, popular fiction, journal articles, scholarly prose, and field surveys. May be repeated for credit. (P/NP grades only.) *Prerequisite: advanced knowledge of Chinese language and consent of instructor.*

170. **History of Science in China** (4)

This course is designed to provide a coherent picture of aspects of the development of science in Chinese civilization from ancient times through the eighteenth century. The focus (mathematics, astronomy, medicine, chemistry, etc.) will shift from year to year.

180. **Chinese Cinema** (4)

This course surveys the development of Chinese cinema from the 1920s to the present. Emphasis is placed on the ways in

which filmmakers have represented such major social problems as family conflict, gender relations, and the tension between traditional and modern cultural modes. *Prerequisite: knowledge of Chinese.*

181A. **Introduction to Classical Chinese** (4)

Introduction to the classical language through Confucius, Mencius, and the other Great Books. The emphasis will be on comprehension and reading ability. *Prerequisite: Chinese Studies 23 or equivalent.*

181B. **Introduction to Classical Chinese** (4)

Continuation of Chinese Studies 181A. *Prerequisite: Chinese Studies 181A or equivalent.*

181C. **Introduction to Classical Chinese** (4)

This course is a continuation of 181A and B. Short passages from major historical, literary, and philosophical works are introduced. *Prerequisite: Chinese Studies 181B or equivalent.*

182A. **Intermediate Classical Chinese** (4)

This course is a continuation of Introduction to Classical Chinese (181A-B-C). Selections from major works written in classical Chinese, such as Laozi, Shijing, etc., will be read. The course emphasizes the structures, function words, the analysis of each sentence, and the comprehension of texts. *Prerequisite: Chinese Studies 181A-B-C or equivalent.*

182B. **Intermediate Classical Chinese** (4)

This course is a continuation of 182A. Selections from Zhuangzi, Shiji, etc., will be taught. The course emphasizes the structures, function words, the analysis of each sentence, and the comprehension of texts. *Prerequisite: Chinese Studies 182A or equivalent.*

182C. **Intermediate Classical Chinese** (4)

This course is a continuation of 182B. Selections from I Ching, Hanshu, etc., will be introduced. The course emphasizes the structures, function words, the analysis of each sentence, and the comprehension of texts. *Prerequisite: Chinese Studies 182B or equivalent.*

183. **Readings in Classical Chinese** (4)

Introduction to major works written in classical Chinese, including poetry and historical documents. *Prerequisite: Chinese Studies 181B or equivalent.*

185. **Syntactic Structures of Chinese** (4)

This course introduces the phrase structures and basic word order of Chinese. It compares the most common syntactic structures of modern Chinese and English. *Prerequisite: three years of Chinese or equivalent.*

186A-B-C. **Readings in Chinese Economics, Politics, and Trade** (4-4-4)

Introduction to the specialized vocabulary relating to Chinese politics, trade, and development. Designed for students in the social sciences or with career interests in international trade, the course will stress reading and translating documents, and the special forms of business correspondence and oral negotiation. *Prerequisite: one year of Chinese.*

196. **Directed Thesis Research** (4)

B.A. honors thesis under the direction of a faculty member in Chinese studies. This course requires two quarters to complete. An IP grade will be awarded at the end of the first quarter. *Prerequisite: consent of instructor.* (F,W,S)

198. **Directed Group Study in Chinese Studies** (2 or 4)

Study of specific aspects in Chinese civilization not covered in regular course work, under the direction of faculty members in Chinese studies. (P/NP grades only.) *Prerequisite: consent of instructor.* (F,W,S)

199. **Independent Study in Chinese Studies** (2 or 4)

The student will undertake a program of research or advanced reading in selected areas in Chinese studies under the supervision of a faculty member of the Program in Chinese Studies. (P/NP grades only.) *Prerequisite: consent of instructor.* (F,W,S)

269. **Conversational Mandarin for Medical Students—Beginning** (2)

This introductory course is designed to develop a working knowledge of medical Mandarin that will enable the student to communicate with Mandarin-speaking patients. There will be instruction in basic medical vocabulary and grammar, with a focus on taking a medical history. No previous knowledge of Mandarin is required since this is only a conversation course. For graduate and School of Medicine students. S/U only.

296. **Directed Thesis Research** (2-12)

Graduate thesis research under the guidance of a faculty member affiliated with the Program in Chinese Studies.

299. **Independent Study in Chinese Studies** (2-12)

Independent graduate research under the guidance of a faculty member affiliated with the Program in Chinese Studies.

500. **Apprentice Teaching** (1-4)

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty; handling of discussions, preparation and grading of exams and other written exercises, and student relations.

### DEPARTMENT-SPONSORED COURSES

For description of courses listed below, see appropriate departmental listing. All graduate-level courses require consent of the instructor for undergraduate students.

### LOWER-DIVISION

History HILD 10. **East Asia: The Great Tradition** (staff)

History HILD 11. **East Asia and the West** (staff)

History HILD 12. **Twentieth-Century East Asia** (staff)

### UPPER-DIVISION

#### I. CHINESE SOCIETY

ANRG 170: **Traditional Chinese Society** (Jordan)

ANRG 172: **Culture and Personality in China** (Jordan)

ANRG 173: **Chinese Popular Religion** (Jordan)

History HITO 102: **Asian Religions** (Staff)

History HIEA 137: **Women and Family in Chinese History** (Ko)

#### II. CONTEMPORARY CHINA

History HIEA 132: **History of the People's Republic of China** (Pickowicz)

IR/PS IP/Gen 400: **International Relations of the Pacific** (Johnson)

IR/PS IP/Gen 404: **Chinese Politics**

IR/PS IP/Gen 465: **Economy of China** (Naughton)

IR/PS IP/Gen 466: Chinese Foreign Policy

IR/PS IP/Gen 486: Economic and Social Development of China (Naughton)

Political Science 130B: Politics in the People's Republic of China (Shirk)

Political Science 232: The Chinese Political System

Sociology 188B: Chinese Society (Madsen)

### III. LANGUAGE AND LITERATURE

Linguistics 141: Language Structures (M. Chen)

Literature/LTCH 101: Readings in Contemporary Chinese Literature (Tay)

Literature/LTEA 100A: Classical Chinese Poetry (Yip)

Literature/LTEA 100B: Modern Chinese Poetry (Yip)

Literature/LTEA 100C: Contemporary Chinese Poetry (Yip)

Literature/LTEA 110A: Classical Chinese Fiction (Tay/Yip)

Literature/LTEA 110B: Modern Chinese Fiction (Tay/Yip)

Literature/LTEA 110C: Contemporary Chinese Fiction (Tay/Yip)

Literature/LTEA 120A: Chinese Films (Tay)

Literature/LTEA 120B: Taiwan Films (Tay)

Literature/LTEA 120C: Hong Kong Films (Tay)

Literature/LTEA 120D: Filming Chinese Literature (Tay)

Literature/LTCO 274: Genre Studies—Intercultural Poetics (Yip)

### IV. CHINESE HISTORY

History HIEA 120: The History of Chinese Culture and Society: The Ancient Imperial Period (Hanson)

History HIEA 121: The History of Chinese Culture and Society: The Middle Imperial Period (Hanson)

History HIEA 122: The History of Chinese Culture and Society: The Late Imperial Period (Hanson)

History HIEA 137: Women and Family in Chinese History (Hanson)

History HIEA 130: History of the Modern Chinese Revolution: 1800–1911 (Esherrick)

History HIEA 131 (IP/GEN 408): History of the Modern Chinese Revolution: 1911–1949 (Pickowicz)

History HIEA 132: History of the People's Republic of China (Pickowicz)

History HIEA 163: Cinema and Society in Twentieth-Century China (Pickowicz)

History HIEA 164: Seminar in Late Imperial Chinese History (Ko)

History HIEA 165: The Chinese Village in Transition: 1930–1956 (Pickowicz)

History HIEA 167: Special Topics on Modern Chinese History (Esherrick)

History HIEA 168: Chinese Thought from Chou through Sung (Staff)

History HIEA 169: Literature and Society in Republican China (Pickowicz)

## Classical Studies

OFFICE: 3024 Humanities and Social Sciences Building, Muir College (CAESAR office)  
Web site: <http://orpheus.ucsd.edu/history/ClassicalStud.html>

### Professors

Georgios H. Anagnostopoulos, Ph.D., *Philosophy*  
Page Ann duBois, Ph.D., *Classical and*

*Comparative Literature*

William Fitzgerald, Ph.D., *Classical and*  
*Comparative Literature*

Richard E. Friedman, Ph.D., *Hebrew and*  
*Comparative Literature*

Edward N. Lee, Ph.D., *Philosophy, Emeritus*

Marianne McDonald, Ph.D., *Theatre*

Alden A. Mosshammer, Ph.D., *History*

Sheldon A. Nodelman, Ph.D., *Visual Arts*

### Associate Professors

Anthony T. Edwards, Ph.D., *Classical Literature*  
*and Languages*

### Assistant Professor

Gary Shiffman, Ph.D., *Political Science*

### Lecturers

Charles Chamberlain, Ph.D., *Classical*  
*and Comparative Literature*

Leslie Collins Edwards, Ph.D., *Classical*  
*Literature and Languages*

Eliot Wirshbo, Ph.D., *Classical Literature*  
*and Languages*

Classical studies is concerned with the cultures of ancient Greece and Rome—roughly from the time of Homer through the time of St. Augustine—in all of their aspects. This program thus offers undergraduates an opportunity to study the cultures of Greece and Rome through the combined resources of the Departments of History, Literature, Visual Arts, and Philosophy. The study of the ancient Greek and Latin languages themselves serves as the starting point for the broader consideration of specific texts in their literary, intellectual, and historical context. In cooperation with the Judaic Studies Program, moreover, students are provided the opportunity to link the study of ancient Greece to that of the ancient Near East.

### The Major Programs

The Classical Studies Program offers four different degree paths, three within classical studies and one in cooperation with Judaic studies. The majors are Greek, Latin, classics, and Greek and Hebrew. Each consists of a choice of twelve upper-division courses approved for the program and listed below. All courses used to meet requirements for a major in classical studies must be taken for a letter grade and be passed with a grade of C– or better.

### GREEK

LT/GN 19A-B-C are a prerequisite to the Greek major. Six of the twelve upper-division courses must be Lit/Greek courses numbered 100 and above, but exclusive of Lit/Greek 101. The remaining six courses may be in classical civilization (in English translation), selected from the list of approved courses from history, Lit/General, philosophy, political science, and visual arts, though additional Lit/Greek courses numbered 100 and above (including Lit/Greek 101) are acceptable here. These must be from at least two departments and selected in consultation with the adviser; courses dealing with Greek civilization are strongly preferred.

### LATIN

LT/GN 19A-B-C are a prerequisite to the Latin major. Six of the twelve upper-division courses must be Lit/Latin courses numbered 100 and above, but exclusive of Lit/Latin 101 and 102. The remaining six courses may be in classical civilization (in English translation), selected from the list of approved courses from history, Lit/General, philosophy, political science, and visual arts, though additional Lit/Latin courses numbered 100 and above (including Lit/Latin 101 and 102) are acceptable here. These must be from at least two departments and selected in consultation with the adviser; courses dealing with Roman civilization are strongly preferred.

### CLASSICS

LT/GN 19A-B-C are a prerequisite to the classics major. Nine of the twelve upper-division courses must be distributed between Lit/Latin and Lit/Greek courses numbered 100 and above (but exclusive of Lit/Latin 101 and 102

and Lit/Greek 101), six in one literature and three in the other according to the student's emphasis. The remaining three courses may be in classical civilization (in English translation), selected from the list of approved courses from history, Lit/General, philosophy, political science, and visual arts, though additional Lit/Latin or Lit/Greek courses numbered 100 and above (including Lit/Latin 101 and 102 and Lit/Greek 101) are acceptable here. These must be from at least two departments and selected in consultation with the adviser to reflect the relative emphasis upon the Greek and Latin literatures, but with at least one focusing upon each culture.

### GREEK AND HEBREW

Three courses from LT/GN 19A-B-C and Cultural Traditions, Judaic 1A-B, to be selected in consultation with the adviser, are a prerequisite to the Greek and Hebrew major. Nine of the twelve upper-division courses must be distributed between Lit/Greek courses numbered 100 and above (but exclusive of Lit/Greek 101) and Judaic Studies 101-102-103 or Lit/Hebrew courses numbered 148 and above, six in one literature and three in the other according to the student's emphasis. The remaining three courses may be in ancient Greek and Judaic civilization (in English translation), selected from the list of courses approved for classical studies and from the list of courses approved for Judaic studies, though additional Lit/Greek courses numbered 100 and above (including Lit/Greek 101) or Judaic Studies 101-102-103 or Lit/Hebrew courses numbered 148 and above are acceptable here. These must be from at least two departments and selected in consultation with the adviser (who is selected in accordance with the student's emphasis) to reflect the relative emphasis upon the Greek and Hebrew literatures, but with at least one course from each program.

Students who began work before fall 1991 on a major in classical studies, whether at UCSD or elsewhere, as described in a pre-1991 UCSD *General Catalog*, may be eligible to complete the major as described there.

### The Minor Programs

#### CLASSICAL STUDIES:

A minor in classical studies consists of seven courses from those listed below, of which at least four must be upper-division. A knowledge of the ancient languages is not required. The minor will normally include LT/GN 19A-B-C: the Greco-Roman World, and four other courses from the participating departments.

#### Greek:

See Literature: "The Minor in Literature"

#### Latin:

See Literature: "The Minor in Literature"

### Warren College

A Warren College program of concentration in classical studies normally consists of LT/GN 19A-B-C and three of the upper-division courses listed below.

Graduate courses may be taken by undergraduates with consent of the instructor. The faculty of the program welcomes qualified undergraduates in graduate courses.

Additional courses counting toward a major in classical studies are offered on a year-to-year basis, both at the undergraduate and graduate levels. As these often cannot be listed in advance, interested students should consult the program faculty for an up-to-date list.

### Honors In Greek, Latin, and Classics

Honors is intended for the most talented and motivated students majoring in Greek, Latin, classics, or Greek and Hebrew. Requirements for admission to the honors program are:

1. Junior standing
2. An overall GPA of 3.5
3. A GPA in the major of 3.7

Qualified students majoring in Greek, Latin, or classics may apply at the end of their junior year to the program faculty on the basis of 1) a thesis proposal (three to four pages) worked out in advance with a classical studies faculty member and 2) a recommendation from that faculty member. It is strongly advised that the

proposal be based upon a class paper or project from a course taken towards completion of the major.

The core of the honors program is an honors thesis. The research and writing of the thesis will be conducted over the winter or fall and winter terms of the senior year. Up to four hours of 196 credit to this end may be counted towards the major in place of one of the courses in English translation. Thesis completed by the end of the winter quarter of the senior year will be read and evaluated by the thesis adviser and another member of the program faculty. If the thesis is accepted and the student maintains a 3.7 GPA, departmental honors will be awarded. The level of honors—distinction, high distinction, or highest distinction—will be determined by the program faculty.

Students choosing a major in Greek and Hebrew may complete an honors major as follows: those with an emphasis on Greek must meet the requirements for honors in the Classical Studies Program and work with a thesis adviser from classical studies, but select a second adviser for the thesis from Judaic studies. Those with an emphasis on Hebrew must meet the requirements for honors in the Judaic Studies Program and work with a thesis adviser from Judaic studies, but select a second adviser for the thesis from classical studies.

## COURSES

### UNDERGRADUATE

#### Classical Studies 51. Bio-Scientific Vocabulary (Greek-Latin Roots) (4)

Intensive exposure (100 words per week) to Greek and Latin roots, prefixes, and suffixes which form the basis of bio-scientific terminology. Extensive practice in word building and analysis. No knowledge of Greek or Latin required.

#### Classical Studies 107. Myth, Religion, and Philosophy in Late Antiquity (4)

#### Classical Studies 111. Topics in Ancient Greek Drama (4)

Close reading and discussion of selected works of ancient Greek drama in translation. (Course may be repeated for credit when topic varies.) *Prerequisite: sophomore standing.*

#### Cultural Traditions. Judaic 1A-B (4-4)

#### Humanities 1. The Foundations of Western Civilization: Israel and Greece (6)

*Prerequisite: satisfaction of the Subject A requirement. (W)*

**Humanities 2. Rome, Christianity, and the Medieval World(6)**  
Prerequisite: satisfaction of the Subject A requirement. (S)

**Humanities 3. Renaissance, Reformation, and Early Modern Europe (4)**  
Prerequisite: satisfaction of the Subject A requirement. (F)

**HIEU 100. Early Greece (4)**

**HIEU 101. Greece in the Classical Age (4)**

**HIEU 102. The Roman Republic (4)**

**HIEU 103. The Roman Empire (4)**

**HIEU 105. The Early Christian Church (4)**

**HIEU 106. Late Antiquity (4)**

**HIEU 160. Alexander the Great and the Hellenistic World (4)**

**HIEU 161. The Decline of Rome (4)**

**HIEU 162. Special Topics in the History of Early Christianity (4)**

**HIEU 199. Independent Study in Greek and Roman History (4)**

**Lit/Gk 1-2-3. Beginning and Intermediate Greek (4-4-4)**

**Lit/Gk 101. Advanced Greek Grammar and Prose Composition (4)**

**Lit/Gk 110. Archaic Period (4)**  
Previously Lit/Gk 112.

**Lit/Gk 112. Homer (4)**

**Lit/Gk 113. Classical Period (4)**  
Previously Lit/Gk 114.

**Lit/Gk 118. Hellenistic Period (4)**  
Previously Lit/Gk 116.

**Lit/Gk 120. New Testament Greek (4)**  
Previously Lit/Gk 119.

**Lit/Gk 130. Tragedy (4)**  
Previously Lit/Gk 104.

**Lit/Gk 131. Comedy (4)**  
Previously Lit/Gk 106.

**Lit/Gk 132. History (4)**  
Previously Lit/Gk 108.

**Lit/Gk 133. Prose (4)**  
Previously Lit/Gk 110.

**Lit/Gk 134. Epic Poetry (4)**  
Previously Lit/Gk 121.

**Lit/Gk 135. Lyric Poetry (4)**  
Previously Lit/Gk 123.

**Lit/Gk 199. Special Studies (2 or 4)**

**Lit/La 1-2-3. Beginning and Intermediate Latin (4-4-4)**

**Lit/La 100. Introduction to Latin Literature (4)**

**Lit/La 101. Advanced Grammar and Composition (4)**

**Lit/La 102. Prose Composition (4)**

**Lit/La 111. Pre-Augustan (4)**  
Previously Lit/La 116.

**Lit/La 113. Augustan (4)**  
Previously Lit/La 118.

**Lit/La 114. Vergil (4)**

**Lit/La 116. Silver Latin (4)**  
Previously Lit/La 120.

**Lit/La 120. Late Latin (4)**  
Previously Lit/La 122.

**Lit/La 124. Medieval Latin (4)**

**Lit/La 126. Renaissance Latin (4)**  
Previously Lit/La 129.

**Lit/La 130. The Novel (4)**  
Previously Lit/La 106.

**Lit/La 131. Prose (4)**  
Previously Lit/La 108.

**Lit/La 132. Lyric and Elegiac Poetry (4)**  
Previously Lit/La 110.

**Lit/La 133. Epic (4)**  
Previously Lit/La 112.

**Lit/La 134. History (4)**  
Previously Lit/La 114.

**Lit/La 199. Special Studies (2 or 4)**

**Lit/Gen 100. The Classical Tradition (4)**  
Previously Lit/Gen 120. (May be repeated for credit as topics vary.)

**Lit/Gen 181. Mythology (4)**  
Previously Lit/Gen 119.

**Philosophy 101. Plato (4)**

**Philosophy 102. Aristotle (4)**

**Philosophy 108. Mythology and Philosophy (4)**

**Philosophy 199. Independent Study (4)**

**Pol. Sci. 110A. Systems of Political Thought (Greece and Rome) (4)**

**Theatre 159. Ancient Greek Drama in Modern Versions (4)**

**Visual Arts 11. Western Art I: Prehistoric to Medieval (4)**

**Visual Arts 120A. Greek Art (4)**

**Visual Arts 120B. Roman Art (4)**

**Visual Arts 120C. Late Antique Art (4)**

## Graduate

An intercampus Ph.D. program is being planned in collaboration with UC Irvine and UC Riverside. For more information contact Professor Walter Donlan, Department of Classics, 141 C Humanities Hall, UC Irvine, Irvine, California 92717.

**HIGR 201. The Literature of Ancient History (4)**

**HIGR 298. Directed Readings in Greek and Roman History (1-12)**

**Lit/Co 202A. History of Criticism and Aesthetics (4)**

**Lit/Co 210. Classical Studies (4)**  
Prerequisite: working knowledge of either Greek or Latin.

**Lit/Gk 297. Directed Studies (1-12)**

**Lit/Gk 298. Special Projects (4)**

**Lit/La 297. Directed Studies (1-12)**

**Lit/La 298. Special Projects (4)**

**Philosophy 201. Greek Philosophy (4)**

**Philosophy 202. Hellenistic and Roman Philosophy (4)**

**Philosophy 290. Directed Independent Study (1-4)**

## Clinical Psychology

OFFICE: 216 UCSD Psychiatric Outpatient Clinic  
(619) 497-6659

### Professors

Sonia Ancoli-Israel, Ph.D., *In-Residence/*  
*Psychiatry*

Mark I. Appelbaum, Ph.D., *Psychology*  
J. Hampton Atkinson, Jr., M.D., *Adjunct/*  
*Psychiatry*

Elizabeth A. Bates, Ph.D., *Cognitive Science/*  
*Psychology*

Ursula Bellugi, Ed.D., *Adjunct/Psychology*  
Gary R. Birchler, Ph.D., *Clinical/Psychiatry*

David L. Braff, M.D., *Psychiatry*

Karen Britton, M.D., Ph.D., *In-Residence/*  
*Psychiatry*

Sandra Brown, Ph.D., *Psychology*

Eric Courchesne, Ph.D., *Neurosciences*

Dean C. Delis, Ph.D., *In-Residence/Psychiatry*

Joel E. Dimsdale, M.D., *In-Residence/Psychiatry*

Mark A. Geyer, Ph.D., *In-Residence/Psychiatry*

J. Christian Gillin, M.D., *Psychiatry*

Igor Grant, M.D., *Psychiatry*

Philip M. Groves, Ph.D., *Psychiatry*

Robert K. Heaton, Ph.D., *Psychiatry, Program*  
*Director*

Michael R. Irwin, M.D., *In-Residence/Psychiatry*

Terry L. Jernigan, Ph.D., *In-Residence/Psychiatry*

Dilip V. Jeste, M.D., *In-Residence/Psychiatry*

Lewis L. Judd, M.D., *Psychiatry, Chair*

Robert M. Kaplan, Ph.D., *Family and Preventive*  
*Medicine, Acting Chair*

Daniel F. Kripke, M.D., *In-Residence/Psychiatry*

James A. Kulik, Ph.D., *Psychology*

Marta Kutus, Ph.D., *Cognitive Science*

Saul Levine, M.D., *In-Residence/Psychiatry*

James B. Lohr, M.D., *In-Residence/Psychiatry*

Barbara L. Parry, Ph.D., *In-Residence, Psychiatry*

Thomas L. Patterson, Ph.D., *Adjunct/Psychiatry*

Laura Schreibman, Ph.D., *Psychology*  
Marc A. Schuckit, M.D., *Psychiatry*  
David S. Segal, Ph.D., *Psychiatry*  
Stephen R. Shuchter, M.D., *Psychiatry*  
Larry R. Squire, Ph.D., *In-Residence/Psychiatry*  
Stephen M. Stahl, M.D., Ph.D., *Adjunct/  
Psychiatry*  
Joan Stiles, Ph.D., *Psychology*  
Doris A. Trauner, M.D., *Neurosciences/  
Pediatrics*  
James Varni, Ph.D., *In-Residence/Psychiatry*  
Sidney Zisook, M.D., *Psychiatry*

### Associate Professors

Gregory G. Brown, *In-Residence/Psychiatry*  
Michael P. Caligiuri, Ph.D., *Adjunct/Psychiatry*  
Brett Clementz, Ph.D., *Psychology*  
Denis Darko, M.D., *Adjunct/Psychiatry*  
Renee Dupont, M.D., *Clinical/Psychiatry*  
Patricia A. Judd, Ph.D., *Clinical/Psychiatry*  
John R. Kelsoe, Jr., M.D., *Psychiatry*  
Mark H. Rapaport, M.D., *In-Residence/  
Psychiatry*  
David P. Salmon, Ph.D., *In-Residence/Psychiatry*  
Murray B. Stein, M.D., *In-Residence, Psychiatry*  
Neal R. Swerdlow, M.D., Ph.D., *Psychiatry*

### Assistant Professors

Mark W. Bondi, Ph.D., *Adjunct/Psychiatry*  
David Feifel, M.D., *In-Residence/Psychiatry*  
Ann Garland, Ph.D., *Adjunct/Psychiatry*  
Eric Granholm, Ph.D., *In-Residence/Psychiatry*  
John R. McQuaid, Ph.D., *Adjunct/Psychiatry*  
Paul J. Mills, Ph.D., *Adjunct/Psychiatry*  
Mark G. Myers, Ph.D., *Adjunct/Psychiatry*  
Sharon Nichols, Ph.D., *Adjunct/Neurosciences*  
William Perry, Ph.D., *Adjunct/Psychiatry*  
Sheri D. Pruitt, Ph.D., *Adjunct/Psychiatry*  
Tamara L. Wall, Ph.D., *In-Residence/Psychiatry*

### Research Scientist

Arne L. Ostergaard, Ph.D., *Associate Research  
Scientist/Psychiatry*

### Project Scientist

William J. Sieber, Ph.D., *Assistant Project  
Scientist/Family and Preventive Medicine*

### The Joint Doctoral Program

The interdisciplinary partnership of the Department of Psychiatry at UCSD School of Medicine and the Department of Psychology at

San Diego State University greatly extends the range of perspectives and furnishes unusual opportunities for graduate study leading to the Ph.D. degree in clinical psychology. The Joint Doctoral Group in Clinical Psychology currently consists of faculty from the UCSD Department of Psychiatry, School of Medicine, and the Departments of Neurosciences, Cognitive Science, Community and Family Medicine, Psychology, and SDSU Department of Psychology and School of Public Health.

Information regarding admission is found in the current edition of the *Bulletin of the Graduate Division* of San Diego State University.

The program goal is to train clinical psychologists who are accomplished both as clinicians and as research scientists. The curricula and training provide a strong foundation in clinical psychological concepts, methods, theories and data, together with intensive concentrations in specialized areas of clinical psychology. Currently our program has three areas of specialization: behavioral medicine, neuropsychology, and experimental psychopathology.

The scientist-practitioner model on which this program is based requires that students receive ongoing supervised research experience, including planning, design, implementation, analysis, and communication of findings. Equally important is extensive supervised experience aimed at developing sound general and specialized clinical skills. Students are expected to be actively involved in all these activities throughout their tenure in the program.

The program is designed as a five-year curriculum, including a one-year clinical internship. The curriculum is based on a twelve-month academic year. The program is accredited by the American Psychological Association.

Specific courses currently required as part of the core at UCSD include: Clinical Psychology 224; Clinical Psychology 294; Clinical Psychology 295; Clinical Psychology 296 (independent study, lab practicum); Clinical Psychology 299 (independent study project); School of Medicine 202E (Psychopathology).

### Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of five years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

## COURSES

### Clinical Psychology 205. Neuroanatomy (6)

Fundamental anatomy/physiology of human nervous system, emphasizing higher cortical functions. Methods of clinical problem solving in neurology; background in basic neuropsychological skills.

### Clinical Psychology 224. Introduction to Neuropsychology (1)

Introduction to study of brain-behavior relationships and to clinical neuropsychological assessment.

### Clinical Psychology 294. Pro-Seminar in Neuropsychology (3)

Provides a fundamental knowledge of brain-behavior relationships as well as strategies and methods of neuropsychological assessment and rehabilitation.

### Clinical Psychology 295. Introduction to Research of UCSD/SDSU Faculty (4)

How to evaluate a psychological experiment; using a research evaluation guide, students will evaluate two faculty papers per week. They will also develop and present their own proposed research projects. (S/U grades only.) *Prerequisite: graduate student status in joint clinical psychology doctoral program or consent of instructor.*

### School of Medicine 202E. Social and Behavioral Sciences-Psychopathology (3)

This sequence will acquaint students with techniques of interviewing, concepts of mental illness and normality, basic research in causality of behavioral disorders, and approaches to treatment, all in the context of a bio-psycho-social frame of reference. Format combines a lecture followed by smaller group sessions with a faculty leader. The groups enable students to meet patients with behavioral disorders, to practice interviewing, to develop observational skills, and to discuss material presented in lectures and assigned readings. (S/U grades only.) *Prerequisite: SOM 202A, C, D or consent of instructor.*

### Clinical Psychology 296. Independent Study (1-12)

Independent survey of basic concepts in clinical psychology using various sources of material, including scientific papers in clinical psychology and behavioral science and other sources as seem indicated.

### Clinical Psychology 299. Graduate Research (1-12)

Individual study course under one or more of the joint doctoral program faculty to develop certain research questions, design a methodology to answer the questions, and then carry out actual research, data reduction, and analysis.

## Cognitive Science

OFFICE: 139 Cognitive Science Building

### Professors

Richard C. Atkinson, Ph.D., *UC President*  
Elizabeth Bates, Ph.D.  
Aaron V. Cicourel, Ph.D., *Emeritus*  
Jeffrey L. Elman, Ph.D., *Chair*  
Gilles Fauconnier, Ph.D.

James D. Hollan, Ph.D.  
 Edwin L. Hutchins, Ph.D.  
 Marta Kutas, Ph.D.  
 Jean M. Mandler, Ph.D.  
 Donald A. Norman, Ph.D., *Emeritus*  
 Joan Stiles, Ph.D.  
 David Zipser, Ph.D.

### Associate Professor

David Kirsh, D.Phil.  
 Jaime A. Pineda, Ph.D.  
 Martin I. Sereno, Ph.D.

### Assistant Professors

John D. Batali, Ph.D.  
 Andrea A. Chiba, Ph.D.  
 Javier R. Movellan, Ph.D.

### Adjunct Professors

David E. Rumelhart, Ph.D.  
 Terrence J. Sejnowski, Ph.D., *Biology and Physics*

### Introduction

The Department of Cognitive Science emphasizes three main areas of study: the *brain*—the understanding of neurobiological processes and phenomena; *behavior*—the experimental methods and findings from the study of psychology, language, and the sociocultural environment; and *computation*—the powers and limits of various representational formats, coupled with studies of computational mechanisms. This approach involves a multidisciplinary study of cognition with emphasis on computer science, linguistics, neuroscience, psychology, and related aspects of anthropology, biology, mathematics, philosophy, and sociology.

The study of cognition takes place within the controlled situations of the laboratory and the natural situations of the everyday world, as well as through extensive modeling and simulation studies of these situations. The unit under study ranges from the individual neuron, to neural systems, to the individual person, to social groups in which language, social organization, and culture play important roles. Each level of study can be informed through knowledge of, and the constraints imposed from, adjacent levels of study. The department also is strong in applied research in university, home, and workplace settings.

The underlying philosophy of the department poses special challenges to its faculty and students to be knowledgeable in and sympathetic to a wide variety of fields and techniques. For example, required topics for both undergraduates and graduates include courses in behavior, computation, and the neurobiological basis of cognition.

We have a commitment to student involvement, and students participate in the department by sharing their ideas and suggestions with faculty and staff. Meetings are held at least once a year for students and faculty to discuss the curriculum and other topics. A newsletter is sent to all faculty, students, staff, and visitors associated with cognitive science at UCSD. Undergraduate students may join the Students in Cognitive and Neurosciences (SCANS) organization, which provides opportunities for undergraduates to meet each other as well as faculty from UCSD and other campuses, to visit research laboratories, and to make job contacts. Graduate students select their own representatives for faculty meetings, graduate admissions, departmental TA training and development programs, and the campus-wide Graduate Student Association.

### The Undergraduate Programs

The department offers both a B.A. and a B.S. degree. The B.S. requires completion of more rigorous lower-division course work and three additional courses at the upper-division level. The B.S. degree may be taken optionally with a specified area of specialization. There is also an honors program for exceptional students in both degree programs.

### Grade Requirements for the Major

A minimum grade-point average of 2.0 is required for the B.A. or B.S. degree. Students must receive a grade of C- or better in any course to be counted toward fulfillment of the major requirements. All courses must be taken for a letter grade, with the exception of Cognitive Science 195, 198, and 199, which are taken Pass/No Pass.

### Four-Year Plan of Study

The four-year plan of study below assures that all prerequisites and requirements for the

cognitive science major are completed. The department does enforce course prerequisites and several courses are offered only once a year, so careful planning is important. It is recommended that lower-division courses be taken in the first two years, core courses in the third year, and electives in the final year. Check with a departmental adviser about which quarter cognitive science courses will be offered each academic year. Check with a college adviser about course planning to meet college requirements.

**Freshman** Mathematics 10A-B-C or  
**Year:** Mathematics 20A-B-C or  
 Mathematics 20A-B, 21C,  
 and 20F  
 College requirements

**Sophomore** Cognitive Science 14, 17,  
**Year:** and 18  
 College requirements

**Junior Year:** Cognitive Science 101A-B-C  
 Cognitive Science 107A-B-C  
 Cognitive Science 108A-B-C

**Senior Year:** Electives for the major

### Lower-Division Requirements

All majors must complete lower-division courses in neurobiology, calculus, methods, and computer programming:

#### B.A. Requirements

Mathematics 10A-B-C or 20A-B-C  
 Cognitive Science 14  
 Cognitive Science 17  
 Cognitive Science 18

#### B.S. Requirements

Mathematics 20A-B, 21C, and 20F  
 Cognitive Science 14  
 Cognitive Science 17  
 Cognitive Science 18

### Upper-Division Requirements

The B.A. requires completion of twelve upper-division courses, and the B.S. requires fifteen. All majors must complete three core sequences. Students are advised to complete these core sequences in their junior year, especially if they intend to apply to the honors program. The remainder of the upper-division requirement is fulfilled by completing electives.

### Core Sequences

The B.A. and the B.S. programs require nine core courses:

Cognitive Science 101A-B-C  
(Cognitive Theory and Phenomena)

Cognitive Science 107A-B-C  
(Cognitive Neuroscience)

Cognitive Science 108A-B-C  
(Computational Models of Cognition)

### Electives

At least half of the electives for the major must be taken in the department. One Cognitive Science 195 and one 198 or 199 course may be used. A course taken outside the department must meet the following criteria:

1. The course must deal with topics and issues that are clearly part of cognitive science.
2. The material must not be available in a course offered inside the department.

This policy permits students and their advisers to be responsive to changes in course offerings. Majors must obtain departmental approval for electives taken outside of the department.

### Areas of Specialization

A major may elect to receive a B.S. in cognitive science with a specified area of specialization. The areas of specialization are intended to provide majors with guidance in choosing elective courses and to make the specific interests and training of a major clear to prospective employers and graduate schools. Specifying an area of specialization is optional.

To major in cognitive science with an area of specialization, the student must fulfill the requirements for the B.S. degree and must choose four of the required six elective courses from a list of approved electives for that area of specialization. (The lists of approved electives for each area of specialization are available from the department office.)

The following areas of specialization are currently offered by the department:

#### Specialization in Clinical Aspects of Cognition

This area of specialization is intended for majors interested in cognitive neuropsychology, psychiatry, cognitive disorders, and the effects

of drugs and brain-damage on cognitive functions. Allowed electives include courses in those topics, as well as organic chemistry, biochemistry, and physiology.

#### Specialization in Computation

This area of specialization is intended for majors interested in software engineering or research in computational modeling of cognition. Allowed electives include advanced courses in neural networks, artificial intelligence, and computer science.

#### Specialization in Human Cognition

This area of specialization is intended for majors whose primary interests include human psychology and applications of cognitive science in design and engineering. Allowed electives include courses in cognitive development, language, laboratory research of cognition, anthropology, and sociology.

#### Specialization in Neuroscience

This area of specialization is intended for majors interested in neuroscience research or medicine. Allowed electives include courses in cognitive neuroscience, organic chemistry, biochemistry, and physiology.

### Honors Program

Majors apply for admission to the honors program during the beginning of their graduating year, although serious thought should be given to the thesis project in the penultimate year. Applicants to the honors program must have a minimum grade-point average of 3.5 in the major and an approved thesis project sponsored by a faculty member within the department. To graduate with departmental honors, students must maintain a minimum grade-point average of 3.5 in the major through graduation, complete an honors thesis (190A-B and possibly C) in the senior year with a grade of A, present the thesis in writing and orally, and complete one approved cognitive science graduate course.

### Minors and Programs of Concentration

Each college has specific requirements, and students should consult with an academic adviser in their provost's office as well as a cognitive science adviser to be sure they fulfill

requirements of the college and of the department. The lower-division requirements are normally fulfilled by completing Cognitive Science 10, 11, and 14, 17, or 18. Upper-division requirements are normally fulfilled by completing one of the following sequences:

Cognitive Science 101A-B-C

Cognitive Science 107A-B-C

Cognitive Science 108A-B-C

Cognitive Science 130-131 and 132 or 141

All courses must be taken for a letter grade.

#### Requirements Effective January, 1998.

Each college has specific requirements, and students should consult with an academic adviser in their provost's office as well as a cognitive science adviser to be sure they fulfill requirements of the college and of the department.

To receive a minor from the Department of Cognitive Science, a student must complete a total of seven (four unit) courses; five of which must be upper-division. Lower-division requirements are fulfilled by completing Cognitive Science 3, 10 or 11 and 14, 17 or 18. Upper-division requirements are fulfilled by completing two cognitive science electives and one of the following sequences:

Cognitive Science 101A-B-C

Cognitive Science 107A-B-C

Cognitive Science 108A-B-C

Cognitive Science 130-131 and 132 or 141

All courses must be taken for a letter grade.

### Transfer Credit

Students who wish to transfer from another institution to UCSD as cognitive science majors should work closely with university advisers to ensure that all lower-division requirements have been completed and are equivalent to those offered at UCSD. It is extremely important for students to have completed lower-division requirements by the end of their sophomore year so they are prepared for core courses in their junior year. Advanced UCSD students who wish to transfer to the department should consult with the departmental advisers about credit for courses already completed.



## Education Abroad

Students majoring in cognitive science are encouraged to participate in the Education Abroad Programs (EAP), and to investigate other options of foreign study through the Opportunities Abroad Program (OAP). By petition, credits earned through EAP/OAP can fulfill UCSD degree and major requirements.

## The Graduate Programs

There are two Ph.D. programs, each with different admissions and graduation requirements. The *Department of Cognitive Science* offers a Ph.D. in cognitive science. Students are admitted to UCSD directly into the department and fulfill degree requirements of the department. The *Interdisciplinary Program in Cognitive Science* offers a joint Ph.D. in cognitive science and a home department (anthropology, communication, computer science and engineering, linguistics, neurosciences, philosophy, psychology, or sociology). Students are admitted to UCSD through the home department and fulfill the requirements of both the interdisciplinary program and the home department.

## Ph.D. in Cognitive Science

This program provides broad training in neurological processes and phenomena; the experimental methods, results, and theories from the study of psychology, language, and social and cultural issues; and the studies of computational mechanisms. The first year is devoted to familiarizing the student with the findings and current problems in cognitive science through courses in foundations and issues. In the second year, basic courses and laboratory rotations are completed, with the major emphasis on the completion of a year-long research project. Future years are spent completing the advancement to candidacy requirements and doing the thesis research. Throughout the program, there are frequent faculty-student interactions, including special lectures by the faculty or invited speakers and the weekly informal research discussions and cognitive science seminar.

## Admissions

The application deadline is January 15. The admissions committee reviews each applicant's

statement of purpose, letters of recommendation, GRE scores, previous education and work experience, and grade-point averages, then recommends candidates for admission to the entire faculty, who make the final decision.

## Advising

An interim adviser is appointed to serve as general adviser and counselor for each entering student. The adviser helps chart a set of courses that fulfill the content area requirements, taking into account the student's prior training and interests. Students may change the interim adviser at any time (as long as the new interim adviser is willing). At the time of advancement to candidacy, students choose a permanent adviser who also functions as the chair of the dissertation committee.

All entering students are assumed to have basic prerequisite knowledge, and a list of basic readings will be provided to incoming students. Students who do not have this background can acquire it through self-study in the summer preceding arrival at UCSD or by taking self-paced study courses or relevant undergraduate courses at UCSD.

## Summary of Requirements

1. Foundations courses
2. Approved study plan, which includes issues courses, methods courses, and laboratory rotations
3. Second-year project
4. Language requirement
5. Participation in the cognitive science advanced faculty/student seminar series
6. Advancement to candidacy
7. Teaching
8. Participation in departmental events and committees
9. Ph.D. dissertation and defense

## Description of Requirements

1. **Foundations Courses (Cognitive Science 201A-B-C-D-E-F-G).** Students complete foundations courses in the areas of brain, behavior, and computation by the end of the second year. The department may waive some or all courses for students who already have the required knowledge.

2. **Study Plan.** Students complete a study plan recommended by their adviser. The normal plan includes:
  - a. **Issues Courses.** Issues courses are required, one each in the areas of brain, behavior, and computation. At least half of the issues courses should be taken within the department. Issues courses are completed by the end of the second year. Issues courses taken outside the department require the approval of the adviser in conjunction with the Graduate Committee and, if needed, the BBC Committee.
  - b. **Methods Courses.** Three methods courses are required. In the first year, Psychology 201A (or equivalent knowledge) is required. Students are also encouraged to take a statistics course, such as Psychology 201B. In the second year, Cognitive Science 204A-B-C is taken concurrently with Cognitive Science 203A-B-C.
  - c. **Laboratory Rotations (Cognitive Science 290).** Three rotations in different faculty laboratories are required. Each rotation is for a full quarter, and all rotations should be completed by the end of fall quarter of the second year.

3. **Second-Year Research Project (Cognitive Science 203A-B-C).** In the summer between the first and second year, students work with their adviser and a faculty committee to develop a prospectus for a research project. The year-long project culminates with written and oral presentations to the faculty at the end of spring quarter.
4. **Language Requirement.** The main goal of the language requirement is to give all students firsthand experience with some of the differences in structure and usage of languages and the several issues involved in the learning of second languages. This requirement can be satisfied by demonstrating satisfactory proficiency, by prior study in a language (e.g., two years of high school study), or by satisfactory completion of one quarter of study in a language course approved by the department.
5. **Advancement to Candidacy/Qualifying Paper and Oral Exam.** There are three components to advancement to candidacy:

- a. Competency. This requirement is met by satisfactorily completing items 1-4 above.
  - b. Depth. This requirement is met by satisfactorily completing an integrative paper that focuses on important readings covering at least two of the three areas of brain, behavior, and computation. The final paper is completed by the end of fall quarter of the third year. The oral presentation and defense are completed by the beginning of winter quarter of the third year.
  - c. Dissertation Topic/Advancement Exam. The student prepares a proposal of the dissertation topic that must be approved by the student's doctoral committee. A written proposal is submitted to the committee at least two weeks prior to an oral defense of the proposal. The doctoral committee consists of at least five faculty members: three from the department and two from outside the department; one of the outside members must be tenured.
6. **Teaching (Cognitive Science 500).** All graduate students must serve as a teaching assistant at least one quarter in each of three different academic years. The undergraduate program offers a special challenge to instructor and student alike, and experience with the teaching of that program can provide a valuable part of the education of a cognitive scientist. Teaching assistantships performed in other departments must be approved by formal petition to the graduate committee to count toward the requirement. The department works closely with the Center for Teaching Development to design effective training and development programs for its teaching assistants. At the end of each quarter, instructors prepare written evaluations of all teaching assistants.
7. **Cognitive Science 200 Seminar.** Students must enroll in this seminar for at least three quarters while in residence; frequent participation is encouraged.
8. **Participation in Departmental Events and Committees.** Students participate in departmental special events and committees and serve as student representatives for faculty meetings, the graduate admissions com-

mittee, and the campus-wide Graduate Student Association.

9. **Completion of the Ph.D. Dissertation and Defense.** Candidates prepare a written dissertation demonstrating a substantive contribution to our understanding of cognition. An oral defense follows.

### *Master's Degree*

The Department of Cognitive Science does not offer admissions to a master's program. However, candidates for the Ph.D. may be granted the M.S. degree after fulfilling the first three requirements listed above. This is usually at the end of the second year.

### *Evaluation of Performance and Progress*

A formal evaluation of performance and progress for all students takes place at the end of spring quarter every year, with special attention given to the first and second years of study and at the time of qualification. The first-year evaluation is based in large part on the performance in foundations and issues courses. The second-year evaluation is based on the student's total performance, with heavy weight given to the student's second-year research project. The third-year evaluation focuses on the competency and depth requirements, and the following years on the progress made toward completion of the dissertation.

### *Special Events*

The department intends to enhance student-faculty interaction and current awareness of active research issues by special "events":

- Lectures by invited speakers or faculty members.
- A full day of faculty/student overview and information at the start of each year, with emphasis on ongoing research activity.
- Presentations of second-year research projects to the entire faculty at the end of each year.
- Final defense of the dissertation accompanied by a public lecture and celebration.

### *Time Limits to Ph.D.*

Students must be advanced to candidacy by the end of spring quarter of their fourth year.

Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

### *Financial Aid*

Financial support is available to qualified students in the form of fellowships, loans, and assistantships. Students are encouraged to seek fellowships and research awards from outside the university. Please refer to the Graduate Studies section for more information.

### **The Interdisciplinary Ph.D. Program**

#### **FACULTY**

##### **Professors**

- Norman H. Anderson, Ph.D., *Emeritus, Psychology*  
 Richard C. Atkinson, Ph.D., *Cognitive Science and Psychology*  
 Elizabeth Bates, Ph.D., *Cognitive Science and Psychology*  
 Ursula Bellugi, Ed.D., *Adjunct/Psychology*  
 Patricia S. Churchland, B.Phil., *Philosophy*  
 Paul M. Churchland, Ph.D., *Philosophy*  
 Aaron V. Cicourel, Ph.D., *Emeritus, Cognitive Science and Sociology*  
 Michael Cole, Ph.D., *Communication and Psychology*  
 Francis H. C. Crick, Ph.D., *Adjunct/Biology*  
 Roy G. D'Andrade, Ph.D., *Anthropology*  
 Jeffrey L. Elman, Ph.D., *Cognitive Science*  
 Yrjö Engeström, Ph.D., *Communication*  
 Gilles R. Fauconnier, Ph.D., *Cognitive Science*  
 Philip M. Groves, Ph.D., *Psychiatry*  
 Steven A. Hillyard, Ph.D., *Neurosciences*  
 Edwin L. Hutchins, Ph.D., *Cognitive Science*  
 Patricia W. Kitcher, Ph.D., *Philosophy*  
 Edward S. Klima, Ph.D., *Emeritus, Linguistics*  
 Marta Kutas, Ph.D., *Cognitive Science*  
 Ronald W. Langacker, Ph.D., *Linguistics*  
 George Mandler, Ph.D., *Emeritus, Psychology*  
 Jean M. Mandler, Ph.D., *Cognitive Science*  
 Hugh B. Mehan, Ph.D., *Sociology*  
 Donald A. Norman, Ph.D., *Emeritus, Cognitive Science*  
 Harold E. Pashler, Ph.D., *Psychology*  
 David M. Perlmutter, Ph.D., *Linguistics*  
 Vilayanur S. Ramachandran, Ph.D., *Psychology*  
 Walter J. Savitch, Ph.D., (Program Director)  
*Computer Science and Engineering*

Terrence J. Sejnowski, Ph.D., *Biology*  
 Larry R. Squire, Ph.D., *Psychiatry*  
 Joan Stiles, Ph.D., *Cognitive Science*  
 David A. Swinney, Ph.D., *Psychology*  
 David Zipser, Ph.D., *Cognitive Science*

### Associate Professors

Farrell Ackerman, Ph.D., *Linguistics*  
 Gerald J. Balzano, Ph.D., *Music*  
 Richard K. Belew, Ph.D., *Computer Science and Engineering*  
 Garrison W. Cottrell, Ph.D., *Computer Science and Engineering*  
 David Kirsh, D.Phil., *Cognitive Science*  
 James Moore, Ph.D., *Anthropology*  
 Dennis D. M. O'Leary, Ph.D., *Adjunct/Neurosciences*  
 Carol Padden, Ph.D., *Communication*  
 Jaime A. Pineda, Ph.D., *Cognitive Science*  
 Martin Sereno, Ph.D., *Cognitive Science*  
 Stuart Zola, Ph.D., *Psychiatry*

### Assistant Professors

Philip Agre, Ph.D., *Communication*  
 John Batali, Ph.D., *Cognitive Science*  
 Adrian Cussins, D.Phil., *Philosophy*  
 Charles P. Elkan, Ph.D., *Computer Science and Engineering*  
 Adele E. Goldberg, Ph.D., *Linguistics*  
 Robert E. Kluender, Ph.D., *Linguistics*  
 Paul Kube, Ph.D., *Computer Science and Engineering*  
 John Moore, Ph.D., *Linguistics*  
 Javier R. Movellan, Ph.D., *Cognitive Science*  
 David Salmon, Ph.D., *Neurosciences*

The interdisciplinary Ph.D. program is distinct from the departmental Ph.D. program (see previous section) both in admissions and graduation requirements. There are four aspects to graduate study in the interdisciplinary program: (a) a primary specialization in one of the established disciplines of cognitive science; (b) a secondary specialization in a second field of study; (c) familiarity with general issues in the field and the various approaches taken to these issues by scholars in different disciplines; and (d) an original dissertation project of an interdisciplinary character. The degree itself reflects the interdisciplinary nature of the program, being awarded jointly to the student for studies in cognitive science and the home department. Thus, students in linguistics or psychology will have degrees that read "Ph.D. in Cognitive

Science and Linguistics" or "Ph.D. in Cognitive Science and Psychology."

### Admission to the Program

Students enter UCSD through admission to one of the affiliated departments, which then serves as their home department, and which specifies their primary specialization. The affiliated departments are anthropology, communication, computer science and engineering, linguistics, neurosciences, philosophy, psychology, and sociology. Students may apply for admission to the interdisciplinary program at the same time they apply to the home department or after entering UCSD. Students must have an adviser from their home department who is a member of the interdisciplinary program faculty. If a student does not have such an adviser, a member of the Instructional Advisory Committee will be appointed as interim adviser. The Instructional Advisory Committee is made up of one interdisciplinary program faculty person from each of the home departments. The committee member that will serve as interim adviser for a student will come from the same home department as the student.

### Primary Specialization

Primary specialization is accomplished through the home department. Students are expected to maintain good standing within their home departments and to complete all requirements of their home departments through qualification for candidacy for the Ph.D. degree.

### Secondary Specialization

The power of an interdisciplinary graduate training program lies in large measure in its ability to provide the student the tools of inquiry of more than one discipline. Students in the cognitive science interdisciplinary program are expected to gain significant expertise in areas of study outside of those covered by their home departments. Such expertise can be defined in several ways. The second area might coincide with that of an established discipline, and study within that discipline would be appropriate. Alternatively, the area could be based upon a substantive issue of cognitive science that spans several of the existing disciplines, and study within several departments would be involved. In either case, students work with

their adviser and the Instructional Advisory Committee to develop an individual study plan designed to give them this secondary specialization. A list of courses in cognitive studies at UCSD is available. This requirement takes the equivalent of a full year of study, possibly spread out over several years. Often it is valuable to perform an individual research project sponsored by a faculty member in a department other than the student's home department.

The following list demonstrates some ways to fulfill the secondary specialization requirement. It should be emphasized that these programs are only examples. Students will devise individual plans by working with their advisers and the advisory committee. Ideally, students who elect to do research in their areas of secondary interest will be able to accomplish a substantive piece of work, either one of publishable quality or one that will be of significant assistance in their dissertation projects.

**Cognitive Psychology.** Get a basic introduction to cognitive psychology through the Cognitive Psychology Seminar (Psychology 218A-B) and acquire or demonstrate knowledge of statistical tools and experimental design (this can be done either by taking the graduate sequence in statistics, Psychology 201A-B, or through the standard "testing out" option offered to all psychology graduate students). Finally, and, perhaps of most importance, the student should do a year-long project of empirical research in psychology with the guidance of a member of the Department of Psychology.

**Cognitive Social Sciences.** A course sequence from sociology and anthropology, including one or two courses in field methods and a research project under the direction of a cognitive social sciences faculty member. The course sequence and project should be worked out with the advisory committee to reflect the interests and background of the student. Examples of courses include Cognitive Anthropology (Anthropology 218), Distributed Cognition (Cognitive Science 234), Seminar in Comparative Cognitive Research (Psychology 216), Text and Discourse Analysis (Sociology 204), Ethnomethodology (Sociology 240), and Cognitive and Linguistic Aspects of Social Structure (Sociology 241 and 242). In addition, courses on field methods are offered by both anthropology and sociology.

**Computer Science and Artificial Language.** This specialization requires a thorough background in computer science. For those who enter the program without much formal training in this area, the secondary specialization in computer science includes some upper-division undergraduate courses (CSE 100, 102, 105) and a minimum of two graduate courses (CSE 250AB). (Note that these courses require basic knowledge of programming and discrete mathematics areas that may require some additional undergraduate courses for those who lack these skills.) Students with stronger backgrounds in computer science may go straight to graduate courses. For all students interested in this specialization, the course sequences and any projects should be worked out on an individual basis with the student's adviser.

**Discourse Structure and Processing.** This specialization is highly interdisciplinary, spanning linguistics, computer science, psychology, sociology, philosophy, and anthropology. Research within this specialization depends upon which discipline is given emphasis. Therefore, the specialization will have to be developed according to the interests of the student. All students will have to demonstrate awareness and knowledge of relevant studies and the approaches of the various disciplines.

**Linguistics.** Students who elect a secondary specialization in linguistics should specialize either in the general area of syntax/semantics or in the general area of phonetics/phonology. Those who specialize in syntax/semantics should plan to take three courses in this area and one course in phonetics/phonology. Conversely, those who specialize in phonetics/phonology should plan to take three courses in this area and one course in syntax/semantics. The specific courses recommended will depend on the individual student's interests and should be arranged in conjunction with the Department of Linguistics faculty liaison to the Cognitive Science Interdisciplinary Program.

In addition, students will prepare a research paper (preferably originating in one of the above courses) that demonstrates control of the methodology and knowledge of important issues in their area of specialization.

**Neurosciences.** A student specializing in neurosciences would take a program of courses

emphasizing brain-behavior relationships, including Behavioral Neuroscience (Neurosciences 264) and the Physiological Basis of Human Information (Neurosciences 243). In addition, depending upon the student's individual interests, one or more of the neurosciences core courses would be taken in the areas of Neurophysiology (Neurosciences 262), Mammalian Neuroanatomy (Neurosciences 256), Neuropsychopharmacology (Neurosciences 277), and/or Neurochemistry (Neurosciences 234). In most cases, the student would also take a research rotation in the laboratory of a member of the neurosciences faculty.

**Philosophy.** Students who elect a secondary specialization in philosophy will focus on philosophy of science, philosophy of mind, philosophy of psychology, philosophy of neuroscience, or philosophy of language, depending on their area of primary specialization. Courses suitable for this program include Contemporary Topics in the Philosophy of Science (Philosophy 212), Philosophy of Language (Philosophy 235), Contemporary Epistemology and Metaphysics (Philosophy 270), Theory of Knowledge (Philosophy 272), Philosophy of Mind (Philosophy 274), and Seminar on Special Topics (Philosophy 285), which will frequently focus on issues relevant to cognitive science. The course sequence should be worked out with the student's adviser.

### *Acquisition of Perspective on the Field*

The cognitive science faculty offers a special seminar, Cognitive Science 200, that emphasizes the interdisciplinary approach to the field and that covers a variety of different problems, each from the perspective of several disciplines. All students are required to enroll in this seminar a total of six quarters while in residence; most students regularly attend the seminar even after fulfilling the requirement. Students may substitute a Cognitive Science Foundations course for a Cognitive Science 200. A maximum of two quarters may be substituted.

### *Prequalifying Examinations*

Students must complete any prequalifying and field requirements of their home department.

### *Qualifying Examinations*

**The Dissertation Advisory Committee.** As soon as possible, students form a dissertation committee consisting of:

At least three members from the student's home department, including the student's adviser; and at least three members of the Cognitive Science Program, at least two of whom are not members of the student's home department.

University regulations require that at least one of the faculty members of the committee from outside the home department must be tenured. The committee must be approved by the interdisciplinary program, the home department, and by the dean of Graduate Studies. The dissertation committee is expected to play an active role in supervising the student and to meet with the student at regular intervals to review progress and plans.

In the qualifying examination, the student must demonstrate familiarity with the approaches and findings from several disciplines relevant to the proposed dissertation research and must satisfy the committee of the quality, soundness, originality, and interdisciplinary character of the proposed research.

### *Interdisciplinary Dissertation*

It is expected that the dissertation will draw on both the primary and secondary areas of expertise, combining methodologies and viewpoints from two or more perspectives, and that the dissertation will make a substantive contribution to the field of cognitive science.

### *Overview*

The program can be summarized in this way: In the first years, basic training within the student's primary specialization, provided by the home departments;

In the middle years, acquisition of secondary specialization and participation in the Cognitive Science Seminar;

In the final years, dissertation research on a topic in cognitive science, supervised by faculty from the program.

**Time Limits.** Time limits for precandidacy, financial support, and registration are those established for the home department. Normative time is six years.

## COURSES

## LOWER-DIVISION

**3. An Introduction to Computers (4)**

A practical introduction to computers and how you can use their power. Designed for undergraduates in the social sciences. Topics include: basic operations of personal computers (MAC, PC), UNIX, word processing, email, spreadsheets, and creating web pages using the World Wide Web. *No previous background in computing required.*

**10. Cognitive Consequences of Technology (4)**

The role of cognition and computation in the development of state-of-the-art technologies such as human computational interaction in aviation, air traffic control, medical diagnosis, robotics and telerobotics, and the design and engineering of cognitive artifacts.

**11. Introduction to Cognitive Science: Minds and Brains (4)**

How damaged and normal brains influence the way humans solve problems, remember or forget, pay attention to things, how they affect our emotions; and the way we use language in daily life.

**14. Design and Analysis of Experiments (4)**

Design, statistical analysis, and interpretation of experiments in the main areas of cognitive science: brain, behavior, and computation. Introduction to mathematical foundations of probability and statistical decision theory. Decision theory is applied to the problem of designing and analyzing experiments. Students will participate in a group project in which they must design scientific experiments, collect data and analyze results. May fulfill general education requirements; ask a college adviser.

**17. Neurobiology of Cognition (4)**

Introduction to the organization and functions of the nervous system. Topics include molecular, cellular, developmental, systems, and behavioral neurobiology. Specifically, structure and function of neurons, peripheral and central nervous systems, sensory, motor, and control systems, learning and memory mechanisms. (Students may not receive credit for both Biology 12 and Cognitive Science 17. This course fulfills general-education requirements for Marshall and Roosevelt Colleges as well as Warren by petition.)

**18. Introduction to C Programming for Cognitive Modeling (4)**

An introduction to the C programming language and its use in modeling cognitive phenomena. Other topics include: fundamentals of computer architecture, programming languages, operating systems, algorithms and data-structures. Modeling applications include: symbolic artificial intelligence, neural networks, genetic algorithms and computer graphics. *Prerequisite: Mathematics 1A or 20A.*

**90. Undergraduate Seminar (1)**

Issues and contemporary research in cognitive science are introduced. (May be repeated when topics vary.)

**91. SCANS Presents (1)**

The department faculty and the Students for Cognitive and Neurosciences (SCANS) offer this seminar exploring issues in cognitive science. It includes informal faculty research presentations, investigations of topics not covered in the curriculum, and discussions on graduate school and careers. (May be repeated when topics vary.)

## UPPER-DIVISION

**101A. Cognitive Theory and Phenomena: Experimental Approaches to Cognition, Part A (4)**

This part of the Cognitive Science 101A-B-C sequence focuses on experimental approaches to the study of memory, imagery, knowledge, representation, language, emotion, and development. The interaction between data and cognitive theory is also emphasized. *Prerequisite: upper-division standing.*

**101B. Cognitive Theory and Phenomena: Experimental Approaches to Cognition, Part B (4)**

This course covers the phenomena and explores the underlying cognitive mechanisms of attention, short-term memory and problem solving, changes in representation and expertise, and several varieties of human learning. *Prerequisites: Cognitive Science 101A; Cognitive Science 14 or Psychology 60 or Mathematics 183.*

**101C. Cognitive Theory and Phenomena: Language and Reasoning (4)**

This course acquaints students with the complex structural organization behind higher-level cognitive phenomena linked to language and thought. Recursion, induction, and analogy are the focus, with applications to transformational syntax, cognitive semantics, analogical and inductive thought, and judgments under uncertainty. *Prerequisite: Cognitive Science 14 or Philosophy 10.*

**107A. Cognitive Neuroscience: Functional Neurobiology (4)**

This first course in the sequence focuses on principles of brain organization, from neurons to circuits to functional networks. It explores developmental plasticity, neuronal connectivity, cellular communication, complex signaling, and how these various dimensions form functional brain systems. *Prerequisite: Cognitive Science 17 or Biology 12.*

**107B. Cognitive Neuroscience: Systems Neurobiology (4)**

This course is devoted to the cognitive aspects of systems neuroscience, with a focus on the visual and motor systems. Many other high order neural systems are also covered. Readings are augmented with lectures on current experimental and theoretical results. *Prerequisites: Cognitive Science 107A and its prerequisites.*

**107C. Cognitive Neuroscience: Neural Bases of Cognition (4)**

This course studies brain systems implicated in attention, language, object recognition, and memory. Neurobiological evidence for functional subsystems within these processes and the way specialized systems develop are considered using findings from animal studies, human development, and behavioral and brain imaging. *Prerequisites: Cognitive Science 107B and its prerequisites.*

**108A. Theory of Computation and Formal Systems (4)**

Syntax and semantics of propositional logic. Digital electronics and the fundamentals of computer architecture. Turing machines, universality and the halting problem. Syntax and semantics of predicate logic. Limitative results of formal logic. *Prerequisite: Mathematics 1A or 20A.*

**108B. Symbolic Modeling of Cognition (4)**

This course covers topics from artificial intelligence, including symbolic mathematics, search, planning and problem-solving and natural-language processing. Also covered are topics from computer science relevant to cognitive modeling and computer-based experiments in cognitive science, including design and analysis of data-structures and algorithms, computer graphics, operating systems and distributed computation. *Prerequisite:*

*Cognitive Science 18 or CSE 9A or CSE 10, or permission of instructor.*

**108C. Neural Network Models of Cognition I (4)**

This course is an elementary introduction to neural networks and their use in cognitive science. Students will learn how to construct and train neural networks to solve problems at both the psychological and neurological levels of cognition. (Course previously offered as Cognitive Science 108B, Cognitive Science 108P, Cognitive Science 188A, and Psychology 188A.) *Prerequisites: Cognitive Science 18, Cognitive Science 108A, Mathematics 1C or 20C.*

**113. Cognitive Development (4)**

This course examines the foundations and growth of mind, discussing the development of perception, imagery, concept formation, memory, and thinking. Emphasis is placed on the representation of knowledge in infancy and early childhood. (Credit may not be received for both Psychology 136 and Cognitive Science 113.) *Prerequisite: Cognitive Science 101B or Psychology 105 or Psychology 101.*

**115. Neurological Development and Cognitive Change (4)**

This course provides an overview of neurological development and explores the relations between physiological change and the experience of the child from the prenatal period through adolescence. *Prerequisite: Cognitive Science 17 or equivalent.*

**130. Everyday Cognition (4)**

This course examines memory, reasoning, language understanding, learning, and planning directly in everyday, real-world settings. The course work will include discussions of both the findings and the methodology of naturalistic studies of cognition. *Prerequisite: upper-division standing preferred.*

**131. Distributed Cognition (4)**

This course is a continuation of Cognitive Science 130. Cognition extends beyond the boundaries of the person to include the environment, artifacts, social interactions, and culture. Major themes are the study of socially distributed cognition and the role of artifacts in human cognition. *Prerequisite: Cognitive Science 130.*

**132. Cognitive Engineering (4)**

Applications of cognitive science are explored, emphasizing principles for the design of intelligent systems focusing on human-machine interaction whether the users be individuals, groups, or organizations. An extensive project analyzing an existing system or product or designing a new application is required. (This course was previously offered as Psychology 135.) *Prerequisite: Cognitive Science 131.*

**141. Observation, Protocol, and Discourse Analysis (4)**

This class will assess human problem solving in laboratory and natural settings and their ecological validity. Several exercises will introduce students to protocol analysis and the coding of discourse materials in semi-controlled environments. Students will be introduced to the use of medical expert systems. *Prerequisite: upper-division standing preferred.*

**142. Philosophy of Cognitive Science (4)**

An examination of the philosophical foundations and implications of cognitive science. Emphasis is placed on understanding how philosophical issues and arguments are relevant to the theory and practice of modern cognitive science. May be repeated for credit where topics vary. *Prerequisite: upper-division standing.*

**150. Semantics (4)**

This course is an introduction to the study of meaning, reasoning, and understanding. It examines the ways in which natural language reflects complex human thinking processes. *Prerequisite: upper-division standing preferred.*

**151. Analogy and Conceptual Systems (4)**

Human thought and meaning are deeply tied to the capacity for mapping conceptual domains onto each other, inducing common schemas and performing mental simulation. This course examines major aspects of this cognitive activity including metaphor, conceptual blending and embodied cognition. *Prerequisite: upper-division standing.*

**153. Language Comprehension (4)**

The processes and representations involved in understanding language—processing words, syntax, semantics, and discourse—are examined in light of evidence from both psychological experiments and computer simulations. The course emphasizes connectionist models: how they work and how they simulate psychological results. *Prerequisites: introductory cognitive science and programming are recommended. Cognitive Science 108C is recommended.*

**154. Communication Disorders in Children and Adults (4)**

The course will begin with neural bases of language use in normal adults, and the neural bases of language and communication development in normal children. It will review recent evidence on the nature of language and communication deficits in several clinical populations of adults (especially aphasia and dementia) and children (including specific language impairment, focal brain injury, retardation, and autism). (Credit may not be received for both Psychology 174 and Cognitive Science 154.) *Prerequisites: Cognitive Science 10, 11 or Psychology 101 or Cognitive Science 101AB or Psychology 101AB or Psychology 145 or Psychology 105 or Psychology 2 and 3.*

**156. Language Development (4)**

A comprehensive survey of theory, method and research findings on language development in children ranging from the earliest stages of speech perception and communication at birth to refinements in narrative discourse and conversational fluency through middle childhood and adolescence. (Credit may not be received for both Psychology 126 and Cognitive Science 156). *Prerequisites: upper-division standing and background in developmental psychology and/or linguistics is recommended.*

**160. Upper-Division Seminar on Special Topics (1-4)**

Special topics in cognitive science are discussed. (May be repeated when topics vary.) *Prerequisite: department approval.*

**170. Natural and Artificial Symbolic Representational Systems (4)**

This course develops a detailed analogy between the evolution and architecture of language comprehension in human primates and symbol processing at the level of individual cells, contrasting this with the analogy between cognition and computation. *Prerequisites: Cognitive Science 17 or Biology 12; Cognitive Science 18 or Computer Science and Engineering 62AB recommended.*

**172. Brain Disorders and Cognition (4)**

A review of the patterns of impaired and intact cognitive abilities present in brain-damaged patients in terms of damage to one or more components of a model of normal cognitive functioning. (Cognitive science majors may not receive elective credit for both Psychology 139 and Cognitive Science 172.) *Prerequisite: Cognitive Science 107A.*

**173. Neurobiology of Plasticity and Comparative Cognition (4)**

Advanced study of the neurobiology of brain systems that underlie learning, memory, and complex brain functions. Both theoretical (modeling) and empirical approaches used to explore these processes will be examined. Descriptions will be placed within the broad context of evolutionary biology. *Prerequisites: Cognitive Science 17 and Cognitive Science 107A.*

**174. Drugs: Brain, Mind and Culture (4)**

The brain controls what you perceive, what you think, how you feel and how you act. It is sensitive to drugs such as cocaine, marijuana, caffeine, and nicotine because the brain utilizes chemicals similar to these drugs to perform all its functions. This class will explore how the "native" drugs work and what role they play in cognition. It will also examine what goes wrong when "foreign," man-made drugs enter the system, and what the short and long-term consequences of drug abuse are. *Prerequisite: upper-division standing.*

**179. Electrophysiology of Cognition (4)**

This course surveys the theory and practice of using recordings of electrical and magnetic activity of the brain to study cognition and behavior. It explores what brain waves reveal about normal and abnormal perception, processing, decision making, memory, preparation, and comprehension. *Prerequisites: Cognitive Science 107A or Psychology 106 or Psychology 176; Cognitive Science 101A or Psychology 105.*

**181. Neural Network Models of Cognition II (4)**

This course is a continuation of the study of neural models of cognitive systems with an emphasis on applications and a term-long student project. *Prerequisites: Cognitive Science 108C and its prerequisites.*

**182. Artificial Intelligence Modeling II (4)**

The course is an advanced study of artificial intelligence models of control and representation. (Course previously offered as Cognitive Science 108D.) *Prerequisites: Cognitive Science 108B and its prerequisites.*

**183. Artificial Life (4)**

This class will explore models of life as it could be, in artificial as well as biological contexts. An attempt will be made to understand the characteristics which distinguish living from non-living systems. Coursework includes computer simulations of artificial lifeforms. *Prerequisites: Cognitive Science 18, CSE 62 or 65, or equivalent.*

**184. Modeling the Evolution of Cognition (4)**

Mathematical and computational modeling of the evolution and mechanisms of simple cognitive functions. Theoretical background, including topics in population genetics, behavioral ecology, evolutionary game theory, dynamical systems theory, genetic algorithms and neural networks will be applied to questions concerning the evolution of behavioral strategies, the relation between evolution and learning, and the evolution of cooperation, communication and other aspects of social behavior. *Prerequisites: Cognitive Science 18, Mathematics 20ABC.*

**187A-B. Multimedia Design (4)**

This sequence will examine the cognitive basis of successful multimedia designs. We will be interested in what makes an interactive system effective: what makes images easy to understand, animations clear and helpful, and why some sequences of images, text and sounds make more sense than others. Students will learn web design, how to evaluate CD ROMs and assess their usability, and gain first hand experience with the problems of visualization. No programming skills are presupposed but we do assume a strong familiarity with computer software.

**190A-B-C. Projects in Cognitive Science (4-4-4)**

This independent study sequence is for advanced students who wish to undertake a two- or three-quarter reading or research project under the mentorship of a department faculty member. Students should contact faculty whose research interests them to discuss possible projects. *Prerequisites: upper-division standing; instructor and department approval.*

**191. Laboratory Research (1-4)**

Students engage in discussions of reading of recent research in an area designated and directed by the instructor and also

participate in design and execution of original research. Assignments include both oral and written presentations and demonstrating the ability to pursue research objectives. *Prerequisite: consent of the instructor and department approval.* (May be repeated for credit, but not to exceed 8 units).

**195. Instructional Apprenticeship in Cognitive Science (4)**

Students, under the direction of the instructor, lead laboratory or discussion sections, attend lectures, and meet regularly with the instructor to help prepare course materials and grade papers and exams. Applications must be submitted to and approved by the department. *Prerequisites: upper-division standing; 3.0 GPA; instructor and department approval. P/NP only.*

**198. Directed Group Study (4)**

This independent study course is for small groups of advanced students who wish to complete a one-quarter reading or research project under the mentorship of a faculty member. Students should contact faculty whose research interests them to discuss possible projects. *Prerequisites: upper-division standing; 2.5 GPA; consent of instructor and department approval.*

**199. Special Project (1-4)**

This independent study course is for individual, advanced students who wish to complete a one-quarter reading or research project under the mentorship of a faculty member. Students should contact faculty whose research interests them to discuss possible projects. *Prerequisites: upper-division standing; 2.5 GPA; consent of instructor and department approval.*

**GRADUATE****200. Cognitive Science Seminar (4)**

This seminar emphasizes the conceptual basis of cognitive science, including representation, processing mechanisms, language, and the role of interaction among individuals, culture, and the environment. Current developments in each field are considered as they relate to issues in cognitive science. (May be repeated for credit.)

**201A. Foundations of Cognitive Science: Neuroanatomy and Neurophysiology (4)**

This course is a rigorous introduction to the neurophysiological and neuroanatomical basis of human and animal cognition, covering cellular neurophysiology and local circuits; development; the visual, somatosensory, auditory, motor, and limbic systems; and the evolution of language.

**201B. Foundations of Cognitive Science: Interaction of Internal and External Representation (4)**

The course addresses the interplay between natural and artificial internal and external representations as products of socially organized and distributed cognitive-behavioral ecologies that facilitate and constrain problem solving and the transfer of knowledge across generations.

**201C. Foundations of Cognitive Science: Artificial Intelligence (4)**

This course provides a theoretical introduction to the representations and methods of artificial intelligence. Emphasis is on logical, classical, and "situated" models to understand cognition. Topics include nonmonotonic logic, production systems, frame-based representations, robotics, and the Marr approach to vision.

**201D. Foundations of Cognitive Science: Language (4)**

This course provides an overview of major theoretical issues in the study of language from the cognitive science point of view: linguistic representation, linguistic description, language processing and learning, and computational consequences of theoretical assumptions about the nature of language.



**201E. Foundations of Cognitive Science: Mathematical (4)**

This course covers mathematical and modeling foundations as applied to the three main areas of cognitive science: brain, behavior, and computation.

**201F. Foundations of Cognitive Science: Neural Networks (4)**

This course introduces the use of neural networks (connectionist) models to understand cognitive phenomena. Topics include principles of network computation, network learning, the basis for generalization, nature of representation, a comparison with traditional cognitive models, and practical aspects of simulations.

**201G. Foundations of Cognitive Science: Cognitive Neuroscience (4)**

This seminar surveys current research investigating the neural systems important in attention, language, memory, and object recognition. Factors important in their development and several different experimental approaches employed in their study are also considered.

**203A-B-C. Introduction to Research (4-4-4)**

This sequence is an intensive research project. Students under faculty mentorship perform a thorough analysis of the problem and the literature, carry out original studies, and prepare oral and written presentations. Students should aim for a report of publishable quality.

**204A-B-C. Research Methods in Cognitive Science (2-2-2)**

Issues in design, implementation, and evaluation of research in cognitive science are discussed. Students will present and comment on their own research projects in progress. Discussions also include presentations of research to various audiences, abstracts, reviews, grant process, and scientific ethics.

**212. Mechanisms of Learning and Cognition (4)**

This course explores the behavior and mechanisms that underlie a cognitive process from acquisition to expert performance. The emphasis is on the computational mechanisms required to learn skilled performance. Topics vary by quarter, e.g., implicit learning, speech recognition, and mathematic word-problem solving.

**213. Issues in Cognitive Development (4)**

This course examines current issues in human development of interest to cognitive scientists. An emphasis is placed on the foundations of mind and how information is represented at various stages of learning and development. (May be repeated once, when topics vary.)

**215. Neurological and Cognitive Development (3)**

This course is presented in two sections. The first part of the course focuses on early neurological development. The second part addresses questions concerned with the relations between cognitive brain development, and linguistic and affective development.

**234. Distributed Cognition (4)**

This course focuses on aspects of individual and socially distributed cognition. Empirical examples are drawn from natural and experimental settings which presuppose, tacitly or explicitly, socially distributed knowledge among participants. The class examines the way locally managed, pragmatic conditions influence how decisions are framed.

**238. Topics in Cognitive Linguistics (1-4)**

Basic concepts, empirical findings, and recent developments in cognitive and functional linguistics. Language viewed dynamically in relation to conceptualization, discourse, meaning construction, and cognitive processing. (As topics vary, may be repeated for credit.)

**241. Ethics and Survival Skills in Academia (2-4)**

This course will cover ethical issues which arise in academia, including: dishonesty, plagiarism, attribution, sexual misconduct, correcting errors, political activity, dealing with collaborators, etc. We will also discuss 'survival' issues, including job hunting, grant preparation, journal reviews, writing letters of recommendation, mentoring, etc. This course is open to students from any department.

**251. Aphasia (4)**

Research and theory on language breakdown in brain-damaged adults is surveyed. Topics include an historical overview from linguistics, psycholinguistics, and neuroscience (especially brain imaging techniques). Credit may not be received for both Psychology 245 and Cognitive Science 251.

**253. Semantics and Cognition (4)**

This course explores current issues in the study of meaning and its interaction with other areas of cognitive science. The focus is on cognitive semantics, pragmatics, and meaning construction in general.

**256. Language Acquisition (4)**

Discussion of the acquisition of language by young children, including such topics as its stages, mechanisms, and relation to nonlinguistic development.

**260. Seminar on Special Topics (1-4)**

Specific topics in cognitive science are discussed. (May be repeated when topics vary.)

**262. Ethological and Evolutionary Perspectives on Cognition (4)**

This seminar combines perspectives from primate behavior, cognitive ethology, and human evolution with recent developments in human cognitive science to explore different models of "mind" and their implication for the evolution of primate (human and non human) cognition.

**270A-B-C. Seminar in Cognitive Neuroscience (2-2-2)**

This year-long seminar will provide a broad overview of the emerging field of cognitive neuroscience: the multidisciplinary study of the neural bases of higher cognitive functions, including perception and attention, sensory plasticity, learning and memory, cerebral specialization, and language.

**272. Topics in Theoretical Neurobiology (4)**

The main focus of this course is the relationship between nervous system function and cognition. It covers broad theoretical issues and specific topics. Material comes from lectures, papers, and the text. Topic varies each time the course is offered. (May be repeated for credit.)

**273. Biological Basis of Attention (4)**

A survey of the research and theories of attention with special emphasis on the current anatomical, physiological, and biochemical basis of attention.

**275. Visual Modeling (4)**

Visual system neurophysiology and neuroanatomy, and neurally realistic and artificial intelligence modeling approaches are covered. Topics are: dendrites, orientation and edges, motion, stereo, shading and color, eye movements, and pattern recognition. Students prepare computer modeling projects or research papers.

**283. Evaluating Cognitive Models (4)**

Computer models bear a variety of relationships to cognitive evidence, from descriptive statements to detailed, working process models. This course explores the theory and practice of computer simulation through readings and hands-on experiences by developing and evaluating models of cognitive processes.

**290. Cognitive Science Laboratory Rotation (2)**

Laboratory rotations provide students with experience in the various experimental methods used in cognitive science. *Prerequisite: consent of instructor.*

**291. Laboratory Research (1-4)**

Students engage in discussions of reading of recent research in an area designated and directed by the instructor and also participate in the design and execution of original research. Students are expected to demonstrate oral and written competence in presenting original research. *Prerequisite: consent of the instructor and departmental approval. (May be repeated for credit.)*

**298. Directed Independent Study (1-12)**

Students study and research selected topics under the direction of a member of the faculty.

**299. Thesis Research (1-12)**

Students are provided directed research on their dissertation topic by faculty advisers.

**500. Teaching Apprenticeship (1-4)**

This practicum for graduate students provides experience in teaching undergraduate cognitive science courses.

## Communication

OFFICE: 127 Media Center Communication Building, Marshall College  
(619) 534-4410

**Professors**

Michael Cole, Ph.D.  
Susan G. Davis, Ph.D.  
Yrjö Engeström, Ph.D.  
Dee Dee Halleck  
Daniel Hallin, Ph.D.  
Helene Keyssar, Ph.D.  
Chandra Mukerji, Ph.D.  
Daniel T. Schiller, Ph.D.  
Herbert I. Schiller, Ph.D., *Emeritus*  
Michael S. Schudson, Ph.D.  
Ellen Seiter, Ph.D.

**Associate Professors**

Valerie Hartouni, Ph.D.  
Robert Horwitz, Ph.D.  
Carol Padden, Ph.D., *Chair*  
Vicente Rafael, Ph.D.

**Assistant Professors**

Olga A. Vasquez, Ph.D.  
Yuezhi Zhao, Ph.D.



## Lecturers with Security of Employment

Claudio Fenner-Lopez, M.A., *Emeritus*  
Tom Humphries, Ph.D.

Communication at UCSD is a field of study which emphasizes the role of different technologies of communication, from language to television, in mediating human experience. It draws from such social science disciplines as anthropology, psychology, sociology, and political science, and from the humanities and fine arts, including theatre, literature, and visual arts. Communication students will develop a critical awareness of the communicative forces which affect their everyday lives.

The communication major is *not* designed as a training program in advertising, journalism, production, or public relations. It provides students with a solid liberal arts background necessary for graduate studies in communication and other disciplines, and for professional work in a number of communication-related fields, including primary and secondary education.

Though the emphasis of the major is not a technical one, the faculty in the Department of Communication believe that students will develop a deeper understanding of how communication works by exploring firsthand the capabilities and limitations of a variety of media; students, therefore, will have the opportunity to conduct part of their studies in video, writing, theatre performance, or computer communication.

We recommend that students interested in film and video production review requirements for the media production major offered through the Department of Visual Arts. We suggest that students who wish to develop their writing abilities review the listing for the literature/writing major and minor offered through the Department of Literature.

Within the communication department curriculum are three broadly defined areas of study: Communication as a Social Force, Communication and Culture, and Communication and Human Information processing. Students take courses in each of these areas.

### *Communication as a Social Force*

How are social systems affected by communication technology? What is the social organi-

zation of the communication industries? How is the information presented by the media related to the characteristics of the intended audiences? How do media fit into the power structure of societies? Courses in this area address such questions. Students analyze mass communications, the development of telecommunication and information technologies, and the political economy of communication institutions both at home and abroad.

### *Communication and Culture*

Film, music, advertising, art, theater, ritual, literature, and language are forms of communication which embody cultural beliefs of the societies from which they come. These media can influence and bring about changes in social behavior, styles, and traditions. At the same time, individuals and groups can reshape the media. Students will study the social production of cultural objects, the cultural traditions that shape their form and content, and various approaches to interpreting or "reading" television, film, newspapers, language, rituals, and other forms.

### *Communication and Human Information Processing*

How do people turn concepts and ideas into messages? What is the process by which people receive and respond to those messages? Each medium—whether it is language, writing, or electronic media—has different properties that change the way people create and comprehend messages. The impact of television on the individual, the effect of literacy on individuals and on cultures, the ways that concepts are transmitted in film, and the means by which computers expand communication potentials are examples of topics investigated in this area.

## **The Communication Major**

Degree offered: Bachelor of Arts

The major consists of two lower-division courses and fourteen upper-division courses. None of the major courses may be taken on a Pass/No Pass basis.

### *Lower-Division*

\*Com/Gen 20: Introduction to Communication  
Com/Gen 21: Methods of Media Production

### *Upper-Division*

\*Com/SF 100: Introduction to Communication as a Social Force  
\*Com/Cul 100: Introduction to Communication and Culture  
\*Com/HIP 100: Introduction to Communication and Human Information Processing  
\*Com/Gen 150: Senior Seminar in Communication

One media methods course

Three courses beyond the introductory courses: (one must be chosen from each of the categories: Com/SF, Com/Cul, and Com/HIP)

Six upper-division communication electives

\*These courses must be taken at UCSD.

### *Residency Requirement*

Com/Gen 20, Com/Cul 100, Com/HIP 100, Com/SF 100, and Com/Gen 150 must be taken at UCSD. Students must take at least ten classes of their overall major requirements at UCSD.

### *Requirements for the Communication Minor*

(Effective fall 1997)

The communication minor at UCSD is a social science minor. None of the courses may be taken on a Pass/Not Pass basis. Students are required to take seven courses in communication as follows:

\*Com/Gen 20 (Introduction to Communication)  
Two courses of your choice from the following 100's:  
\*Com/SF 100 (Introduction to Communication as a Social Force)  
\*Com/Cul 100 (Introduction to Communication and Culture)  
\*Com/HIP 100 (Introduction to Communication and Human Information Processing)

Four upper-division communication electives within the areas of the chosen 100 classes.

**Note:** Com/Gen 100, Com/Gen 150, 197, 198, and 199 may not be used as electives within the minor.

### The Honors Program

The Department of Communication offers an honors program to those students who have demonstrated excellence in the communication major. Successful completion of the honors program enables the student to graduate "With Highest Distinction," "With High Distinction," or "With Distinction," depending on performance in the program. Application must be made the spring before student is at senior standing.

### The Graduate Program

The Department of Communication offers a program of study leading to the Doctor of Philosophy degree. Communication at UCSD seeks to combine modes of analysis from the humanities and social sciences to explore the history, structure, and process of communication. The graduate program is conceived as a blending of the tradition of critical communication research with the empirical tradition of American scholarship. The program does not closely resemble any other communication department in this country. It is related by sympathy and interest to mass communication programs, but not by kinship. Historically, this department grew out of an interdisciplinary program jointly sponsored by the Departments of Drama (currently, Theatre and Dance), Political Science, Psychology, and Sociology. The department retains strong ties to the departments and disciplines from which it developed.

The study of communication at UCSD places major emphasis on historical and comparative approaches to symbolically mediated human activity. The graduate curriculum is organized around three perspectives: 1. Communication as a Social Force, 2. Communication and Culture, and 3. Communication and the Individual. Communication as a Social Force deals with the history and political economy of mediated communication and the study of the media as social institutions. The department is particularly strong in the areas of telecommunications,

regulation, and information studies. Special interests include the increasing importance of information and information technologies in American society and the global consequences of media practices. Communication and Culture involves the analysis of culture, using traditions from literature, folklore, history, sociology, and anthropology to focus on the social construction of interpretation and meaning. Special interests include the study of broadcast news, print journalism, commercial entertainment, and live performances as communicative systems. The department is particularly strong in the areas of popular culture, political culture, and the relationship of nature to culture. Communication and the individual involves examination of the individual as socially constituted through language and other media. Special interests include computer-mediated interaction, the effects of specified media practices on individual consciousness, and the language and culture of the deaf community. The program also emphasizes a production component in which students test theory in practical implementations. Some faculty and student interests bridge the components of the curriculum. Faculty research interests that do so include concepts of person and mind, communication and collective memory; relations of language, power and culture; gender and cultural forms; telecommunications and information studies and communication and technology in the work place.

### Ph.D. Requirements

1. Communication 200A-B-C (Introduction to the Theory of Communication as a Social Force, Communication and Culture, and Communication and the Individual).
2. Communication 294, The History of Communication Research.
3. At least three methods courses from the 201 sequence (see course listings).
4. Four courses in communication history and theory (see course listings).
5. Communication 280, Advanced Workshop in Communication Media.
6. Communication 296, Communication Research as an Interdisciplinary Activity.
7. First-Year Exam and Evaluation: At the end of the spring quarter of the student's first

year, the student must pass a comprehensive written examination based on course work completed during the first year.

8. Language Requirement: All students are required to demonstrate proficiency in one language other than their native language.
9. Qualifying Examinations: Before the end of the fourth year the student must take and pass an oral qualifying examination. The exam will be based on two papers concerning two of the subfields covered in the program. The student will also present a separate dissertation proposal at the examination. At this time, the faculty will examine the proposal for appropriateness and feasibility.
10. Teaching Requirement: In order to acquire teaching experience, all students are required to participate in the teaching activities of the university for three academic quarters.
11. Dissertation: Acceptance of the dissertation by the university librarian represents the final step in completing all requirements for a Ph.D. The dissertation committee must be approved by the department chair and the dean of Graduate Studies.

### Departmental Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

### Student Advising

Faculty Graduate Adviser:  
Michael Schudson

Faculty Undergraduate Adviser:  
Vicente Rafael, Ph.D.

Undergraduate Coordinators:  
Bea Velasco  
Jamie Lloyd

Graduate Coordinator:  
Jamie Lloyd

## COURSES

### LOWER-DIVISION

#### General Communication

##### Com/Gen 20. Introduction to Communication (4)

An historical introduction to the development of the means of human communication, from language and early symbols through the introduction of writing, printing, and electronic media, to today's digital and multimedia revolution. Examines the effect of communications media on human activity, and the historical forces that shape their development and use.

##### Com/Gen 21. Methods of Media Production (4)

This course explores fundamental technical and social constraints shaping media production: light, optics, electricity, news media technology, camera techniques, basic editing languages, and aesthetic standards affecting production decisions. Satisfactory completion of Com/Gen 21 is required to obtain a "media card."

### UPPER-DIVISION

#### Communication as a Social Force

##### Com/SF 100. Introduction to Communication as a Social Force (4)

A critical overview of areas of macro communication and analysis, with special emphasis on the development of communication institutions, including broadcasting, common carriers, and information industries. Questions regarding power, ideology, and the public interest are addressed. *Prerequisite:* Com/Gen 20.

##### Com/SF 120. The Transformation of Global Communications (4)

The information revolution has dramatically altered the telecommunications and information technologies and services which constitute the infrastructural nervous system of all international economic activity. This course is an introduction to the technical and market changes driving the emergence of a global information economy. Topics include the rise and decline of regulatory consensus; the development of new systems, services and markets; the growth of intangible, network-based transactions; the restructuring of corporate production and products; and the emergence of new international issues and conflicts. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 126. The Information Age: In Fact and Fiction (4)

Analysis of the forces propelling the "Information Age." An examination of the differential benefits and costs, and a discussion of the presentation in the general media of the "Information Age." *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 128. Information Technology: Culture, Society, Politics (4)

A survey of recent developments in telecommunications, computer, and information technologies, and the social impact of their melding into a new industrial complex. The examination will be situated within the debates over the so-called post-industrial society. The impact of information technology on industry, work, stratification, politics, and culture will be considered. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 132. History of U.S. Political Communication (4)

Survey of the history of political communication in the United States from the colonial period to the present. Students will work on term papers in which they will undertake original his-

torical research. *Prerequisites:* communication major, Com/SF 100, or consent of instructor.

##### Com/SF 139A-B. Law, Communication, and Freedom of Expression (4-4)

An examination of the legal framework of the freedom of expression in the United States. 139A covers the fundamentals of First Amendment law through the consideration of key cases in historical context. Prior restraint, incitement, obscenity, libel, fighting words, public forum, commercial speech, and hate speech are some of the topics covered. 139B focuses on the law of mass communication, examining the different legal treatments accorded print, broadcasting, cable, and common carriers. The decline of broadcast regulation, the breakup of AT&T, the rise of new forms of mass communication, and the question of the public interest are of central concern. *Prerequisites:* 139A - SF100 or PS 40 or consent of instructor. 139B - SF 100 or PS 40, SF 139A preferred.

##### Com/SF 140A. Comparative Media Systems: Asia (4)

The development of media systems and policies in Asia, with emphasis on the news media and television. Special attention to the impact of market reforms in China. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 140B. Comparative Media Systems: Europe (4)

The development of media systems and policies in Europe. Differences between European and American journalism. Debates over the commercialization of television. The role of media in post-communist societies in Eastern Europe. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 140C. Comparative Media Systems: Latin America and the Caribbean (4)

The development of media systems and policies in Latin America and the Caribbean. Debates over dependency and cultural imperialism. The news media and the process of democratization. Development of the regional television industry. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 141. History of U.S. Telecommunications (4)

This course provides a sustained historical focus on the developing social form and industry structure of U.S. telecommunications, beginning with the telegraph. Policy issues are regularly incorporated into readings and discussions. Emphasis is placed on the emergence, around the turn of the century, of the regulated, national telephone network system dominated by AT&T. A research paper is required. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 148. Computers, Work, and Society (4)

This course explores new ways in which information technology is used to reorganize the work place and its social impact. Examines different approaches to organizing work both historically and today, the social forces affecting technological development, and the economic forces reshaping industry and labor. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 171A-B. American News Media (4-4)

(Same as Pol. Sci. 102L.) History, politics, social organization, and ideology of the American news media. SF 171A surveys the development of the news media as an institution, from earliest new newspapers to modern mass news media. SF 171B deals with special topics, including the nature of television news, and with methods of news media research, and requires a research paper. *Prerequisite:* Com/SF 100 for Com/SF 171A; Com/SF 171A is required for Com/SF 171B.

##### Com/SF 175. Advanced Topics in Communication: Social Force (4)

Specialized study in communication as a social force with topics to be determined by the instructor for any given quarter. Past topics include information as a commodity and book publishing. May be repeated for credit three times. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 180. Political Economy of Mass Communications (4)

The social, legal, and economic forces affecting the evolution of mass communications institutions and structure in the industrialized world. The character and the dynamics of mass communications in the United States today. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 181. Political Economy of International Communications (4)

The character and forms of international communications. Emerging structures of international communications. The United States as the foremost international communicator. Differential impacts of the free flow of information and the unequal roles and needs of developed and developing economies in international communications. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 183. History of Communication Technologies (4)

A historical survey of the relationship of communication technology, mind, and society. If communication technologies are artifactual extensions of the human mind, their history may be traced back at least to the origins of writing. The course, organized chronologically, will in different years take up different technologies among writing, printing, telephone and telegraph, film, broadcasting, and computers. *Prerequisite:* Com/SF 100 or consent of instructor.

##### Com/SF 186. Film Industry (4)

A study of the social organization of the film industry throughout its history, addressing such questions as who makes films, by what criteria, and for what audience. The changing relationships between studios, producers, directors, writers, actors, editors, censors, distributors, audience, and subject matter of the films will be explored. *Prerequisite:* Com/SF 100 or consent of instructor.

### Communication and Culture

##### Com/Cul 100. Introduction to Communication and Culture (4)

Processes of communication shape and are shaped by the cultures within which they occur. This course emphasizes the ways in which cultural understandings are constructed and transmitted via the variety of communication media available to members. A wide range of cultural contexts are sampled, and the different ways that available communication technologies (language, writing, electronic media) influence the cultural organization of people's lives are analyzed. *Prerequisite:* Com/Gen 20 or consent of instructor.

##### Com/Cul 110. Cinema in Latin America (4)

Analysis of the changing content and sociopolitical role in Latin America of contemporary media, including the "new cinema" movement, recent developments in film, and popular television programming, including the telenovela. Examples drawn from Mexico, Brazil, Cuba, and other countries. *Prerequisite:* Com/Cul 100 or consent of instructor.

##### Com/Cul 110XL. Foreign Language Discussion (1)

Students will exercise advanced foreign language skills to discuss materials and the correspondingly numbered communication language foreign area course. This section is taught by the course instructor, has no final exam and does not affect the grade in the core course, Com/Cul 110. Concurrent enrollment in Com/Cul 110 required.

##### Com/Cul 120. The Problem of Voice (4)

This course will explore the problem of self-expression for members of various ethnic and cultural groups. Of special interest is how writers find ways of describing themselves in the face of others' sometimes overwhelming predilection to describe them. *Prerequisite:* Com/Cul 100 or consent of the instructor.

**Com/Cul 125. How to Read a Film (4)**

The purpose of this course is to increase our awareness of the ways we commonly interpret or make understandings from movies and to enrich and increase the means by which one can enjoy and comprehend movies. We will talk about movies and we will explore a range of methods and approaches to film interpretation. Readings will emphasize major and diverse theorists, including: Bazin, Eisenstein, Cavell, and Mulvey. *Prerequisite: Com/Cul 100 or consent of instructor.*

**Com/Cul 127. Folklore and Communication (4)**

Folklore is an important variety of noncommercial communication in societies dominated by commercial media. A source of alternative understandings, folklore is characterized by particular styles, forms, and settings. This course introduces a wide range of folklore genres from different cultures and historical periods, including oral narrative, material folk arts, dramas, and rituals. We will pay special attention to the relation between expressive form and social context. Sources include folklore texts, ethnographies, performances on film and videotape, novels, autobiographies, and student observations and experiences. *Prerequisite: Com/Cul 100 or consent of the instructor.*

**Com/Cul 128. Folklore and Mass Media (4)**

Local personal, vernacular, and oral traditions coexist with and influence the mass-produced, mass-mediated culture of the late twentieth century. This course examines the history of this influence, using materials such as oral histories, life stories, urban legends, and soap operas to explore the conjunctions of folklore and commercially produced entertainments in everyday social life. *Prerequisite: Com/Cul 100 or consent of the instructor.*

**Com/Cul 130. Tourism: Global Industry and Cultural Form (4)**

The largest industry in the world has far-reaching cultural ramifications. We will explore tourism's history and its contemporary cultural effects, taking the perspective of the "toured" as well as that of the tourist. *Prerequisite: Com/Cul 100 or consent of the instructor.*

**Com/Cul 132. Gender and Media (4)**

This course examines the work of women artists and the history of the representation of women in the media, from the beginnings of cinema to the present, and offers a basic introduction to feminist media theory. It focuses on the representation of gender, and narrative and experimental strategies used by women media makers, and the role of the female spectator. *Prerequisite: Com/Cul 100 or consent of the instructor.*

**Com/Cul 134. Communication, Politics, and Citizenship in America (4)**

The citizen, free enough and informed enough to make political choices, supported by democratic social institutions and representative political institutions, lies at the heart of democratic theory. But who is entitled to be a citizen? Are citizens adequately informed? Do social and political institutions make possible or stand in the way of their ability to express their needs and interests? This course will examine these questions, and changing theoretical and practical answers to them, from colonial times to the present. *Prerequisite: upper-division standing.*

**Com/Cul 137. The Politics of Bodies (4)**

This course will explore the construction of gendered bodies and gendered sexuality in the late twentieth century, postindustrial culture(s). Through the use of fiction, film and theory as well as political, historical and media analysis, we will examine the contested terrain, including the race and class coding, of such issues as abortion, infertility, eating disorders, gender identity, and AIDS. *Prerequisite: Com/Cul 100 or Women's Studies 2A, B, or C.*

**Com/Cul 138. Feminist Theory (4)**

This class is designed to initiate students into the pleasures, pains, and perplexities of critical thinking about gender. We will survey a wide variety of thinkers and issues, consider some of the historical as well as contemporary debates within western feminist thought, and develop tools of analysis for future work. *Prerequisite: upper-division standing. Recommended: Women's Studies/Cultural Traditions 2A, B, or C.*

**Com/Cul 139. Reproductive Discourse and Gender (4)**

In this course we will examine as a problem of discourse and culture the controversies surrounding the development and use of the new technologies of human genetics and reproduction. Of particular interest will be the way in which these new technological practices and processes test, erode, or undermine traditional understanding of "human nature" and relationship while enforcing traditional understanding of gender. *Prerequisite: Com/Cul 137 or Women's Studies 2A, B, or C.*

**Com/Cul 140. Television, Culture, and the Public (4)**

How and what does television communicate? Emphasis will be on contemporary U.S. television programming, placed in comparative and historical context. Special topics may include: TV genres; TV and politics; TV and other media. Frequent in-class screenings. *Prerequisite: Com/Gen 20 or consent of the instructor.*

**Com/Cul 144. Language and Society (4)**

An introduction to the major ideas and methods in the social study of language. Topics include the history of English, bilingualism, the mechanics of ordinary conversation, and national language policies. No background in formal linguistics is required. *Prerequisite: Com/Cul 100 or consent of instructor.*

**Com/Cul 148. Communication and the Environment (4)**

Survey of the communication practices found in environment controversies. The sociological aspects of environmental issues will provide background for the investigation of environmental disputes in particular contested areas, such as scientific institutions, communities, work-places, governments, popular culture, and the media. *Prerequisite: Com/Cul 100 or consent of instructor.*

**Com/Cul 161. Material Culture: Design and Social Process (4)**

An investigation of the connections between material culture and the technical and social forces affecting its production and use. Analytic topics include dress, gardening, and urban planning. *Prerequisite: Com/Gen 20 or consent of instructor.*

**Com/Cul 162. Popular Culture (4)**

An overview of the historical development of popular culture from the early modern period to the present. Also a review of major theories explaining how popular culture reflects and/or affects patterns of social behavior. *Prerequisite: Com/Gen 20 or Soc. 1A or consent of instructor.*

**Com/Cul 163. Popular Culture in Contemporary Life (4)**

Treats the products of the modern culture industries and theories of their social and political importance. We will look at a wide range of cultural forms, including music, television, fashion, food, and landscapes. Special attention will be paid to questions of how popular culture is consumed, what it means to its audiences, and to gender, racial and ethnic differences among producers and consumers. *Prerequisite: upper-division standing.*

**Com/Cul 164. Multinational Media, Conglomerate Culture (4)**

To understand the workings of mass media conglomerates, this course will study one media corporation in depth. We will examine its history and present structure, paying attention to its diverse, interlocking sectors (news, cable, music, publish-

ing, animation, theme parks). *Prerequisite: Com/Cul 100 or consent of the instructor.*

**Com/Cul 165. History, Memory and Popular Culture (4)**

What role does popular culture play in shaping and creating our shared memory of the past? The course examines diverse sources such as school text books, monuments, holidays and commemorations, museums, films, music, and tourist attractions. *Prerequisite: Com/Cul 100 or consent of the instructor.*

**Com/Cul 170. Advertising and Society (4)**

Advertising in historical and cross-cultural perspectives. Topics will include the ideology and organization of the advertising industry; the meaning of material goods and gifts in capitalist, socialist, and nonindustrial societies; the natures of needs and desires and whether advertising creates needs and desires; and approaches to decoding the messages of advertising. *Prerequisite: Com/Cul 100 or consent of instructor.*

**Com/Cul 174. Persuasion and Society (4)**

(Same as Soc/B 164.) What is the role of messages intentionally designed to be persuasive in society? How are messages crafted, and what impact do they have? Specific domains of persuasive communication to be examined will vary from year to year, but will typically include commercial advertising, public information campaigns, propaganda, public relations, and schooling. This course integrates research from sociology, social psychology, rhetoric, and communication. *Prerequisite: upper-division standing or consent of instructor.*

**Com/Cul 175. Advanced Topics in Communication: Culture (4)**

Specialized study in communication and culture with topics to be determined by the instructor for any given quarter. Past topics include critical theory, rituals and spectacles. May be repeated for credit three times. *Prerequisite: Com/Cul 100 or consent of instructor.*

**Com/Cul 179. Colonialism and Culture (4)**

This course examines colonial narratives, slave accounts, essays, and stories by both colonizers and colonized. It also explores the issue of nationalism in determining the limits of colonialism among minority groups in the United States and in the Third World. *Prerequisite: upper-division standing.*

**Com/Cul 180. Cultures and Markets (4)**

What is the relationship between "culture"—those conventions that anchor ideas and practices about self and society—and the "market"—the site of exchange and the restless circulation of social energy? This course will introduce students to the symbolic and practical import of commodities in shaping everyday life. Students will be expected to do the assigned readings and keep ethnographic accounts of the cultures that have grown around the sites of market transactions, e.g., shopping malls, corporate offices, network t.v., etc. They are also expected to write a paper integrating the readings with their ethnographic materials. *Prerequisite: Com/Cul 100 or consent of instructor.*

**Communication and Human Information Processing**

**Com/HIP 100. Introduction to Communication and the Individual (4)**

An introduction to theories of human mental processes which emphasizes the central role of mediation. The course covers methods of research that permit the study of mind in relation to different media and contexts of use. The traditional notion of media effects is critically examined in a number of important domains, including television, film, writing, and oral language. *Prerequisite: Com/Gen 20 or consent of instructor.*

**Com/HIP 108. The Development of Communication in Children (4)**

(Same as HDP 130.) The course serves as an introduction to research methods in the study of child development. The special focus of the course will be on how children acquire competence in symbolic communication, including language, drawing, writing, and number systems. Observation of children in their interactions with each others and adults will be required. *Prerequisite: Com/HIP 100 or HDP 1.*

**Com/HIP 110. Media Effects (4)**

This course examines three major approaches to studying effects of media in individuals: survey studies, content analysis, and ethnographic description. Representative studies from each approach are analyzed and compared for types of questions and conclusions drawn. Social and historical influences on interpretation of effects research are also examined. Course requirements include a final project using one of the three approaches. *Prerequisite: Com/HIP 100 or consent of instructor.*

**Com/HIP 114. Bilingual Communication (4)**

This course is designed to introduce students to the multiple settings in which bilingualism is the mode of communication. Students will examine how such settings are socially constructed and culturally-based. Readings on language policy, bilingual education, and linguistic minorities, as well as field activities will constitute the bulk of the course. *Prerequisite: Com/HIP 100 or consent of instructor.*

**Com/HIP 117. Language, Thought, and the Media (4)**

This course examines the ways in which various communicative channels mediate human action and thought. A basic premise of the course is that human thought is shaped in important ways by the communicative devices used to communicate. There is a particular emphasis on how thought develops, both historically and in the individual. *Prerequisites: Com/HIP 100 and Com/Gen 21 or consent of instructor.*

**Com/HIP 121. Literacy, Social Organization, and the Individual (4)**

This course will examine the historical growth of literacy from its earliest precursors in the Near East. The interrelation between literate technology and social organization and the impact of literacy on the individual will be twin foci of the course. Arriving at the modern era, the course will examine such questions as the impediments to teaching reading and writing skills to all normal children in technological societies and the relation between literacy and national development in the Third World. *Prerequisite: Com/HIP 100 or Com/Cul 100 or HDP 1 or consent of instructor.*

**Com/HIP 122. Communication and the Community (4-4)**

This course examines various forms of communication that affect people's everyday lives. Focusing on ways that ethnic communities transmit and acquire information, and interact with mainstream institutions, we examine a variety of alternative local media, including murals, graffiti, newsletters, and community radio. *Prerequisite: Com/HIP 100 or consent of instructor.*

**Com/HIP 123. Children and Media (4)**

A course which analyzes the influence of media on children's lives. The course adopts an historical as well as social perspective on childhood within which media plays a role. Among media studied are books, films for children, video games, computer games, and television. *Prerequisite: COGN 20 or HDP 1 or consent of instructor.*

**Com/HIP 124. Voice: Deaf People in America (4)**

The relationship between small groups and dominant culture is studied by exploring the world of deaf people who have for the past twenty years begun to speak as a cultural group. Issues of language, communication, self-representation, and social structure are examined. *Prerequisite: Com/HIP 100 or consent of instructor.*

**Com/HIP 134. Language and Human Communication (4)**

This course looks at the interaction of technology, culture, and language, with a focus on narrative styles. Theories on the role of technology in shaping and transforming talk are examined. Cultural properties such as physical space and work traditions are studied as they bear on styles of talking and talking about the world. Storytelling, humor, and talk of children are used as examples of styles of talking. *Prerequisite: Com/HIP 100 or consent of instructor.*

**Com/HIP 143. The Psychology of the Filmic Text (4)**

The course will examine a variety of films using different perspectives and methods of psychology to analyze the types of problems raised by the nature of cinematic communication. Topics will include an introduction to basic elements of cinematography, theoretical and technical bases of film's "grammar," perception of moving pictures, the function and status of sound, the influence of film on behavior and culture (and vice versa), the representation of psychological and social interaction, the communication of narrative and spatial information formation, the generation and translation of film's conventions, and the parameters which the medium and the culture impose upon the attempt to express various forms of abstraction in the concrete visual language of film. *Prerequisite: Com/HIP 100 or consent of instructor.*

**Com/HIP 175. Advanced Topics in Communication: Human Information Processing (4)**

Specialized study in communication: human information processing with topics to be determined by the instructor for any given quarter. May be repeated for credit three times. *Prerequisite: Com/HIP 100 or consent of the instructor.*

**Communication Media Methods**

**Com/MT 101. Television Analysis and Production (6)**

An introduction to the techniques and conventions common to the production of news, discussion, and variety-format television programs. Particular emphasis will be placed on the choice of camera "point of view" and its influence on program content. Laboratory sessions provide students the opportunity to experiment with production elements influencing the interpretation of program content. Concentration on lighting, camera movement, composition, and audio support. *Prerequisite: Com/Gen 21 or consent of instructor.*

**Com/MT 102. Introduction to Media Use in Communication (4)**

Students will engage in projects, using media, to address theories of communication. Students can use film, video, computers, pen and paper, photography, posters, or performances for their projects. *Prerequisites: Com/Gen 20 and Com/Gen 21.*

**Com/MT 103. Television Documentary (6)**

An advanced television course which examines the history, form, and function of the television documentary in American society. Experimentation with documentary techniques and styles requires prior knowledge of television or film production. Laboratory sessions apply theory and methods in the documentary genre via technological process. Integrates research, studio and field experience of various media components. *Prerequisite: Com/SF 101A or Com/Gen 21 or consent of instructor.*

**Com/MT 104. Television as a Social Force (6)**

Students will conduct simple field research and then make a series of documentary video tapes to present research in a television format. *Prerequisite: Com/SF 101B or consent of instructor.*

**Com/MT 105. Media Stereotypes (4)**

An examination of how the media present society's members and activities in stereotypical formats. Reasons for and consequences of this presentation are examined. Student responsibilities will be: (a) participation in measurement and analysis

of stereotype presentations; (b) investigating techniques for assessing both cognitive and behavioral effects of such scripted presentations on the users of media. *Prerequisite: Com/Cul 100 or consent of instructor.* Course can be taken to meet Com/Cul major requirement.

**Com/MT 106. Feminist Video Workshop (6)**

This course explores the relationship between dramatic production and theory in a feminist context. Examination of such questions as the nature of collaboration, gender as an aspect of role identity, and sexual codes of behavior. This class will create, as an ensemble, a live dramatic production of a feminist video and collaborate on a dramatic production. *Prerequisites: Com/Gen 21 and Com/Cul 100 or consent of instructor.* Course can be taken to meet Com/Cul major requirement.

**Com/MT 108. Visual Knowledge (4)**

This course reviews ways that visual imagery contributes to our understanding of the world around us and ourselves. Students will consider uses of visual images in science, the mass media, and everyday life. *Prerequisite: Com/Gen 20 or Soc. 1A or consent of instructor.* Course can be taken to meet Com/Cul major requirement.

**Com/MT 110. News Media Workshop (4)**

Designed for students working in student news organizations or off-campus internships or jobs in news, public relations, or public information. A workshop in news writing and news analysis. *Prerequisites: Com/Cul 100 and Com/SF 171 (may be taken concurrently) or consent of instructor.*

**Com/MT 111A-B. Communicating and Computers (4-4)**

This course introduces students to computers as media of communication. Each quarter students participate in a variety of networking activities designed to show the interactive potential of the medium. Field work designed to teach basic methods is combined with readings designed to build a deeper theoretical understanding of computer-based communication. *Prerequisites: Com/HIP 100 and communication major or consent of instructor.* Com/MT 111B can be taken to meet Com/HIP major requirement.

**Com/MT 112. Ethnographic Studies of the Media (4)**

This is a practical course on ethnographic fieldwork—obtaining informed consent interviewing, negotiating, formulating a research topic, finding relevant literature, writing a research paper, and assisting others with their research. *Prerequisite: Com/HIP 100 or consent of instructor.*

**Com/MT 113. Theatre Text to Media Performance (6)**

This course will explore the relationships between theatre performance and video and film production of dramatic texts as communication. Beginning with a case study of one dramatic score and moving to a variety of short dramatic pieces, students will be expected to apply both creative and critical skills to scene study for theatre and film. This course will include consideration of such elements as space, pacing, continuity, choice and preparation of materials, improvisations and relationship to the audience. Students may emphasize one area, such as acting, dramaturgy or camera work, but all members of the class will take on at least two different performance production tasks during the course. Seminar and workshop format. *Prerequisite: Com/Cul 100 (Com/Gen 21 strongly recommended) or consent of instructor.*

**Com/MT 116. Practicum in Child Development (6)**

(Same as Psych 128, HDP 135.) A combined lecture and laboratory course for juniors and seniors in psychology and communication. Students should have a solid foundation in general psychology and communication as human information processing. Students will be expected to spend four hours a week in a supervised practical after-school setting at one of the community field sites involving children. Additional time will be devoted to readings and class prep, as well as, six hours a week transcribing field notes and writing a paper on some aspect of



the field work experience as it relates to class lectures and readings. Please note that the enrollment size for each site/section is limited. See department course listing for site/section descriptions. *Prerequisite:* Com/HIP 100 or consent of instructor.

**Com/MT 118. Oral History (4)**

Theories, questions, cases and methods in oral history will be introduced through readings, lectures, and concrete practice in oral historical research. Topics will include the relationship between oral history and official history; oral history and social history, voices and stances of the speaker, stances of the ethnographer and politics of editing; recording and presenting of texts; what is social speech in the individual. *Prerequisite:* Com/Cul 100 or consent of instructor. Course can be taken to meet Com/Cul major requirement.

**Com/MT 175. Advanced Topics in Communication, Media Methods (4)**

Specialized "practice" in communication: media methods with topics to be determined by the instructor in any given quarter. *Prerequisite:* communication majors only.

### General Communication

**Com/Gen 150. Senior Seminar in Communication (4)**

This course examines in detail some topic in the field of communication, bringing to bear several of the approaches and perspectives introduced in the basic communication curriculum. Seminars will be limited to 25 students and class participation is stressed. A research paper is required. *Prerequisite:* Communication majors only, senior standing.

**Com/Gen 175. Advanced Topics in Communication: General (4)**

Specialized study in communication: General with topics to be determined by the instructor in any given quarter. May be repeated for credit three times. *Prerequisite:* Com/Gen 100 or consent of instructor.

**Com/Gen 194. Research Seminar in Washington, D.C. (4)**

(Same as Poli Sci 194, USP 194.) Course attached to six-unit internship taken by students participating in the UCDC program. Involves weekly seminar meetings with faculty and teaching assistants and a substantial research paper. *Prerequisite:* participating in UCDC program.

**Com/Gen 198. Directed Group Study in Communication (4)**

Directed group study on a topic or in a field not included in the regular curriculum by special arrangement with a faculty member. (P/NP grades only.) May be taken three times for credit. *Prerequisite:* consent of instructor.

**Com/Gen 199. Independent Study (4)**

Independent study and research under the direction of a member of the staff. (P/NP grades only.) *Prerequisite:* consent of instructor.

### GRADUATE

**Com 200A. Introduction to the Study of Communication as Social Force (4)**

This course focuses on the political economy of communication and the social organization of key media institutions. There will be both descriptive and analytical concerns. The descriptive concern will emphasize the complex structure of communication industries and organizations, both historically and cross-nationally. The analytic focus will examine causal relationships between the economic and political structure of societies, the character of their media institutions, public opinion, and public attitudes and behaviors expressed in patterns of voting, consuming, and public participation. The nature of evi-

dence and theoretical basis for such relationships will be critically explored.

**Com 200B. Introduction to Study of Communication: Communication and Culture (4)**

This course focuses on questions of interpretation and meaning. This course will examine how people use texts to interpret the world and coordinate their activities in social groups. Students will study both theories of interpretation in the conventional sense and theories about the act of interpreting.

**Com 200C. Introduction to the Study of Communication: Communication and the Individual (4)**

This course will draw on theorists who examine human nature as constituted by social, material, and historical circumstances. This course considers the media in relation to the ontogenetic and historical development of the human being and an examination of the individual as socially constituted in a language-using medium. The role of new communication technologies as part of research methodologies is explored in lecture-seminar.

**Com 201A. Experimental Designs and Methods (4)**

This course will familiarize students with a variety of experimental strategies used to study the process and products of communication. The conduct of two small experimental projects will be combined with reading and critique of classic experiments in the field.

**Com 201B. Ethnographic Methods for Communication Research (4)**

A supervised and coordinated group project will allow students to develop competence in a variety of ethnographic approaches to communication. Subjects covered include choosing a field-work site, setting or process for participation; entry and development of relationships; techniques of observation, interviewing, notetaking, and transcription. Course may also include photography and video as research tools. All participant observation and interviewing strategies fall under the review of the Committee on Human Subjects. *Prerequisite:* graduate standing or consent of instructor.

**Com 201C. Discourse Analysis (4)**

Review and critique of studies employing discourse analysis, focusing on the ways that "discourse" is identified, recorded, and reported. A working notion of "discourse" will develop from works representing diverse disciplinary approaches. Students will record, transcribe, and report on segments of talk in an everyday setting. All participant observation and interviewing strategies fall under the review of the Committee on Human Subjects. *Prerequisite:* graduate standing or consent of instructor.

**Com 201D. Historical Methods for Communication Research (4)**

Different approaches to conducting historical research in communication. Such approaches may include the social history of communication technology; structuralist and poststructuralist accounts of language, media, and collective memory; and new historicist treatments of cultural history. Sources, documentation, and the nature of argument from historical evidence are emphasized.

**Com 201E. Political Economic Methods for Communication Research (4)**

Combines methodological critique of classic political-economic studies of communication agencies and institutions with an in-depth research project. The project serves to familiarize students with approaches to documentation and to methodological issues associated with an overarching process or trend, such as social effects of communications technologies, economic concentration in the communications industry, the information economy, transnationalization of networks, deregulation of telecommunications, or causes and impacts of increasing television programming costs.

**Com 201F. Textual Analysis (4)**

Students will explore the theoretical stakes and methodological implications of a range of contemporary critical reading practices including but not limited to psychoanalysis, literary criticism, deconstruction, and film theory. Readings will be drawing from the works of Lacan, Foucault, Irigaray, Derrida, Bakhtin, Eco, de Lauretis, White, and Barthes.

**Com 201H. Qualitative Methods in Audience Research (4)**

This course explores the social and economic definitions of media audiences and the various qualitative methodologies for studying media use. Includes audiences for television, video, and motion pictures, as well as users of telephones, computers, and electronic mail. *Prerequisite:* graduate standing or consent of instructor.

**Com 201J. Comparative Analysis (4)**

The logic of comparative analysis and its role in communication research. Scientific inference in qualitative research. Selection of cases. Problems of translation across cultures. *Prerequisite:* graduate standing or consent of instructor.

**Com 209. International Communications (4)**

This course will examine the material infrastructure of communication flows internationally, focusing on the major transmitters and categories of the messages and imagery. Emphasis will be placed on the impact of international communication on national sovereignty and the character of economic development.

**Com 210. Information and Society (4)**

The social, legal, and economic forces affecting the evolution of mass communication institutions and structure in the industrialized world. Differential impacts of the free flow of information and unequal roles and needs of developed and developing economies.

**Com/Grad 212. Enlightenment and Counter-Enlightenment Traditions in Communication Research (4)**

The course investigates the enlightenment concepts of rationality, subjectivity, power, and truth and examines the anti-enlightenment attack on these concepts. The aim of the course is to provide students the opportunity to read key works in Western social and political theory, and to understand how these underlie and shape different theoretical-methodological agendas in contemporary communications research. *Prerequisite:* graduate standing or consent of instructor.

**Com 215. Regulation of Telecommunications (4)**

The course will look at the history of, and rationales for, the regulation of mass communications in the United States. The course will cover both broadcasting and common carrier regulation. We will analyze telecommunications regulatory structures as they were constituted historically with the 1934 Communications Act and examine their breakdown in the late 1970s. In a larger vein, the course will examine the rise and functions of regulatory agencies in modern American history.

**Com 216. Research Problems in Global Communications (4)**

Despite the importance of telecommunications and information industries and policies in contemporary world politics, there remains a dearth of sophisticated, theoretically informed academic research on these subjects. This course provides graduate students with a multidisciplinary introduction to the field and attempts to delineate research strategies for doctoral work. Topics include theories of comparative and international policy making and political economy, and their application to numerous issues in global communications and information. *Prerequisite:* graduate standing or consent of instructor.

**Com 220. The News Media (4)**

History, politics, social organization, and ideology of the American news media. Special attention will be paid to historical origins of journalism as a profession and "objective report-

ing" as ideology; empirical studies of print and TV journalism as social institutions; news coverage of Vietnam and its implications for theories of the news media.

**Com/Grad 222. Modern Childhood (4)**

This course explores the social construction of childhood as organized by the institutions of school and family. Of particular interest are media consumption and leisure as they interact with the emergence of taste, preference, and identity in children. Modern adolescence is also explored as it bears on the social nature of childhood. *Prerequisite: graduate standing or consent of the instructor.*

**Com 232. History of U.S. Political Communication (4)**

Survey of the history of political communication in the United States from the colonial period to present. Students will work on term papers in which they will undertake original historical research.

**Com 236. Popular Culture (4)**

This class will be an opportunity for students to review major contributions to the field from the disciplines of anthropology, history, literature, sociology and American studies, and to experiment with some of the recently developed methods for studying popular forms. They will then be able to consider more precisely the potential and actual contribution of studies of popular culture to the discipline of communication.

**Com 240. The Culture of Consumption (4)**

This course will explore the development and cultural manifestations of consumerism in the nineteenth and twentieth centuries. Topics will include the rise of museums, the development of mass market journalism and literature, advertising, and the growth of commercial amusements. Readings will focus primarily, but not exclusively, on the United States. Students will be encouraged to think comparatively. *Prerequisite: graduate standing or consent of instructor.*

**Com 245. Performance and Audience (4)**

This course will explore the history and nature of audience as a concept and phenomenon. The first half of the term will be spent surveying the historical nature of the relations of audience to performance and to social groups. The second half of the course will address modern and contemporary aspects of audience, taking into consideration the effects of radio, film, and television on audience and nature of audience in contrasting cultures such as that of contemporary China and the United States.

**Com 261. Advanced Seminar in Mediational Approaches to Culture/Mind (4)**

This course will examine theories of mind in which cultural mediation is given a leading role. The work of anthropologists, psychologists, and communication scholars will be studied in depth. Emphasis will be placed on the methodological implication of cultural theories of mind for empirical research. *Prerequisite: graduate standing or consent of instructor.*

**Com 265. Literacy (4)**

This course will examine the historical growth of literacy from its earliest precursors in the Near East. The interrelation between literate technology and social organization and the impact of literacy on the individual will be twin foci of the course. Arriving at the modern era, the course will examine such questions as the impediments to teaching reading and writing skills to all normal children in technological societies and the relation between literacy and national development in the Third World.

**Com 271A. The News Media (4)**

Theories and methods in the study of news, both print and broadcast. Topics include the political economy of news, the social organization of news institutions, and news as a cultural form. The course will normally concentrate on U.S. news

media but comparative studies will also be examined. *Prerequisite: graduate standing or consent of instructor.*

**Com 275. Topics in Communication (4)**

Specialized study in communication, with topics to be determined by the instructor for any given quarter. *Prerequisite: graduate standing or consent of instructor.*

**Com 280A. Production Pedagogy (4)**

The course analyzes the practice of production teaching and connects this practice to theoretical issues covered in the core curriculum. Beginners and advanced students complete creative exercises in video and digital media while learning how to write production course syllabi, evaluate production texts, and develop assignments for creative exercises. *Prerequisite: graduate standing or consent of instructor.*

**Com 280B. Media Production (4)**

This course is a project course in which students prepare a production or experiment using one of the forms of media. This course is designed to allow students to experiment in a communication form other than the usual presentation in class or a term paper. Students can do video production, a coordinated photographic essay or exhibit, a computer instructional game, a published newspaper or magazine article directed at a special audience, a theoretical presentation, or some form other than those mentioned. *Prerequisite: graduate standing or consent of instructor.*

**Com 294. The History of Communication Research (4)**

Intellectual history of the field of communication studies from Robert Park to the present. Explication and assessment of major research approaches and classic studies representing both empirical and critical traditions.

**Com 296. Communication Research as an Interdisciplinary Activity (4)**

A course oriented toward a re-analysis of communication as a discipline. The content of this course is to provide the student with as well-integrated a framework as possible for initiating strong communication research in the dissertation.

**Com 298. Directed Group Study (1-12)**

The study and analysis of specific topics to be developed by a small group of graduate students under the guidance of an interested faculty member.

**Com 299. Independent Graduate Study (1-12)**

Advanced independent study in communication under the guidance of Department of Communication faculty.

**Com 500. Practice Teaching in Communication (4)**

A doctoral student in communication is required to assist in teaching undergraduate Department of Communication courses for a total of six quarters. One meeting per week with the instructor, one meeting per week with the assigned sections, and attendance at the lecture of the undergraduate course in which he or she is participating are part of this requirement. *Prerequisites: graduate standing and consent of instructor.*

**Program Faculty**

Michael Meeker, Ph.D. *Department of Anthropology*

Jann Pasler, Ph.D. *Department of Music*

Don E. Wayne, Ph.D. *Department of Literature*

Graduate students in the humanities, social sciences, and arts in this program are provided the opportunity to design curricula, conduct research, and write dissertations under the guidance of interdepartmental and/or intercampus Ph.D. committees. The student who participates in the program must be admitted, satisfy all requirements for advancement to candidacy, and pass the qualifying examination in one department. The student must also undertake advanced study in an integrally-related area of research specialization. The student advances to candidacy in the program upon successfully defending a written dissertation proposal before the interdepartment and/or intercampus Ph.D. committee. In the instance of some departments and programs, the defense will be identical with completion of the departmental qualifying examination.

Application to the Program in Comparative Studies may be made at the earliest during the student's third quarter of residency in his or her primary department. From the point of acceptance into the program, the student's preparation for dissertation research will be under the supervision of the interdepartment or intercampus Ph.D. committee. The degree granted may indicate in its title the precise nature of the student's studies and research when appropriate and desirable—e.g., Ph.D. in comparative literature and ethnopoetics, in linguistics and literary studies, in economics and Chinese studies, in philosophy and the history of ideas. When an additional degree title is contemplated, the student's Ph.D. committee must forward a program of study and research, as well as the dissertation proposal, to the supervising committee for initial approval and to the Graduate Council for final approval.

Students applying for admission to UCSD and interested in applying for admission to the program should direct their inquiries to a primary department. Students already admitted to a primary department should, after the required quarters of residence and with the advice of a department adviser, direct inquiries to the chairperson of the program.

## Comparative Studies in Language, Society, and Culture

OFFICE: 3354 Literature Building  
(619) 534-3826/(619) 534-3217



### Faculty Research Groups

Beginning with the academic year 1997–1998, the program intends to sponsor a series of faculty research groups. These groups will consist of faculty who have announced their intention to supervise graduate students wishing to work on topics involving the comparative study of language, society, and culture. Each faculty research group is expected to be composed of faculty in the humanities, social sciences, and arts from different departments and/or campuses. For a list of current faculty research groups and the topics which they support, contact the chairperson of the program.

### The Anthropology of Modern Society

The Anthropology of Modern Society is a project of graduate training and research dedicated to the study of modernity and its counterpoints in the late twentieth century. The Group sees the social life of cities as making manifest this problem in issues of citizenship and democracy, social formations in tension with the nation-state, modern subjectivities, social and religious movements, transnational markets and migrations, and relations of local to global processes. Participants are committed to reorienting anthropological theory and ethnographic practice towards such contemporary social and political problems.

Director: James Holston,  
Department of Anthropology, (619) 534-0111  
Co-Director: Martha Lampland,  
Department of Sociology, (619) 534-5640

### Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed eight years.

## Computer Science and Engineering (CSE)

See Engineering, School of.

## Computing and the Arts

### OFFICE:

Music—124 Mandeville Center for the Arts  
Visual Arts—214 Mandeville Center for the Arts

### Faculty

Gerald Balzano, Ph.D., *Associate Professor, Music*

Sheldon Brown, M.F.A., *Assistant Professor, Visual Arts*

Louis Hock, M.F.A., *Professor and Chair, Visual Arts*

Adriene Jenik, M.F.A., *Assistant Professor, Visual Arts*

Lev Manovich, Ph.D., *Assistant Professor, Visual Arts*

F. Richard Moore, Ph.D., *Professor and Chair, Music*

Peter Otto, M.F.A., *Lecturer and Music Technology Director, Music*

Miller Puckette, Ph.D., *Professor, Music*

### The Undergraduate Program

The interdisciplinary computing and the arts major in the Departments of Music and Visual Arts draws upon, and aims to bring together, ideas and paradigms from computer science, art, and cultural theory. It takes for granted that the computer has become a metamedium and that artists working with computers are expected to combine different media forms in their works. All of this makes the program unique among currently existing computer art or design programs which, on the one hand, usually focus on the use of computers for a particular media (for instance, specializing in computer animation, or computer music, or computer design for print) and, on the other hand, do not enter into a serious dialogue with current research in computer science, only teaching the students "off-the-shelf" software.

The program also recognizes that creating sophisticated artistic works with computers requires a new model of the creative process, one which combines traditional artistic procedures with the experimental research characteristic of the sciences. All in all, it aims to train a new type of cultural producer, who is familiar with art and media history, who is equally

proficient with computer programming and artistic skills, who is always ready to learn new technologies, and who is comfortable interacting with scientists and computer industry resources.

The goals of the program are:

- to prepare the next generation of artists who will be functioning in a computer-mediated culture;
- to give students necessary technical, theoretical, and historical backgrounds so they can contribute to the development of new aesthetics for computer media;
- to prepare students to mediate between the worlds of computer science and technology, the arts, and the culture at large by being equally proficient with computing and cultural concepts;
- to give students sufficient understanding of the trajectories of development in computing so they can anticipate and work with the emerging trends, rather than being locked in particular software currently available on the market.

### Major Requirements

Twenty courses are required in the computing and the arts major for the attainment of the bachelor of arts degree. A minimum of twelve of these courses must be upper-division.

All courses taken to satisfy major requirements must be taken for a letter grade, and only grades of C– or better will be accepted in the major.

### LOWER-DIVISION

(8 courses required)

#### Arts (4 course required)

MUS 4—Introduction to Music

VIS 1—Introduction to Art Making:  
Two-Dimensional Practices  
and

VIS 22—Formations of Modern Art

VIS 70N—Introduction to Media  
or

MUS 14—Contemporary Music

and one of:

MUS 1A—Music Literacy

MUS 2A—Basic Musicianship

MUS 5—Introduction to Music Making

**Computer Science** (1 course required)

CSE 11—Introduction to Computer Science: JAVA

**Mathematics** (2 courses required)

MATH 20A—Calculus for Science and Engineering

MATH 20B—Calculus for Science and Engineering

**Computing and the Arts** (1 course required)

ICAM 40/VIS 40—Introduction to Computing in the Arts

**UPPER-DIVISION**

(12 courses required)

**Survey** (1 course required)

ICAM 110—Computing in the Arts: Current Practice

**Foundation** (3 courses required)

ICAM 101/VIS 140—Digital Imaging: Image and Interactivity

ICAM 102/VIS 145A—Digital Media I: Time, Movement, Sound

ICAM 103/MUS 160A—Musical Acoustics

**Advanced** (4 courses required)

ICAM 120—Virtual Environments

ICAM 130/VIS 149—Seminar in Contemporary Computer Topics

MUS 160C—Electronics in Music

MUS 161—Audio Production: Mixing and Editing

MUS 162—Computer Music

MUS 163—Music Technology Seminar

VIS 109—Advanced Projects in Media

VIS 131—Special Projects in Media

VIS 132—Installation Production and Studio

VIS 141A—Computer Programming for the Arts I

VIS 141B—Computer Programming for the Arts II

VIS 145B—Digital Media II

VIS 147A—Electronic Technologies for Art I

VIS 147B—Electronic Technologies for Art II

VIS 174—Media Sketchbook

**Theory and History** (2 courses required)

ICAM 150/VIS 159—History of Art and Technology

and one of:

MUS 111—World Music Traditions

MUS 114—Music of the Twentieth Century

MUS 160B—Psychoacoustics

VIS 123CN—Early Print Culture: The First Media Revolution

VIS 125E—History of Performance

VIS 150—History and Art of the Silent Cinema

VIS 151—History of the Experimental Film

VIS 152—Film in Social Context

VIS 153—The Genre Series

VIS 154—Hard Look at the Movies

VIS 155—The Director Series

VIS 157—Video History and Criticism

VIS 158—Histories of Photography

**Senior Project** (2 courses required)

ICAM 160A-B—Senior Project in Computer Arts

**Minor Requirements**

A minor with an emphasis in either music or visual arts consists of seven specific courses, of which at least five must be upper-division. Prospective minors should consult with the respective departmental adviser for a complete list of appropriate classes acceptable for the minor.

**Residency Requirements**

A minimum of two-thirds of the course work completed for the major should be taken as a registered student at UCSD. Students who transfer to UCSD in their second or third year may petition to substitute courses taken at other colleges and universities for lower-division requirements.

**Education Abroad Program**

Students are often able to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP) while still making progress toward completing their major. Students considering this option should discuss their plans with the director of Undergraduate Studies before going abroad, and courses taken abroad must be approved by the respective department. More information on EAP/OAP is detailed in the Education Abroad Program of the *UCSD General Catalog*. Interested students should contact the Program Abroad Office in the International Center.

**COURSES**

The following list of courses represent all computing and the arts offerings; not all courses are offered each year.

**ICAM 40. Introduction to Computing in the Arts (4)**

(Cross-listed with VIS 40.) An introduction to the conceptual uses and historical precedents for the use of computers in art making. Preparation for further study in the computer arts area by providing overview of theoretical issues related to the use of computers by artists. Introduces the students to program's computer facilities and teaches them basic computer skills. *Prerequisite: none. Note: Materials fee required.*

**ICAM 101. Digital Imaging: Image and Interactivity (4)**

(Cross-listed with VIS 140.) This introduction to the digital image involves images, texts, and interactive display and operates both within a computer mediated space (i.e., Web site) and in physical space (i.e., artist book). Interactive narrative and computer programming are explored. *Prerequisite: ICAM 40. Note: Materials fee required.*

**ICAM 102. Digital Media I: Time, Movement, Sound (4)**

(Cross-listed with VIS 145A.) As an exploration of time dependent media components, this course will deal with the creation and manipulation of digital sound as well as moving images and their integration in multimedia works. Use of computer programming to control time is emphasized. *Prerequisites: ICAM 40 and 101. Note: Materials fee required.*

**ICAM 103. Musical Acoustics (4)**

(Cross-listed with MUS 160A.) An introduction to the acoustics of music with particular emphasis on contemporary digital techniques for understanding and manipulating sound. *Prerequisite: MUS 4 or equivalent.*

**ICAM 110. Computing in the Arts: Current Practice (4)**

Designed around the presentations by visiting artists, critics, and scientists involved with contemporary issues related to computer arts. Lectures by the instructor and contextual readings provide background material for the visitor presentations. *Prerequisite: none. Note: Materials fee required.*

**ICAM 120. Virtual Environments (4)**

Students will create virtual reality artworks in this course. Projects may be done individually or in groups. An exploration of the theoretical issues involved will underlie the acquisition of techniques utilized in the construction of virtual realities. *Prerequisite: ICAM 102; CSE 11 recommended. Note: Materials fee required.*

**ICAM 130. Seminar in Contemporary Computer Topics (4)**

(Cross-listed with VIS 149.) Treats selected topics drawn from a broad variety of subjects relevant to computer based art and music-making, such as computer methods for making art and music, the design of interactive systems, spatialization of visual and musical elements, and critical studies. Topics will vary. May be repeated five times for credit. *Prerequisites: ICAM 101 and 110; ICAM 102 or 103 recommended. Note: Materials fee required.*

**ICAM 150. History of Art and Technology (4)**

(Cross-listed with VIS 159.) Aims to provide historical context for computer arts by examining the interaction between the arts, media technologies, and sciences in different historical periods. Topics vary (e.g., Renaissance perspective, futurism and technology, and computer art of the 1950s and 1960s). *Prerequisite: none. Note: Materials fee required.*

**ICAM 160 A-B. Senior Project in Computer Arts (4-4)**

Students will pursue projects of their own design over two quarters with support from faculty in a seminar environment. Collaborations are possible. Prerequisites: ICAM 101, 102, 103, 110 and senior standing.

**VISUAL ART**

- VIS 1. Introduction to Art Making: Two-Dimensional Practices
- VIS 22. Formations of Modern Art
- VIS 70N. Introduction to Media
- VIS 109. Advanced Projects with Media
- VIS 123CN. Early Print Culture: The First Media Revolution
- VIS 125E. History of Performance
- VIS 131. Special Projects in Media
- VIS 132. Installation Production and Studio
- VIS141A. Computer Programming for the Arts I
- VIS 141B. Computer Programming for the Arts II
- VIS 145B. Digital Media II
- VIS 147A. Electronic Technologies for Art I
- VIS 147B. Electronic Technologies for Art II
- VIS 150. History and Art of the Silent Cinema
- VIS 151. History of the Experimental Film
- VIS 152. Film in Social Context
- VIS 153. The Genre Series
- VIS 154. Hard Look at the Movies
- VIS 155. The Director Series
- VIS 157. Video History and Criticism
- VIS 158. Histories of Photography
- VIS 174. Media Sketchbook

**MUSIC**

- MUS 1A. Music Literacy
- MUS 2A. Basic Musicianship
- MUS 4. Introduction to Music
- MUS 5. Introduction to Music Making
- MUS 14. Contemporary Music
- MUS 111. World Music Traditions
- MUS 114. Music of the Twentieth Century
- MUS 160B. Musical Psychoacoustics
- MUS 160C. Electronics in Music
- MUS 161. Programming for Musical Applications
- MUS 162. Introduction to Computer Music
- MUS 163. Music Technology Seminar

**MATHEMATICS**

- MATH 20A. Calculus for Science and Engineering
- MATH 20B. Calculus for Science and Engineering

**COMPUTER SCIENCE**

- CSE 11. Introduction to Computer Science: JAVA

**Contemporary Black Arts Program**

OFFICE: Thurgood Marshall College Administration Building, Room 120

**Director**

Cecil Lytle, *Provost, Thurgood Marshall College*

**Faculty**

- Ken Anderson, *Visiting Lecturer, Music*
- Robert Cancel, *Associate Professor, Literature*
- Floyd Gaffney, Ph.D., *Professor Emeritus, Theatre*
- Sandra Foster-King, M.F.A., *Visiting Lecturer, Theatre*
- George Lewis, *Professor, Music*
- Cecil Lytle, B.A., *Professor, Music*
- Faith Ringgold, M.A., *Professor, Visual Arts*
- Quincy Troupe, *Professor, Literature*
- Sherley Anne Williams, M.A., *Professor, Literature*

**The Minor**

The Contemporary Black Arts Program is an interdisciplinary minor which provides a broad introduction to an appreciation of Afro-American performing arts through lecture, studio courses, and public performance. Students complete twenty-eight units, with a minimum of twenty upper-division units. Students who complete the minor must meet the following requirements:

1. A required core of four lecture courses chosen from:

- Theatre** THHS 109 (African Heritage in Contemporary Drama)  
or  
THHS 101 (Topics: African American Theatre)
- Music** Music 127A (Music of Black Americans)
- Visual Arts** VA 126DN (African and African American Arts)
- Literature** LTEN 17 (Intro to African American Lit)
- History** HIUS 135 (Slavery and the Atlantic World) or HIUS 136 (Slavery and Freedom in Nineteenth-Century U.S.)

2. A fifth lecture course selected from the following approved list:

Literature/English 185. Themes in Afro-American Literature (4)

Literature/English 188. Contemporary Caribbean Literature (4)

Literature/English 148. Genres in American Lit (4)

Literature/English 183. African American Prose (4)

Literature/English 184. African American Poetry (4)

Literature/Writing 100. Beginning Fiction (4)

Music 126. Introduction to Oral Music (4)

Music 127B. Music of Black Americans (4)

Literature/Writing 102. Poetry (4)

Literature/Writing 120. Personal Narrative (4)

VA 1. Introduction to Art Making (4)

3. A total of eight units of performance courses selected from the following approved list:

Music 95G. Gospel Choir (2)

Music 95J. Jazz Ensemble (2)

Music 131. Jazz Improvisation (4)

Theatre/Dance 132. Dances of the World (4)

Theatre/Acting 120. Ensemble (4)

Students interested in either taking Contemporary Black Arts Program courses or completing the minor are encouraged to discuss their interests and develop a course of study with a faculty member of the program at their earliest convenience. See the Marshall College Provost's Office for further information.

**Contemporary Issues**

OFFICE: 2024 Humanities and Social Sciences Building, Muir College, (619) 534-3589

**Director**

Patrick J. Ledden, Ph.D.

In addition to the current offerings, the Contemporary Issues Program sponsors an environmental studies minor which draws upon the humanities as well as the natural and social sciences. For information please see "Environmental Studies" or come to the Muir Interdisciplinary Studies Office, 2024 HSS.

**COURSES**

**LOWER-DIVISION**

22. Human Sexuality (4)

A survey of the nature and problems of human sexuality in the development of the individual, in cultural traditions and val-

ues, and in social roles and organizations, particularly with regard to contemporary America. L. Ross

**40. Contemporary Issues: The AIDS Epidemic (4)**

Using current information, this course will deal with the worldwide spread of AIDS, particularly into communities, colleges, and universities. Discussion topics: origin, infection, biology, clinical expression, risks, vaccines, epidemiology, and the social, ethical, economic, and legal aspects of this epidemic.

**50. Information and Academic Libraries (2)**

An introduction to research strategies directed at satisfying the information needs of the student using the academic library, with emphasis on the UCSD library system. Library techniques will be acquired through lectures and discussion, problem sets, and a term project. Students will learn to extend these techniques to independent research.

**UPPER-DIVISION**

**136. The Anthropology of Medicine (4)**

(Same as ANGN 128.) Theoretical approaches to and cross-cultural analyses of the role of the medical profession, the sick and the healers, and culture as communication in the medical event. The theoretical anthropological aspects of medical practice and medical research will include a consideration of the "Great Traditions" of medicine as well as primitive and peasant systems. Western medicine will be considered in the foregoing framework, with issues of contemporary concern by way of introduction. *Prerequisite: upper-division standing.* L. Ross

**195. Discussion Leading in Contemporary Issues (4)**

Students will lead groups of ten to twenty students in discussions of contemporary concern. Students will meet with the professor to plan and prepare for their discussions to be held weekly. Students will also consult with another faculty member specializing in their topics for further check on reading materials and course of discussion. (P/NP grades only.) *Prerequisite: Contemporary Issues 196 and consent of the director of Interdisciplinary Sequences.*

**196. Contemporary Issues Workshop (2)**

A workshop for potential discussion leaders in the Contemporary Issues Program. Students will investigate topics for discussion and methods of presentation and inquiry. Participating in the workshop does not guarantee selection as discussion leader. (P/NP grades only.)

**198. Group Studies in Contemporary Issues (4)**

Group studies, readings, projects, and discussions in areas of contemporary concern. Course is set up so that students may work together as a group with a professor in an area of contemporary concern whereby the group emphasis would be more beneficial and constructive than individual special studies. *Prerequisite: consent of instructor.* (P/NP grades only.)

**199. Special Studies in Contemporary Issues (2-4)**

To be offered during fall, winter, and spring quarters. Permission of the director of Interdisciplinary Sequences is required. The 199 course is to be made up of individual reading and projects in the areas of contemporary concern. Term paper and/or completed project is required. This class is given under special circumstances, e.g., student abroad. (P/NP grades only.)

**500. Apprentice Teaching in Contemporary Issues (4)**

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty: handling of discussions, preparation and grading of examinations and other written exercises, and student relations. *Prerequisite: graduate standing.*

**Dimensions of Culture**

OFFICE: 132 Sequoyah Hall, Marshall College

**Program Director**

Fraser Cocks, Ph.D.

**Assistant Program Director**

Pamela S. Wright, Ph.D.

The Dimensions of Culture Program is a three-course sequence taught by senior faculty from the Departments of History, Political Science, Communication, Ethnic Studies, Philosophy, and Literature. This program provides an interdisciplinary issues-oriented exploration of nineteenth- and twentieth-century American, Western, and non-Western culture, and illustrates Marshall College's commitment to exploring the meaning of social justice and investigating the means by which it might be achieved in contemporary American Society.

The first quarter, **Diversity**, introduces students to the study of basic distinctions in social differences and commonalities among human individuals and groups. This course surveys a range of social differences and stratifications that shape the nature of human attachment to self, work, community, and a sense of nation. The second quarter, **Justice**, introduces basic concepts of political and social theory and moral philosophy. Readings are drawn from nineteenth- and twentieth-century American history and legal case studies. The third quarter, **Imagination**, introduces students to the study of the arts as the cultural expression of the issues presented in the first two quarters. Materials focus on the interdisciplinary study of twentieth-century American culture, including music, literature, art, film, and photography.

Written assignments are required in each quarter of the Dimensions of Culture sequence. In the second and third quarters, students receive intensive instruction in university-level writing in small sections. Frequent writing assignments and revisions are required in connection with the material presented in class.

The Marshall College core course and writing requirements are met by completion of this sequence. Students must have satisfied the university's Subject A requirement before enroll-

ing in Justice or Imagination. All Marshall College first-year students must complete this three-course sequence. Transfer students should see their college academic adviser regarding the appropriate course requirements.

For further details on Marshall College requirements, see "Marshall College, General-Education Requirements."

**COURSES**

**LOWER-DIVISION**

**1. Dimensions of Culture: Diversity (4)**

This course focuses on sociocultural diversity in examining, class, ethnicity, race, gender, and sexuality as significant markers of differences among persons. Emphasizing American society, it explores the cultural understandings of diversity and the economic, moral, political, and other social consequences. Three hours of lecture, one hour of discussion. Open to Marshall College students only. (Letter grade only.) (F)

**2. Dimensions of Culture: Justice (6)**

This course considers the nature of justice in philosophical, historical, and legal terms. Topics include racial justice, political representation, economic justice, gender and justice, rights within the family, the rights of cultural minorities, and crime and punishment. The course offers intensive instruction in writing university-level expository prose. Three hours of lecture, two hours of discussion and writing instruction. Open to Marshall College students only. (Letter grade only.) *Prerequisite: completion of Subject A requirement.* (W)

**3. Dimensions of Culture: Imagination (6)**

Using the arts, this course examines the evolution of pluralistic culture to the modern period. There is a special emphasis on the interdisciplinary study of twentieth-century American culture, including music, literature, art, film, and photography. The course offers intensive instruction in writing university-level expository prose. Three hours of lecture, two hours of discussion and writing instruction. Open to Marshall College students only. (Letter grade only.) *Prerequisite: completion of Subject A requirement.* (S)

**Earth Sciences**

OFFICE: Revelle Commons, Trailer 100, room 102, Revelle College

**Professors**

- Jeffrey L. Bada, *Marine Chemistry*
- Wolfgang H. Berger, *Oceanography*
- James W. Hawkins, *Geology*
- Myrl C. Hendershott, *Oceanography*
- Nicholas D. Holland, *Marine Biology*
- Miriam Kastner, *Earth Sciences*
- Devendra Lal, *Nuclear Geophysics*

J. Douglas Macdougall, *Earth Sciences*,  
(Program Director)

Kurt Marti, *Chemistry*

T. Guy Masters, *Geophysics*

Jean-Bernard H. Minster, *Geophysics*

David T. Sandwell, *Marine Geophysics*

John G. Sclater, *Marine Geophysics*

Richard C.J. Somerville, *Meteorology*

Lisa Tauxe, *Geophysics*

Mark Thiemens, *Chemistry*

Martin Wahlen, *Geochemistry*

Edward L. Winterer, *Geology, Emeritus*

### Associate Professors

Kevin M. Brown, *Geology*

Paterno A. Castillo, *Geology*

Christopher D. Charles, *Oceanography*

Catherine G. Constable, *Geophysics*

### Assistant Professor

David R. Hilton, *Geochemistry*

### Senior Lecturer

Steven C. Constable, *Geophysics*

### Lecturers

Nicholas E. Graham, *Associate Research  
Meteorologist*

Alistair J. Harding, *Geophysics*

David P. Rogers, *Associate Research  
Meteorologist Oceanographer*

Wuchang Wei, *Associate Research  
Oceanographer*

The UCSD Interdisciplinary Earth Sciences Undergraduate Program offers an earth sciences major leading to a B.S. degree, with emphasis on the quantitative aspects of the field. As a guiding concept, the focus of the earth sciences curriculum is the physical and chemical evolution of the earth system and the energetics and dynamics of this evolution. The program takes advantage of the unique opportunities offered by UCSD, in particular through the Scripps Institution of Oceanography and the California Space Institute. The major can be complemented by various minors ranging from mathematics, physics or chemistry, to biology, environmental science, or public policy, and political science. Chemistry and physics majors may also specialize in earth sciences by taking a series of courses offered through this program (see the "Chemistry" and "Physics" sections of the catalog for details). In addition, the program offers a broad choice of courses, includ-

ing general-education courses in the earth sciences and related topics from which to select a minor in the earth sciences.

The Undergraduate Earth Science Program was initiated in the fall of 1992 and is intended to be a transition program to a proposed Department of Earth Sciences, to be implemented at UCSD at a future time. Most earth science faculty are members of the Scripps Institution of Oceanography, and students, especially earth science majors, are encouraged to consult with these instructors about incorporating appropriate Scripps Institution of Oceanography courses into their programs.

### Majors in Earth Sciences

Three tracks with slightly different course requirements are presently offered through the UCSD Interdisciplinary Earth Sciences Undergraduate Program. These are the General EARTH major, and the EARTH/Chemistry and EARTH/Physics majors.

Lower-division requirements are the same for all majors and are designed to provide the foundations in mathematics, physics, chemistry, and biology that are essential in modern quantitative earth sciences disciplines. In addition, two upper-division courses introducing the basic concepts of geology and geochemistry, EARTH 101 and EARTH 102, should be taken during the sophomore year to provide the appropriate background for other upper-division courses.

A grade-point average of 2.0 or higher in the upper-division major program is required for graduation. Students must receive a grade of C- or better in any course to be counted toward fulfillment of the major requirements. In exceptional cases, students with a grade-point average in the major of 2.5 or greater may petition to have one grade of D accepted. All courses (lower- and upper-division) required for the major must be taken for a letter grade.

### Special Studies Courses

Special studies in the earth sciences are offered as the courses EARTH 198 and EARTH 199. These courses are subject to consent of the instructor and approval by the ES adviser. They are open to students who have accrued at least ninety quarter-units and have a GPA of at least

3.0. No more than two quarters of earth sciences special studies may be counted toward any earth sciences major.

### Lower-Division Requirements (common for all Earth Science majors)

The following courses must be taken for a letter grade:

1. Mathematics 20A, 20B, 20C, 20D or equivalent
2. Physics 2A, 2B, 2C
3. Chemistry 6A, 6B, 6C, 6BL
4. Biology 3 (BILD 3)
5. Earth Sciences courses which should be taken in the sophomore year:  
ERTH 101. Introduction to Geology  
ERTH 102. Introduction to Geochemistry

A possible schedule yields:

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Chem. 6A	Chem. 6B	Chem. 6C
Math. 20A	Chem. 6BL	Math. 20C
	Math. 20B	
<b>SOPHOMORE YEAR</b>		
Phys. 2A	Phys. 2B	Phys. 2C
Math. 20D	ERTH 102	BILD 3
ERTH 101		

### ERTH/Chemistry Major

This specialization focuses on the Earth as a chemical system, and on its evolution. Emphasis is placed on the fundamental observations that allow geoscientists to understand better the past history of the planet, the energetics of its evolution, and the major "cycles" (e.g., water, carbon) that characterize and control planetary-scale changes on a broad range of time scales. The major is appropriate for students interested in modern geochemistry, in "global change" studies, and in global and local environmental problems, including biochemical and anthropogenic effects.

### Upper-Division Requirements

In addition to EARTH 101 and EARTH 102 (see lower-division requirements), the following courses must be taken for a letter grade:

- Earth Sciences requirements:  
ERTH 103. Introduction to Geophysics  
ERTH 120. Mineralogy  
ERTH 162A. Introduction to Field Geology  
ERTH 162L. Structural Analysis for Field Geology
- Chemistry requirements:  
Chemistry 120A. Inorganic Chemistry  
Chemistry 131. Physical Chemistry  
Chemistry 140A. Organic Chemistry
- Chemistry restricted electives. (Total of sixteen units required), at least eight units from:  
Chemistry 140B, C. Organic Chemistry  
Chemistry 143A, B. Organic Chemistry Lab  
Chemistry 132, 133. Physical Chemistry  
\*Chemistry 105A, B. Physical Chemistry Lab  
Chemistry 106. Instrumental Analysis Lab  
up to eight units from:  
Chemistry 120B, C. Inorganic Chemistry  
Chemistry 122. Biochemical Evolution  
Chemistry 149A, B. Environmental Geochemistry  
Chemistry 170. Cosmochemistry  
Chemistry 171. Nuclear Chemistry  
Chemistry 173. Atmospheric Chemistry
- Earth Sciences restricted electives: at least sixteen units selected from among the following courses must be passed with a 2.0 grade-point average and grades of C- or better:  
ERTH 130. Geodynamics of Terrestrial Planets  
ERTH 142. Atmospheric Chemistry  
ERTH 144. Isotope Geochemistry  
ERTH 152. Petrology and Petrography  
ERTH 155. Igneous and Metamorphic Processes  
ERTH 160. Tectonics and Structural Geology  
SIO 226. Introduction to Marine Geophysics  
SIO 240. Marine Geology  
SIO 247. Rock Magnetism and Paleomagnetism  
SIO 260. Marine Chemistry

Students may wish to incorporate a small portion of the major program into their lower-division course load, for example, Chemistry 120A, Chemistry 140A.

\* Requires prerequisite other than earth science requirements.

A possible schedule yields:

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Chem. 140A	Chem. 131	ERTH 103
Chem. Elect.	Chem. Elect.	ERTH Elect.
ERTH Elect.	ERTH 120	ERTH Elect.
<b>SENIOR YEAR</b>		
Chem. Elect.	Chem. Elect.	ERTH Elect.
ERTH Elect.	ERTH 162A	ERTH Elect.
—	ERTH 162L	—

### ERTH/Physics Major

This specialization focuses on the mechanical, dynamical, and thermodynamical aspects of the Earth. Emphasis is placed on a solid background of fundamental physics, from mechanics and electromagnetism to continuum- and quantum mechanics, and on the necessary mathematical skills. The major introduces basic techniques used to investigate the internal structure of the Earth, from seismology to the study of potential fields, and space geodesy. Elementary geodynamics, including the physics of simple convective systems, introductory rock mechanics, and plate kinematics are among topics introduced. At the same time, a "hands on" exposure to field problems and techniques will be accessible through a Natural Resources and Field Geophysics sequence.

### Upper-Division Requirements

In addition to ERTH 101 and ERTH 102 (see lower-division requirement), the following courses must be taken for a letter grade:

- Earth Sciences requirements:  
ERTH 103. Introduction to Geophysics
- Physics requirements:  
Physics 100A-B-C. Electromagnetism  
Physics 110A-B. Mechanics
- Physics restricted electives: minimum of four units selected from:  
Physics 121. Experimental Techniques  
Physics 140A, B. Statistical and Thermal Physics  
Physics 105. Computational Physics  
AMES 130A. Solid Mechanics I  
AMES 144A. Space Science and Engineering
- Mathematics restricted electives: minimum of eight units selected from:

- Mathematics 110. Partial Differential Equations or equivalent
  - Mathematics 102. Linear Algebra or equivalent
  - Mathematics 120A, B. Complex Analysis or equivalent
  - Mathematics 183. Statistical Methods or equivalent
- Earth Sciences restricted electives: at least 16 units selected from among the following courses must be passed with a 2.0 grade-point average and grades of C- or better:  
ERTH 120. Mineralogy  
ERTH 130. Geodynamics of Terrestrial Planets  
ERTH 155. Igneous and Metamorphic Processes  
ERTH 160. Tectonics and Structural Geology  
ERTH 162A. Introduction to Field Geology  
ERTH 162L. Structural Analysis for Field Geology  
ERTH 180. Geophysics of Natural Resources  
ERTH 182. Field Geophysics  
SIO 223. Geophysical Data Analysis  
SIO 224. Physics of the Earth Interior  
SIO 226. Introduction to Marine Geophysics  
SIO 227. Advanced Seismology  
SIO 247. Rock Magnetism & Paleomagnetism

Students may wish to incorporate a small portion of the major program into their lower-division course load, for example, Physics 105, Mathematics 110, or equivalent. Students intending to do graduate work in geophysics are encouraged to take the Physics 4 sequence rather than the Physics 2 sequence. Students are also strongly encouraged to participate in a field geology course.

An example schedule is outlined below.

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Phys. 100A	Phys. 100B	Phys. 100C
Phys. 110A	Phys. 110B	—
—	—	Math. 110
—	—	ERTH 103
<b>SENIOR YEAR</b>		
Phys. Elect.	—	ERTH Elect.
Math. Elect.	Math. Elect.	—
—	—	ERTH Elect.
ERTH 130	ERTH Elect.	—

**ERTH/General**

The general ERTH major is designed to allow students maximum flexibility in tailoring the curriculum to their interests, within the constraints of obtaining the necessary background in physical, biological, and earth sciences. Compared to the ERTH/Chemistry and ERTH/Physics tracks, it requires more earth science and fewer non-earth science courses. As this major track is still under development, please check with the Earth Science Office periodically for updates. In particular, a new upper division course in earth history, which will be a required course for this major, is being designed and will be offered in the near future. In the interim, students in this major should take ERTH 12.

**Upper-Division Requirements**

In addition to ERTH 101 and ERTH 102 (see lower-division requirements), the following courses must be taken for a letter grade:

1. Earth Sciences requirements:
  - ERTH 103. Introduction to Geophysics
  - ERTH 120. Mineralogy
  - ERTH 152. Petrology and Petrography
  - ERTH 160. Tectonics and Structural Geology
  - ERTH 162A. Introduction to Field Geology
  - ERTH 162L. Structural Analysis for Field Geology
  - ERTH 180. Geophysics of Natural Resources
  - ERTH 182. Field Geophysics
2. Chemistry requirements:
  - Chemistry 131. Physical Chemistry
3. Upper-division restricted electives: at least eight units from earth sciences and at least twelve units from non-earth science courses.
  - ERTH 130. Geodynamics of Terrestrial Planets
  - ERTH 142. Atmospheric Chemistry
  - ERTH 144. Isotope Geochemistry
  - ERTH 155. Igneous and Metamorphic Processes
  - SIO 223. Geophysical Data Analysis
  - SIO 224. Physics of the Earth Interior
  - SIO 226. Introduction to Marine Geophysics
  - SIO 227A. Advanced Seismology
  - SIO 234. Introduction to Geodynamics
  - SIO 240. Marine Geology
  - SIO 242. Controversies in Geomorphology
  - SIO 245A. Interpretation of the Sedimentary Record

- SIO 247. Rock Magnetism & Paleomagnetism
- SIO 253. Igneous and Metamorphic Petrology
- SIO 260. Marine Chemistry
- AMES 130A. Solid Mechanics
- AMES 144A. Space Science and Engineering
- BIBC 100. Structural Biochemistry
- BIEB 120. General Ecology
- BIBC 130. Marine Biochemistry
- BIEB 130. Introductory Marine Ecology
- BIEB 150. Introductory Marine Ecology Evolution
- Chemistry 105A,B. Physical Chemistry Lab
- Chemistry 120A,B,C. Inorganic Chemistry
- Chemistry 122. Biochemical Evolution
- Chemistry 132, 133. Physical Chemistry
- Chemistry 140A,B,C. Organic Chemistry
- Chemistry 143A,B. Organic Chemistry Lab
- Chemistry 149A,B. Environmental Geochemistry
- Chemistry 170. Cosmochemistry
- Chemistry 171. Nuclear and Radiochemistry
- Chemistry 173. Atmospheric Chemistry
- Mathematics 102. Linear Algebra
- Mathematics 110. Partial Differential Equations or equivalent
- Mathematics 120A,B. Complex Analysis
- Mathematics 183. Statistical Methods
- Physics 100A,B,C. Electromagnetism
- Physics 105. Computational Physics
- Physics 110A,B. Mechanics
- Physics 121. Experimental Techniques
- Physics 140A,B. Statistical and Thermal Physics

A possible schedule yields :

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Chem. 6A Math. 20A	Chem. 6B Chem. 6BL Math. 20B	Chem. 6C Math. 20C
<b>SOPHOMORE YEAR</b>		
Phys. 2A Math. 20D ERTH 101	Phys. 2B ERTH 102	Phys. 2C BILD 3
<b>JUNIOR YEAR</b>		
Chem. 131 ERTH 110 ERTH 160	ERTH 120 Elect.	ERTH 103 ERTH 152 Elect.
<b>SENIOR YEAR</b>		
Elect. Elect. Elect.	ERTH 162A ERTH 162L	ERTH 180 ERTH 182

**Earth Sciences Minor**

A minor in earth sciences consists of twenty-eight units of earth science courses, at least twenty of which must be upper-division, focused on geology, geochemistry, or geophysics. Courses required by a student's major may not be applied toward a minor and neither can ERTH 198 nor ERTH 199. Courses for the minor may be taken on a Pass/Not Pass basis if the student's college permits.

**Honors Program**

The Earth Sciences Program offers an Honors Program for a limited number of students who have demonstrated excellence in the major. Students are eligible for admission to the program when they have:

1. Completed ninety units of courses including twelve units of Earth science courses.
2. Achieved a GPA of 3.3 overall and 3.5 in earth science courses.
3. Submitted to the Earth Science Steering Committee, and had approved, an honors thesis research proposal.

Successful completion of the Honors Program requires:

1. Maintenance of a GPA of 3.3 overall and 3.5 in earth science courses.
2. Completion, with a B grade or higher, of a minimum of eight units of ERTH 199 related to the honors thesis research, distributed over at least two quarters. These units must be in addition to the ordinary major requirements. However, students who subsequently fail to complete the Honors Program may apply up to four of these 199 units to their major.
3. Acceptance of a written honors thesis report by a committee of not fewer than three faculty members.
4. Satisfactory presentation of an oral report on the thesis research, preferably at a public undergraduate research conference on campus, or at an earth science conference. Alternatively, the oral report may be given at a seminar involving honors students and at least three faculty members.



Students who successfully complete the Honors Program will graduate with "high distinction".

Students who are interested in the Honors Program should contact the undergraduate coordinator in Revelle Commons, Trailer 100, room 102.

Study abroad through the **Education Abroad Program** or **Opportunities Abroad Program** can enhance a student's major, particularly as an opportunity for diverse field experiences. However, careful planning is important to meet all major requirements. Please contact the Earth Sciences Office as early as possible if you are planning to study aboard.

### Careers in Education

Students interested in a teaching career should be aware that the earth sciences major, because of its broad course requirements in the sciences, fulfills many of the subject requirements for obtaining a California Teaching Credential through UCSD's Teacher Education Program (TEP). The projected high demand over the next decade for well-trained teachers, particularly in the sciences, makes this an attractive option for many students. Students who wish to take advantage of this opportunity may wish to complete a minor in education. Please contact the TEP office directly for further details.

### Contiguous Bachelor's/ Master's Degree Program

The Earth Sciences Program offers a contiguous bachelor's/master's program. It is limited to UCSD students with a bachelor's degree in earth sciences, or those who graduate in another discipline with an earth sciences specialization or minor. A minimum undergraduate GPA of 3.0 overall and 3.3 in upper-division courses is required for admission. Please contact the Earth Sciences Office in the Revelle Commons, Trailer 100, room 102 for information.

### Earth Sciences Graduate Program

Graduate degrees in the earth sciences are offered through the Scripps Institution of

Oceanography Graduate Department. See listings under "Scripps Institution of Oceanography" for detailed information.

## COURSES

**NOTE: The program will endeavor to offer the courses outlined below. However, unforeseen circumstances (particularly changes in ship schedules) sometimes mandate a change of scheduled offerings, especially the quarter offered (F,W,S). Students are strongly advised to check the Schedule of Classes or to contact the Earth Sciences Program Office (Revelle Commons, Trailer 100, room 102, (619) 534-8157) in order to obtain up-to-date information.**

### LOWER-DIVISION

#### ERTH 10. The Earth (4)

A basic introduction to geology for students with little previous science background. The course stresses understanding of the concepts of the structure of the Earth and the processes which have formed it and continue to modify it. The course emphasizes material which every educated citizen should know for appreciation and enjoyment of the world around us, for understanding geological events as reported in the news, and for participating in making intelligent decisions regarding the future of our environment. Three-hour lecture plus optional local field trips. (W)

#### ERTH 12. History of the Earth and Evolution (4)

Evolution of the Earth from its origin in the early solar system to formation of continents and ocean basins, and how the planet became habitable. It examines the geologic record of evolution, extinction, plate tectonics, and climate changes through time. Three-hour lecture. *Prerequisite: none.* (F)

#### ERTH 20. The Atmosphere (4)

Descriptive introduction to meteorology and climate studies. Topics include global and continental wind and precipitation patterns, weather forecasting, present climate and past climate changes (including droughts, El Niño events), man-made modification of climate, including CO<sub>2</sub> and other "greenhouse" gases effects, ozone destruction, "little ice ages," acid rain. Three-hour lecture. *Prerequisites: some high school physics and chemistry background recommended.* (W)

#### ERTH 30. The Oceans (4)

Presents modern ideas and descriptions of the physical, chemical, biological, and geological aspects of oceanography, and considers the interactions between these aspects. Intended for students interested in the oceans, but who do not necessarily intend to become professional scientists. Three-hour lecture, one-hour discussion. *Prerequisite: some background in high school chemistry recommended.* (F)

#### ERTH 40. Earth Sciences and the Environment (4)

A survey of Earth and environmental sciences as they deal with human's impact on the global environment and the availability of resources. Topics chosen may vary somewhat from year to year, but focus on the evidence for, and the dynamics of, global change from human activity. Resource limitations, cli-

mate modification, water cycle, ecological principles, and basic political and economic factors are discussed in the framework of global habitat modification, including large-scale extinction. (S)

#### ERTH 50. Environmental Perils (4)

An introductory field-oriented course for engineering and science students stressing the geologic basis for environmental perils such as earthquakes, erosion, flooding, and waste disposal. Two one-hour lectures and a two-hour lab/field trip each week. One Saturday field trip. (S)

#### ERTH 96. Frontiers in the Earth Sciences (2)

An introduction to current research in the earth sciences. Background in science not required, but may be useful for some topics. Areas covered vary from year to year. (S)

### UPPER-DIVISION

#### ERTH 101. Introduction to Geology (5)

This introductory course traces the evolution of the Earth from its formation as a planet in the solar system to its present state. A broad range of subjects, from the effect of the atmosphere and weather on the Earth's surface to formation of mountain ranges and the ocean basins through plate tectonics helps create an awareness in students of the geologic environment in which they live. The course includes laboratory sections and several local field trips. *Prerequisites: one year each of college-level math, physics, and chemistry, or consent of instructor.* (F)

#### ERTH 102. Introduction to Geochemistry (4)

A broad introduction to the chemical composition and evolution of the Earth and the solar system. This course explores applications of chemical methods to elucidate the origin and geologic history of the Earth and the planets, the evolution of the oceans and atmosphere, and the impact of humankind on the environment. *Prerequisites: EARTH 101, Chemistry 6A-B-C or equivalent, first-year, mathematics, and physics, or consent of instructor.* (W)

#### ERTH 103. Introduction to Geophysics (4)

An introduction to the use of physical measurements to determine the structure and composition of the solid Earth. Topics include an introduction to earthquake seismology, the gravity and magnetic fields, isostasy, and elementary concepts in geodynamics. The course summarizes current knowledge of the interiors of the Earth as determined by modern geophysical techniques. *Prerequisites: Mathematics 20 and Physics 2 sequence or equivalent, EARTH 101; or consent of instructor.* (S)

#### ERTH 120. Introduction to Mineralogy (4)

This course focuses on the symmetry, crystal structure, chemical, and physical properties of minerals with special emphasis on the common rock-forming minerals, and highlights the applications of mineralogical and X-ray crystallographic techniques to a spectrum of important problems in the earth sciences. The laboratory will introduce the students to the polarizing microscope and X-ray powder diffraction methods for the study of rock-forming minerals. *Prerequisites: EARTH 101, EARTH 102 (may be taken concurrently with EARTH 102).* (W)

#### ERTH 130. Geodynamics of Terrestrial Planets (4)

Planetary differentiation through geodynamical processes is the fundamental agent controlling the evolution of the planet on geological time scales. Similarities and differences between the Earth, Venus, Mars, and other terrestrial planets and satellites teach us about the processes which shape a planet's formation and evolution. The course includes a computer-oriented lab. *Prerequisites: Mathematics 20 and Physics 2 sequence, or consent of instructors.* Offered in alternate years (offered 1999-2000). (F)

**ERTH 142. Atmospheric Chemistry and the Biochemical Cycles of Atmospheric Trace Gases (4)**

Evolution of the Earth's atmosphere, from the earliest days of the planet to the present, and into the future. The atmospheres of other terrestrial planets are discussed to provide a planetary perspective. Discussions will include effects of "greenhouse" gases such as H<sub>2</sub>O, CO<sub>2</sub>, and CH<sub>4</sub> in climate modification, and other influences of civilization's byproducts on atmospheric chemistry, e.g., the destruction of the ozone layer. The biogeochemical cycles of the radioactively important trace gases will be examined. *Prerequisites: Chemistry 6 sequence or equivalent.* Offered in alternate years (offered 1999–2000). SIO staff. (S)

**ERTH 144. Isotope Geochemistry (4)**

Isotopic ratios of various elements serve as natural tracers, as chronometers, and as geothermometers. Thus isotope measurements have become an indispensable tool for earth scientists. This course introduces students to the theory of radioactivity, geochronology, and stable isotope fractionation and shows how these principles are used to investigate important geochemical problems. *Prerequisites: EARTH 101, EARTH 102, EARTH 120.* Offered in alternate years (offered 1998–99). (S)

**ERTH 152. Petrology and Petrography (4)**

Mineralogic, chemical, textural, and structural properties of igneous, metamorphic, and sedimentary rocks; their origin and relations to evolution of the Earth's crust and mantle. Includes rocks of both the continents and ocean basins. The laboratory emphasizes both hand specimens and microscopic studies of rocks in thin sections. *Prerequisites: EARTH 101, EARTH 102, and EARTH 120 or their equivalents.* (S)

**ERTH 155. Igneous and Metamorphic Processes (4)**

This course provides an overview of the Earth from a geochemical and petrogenetic point of view. Topics include the formation and chemical differentiation of material in the solar system, the formation and differentiation of the Earth into core, mantle, crust and atmosphere/hydrosphere, the generation of magma in a variety of plate tectonic settings, and isotope and trace element geochemistry of igneous and metamorphic rocks. Literature readings will be assigned for most topics and discussion is expected of everyone. *Prerequisite: EARTH 152, or consent of instructors.* (F)

**ERTH 160. Tectonics and Structural Geology (4)**

The major structural features both large and small of the continents and oceans are introduced in terms of the theory of plate tectonics. The first half of the course will focus on the large-scale features associated with plate boundaries on the ocean floor and the continents. The second half will examine the detailed structure of these plate boundary regions at the map and outcrop level. *Prerequisites: EARTH 101, EARTH 103, or consent of instructor.* Offered in alternate years (offered 1998–99). (F)

**ERTH 162A. Introduction to Field Geology (4)**

Mapping and interpretation of geologic units and structures in the field. Field observations at the surface are related to theory and extrapolated to three dimensions. Field work is done on weekends in local areas; field data are discussed and evaluated through applicable geologic principles in the laboratory. *Prerequisites: EARTH 101, EARTH 120 or consent of instructor.* To be taken concurrently with EARTH 162L. (W)

**ERTH 162L. Structural Analysis for Field Geology (2)**

Principles of stratigraphy and structural geology applicable to field geologic studies. Discussion and laboratory exercises. *Prerequisites: EARTH 101, EARTH 120, or consent of instructor.* To be taken concurrently with EARTH 162A. (W)

**ERTH 180. Geophysics of Natural Resources (4)**

Introduction to seismic, gravity, magnetic, and electrical methods used in exploration geophysics on scales of hundreds of kilometers to tens of meters. These are the principal means of

discovering energy and mineral resources such as oil, gas, and ore deposits. Emphasis is on the underlying physical principles of the methods, instrumentation, and data interpretation, including an introduction to geophysical inverse theory. *Prerequisites: Mathematics 20 and Physics 2 sequence or equivalent, or consent of instructor.* EARTH 182 can be taken concurrently. (S)

**ERTH 182. Field Geophysics (4)**

Introduction to design and execution of simple geophysical field experiments, including seismic, gravimetric, geoelectrical, and geodetic techniques. The focus is on a simple geological problem that can be solved by geophysical experiments. Computer-aided data analysis and interpretation. *Prerequisites: EARTH 180 (can both be taken concurrently) or consent of instructor.* (S)

**ERTH 190. Special Topics in Earth Sciences (2-4)**

A seminar course designed to treat emerging or topical subjects in the Earth Sciences. Involved reading from the literature and student participation in discussion. Topics vary from year to year.

**ERTH 196. Honors Thesis Research (4)**

Independent reading or research on a problem. By special arrangement with a faculty member. (Letter grade only.)

**ERTH 198. Directed Group Study (2-4)**

This course covers a variety of directed group studies in areas not covered by formal EARTH courses (P/NP grades only.) *Prerequisite: consent of instructor.*

**ERTH 199. Independent Study for Undergraduates (4)**

Independent reading or research on a problem. By special arrangement with a faculty member. (P/NP grades only.)

## Economics

OFFICE: 114 Economics Building

**Professors**

Richard E. Attiyeh, Ph.D.  
 Donald V.T. Bear, Ph.D., *Emeritus*  
 Richard T. Carson, Ph.D.  
 John Conlisk, Ph.D.  
 Vincent P. Crawford, Ph.D.  
 Robert F. Engle, Ph.D.  
 Clive W.J. Granger, Ph.D.  
 Theodore Groves, Ph.D.  
 James D. Hamilton, Ph.D.  
 Walter P. Heller, Ph.D.  
 Mark J. Machina, Ph.D., *Academic Senate Distinguished Teaching Award*  
 Ramachandra Ramanathan, Ph.D.  
 Valerie Ramey, Ph.D.  
 James E. Rauch, Ph.D.  
 Joel Sobel, Ph.D.  
 Ross M. Starr, Ph.D.  
 Halbert L. White, Ph.D.

**Research Professor**

Harry M. Markowitz, Ph.D.

**Associate Professors**

Julian Betts, Ph.D.  
 Wouter J. Den Haan, Ph.D.  
 Marjorie Flavin, Ph.D.  
 José Luis Guasch, Ph.D.  
 Garey Ramey, Ph.D.  
 Dennis E. Smallwood, Ph.D., *Emeritus*  
 Allan Timmermann, Ph.D.  
 Joel Watson, Ph.D.

**Assistant Professors**

Graham Elliott, Ph.D.  
 Leora R. Friedberg, Ph.D.  
 Steven P. Raphael, Ph.D.  
 David A. Riker, Ph.D.  
 Jason M. Shachat, Ph.D.

**Adjunct Professors**

Lawrence Krause, Ph.D., (*IR/PS*)  
 R. John McMillan, Ph.D., (*IR/PS*)  
 Dale Squires, Ph.D., (*IR/PS*)

**Associated Faculty**

Nathaniel Beck, Ph.D., (*Pol Sci*)  
 Michael Bernstein, Ph.D., (*History*)  
 Takeo Hoshi, Ph.D., (*IR/PS*)  
 Alex Kane, Ph.D., (*IR/PS*)  
 Bruce Lehmann, Ph.D., (*IR/PS*)

### Introduction

Economics is the study of how individuals, organizations, and societies deal with scarcity—the problem that available resources are not sufficient to satisfy everyone's wants. Because scarcity requires choice (frequently referred to as trade-off) among alternative uses of resources, economics involves both study of the technology by which resources are turned into the products people want and study of the preferences through which people choose among alternatives. Further, since society is composed of many individuals and groups, economics involves study of the institutions through which a society can gain the advantages of cooperation and resolve the conflicts due to competing goals. The economics curriculum develops tools and uses them to analyze a wide range of societal problems, and also to study the role of the government in solving the problems.

Economics is a different discipline from business administration. However, there are sub-

stantial overlaps. Both disciplines study the behavior of individuals and business firms within the context of market, legal, and other institutions. Economists tend to emphasize the workings of the institutions from the viewpoint of the larger society. How well do the institutions serve the society? Business faculty tend to emphasize the workings of the institutions from the viewpoint of a business enterprise. How can an enterprise operate successfully within the institutions? A fuller discussion is available in the department brochure (described in the next paragraph). The brochure compares a major in economics here at UCSD to a major in business administration at UC Berkeley.

Economics majors and minors are strongly encouraged to obtain a general campus personal student computer account by applying to Academic Computing Services Office, 1218 AP&M. After obtaining a personal account students must then register that account with the Department of Economics Undergraduate Coordinator (room Economics 114) to get electronic mail messages from the department.

The department circulates an informational brochure for undergraduates. It is available from Room 114 of the Economics Building. The brochure answers questions frequently asked by students, gives practical tips for avoiding problems, and, in general, provides a more detailed discussion than is possible in this catalog. It is important for students contemplating a major in the department to be familiar with the brochure and with the course prerequisites listed therein.

Students interested in the Education Abroad Program (EAP) are encouraged to check out the brochure "Opportunities in Business and Economics" available from the department and the EAP Office.

### The Undergraduate Program

#### Lower-Division Economic Courses

##### A FIRST SURVEY COURSE— ECONOMICS 10

Economics 10 is an elementary and nontechnical survey of economic reasoning, with emphasis on applications to current events. The course uses only the simplest formal tools (simple equations and graphs). Several purposes are served by Economics 10—economic

literacy for students who never take more economics, the first course of a two- or three-quarter sequence for students satisfying general-education requirements, and a starting point for students minoring or majoring in economics.

Economics 10 is recommended for most students who intend a minor or major in economics. However, students who have already taken a year or more of economics at the college level are viewed as having passed the level of Economics 10; hence they may not go back and take Economics 10 for credit.

##### MICROECONOMICS AND MACROECONOMICS—ECONOMICS 1A-B AND 2A-B

The department offers two micro-macro sequences, Economics 1A-1B and Economics 2A-2B. For each sequence, the A course introduces the analytical tools of microeconomics (the study of households, firms, and other "micro" agents). The B course introduces the analytical tools of macroeconomics (the study of the aggregate performance of an economy). The 1A-1B courses differ from the 2A-2B courses only in that the latter use calculus in the presentation. Mathematics 10A-10B-10C or 20A-20B-20C is the prerequisite for Economics 2A-2B. Micro and macro courses may be taken in either order, or simultaneously. For example, 1B may be taken before, after, or simultaneously with 1A.

A micro-macro combination (such as Economics 1A-1B), or the equivalent from another institution, is required for upper-division work in economics.

Modern economics is somewhat mathematical, and calculus is a standard working tool. Therefore, there are educational advantages in taking the calculus track (Economics 2A-2B rather than Economics 1A-1B). Students who plan an economics or management science major, especially the latter, are well advised to take the calculus track. However, students who are unable to do so for scheduling or other reasons may be reassured by the fact that Economics 1A-1B satisfies the same requirements as Economics 2A-2B, and by the fact that the economic substance of 1A-1B is the same as for 2A-2B.

Because the substance is the same, it is acceptable to mix courses from the calculus and noncalculus tracks. That is, Economics 1A-2B or

Economics 2A-1B are acceptable combinations. For the same reason, students should not take and will not receive credit for both 1A and 2A or for both 1B and 2B.

#### Accounting Course

The department offers an accounting course, Economics 4. Economics 4 is a lower-division requirement for the B.S. in management science and the management science minor. The course is a prerequisite for Economics 173, Corporate Finance. Economics 4 can be used as an optional part of an economics major or minor; and the course is open to students who take no other courses from the department.

#### Upper-Division Economics Courses

The upper-division economics core courses are scheduled according to the academic calendar. The "A" and "C" courses are offered in fall. The "A" and "B" courses are offered in the winter. The "B" and "C" courses are offered in spring. The following economics core courses are sequential. That is "A" must be taken before "B" before "C".

Economics 100A-B

Economics 110A-B

Economics 170A-B

Economics 120A-B-C

Economics 172A must be taken first. Economics 172B and 172C may be taken in either order.

#### Entry to the Majors

Any student in good standing may declare a major in the department by filling out a form at the Office of the Registrar.

#### The Economics Major

The economics B.A. program is designed to provide a broad understanding of resource-allocation and income-determination mechanisms. Both the development of the tools of economic analysis and their application to contemporary problems and public policy are stressed.

A student majoring in economics must meet the following requirements:

1. Calculus. Mathematics 10A-10B-10C or Mathematics 20A-20B-20C.
2. Lower-division economics. Economics 1A-1B, or 2A-2B or 1A-2B or 2A-1B.

3. Upper-division core. Economics 100A-B (microeconomics), Economics 110A-B (macroeconomics), and Economics 120A-B-C (econometrics).

4. Upper-division electives. Five more economics courses at the upper-division level.

Majors are strongly encouraged to complete the lower-division requirements (1 and 2) before beginning the upper-division requirements (3 and 4). Further, majors are strongly encouraged to take Economics 100A-B and either 110A-B or 120A-B-C prior to the senior year, since numerous upper-division electives have core-course prerequisites.

The following schedule, though not the only possibility, is a well-constructed one for majoring in economics.

#### **FRESHMAN YEAR**

Mathematics 10A-10B-10C or Mathematics 20A-B-C

#### **SOPHOMORE YEAR**

Economics 1A-B or Economics 2A-B or Economics 10-1A-1B or Economics 10-2A-2B

#### **JUNIOR YEAR**

Economics 100A-B  
Economics 110A-B  
Economics 120A-B-C

#### **SENIOR YEAR**

Five Economics Electives

A fuller description of the economics major is contained in the brochure *Economics Curriculum*, available at Room 114 of the Economics Building.

### ***The Management Science Major***

Management science builds on a set of related quantitative methods commonly used to solve problems arising in the private (business and finance) and public (government) sectors. While students will gain some familiarity with the traditional functional fields of business management, this program is more tightly focused and more quantitative than a traditional business administration major. It is not, however, a program in applied mathematics or operational research, since the economic interpretation and application of the tools are continually stressed. Rather, it is a quantitative major in applied economics with a management focus. Before beginning upper-division work, a major must complete Economics 2A-B,

Economics 4, Mathematics 20A-B-C, and Mathematics 20F. Economics 1A may be substituted for 2A, or 1B for 2B. However, 2A-B are recommended. These courses provide both the understanding of basic principles and the mathematical maturity needed to understand the quantitative techniques of management science.

The management science major requires a total of 15 upper-division courses. Nine of these are specified: Economics 170A-B (Management Science Microeconomics), Economics 120A-B-C (Econometrics), Economics 171 (Decisions Under Uncertainty), and Economics 172A-B-C (Introduction to Operations Research). The 170 sequence concerns the nature and interdependence of managerial resource allocation decisions. Economics 120A-B-C teaches the theory and use of statistics and econometrics. The 172 sequence provides a general survey of optimization and problem-solving techniques employed by management scientists.

Of the six management science electives, at least one must be chosen from Economics 173 (Corporate Finance) or Economics 175 (Financial Investments). Two must be chosen from Economics 174 (Insurance, Economics, and Finance), Economics 175 (Financial Investments), Economics 176 (Marketing), Economics 177 (Topics in Operations Research), Economics 178 (Economic and Business Forecasting), or Economics 179 (Decisions in the Public Sector). Each of these courses focuses on an important set of managerial problems. The remaining three electives may be chosen from among other upper-division economics courses.

The following schedule, though not the only possibility, is a well-constructed one for a student majoring in Management Science.

#### **FRESHMAN YEAR**

Mathematics 20A-B-C

#### **SOPHOMORE YEAR**

Economics 2A-B or 1A-B or 10-2A-2B or 10-1A-1B  
Economics 4  
Mathematics 20F

#### **JUNIOR YEAR**

Economics 170A-B  
Economics 120A-B  
Economics 171  
Economics 172A-B-C

#### **SENIOR YEAR**

Six Economics Electives

A fuller description of the management science major is contained in the brochure *Economics Curriculum* available at Room 114 of the Economics Building.

### ***Joint Major in Mathematics and Economics***

Majors in mathematics and the natural sciences often feel the need for a more formal introduction to issues involving business applications of science and mathematics. Extending their studies into economics provides this application and can provide a bridge to successful careers or advanced study. Majors in economics generally recognize the importance of mathematics to their discipline. Undergraduate students who plan to pursue doctoral study in economics or business need the more advanced mathematics training prescribed in this major.

This major is considered to be excellent preparation for Ph.D. study in economics and business administration, as well as for graduate studies for professional management degrees, including the MBA. The major provides a formal framework making it easier to combine study in the two fields.

Course requirements of the Joint Major in Mathematics and Economics consist principally of the required courses of the mathematics major and the economics/management science majors:

#### **Lower-Division Requirements:**

1. Calculus and Linear Algebra. Mathematics 20A-B-C-D-F
2. Introductory Economics. Economics 1A or 2A and 1B or 2B

#### **Upper-Division Requirements:**

Fifteen upper-division courses in mathematics and economics, with a minimum of seven courses in each department, chosen from the courses listed below (prerequisites are strictly enforced):

1. Mathematical Reasoning. Mathematics 109 (formerly Math. 89)
2. One of the following:  
Applied Linear Algebra. Mathematics 102  
Numerical Linear Algebra. Mathematics 170A  
Linear Algebra. Mathematics 100AB

3. One of the following:  
Foundations of Analysis. Mathematics 140A  
Advanced Calculus. Mathematics 142A
  4. One of the following:  
Ordinary Differential Equations.  
Mathematics 130A  
Foundations of Analysis. Mathematics 140B  
Advanced Calculus. Mathematics 142B
  5. One of the following:  
Microeconomics. Economics 100AB  
Management Science Microeconomics.  
Economics 170AB
  6. Econometrics. Economics 120A  
(or Introduction to Probability. Mathematics 180A and Introduction to Mathematical Statistics. Mathematics 181)  
and  
Economics 120BC
  7. One of the following:  
Macroeconomics. Economics 110AB  
Mathematical Programming: Numerical  
Optimization. Mathematics 171AB  
or  
Two of the following:  
Decisions Under Uncertainty. Economics 171  
Introduction to Operations Research.  
Economics 172A-B-C (**Note:** 172A is a  
prerequisite for 172BC)
- Other courses which are strongly recommended are: Mathematics 130B, 131, 181B, 185, 190 and 193A-B and Economics 109, 113, 155, 175, 177 and 178.

Further Information may be obtained in the mathematics and economics undergraduate offices.

### *The Quantitative Economics and Decision Sciences Major*

The quantitative economics and decision sciences major, hereafter referred to as the "QEDS major," was an early variant of the management science major. **This major is only available to students who entered UCSD prior to fall 1994.** Relative to the standard economics major described above, the QEDS major places less emphasis on macroeconomics and more emphasis on microeconomics. Within microeconomics, it places more emphasis on the theory of the firm and less on the theory of the household. It also places greater emphasis

on mathematical and statistical tools through which microeconomic decisions can be analyzed. A student majoring in QEDS must meet the following requirements.

1. Calculus and linear algebra. Mathematics 20ABC-20F.
2. Lower-division economics. Economics 2A-2B. Economics 1A may be substituted for 2A, or 1B for 2B. However, 2A-B is recommended.
3. Introductory statistics and computer use. Economics 80. (However, some students may elect instead to meet an older computer requirement. These are students who first enrolled at UCSD prior to fall 1989, or who were enrolled at another college or university prior to fall 1989 and within three years of enrollment at UCSD, provided that the prior enrollment was not solely during high school and the first summer following high school. The older requirement is to take one of the following programming courses: AMES 5, AMES 10, CSE 62A, CSE 65, Mathematics 71, Mathematics 77.)
4. Upper-division core. Economics 170A-B (microeconomics), Economics 120A-120B-120C-171 (econometrics and decisions under uncertainty), and Economics 172A-B-C (operations research).
5. Upper-division electives. Six upper-division economics courses. Two of the six must be from the group Economics 175, 176, 177, 178, and 179.

The following schedule, though not the only possibility, is a well-constructed one for a student majoring in QEDS.

#### **FRESHMAN YEAR**

Mathematics 20A-B-C

#### **SOPHOMORE YEAR**

Economics 2A-B or 10-2A-2B  
Mathematics 20F

#### **JUNIOR YEAR**

Economics 170A-B  
Economics 120A-B-C  
Economics 171  
Economics 172A-B-C

#### **SENIOR YEAR**

Six Economics Electives

A fuller description of the QEDS major is contained in the brochure *Economics Curriculum*, available at Room 114 of the Economics Building.

### *Honors*

The requirements for departmental honors are described in the brochure *Economics Curriculum*, available at Room 114 of the Economics Building. The honors track for both economics and management science are declared as separate majors. Both require fifteen upper-division courses.

### *Grade Rules for Majors*

All courses used in meeting requirements for an economics, management science, or a QEDS major must be taken on a letter-grade basis. (Exceptions are courses such as Economics 195 and Economics 199, for which P/NP grading is mandatory. However, no more than twelve units taken P/NP may be counted toward a major.) These courses must be passed with a grade of C- (C minus) or better. These rules apply to lower-division as well as upper-division courses, and they apply to courses taken from other departments (such as required mathematics courses).

### *Advanced Placement Credits*

Because no high school economics course provides the kind of background needed for upper division economics and management science, we are strict on allowance of credits. The policy is as follows: *Requirements for economics or management science majors and minors:* If the AP score is 5, accept AP Micro (AP Macro) as equivalent to Economics 1A (Economics 1B) in meeting major or minor requirements. If the score is 3 or 4, the student is required to take Economics 1A or 2A (1B or 2B).

### *Minors and Programs of Concentration*

The economics minor consists of seven courses: an introductory microeconomics course (Economics 1A or 2A); an introductory macroeconomics course (Economics 1B or 2B); and five upper-division economics courses, which are otherwise not restricted.

The management science minor, paralleling the existing economics minor, consists of an introductory micro course (Economics 1A or 2A,) an introductory macro course (Economics 1B or 2B,) Economics 4, and any five from the following list (Caution: some courses have prerequisites):

Economics 170A	Managerial Microeconomics
Economics 170B	Managerial Microeconomics
Economics 120A	Econometrics
Economics 120B	Econometrics
Economics 120C	Econometrics
Economics 171	Decisions Under Uncertainty
Economics 172A	Operations Research
Economics 172B	Operations Research
Economics 172C	Operations Research
Economics 173	Corporate Finance
Economics 174	Insurance, Economics and Finance
Economics 175	Financial Investments
Economics 176	Marketing
Economics 177	Topics in Operations Research
Economics 178	Economic and Business Forecasting
Economics 179	Decisions in the Public Sector

To declare an economics or management science minor, obtain a minor declaration form from your college advising office, fill it out, and turn it in at the department (Room 114). Students should check with their colleges regarding area of focus, programs of concentration, and project minors.

### The Graduate Program

The department offers the M.A., C.Phil., and Ph.D. degrees in economics. However, a student must be admitted to the Ph.D. program in order to be eligible for an M.A. or C.Phil. The department also offers the Ph.D. degree in economics and international affairs jointly with the Graduate School of International Relations and Pacific Studies.

The main Ph.D. requirements are that a student pass qualifying exams in microeconomics, macroeconomics, econometrics, select courses of specialization, and prepare an acceptable dissertation. The Ph.D. degree in economics and international affairs also requires successful completion of a language requirement and additional electives offered by IR/PS.

Detailed descriptions of the Ph.D. programs are available by writing to the Graduate Studies Coordinator in care of the Department of Economics. Residence and other campus wide regulations are described in the graduate studies section of this catalog.

### Departmental Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of five years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

## COURSES

### LOWER-DIVISION

#### 1A-B. Elements of Economics (4-4)

Basic methods of economic analysis and their application to public policy and current events. Economics 1A concerns microeconomics: supply and demand, markets, income distribution, perfect and imperfect competition, the rule of government. Economics 1B concerns macroeconomics: unemployment, inflation, business cycles, monetary and fiscal policy. Economics 1A is not required for 1B. Credit not allowed for both Economics 1A and 2A or 1B and 2B.

#### 2A-B. Introduction to Economics (4-4)

Same content as Economics 1A-B, but calculus is used in the presentation. 2A is not required for 2B. Credit not allowed for both Economics 1A and 2A or 1B and 2B. *Prerequisites: Mathematics 10A-B-C or 20A-B-C.*

#### 4. Financial Accounting (4)

Recording, organizing, and communicating economic information relating to business entities. *No prerequisites.*

#### 10. Markets (4)

Emphasis on intuition and current events, markets and resource allocation, government intervention when markets fail (monopoly inequality, environmental issues), stock, bond, and other financial markets, inflation and unemployment, international markets. No credit for students with a year of previous college economics. *No prerequisites.*

#### 90. Undergraduate Seminar (1)

Selected topics in economics. May be repeated twice (total of three units) when course topic varies. (P/NP grades only.)

### UPPER-DIVISION

#### 100A-B. Microeconomics (4-4)

(Conjoined with Economics 100AH-BH.) Household and firm behavior as the foundations of demand and supply. Market structure and performance, income distribution, and welfare economics. Credit not allowed for both Economics 100A-B and Economics 170A-B. *Prerequisites: Economics 1A-B or 2A-B and Mathematics 10A-B-C or 20A-B-C.*

#### 100AH-BH. Honors Microeconomics (4-4)

(Conjoined with Economics 100A-B.) Honors sequence covering the material of Economics 100A-B. *Prerequisites: introductory micro, introductory macro, and either Mathematics 10A-B-C or 20A-B-C. GPA of 3.5 or better. Economics 100AH must be taken before Economics 100BH. Department stamp required.*

#### 101. International Trade (4)

Determinants of trade in goods and services, international flows of labor and capital, and the effects of trade policy on welfare and income distribution. Issues such as competitiveness, im-

migration policy, trading blocs, and industrial policy. *Prerequisites: Economics 1A-B or 2A-B. Recommended: Economics 100A-B or 170A-B.*

#### 103. International Monetary Relations (4)

Balance of payments, international capital movements, and foreign exchange examined in light of current theories, policies, and problems. *Prerequisites: Economics 110A-B.*

#### 105. Industrial Organization and Antitrust Policy (4)

Structure and performance of U.S. industry. Pricing, advertising, product strategies, cartel behavior, and strategic entry barriers. Detailed treatment of antitrust policy. *Prerequisites: Economics 100A-B or 170A-B.*

#### 107. Economic Regulation (4)

Theory and application of economic regulation. Natural monopoly, nonlinear pricing, Ramsey pricing, franchise bidding. Discussion of U.S. electric utilities, gas utilities, broadcasting, surface transportation, and air transportation. *Prerequisites: Economics 100A or 170A.*

#### 109. Game Theory (4)

Introduction to game theory. Analysis of people's decisions when the consequences of the decisions depend on what other people do. Applications to economic, political, and social interactions. *Prerequisites: Economics 100A-B or 170A-B and Mathematics 20A-B-C.*

#### 110A-B. Macroeconomics (4-4)

(Conjoined with Economics 110AH-BH.) The theory of national income determination as the basis for explaining fluctuations in income, employment, and the price level. Use of monetary and fiscal policy to stabilize the economy. *Prerequisites: Economics 1A-B or 2A-B and Mathematics 10A-B-C or 20A-B-C.*

#### 110AH-BH. Honors Macroeconomics (4-4)

(Conjoined with Economics 110A-B.) Honors sequence covering the material of Economics 110A-B. *Prerequisites: Economics 1A-B or 2A-B and Mathematics 10A-B-C or 20A-B-C. GPA of 3.5 or better. Economics 110AH must be taken before Economics 110BH. Department stamp required.*

#### 111. Monetary Economics (4)

Financial structure of the U.S. economy. Bank behavior. Monetary control. *Prerequisites: Economics 1A-B or 2A-B and Mathematics 10A or 20A.*

#### 113. Mathematical Economics (4)

Mathematical concepts and techniques used in advanced economic analysis; applications to selected aspects of economic theory. *Prerequisites: Mathematics 20A-B-C and one of the following: Economics 100A-B, or Economics 170A-B, or Mathematics 140A or Mathematics 142A.*

#### 116. Economic Development (4)

Analysis of current economic problems of less-developed areas and conditions for increasing their income, employment, and welfare; case studies of specific less-developed countries. *Prerequisite: Economics 1A-B or 2A-B.*

#### 117. Economic Growth (4)

Models of the economic growth of developed economies. *Prerequisites: Economics 1A-B or 2A-B and Mathematics 10A-B-C or 20A-B-C and Economics 100A or 170A.*

#### 118A-B. Law and Economics (4-4)

Analysis of the economic effects of the structure of the law with particular emphasis on the law of liability, including liability for nuisances, zoning law, products liability, and accident liability. *Prerequisites: for 118A, Economics 1A-B or 2A-B; for 118B, 118A with a minimum grade of B and department stamp required.*



**120A-B-C. Econometrics (4-4-4)**

(Economics 120A-B-C conjoined with Economics 120AH-BH-CH.) Probability and statistics used in economics. Economics 120A covers basic data analysis using spreadsheets, probability and sampling theory, and introduction to UNIX and MS-DOS operating systems. 120B covers statistical inference and basic regression methods; 120C covers advanced regression including special topics. *Prerequisites: Economics 1A-B or 2A-B and Mathematics 10A-B-C or 20A-B-C. The Economics 120A-B-C sequence must be taken in that order (A before B before C).* Credit not allowed for both Economics 120A and Mathematics 183. Also, see the "Note on overlaps" at the end of the undergraduate course descriptions.

**120AH-BH-CH. Honors Econometrics (4-4-4)**

(Conjoined with Economics 120A-B-C.) Honors sequence covering the material of Economics 120A-B-C. *Prerequisite: department stamp required.*

**121. Applied Econometrics (4)**

Application of econometric methods to such areas as labor supply, human capital, and financial time series. *Prerequisites: Economics 120A-B-C or 120AH-BH-CH.*

**125. Economics of Population Growth (4)**

Economics of population growth, family size, age profiles, birth and death rates, growth of cities. *Prerequisites: Economics 120A-B-C. Economics 178 is recommended.*

**130. Public Policy (4)**

Role of economics in public policy. Topics such as funding health care, drug policy, incentives for high technology industries, mass transit versus highway construction, and agriculture subsidies. Term paper usually required. *Prerequisites: Economics 1A-B or 2A-B.*

**131. Economics of the Environment (4)**

Environmental issues from an economic perspective. Relation of the environment to economic growth. Management of natural resources, such as forest and fresh water. Policies on air, water, and toxic waste pollution. International issues such as ozone depletion and sustainable development. *Prerequisites: Economics 1A-B or 2A-B.*

**132. Energy Economics (4)**

Energy from an economic perspective. Fuel cycles for coal, hydro, nuclear, oil, and solar energy. Emphasis on efficiency and control of pollution. Comparison of energy use across sectors and across countries. Global warming. Role of energy in the international economy. *Prerequisites: Economics 1A-B or 2A-B.*

**133. Housing Policy (4)**

(Same as USP 123.) Examines housing markets and the U.S. housing finance system. Evaluates federal and local policies and tax incentives to promote housing production, encourage homeownership, provide decent shelter for low-income families, and improve conditions in deteriorated neighborhoods. *Prerequisites: Economics 1A-B or 2A-B.*

**134. Regional Economics (4)**

Examines the theoretical and empirical determinants of regional and metropolitan economic growth to explain past trends, to forecast future growth patterns, and to evaluate policies designed to redistribute economic activity between regions. *Prerequisites: Economics 1A-B or 2A-B.*

**135. Urban Economics (4)**

(Same as USP 102.) Urban economic problems and public policies to deal with them. *Prerequisites: Economics 1A-B or 2A-B.*

**136. Human Resources (4)**

Theoretical and empirical analysis of public and private investment in people, emphasizing the contribution to productivity

of education. *Prerequisites: Economics 1A-B or 2A-B and Mathematics 10A-B-C or 20A-B-C.*

**138A-B. Economics of Health (4)**

The application of economic analysis to the health field; the role of health in income, production, and poverty; supply, demand, and price determination in the public and private health sectors. *Prerequisites: Economics 1A-B or 2A-B.*

**139. Labor Economics (4)**

Operation of labor markets. Such topics as labor force participation, unemployment, labor mobility, wage inflation, the impact of unions, human capital investments, internal labor markets, and labor market discrimination. *Prerequisites: Economics 1A-B or 2A-B.*

**145. Economics of Ocean Resources (4)**

Economic issues associated with oceans. Living marine resources, nonliving marine resources, and other economic attributes of the sea. *Prerequisites: Economics 100A-B or 170A-B.*

**146. Economic Stabilization (4)**

Theory of business cycles and techniques used by governments to stabilize an economy. Discussion of recent economic experience. *Prerequisites: Economics 110A-B.*

**150. Economics of the Public Sector: Taxation (4)**

Overview of the public sector in the U.S. and the scope of government intervention in economic life. Basic principles of taxation, tax incidence, and tax efficiency. Analysis of the U.S. tax system before and after the Tax Reform Act of 1986. *Prerequisites: Economics 100A or 170A.*

**151. Economics of the Public Sector: Expenditures (4)**

Overview of the public sector in the U.S. and the scope of government intervention in economic life. Theory of public goods and externalities. Introduction to the basic forms of government intervention. Evaluation of specific expenditure programs such as education and national defense. *Prerequisites: Economics 100A or 170A.*

**152. Topics in Public Economics (4)**

Special topics on the economics of the public sector. *Prerequisite: Economics 150 or 151.*

**155. Economics of Voting and Public Choice (4)**

An economic analysis of social decision making, including such topics as the desirable scope and size of the public sector, the efficiency of collective decision-making procedures, voting theory and collective vs. market resource allocation. *Prerequisite: Economics 100A-B or 170A-B.*

**158A-B. Economic History of the United States (4-4)**

(Same as History HIUS 140-141.) 158A: The United States as a raw materials producer, as an agrarian society, and as an industrial nation. Emphasis on the logic of the growth process, the social and political tensions accompanying expansion, and nineteenth- and early twentieth-century transformations of American capitalism. 158B: The United States as a modern industrial nation. Emphasis on the logic of the growth process, the social and political tensions accompanying expansion, and twentieth-century transformations of American capitalism. *Prerequisite: upper-division standing.*

**161. Latin American Economic Development (4)**

Development issues facing Latin American countries. Economic policy. Emphasis on Argentina, Brazil, Chile, and Mexico. *Prerequisite: Economics 1A-B or 2A-B.*

**163. Japanese Economy (4)**

Survey of Japanese economy. Topics such as economic growth, business cycles, saving-investment balance, financial markets, fiscal and monetary policy, labor markets, industrial structure, international trade, and agricultural policy. *Prerequisite: Economics 1A-B or 2A-B.*

**164. Korean Economy (4)**

Survey of the Korean economy. Topics such as those for Economics 163. *Prerequisites: Economics 1A-B or 2A-B.*

**170A-B. Management Science Microeconomics (4-4)**

(Conjoined with Economics 170AH-BH.) Subject matter of Economics 100A-B, but with greater emphasis on the theory of the firm. Credit not allowed for both Economics 100A-B and Economics 170A-B. *Prerequisites: Economics 1A-B or 2A-B and Mathematics 20A-B-C. 170A must be taken before 170B.*

**170AH-BH. Honors Management Science Microeconomics (4-4)**

(Conjoined with Economics 170A-B.) Honors sequence covering the material of Economics 170A-B. *Prerequisite: Economics 1A-B or 2A-B and Mathematics 20A-B-C. GPA of 3.5 or better. 170 AH must be taken before 170BH. Department stamp required.*

**171. Decisions Under Uncertainty (4)**

Decision-making when the consequences are uncertain. Decision trees, payoff tables, decision criteria, expected utility theory, risk aversion, sample information. *Prerequisites: Economics 1A-B or 2A-B, Economics 120A, Mathematics 20A-B-C, and Mathematics 20F.*

**172A-B-C. Introduction to Operations Research (4-4-4)**

Linear, nonlinear, and integer programming. Elements of game theory. Deterministic and stochastic dynamic programming. *Prerequisites: Economics 1A-B or 2A-B, Mathematics 20A-B-C-F and Economics 120A. Economics 172A may be taken concurrently with 120A. Economics 172A must be taken first, but Economics 172B and C may be taken in either order or concurrently. A student may not receive credit for both Economics 172A-172B and Mathematics 171A-171B. Also, see the "Note on overlaps" at the end of the undergraduate course descriptions.*

**173. Corporate Finance (4)**

Corporate financial management, cash flow analysis, capital budgeting and capital structure. Institutional issues in project analysis, performance evaluation, and financial planning. *Prerequisite: Economics 4.*

**174. Financial Insurance (4)**

Insurance markets, law, and terminology. Demand for insurance and for lotteries. Contingent claims theory. Reserves management and efficient risk sharing. Financial theories for regulating insurance rates. Options and insurance. Moral hazard. Adverse selection. Current controversies in insurance. *Prerequisites: Economics 120A-B-C and either 100A or Economics 170A. Concurrent enrollment in Economics 120C is permitted. Economics 174 and Economics 175 are recommended.*

**175. Financial Investments (4)**

Valuation of assets including stocks, bonds, options, and futures contracts. Optimal portfolio selection and risk management. *Prerequisites: Economics 1A-B or 2A-B and Economics 120A.*

**176. Marketing (4)**

Role of marketing in the economy. Topics such as buyer behavior, marketing mix, promotion, product selection, pricing, and distribution. *Prerequisites: Economics 1A-B or 2A-B, Economics 120A-B-C. Concurrent enrollment in Economics 120C is permitted.*

**177. Topics in Operations Research (4)**

Selected topics in operations research. *Prerequisites: Economics 120A and Economics 172A.*

**178. Economic and Business Forecasting (4)**

Survey of theoretical and practical aspects of statistical and economic forecasting. Such topics as long-run and short-run horizons, leading indicator analysis, econometric models, tech-



nological and population forecasts, forecasting evaluation, and the use of forecasts for public policy. *Prerequisites: Economics 1A-B or 2A-B and Economics 120A-B-C. Concurrent enrollment in Economics 120C is permitted.*

#### 179. Decisions in the Public Sector (4)

Decision making in the public sector. Topics such as program evaluation, budgeting, financial management, and expenditure decisions. *Prerequisites: Economics 100A-B or 170A-B.*

#### 180. Real Estate Finance (4)

Study of property law, mortgage underwriting practices, mortgage insurance programs, financial analysis, valuation principles, federal income-tax laws, investment analysis, financial institutions, real estate development, and capital markets. *Prerequisites: Economics 1A-B or 2A-B.*

#### 181. Topics in Finance (4)

Selected topics in finance. *Prerequisite: consent of department.*

#### 182. Topics in Microeconomics (4)

Selected topics in microeconomics. *Prerequisite: consent of department.*

#### 183. Topics in Macroeconomics (4)

Selected topics in macroeconomics. *Prerequisite: consent of department.*

#### 191A-B. Senior Essay Seminar (4-4)

Senior essay seminar for students with superior records in department majors. *Prerequisite: department stamp required.*

#### 195A-B-C. Introduction to Teaching Economics (4-4-4)

Introduction to teaching economics. Each student will be responsible for a class section in one of the lower-division economics courses. Limited to advanced economics majors with at least a 3.5 GPA in upper-division economics work. (P/NP grades only.) *Prerequisite: consent of the department.*

#### 199. Independent Study (2 or 4)

Independent reading or research under the direction of and by special arrangement with a Department of Economics faculty member. (P/NP grades only.) *Prerequisites: consent of instructor and departmental approval.*

**Note on overlaps:** In general, a student may be denied credit for taking the same subject matter in more than one course, even if there is no explicit mention of the overlap issue in the course descriptions. In particular, the subject matter of Economics 120A-B overlaps the subject matter of probability and statistics courses offered in other departments (Mathematics 180A-181A, for example); and the subject matter of Economics 172A-B overlaps the subject matter of Mathematics 171A-B and AMES 146A-B. It is a student's responsibility to find out, by conferring with relevant advisers, what course combinations are advisable and when credit will be denied.

## GRADUATE

#### 200A-B-C. Microeconomics (4-4-4)

Background mathematical techniques, static and intertemporal consumer and producer theory, partial and general equilibrium, modern producer and consumer theory, risk, time, and interdependence, modern welfare economics.

#### 200D. Decisions (4)

Further topics in consumer and producer theory, intertemporal optimization, and decision-making under uncertainty. *Prerequisites: Economics 200A-B-C or consent of instructor.*

#### 200E. Markets and Welfare (4)

Further topics in general equilibrium, welfare analysis, and social choice theory. *Prerequisites: Economics 200A-B-C or consent of instructor.*

#### 200F. Games and Information (4)

Further topics in game theory and the economics of information. *Prerequisites: Economics 200A-B-C or consent of instructor.*

#### 201A-B-C. Advanced Economic Theory (4-4-4)

An intensive examination of selected topics in economic theory. Course topic nonrepetitive in a three-year cycle. *Prerequisites: Economics 200E and 210D.*

#### 202A-B-C. Workshop in Economic Theory (0-4/0-4/0-4)

An examination of recent research in economic theory, including topics in general equilibrium, welfare economics, duality, and social choice; development of related research topics by both graduate students and faculty. Course may be repeated an unlimited number of times. (S/U grades only.) *Prerequisite: Economics 200E or consent of instructor.*

#### 205. Mathematics for Economists (4)

Advanced calculus review for new graduate students.

#### 207. Experimental Economics (4)

Design and interpretation of controlled experiments using human subjects. *Prerequisite: consent of instructor.*

#### 210A-B-C. Macroeconomics (4-4-4)

Neoclassical and Keynesian theories of employment, income, interest rate, price level, and other aggregate variables; macroeconomic policy; balance of payments and exchange rates; conflicts between external and internal balance; disequilibrium theory; growth theory.

#### 210D. Advanced Macroeconomic Theory (4)

Dynamic analysis, multiple equilibria, modern growth theory, computational methods. *Prerequisites: Economics 210A-B-C or consent of instructor.*

#### 210E. Applied Macroeconomics (4)

Monetary policy, business cycles, factor utilization, investment, heterogeneity. *Prerequisites: Economics 210A-B-C or consent of instructor.*

#### 211A-B-C. Advanced Macroeconomics (4-4-4)

Selected theoretical and empirical issues in macroeconomics. *Prerequisite: Economics 210D or consent of instructor.*

#### 212A-B-C. Workshop in Macroeconomics (4-4-4)

Examination of recent research in macroeconomics; development of own research by graduate students and faculty. *Prerequisite: Economics 210C.*

#### 214A-B-C. Finance (4-4-4)

Theoretical and empirical issues in finance.

#### 220A-B-C-D-E-F. Econometrics (4-4-4-4-4-4)

The construction and application of stochastic models in economics. This includes both single and simultaneous equations models. Matrix algebra and basic statistics are covered. Also covered (in 220F) are empirical applications to micro and macroeconomics. These require the completion of an empirical project. Both 220E and F will be offered simultaneously in the winter quarter.

#### 221A-B-C. Advanced Econometrics (4-4-4)

Extensions of the theory of the linear model; Bayesian analysis; principal components, discriminant analysis, spectral analysis of time series; insufficient data problems and the use of generalized inverse matrices; experimental design; formulation and evaluation of economic models, including the interpretation and testing of causality. *Prerequisite: Economics 220F or consent of instructor.*

#### 222A-B-C. Workshop in Econometrics (4-4-4)

Examination of recent econometric research; development of own research by students and faculty. Course may be repeated an unlimited number of times. (S/U grades only.)

#### 230A-B. Public Economics (4-4)

Theoretical and empirical issues in public economics. *Prerequisite: consent of instructor.*

#### 232A-B-C. International Economics (4-4-4)

Theory of international trade, finance, and monetary relations. Growth, disturbances, capital movements, and balance of payments adjustment. International economic policy and welfare. *Prerequisite: consent of instructor.*

#### 234A-B-C. Industrial Organization (4-4-4)

Theoretical and empirical issues in industrial organization. *Prerequisite: Economics 220F or consent of instructor.*

#### 235A-B-C. Workshop in Applied Microeconomics and Industrial Organization (0-4/0-4/0-4)

Examination of recent research in applied economics; development of own research by graduate students and faculty. Course may be repeated an unlimited number of times. (S/U grades only.)

#### 236A-B. Labor Economics (4-4)

Theoretical and empirical issues in human resource economics. *Prerequisite: consent of instructor.*

#### 238. Urban and Regional Economics (4)

Theoretical and empirical issues in urban and regional economics. *Prerequisite: consent of instructor.*

#### 240. Economic Development (4)

Theoretical and empirical issues in economic development.

#### 242. Economics of Natural Resources (4)

Theoretical and empirical issues in natural resource economics.

#### 267. Special Topics in Economics (4)

A lecture course at an advanced level on a special topic (or set of related topics) in economics. May be repeated for credit if topic differs. *Prerequisites: Economics 200E, 210D, and 220F, or consent of instructor.*

#### 269. Seminar in Economics (4)

A program of regular reports by graduate students on their own research, usually dissertation research. Faculty and visitors are encouraged to participate. May be repeated for credit when subject matter changes.

#### 271. Second-Year Seminar (2)

A survey of how economics research begins and an introduction to the current frontiers. Members of faculty will give 45-minute presentations in the seminar, with two presentations at each meeting. The talks will be at an introductory level and convey a research interest of the faculty member. *Prerequisite: Economics 200C, or consent of instructor.*

#### 272. Third-Year Paper (4)

Written project, such as a critical review of a body of literature, including a proposal for an original research paper. For third-year students in winter quarter.

#### 273. Third-Year Presentations (4)

Workshop for students writing third-year papers. All papers will be formally presented in the workshop.

#### 274. Third-Year Original Paper (4)

Original research paper. For third-year students.

#### 275. Third-Year Original Paper Presentations (4)

Workshop for students writing third-year original papers. All papers will be formally presented in the workshop.

#### 276. Fourth-Year Original Paper (4)

Original research paper. For fourth-year students not admitted to candidacy by spring quarter.

**277. Fourth-Year Original Paper Presentation (4)**

Participation in appropriate workshop in conjunction with preparation and presentation of fourth-year paper.

**280. Computation (2)**

Introduction to econometric computing. (S/U grades only.)

**291. Advanced Field Advising (4)**

Controlled reading and discussion with adviser; literature survey. May be repeated for credit. (S/U grades only.)

**297. Independent Study (1-5)**

(S/U grades only.)

**299. Research in Economics for Dissertation (1-9)**

(S/U grades only.)

**500A-B-C. Teaching Methods in Economics (4-4-4)**

The study and development of effective pedagogical materials and techniques in economics. Students who hold appointments as teaching assistants must enroll in this course, but it is open to other students as well. (S/U grades only.)

## Education Abroad Program (EAP)

OFFICE: Programs Abroad Office in the International Center (corner of Gilman Drive and Library Walk)

William O'Brien, Literature, *Faculty Director*

Mary Corrigan, Theatre, *Faculty Director*

Robert Schmidt, Biology, *Faculty Director*

Mary Dhooge, *Dean of International Education*

Kimberly Burton, *Assistant Director for Programs Abroad*

Molly Ann McCarren, *EAP Adviser*

Bill Clabby, *EAP Adviser*

Administered by the University of California, the Education Abroad Program (EAP) has established study centers in Argentina (pending final approval), Australia, Barbados, Brazil, Canada, Chile, China, Costa Rica, Denmark, Egypt, France, Germany, Ghana, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Russia, Singapore, South Africa, Spain, Sweden, Taiwan, Thailand, and the United Kingdom. Many EAP programs run for the full academic year, although shorter term/special focus programs are also offered in Barbados, Brazil, Canada, Chile, China, Costa Rica, Denmark, France, Germany, Hong Kong, Hungary, India, Indonesia, Israel, Italy, Japan, Korea, Mexico, Netherlands, Russia, Singapore, Sweden, Taiwan, and Thailand. The students who participate in the EAP earn UC academic credit and are eligible for financial aid and many scholar-

ships. Please see the EAP web site (<http://www.ueap.ucsb.edu>) for detailed information about all aspects of the program. Other non-EAP study-abroad opportunities at UCSD are described at the end of this section.

### Purpose

The Education Abroad Program offers undergraduate and graduate students opportunities to integrate into the academic and social life of select foreign universities while continuing to work in major fields of study or otherwise fulfilling UC requirements. EAP provides students access to distinguished academic programs that complement those of the UC campuses and where students can make normal progress toward their degrees at a cost as close as possible to that of education on a UC campus. EAP helps students acquire the knowledge and skills necessary to function confidently and compete successfully in our global environment.

The program stimulates the intellectual development of the participants, broadening the general education of all, and giving a new depth to the particular academic interests of some. Most gain fluency in a language other than their own, and all grow in their ability to engage in independent study. Perhaps most valuable of all are increased self-understanding, clarified life purposes, and a broadening and deepening of personal values.

One of the most distinctive features of the program is the emphasis placed on the full integration of the UC students into the life of the host university. For the most part, UC students abroad live as do the students of the host university: they attend the same classes, take courses from the same professors, and take part in local social and cultural activities. As an aid in facilitating UC student adjustment to unfamiliar educational practices, tutorials are included within the curriculum of most of the Study Centers, supplementing the regular academic offerings of the host university.

### The Academic Program

The Education Abroad Program places students at the finest universities abroad. In most cases students take courses side by side with local students in a wide range of academic fields. In some programs EAP students pursue

language study and take special courses designed for foreign students. In others, they pursue specialized studies in their major, take courses to add breadth to their general education, concentrate on language or area studies, and conduct research.

Each student is concurrently enrolled on the home campus of the University of California and at the host university. Full academic credit is received for courses satisfactorily completed. The selection of courses is such that, by advance planning and wise choice, most students can make normal progress toward completion of major and/or minor requirements. Some students fulfill some general-education requirements.

### Academic Planning and Advising

A participant who wishes to make normal progress toward graduation should counsel in advance with a departmental adviser and an academic adviser in his or her college provost's office in order to ascertain how participation will affect his or her academic program. Descriptions of individual courses currently approved for UC credit may be found in the Programs Abroad Resource Library and on the EAP web site (<http://www.ueap.ucsb.edu>). Many of the same or similar courses will be available in future years, but students should plan programs that are sufficiently flexible to allow them to take alternate courses. Each year new courses are added to a center's approved offerings as needed by UC students attending and as available at the host university. Although courses approved by the University of California carry full credit, each department retains the right to determine the extent to which it will accept units so earned in the fulfillment of the requirements for its own majors.

In order to facilitate the academic work of the students, University of California professors serve as directors and associate directors of the study centers. They work with their counterparts in the host university in developing the academic program and advise students on any problem pertaining to their work. In addition, the directors are responsible for all aspects of student welfare and conduct.

### Cost, Financial Aid, and Scholarships

The regents endeavor to bring the program within the reach of all students, regardless of

## 1998-99 Education Abroad Programs At A Glance

	Academic Year Programs	Short-Term Programs	All/Some Courses in English	Language Prerequisite	Language Study Required*	Graduate Participation Encouraged**	Sophomore Participation Allowed
<b>Argentina</b>		•		•			
<b>Australia</b>	•		•			•	
<b>Austria</b>		•		•			
<b>Barbados (Caribbean Studies)</b>	•	•	•				
<b>Brazil</b>	•	•		•	•		
<b>Canada</b>	•	•	•			•	
<b>Chile</b>	•	•		•			
<b>China</b>	•	•		•	•	•	
<b>Costa Rica: Semester/Academic Year Program</b>	•	•		•		•	
Tropical Biology Programs		•	•		•		
<b>Denmark: Semester/Academic Year Program</b>	•	•	•		•	•	
Summer Intensive Language Program		•	•		•		•
<b>Egypt</b>	•		•		•	•	
<b>France: Academic Year Program</b>	•			•		•	
Language and Society Program		•		•	•		•
<b>Germany: Semester/Academic Year Program</b>	•	•		•		•	
Language and Society Program		•		•	•		•
<b>Ghana</b>	•		•				
<b>Hong Kong: Academic Year Program</b>	•		•		•		
Science & Technology Program	•	•	•				
<b>Hungary (Central Europeans Studies)</b>	•	•	•		•		
<b>India</b>		•	•				
<b>Indonesia</b>	•	•	•		•		
<b>Israel: Academic Year Program</b>	•		•		•		
Research Focused Program	•	•	•		•	•	
<b>Italy: Academic Year Program</b>	•			•		•	
Language and Culture Program		•		•	•		•
Business and International Studies Program		•	•	•		•	
Venice Architecture Program	•	•		•			
<b>Japan: Academic Year Program</b>	•		•	•	•	•	
Global Security and Economic Development Program		•	•				•
Engineering Programs in Japanese	•			•	•	•	
Engineering Programs in English	•	•	•		•		•
Economics Programs	•	•	•	•	•	•	
<b>Korea</b>	•	•	•		•		
<b>Mexico: Semester/Academic Year Program</b>	•	•		•		•	
Language and Society Programs		•		•	•		•
Field Research Program		•		•	•	•	•
Business and Economics Program		•	•		•		
<b>Netherlands</b>	•	•	•				
<b>New Zealand</b>	•		•			•	
<b>Russia</b>		•		•	•	•	
<b>Singapore</b>	•	•	•				
<b>South Africa</b>	•		•				
<b>Spain</b>	•			•		•	
<b>Sweden</b>	•	•	•		•	•	
<b>Taiwan</b>	•	•		•	•		
<b>Thailand</b>	•	•	•		•		
<b>United Kingdom/Ireland</b>	•		•				

\* Intensive language programs precede programs where course work is not in English. Programs identified require language study during the term.

\*\* Graduate study is possible at most EAP sites if approved on a case-by-case basis. Programs identified offer special opportunities for graduate students.

their financial resources. The cost of studying abroad is usually comparable to the cost of studying on a UC campus. The only additional costs directly related to the program are for round-trip transportation, on-site orientation and vacation travel, and personal expenses beyond what normally would be spent at home. Programs in some countries actually cost less than a comparable period of study at a UC campus.

Many forms of financial assistance are available to EAP students. Those already receiving UC financial aid maintain their eligibility for grants, loans, and scholarships while studying on EAP. Financial aid is based on the cost of studying at each EAP location and on individual need. Students who might not normally be eligible for financial aid may qualify for the period they are on EAP. In addition to UC financial aid, there are EAP Opportunity Grants for economically disadvantaged students, EAP Alumni and General Scholarships, regional scholarships for European and most Pacific countries, country-specific scholarships, and scholarships provided by the Friends of the International Center and various campus offices and departments. Annually, UCSD students access more than \$400,000 of special scholarships available only for study abroad. Information about some of these scholarships is available on the student financial services web site (<http://www.ucsd.edu/finaid>).

Prospective participants who require financial assistance should counsel early with the Student Financial Services Office. Study abroad scholarship information is available in the Programs Abroad Office.

### Applications

Application forms for admission to the Education Abroad Program are available in the Programs Abroad Office at the International Center and are given to students following a discussion of various aspects of the program with an EAP adviser. Information on deadlines and related matters such as course offerings, information sessions, selection, schedules of departures, and payment of fees may be obtained from the Programs Abroad Office.

It is not too early to begin planning for an experience abroad prior to or during one's freshman year. General group information ses-

sions about the programs are held during Welcome Week and in October and January.

### Europe

**Austria.** See Hungary—Central European Studies.

**Denmark.** Three options are available:

*Semester or Academic Year.* The academic year program begins with a summer-long intensive language program and the semester program with a three-week language program at the University of Copenhagen. Thereafter, UC students take regular university courses in selected fields and continue language study. Instruction is in Danish and English.

*Summer-Only Program.* The summer language program noted above at the University of Copenhagen may be taken independently. Students with at least sophomore standing at UC may participate.

**France.** *Academic Year Programs:* Students of most academic disciplines can be accommodated in regular university courses, taught in French, for a full academic year at the University of Bordeaux, Grenoble, Lyon or Toulouse. Four to five weeks of intensive language study in France precede the academic year. A minimum of two years of university-level French is required before departure. Students with advanced language skills may take advantage of special course work at the Paris Center for Critical Studies or the Institut d'Etudes Politiques in Paris.

*Language and Society Program:* EAP also offers a fall language and society semester in Lyon, which combines language study with coursework on contemporary France. This option requires a minimum of three quarters, but no more than five quarters of university-level French.

**Germany.** The options available include: a full academic year or semester at Georg-August University in Goettingen, and a German Studies Semester (spring) at the University of Bayreuth.

*Georg-August University of Goettingen.* Academic year or semester. EAP participants study in most academic disciplines in regular university courses. Selected students may have the opportunity to spend the spring semester at one of the following universities in the Berlin area: Free University, Humboldt University, Technical University, and University of Potsdam.

Instruction is in German. A six-week intensive language program (ILP) precedes the year. Two years of university-level German is required. UC students with advanced language skills may apply for the spring semester only at Georg-August (no ILP required).

Advanced biology students may apply for a spring internship at the *Max Planck Institute of Experimental Medicine in Goettingen*.

*Goettingen Language and Society Spring Semester.* EAP students take intensive German equivalent to the first year of German language instruction, plus a supplementary course in 20th century German history, society and culture. Zero to one quarter of university-level German is required.

*University of Bayreuth.* EAP offers a one-semester German language and culture program. The program will be offered in the spring and will concentrate on German language, providing the equivalent of second year of German in one semester. Students with at least sophomore standing at UC may participate. Continuation in the academic year program at Georg-August University immediately following the Bayreuth term is possible in most cases.

**Hungary.** A fall semester and a year-long program at *Eötvös Loránd University in Budapest* focus on Central European studies and European integration. The courses are designed for EAP and taught in English. A limited number of students may elect to spend the spring semester at the University of Vienna in Austria taking European Studies course-work in English or a broader range of courses in German.

**Italy.** *Academic Year:* Most UC students in Italy take courses at the University of Bologna, Padua or Venice in a wide range of disciplines. A compulsory intensive language program precedes the beginning of the academic year. Students who have completed only one year of Italian are eligible for participation in the EAP in Italy but, if selected, must complete the equivalent of the second year prior to the start of the program by attending the "pre" Intensive Language Program offered during the summer in Italy. A UC faculty director residing in Padua administers all EAP programs in Italy. All courses are taught in Italian.

Specialized programs are also available in Italy for qualified students at the following institutions:

- *Bocconi University, Milan*, offers semester or academic year studies in business administration, economics, management, public administration.
- *Bologna Academy of Fine Arts*, provides art studio opportunities by special arrangement.
- *Venice Institute of Architecture* provides excellent instruction in architecture, architectural history, urban planning, conservation, and restoration.
- *Language and Society Program*: EAP offers fall and spring language and society quarter programs at the University for Foreigners in Siena, with five additional weeks in Venice for semester students during the spring. The program will provide the equivalent of one year of Italian language instruction and course work on Italian culture. Students with at least sophomore standing at UC may participate. One year of university-level Italian is required for the semester program. No previous knowledge of Italian is required for participation in the quarter program.

**Netherlands.** *Quarter or Academic Year:* Economics students may study at Limburg University in Maastricht.

**Russia.** EAP offers a fall semester program of special courses designed for EAP students in Russian language, art history, economics, history, literature, and politics at the European University in Moscow. The curriculum is taught by faculty from various institutions in Moscow. Instruction is in Russian. A four-week intensive language program precedes the semester. Options exist for students who have had both one and two years equivalent of Russian language study.

**Spain.** *Academic Year.* Most UC students study at the University of Alcalá de Henares, the University of Barcelona, the University of Granada, or the Complutense University of Madrid. Advanced students may also study at the Autonomous Universities of Barcelona or Madrid. EAP participants at all locations select regular university courses based on individual academic interests and, at the Universities of Alcalá, Barcelona, Granada, and Madrid, special courses or tutorials designed for EAP. The language of instruction is Spanish at all universities; however, in Barcelona, Catalan also may be used. Four weeks of intensive Spanish language study precede the academic year. The

program requires two years of university-level Spanish. The Autonomous Universities of Barcelona and Madrid require near-native fluency.

**Sweden.** EAP offers an academic year and a fall semester program at Lund University. The academic year program consists of an intensive language program followed by regular university courses and continued language study during the academic year. A separate semester program consists of a survival Swedish course taken in August, followed by selected studies at the Lund University during the fall.

**United Kingdom and Ireland.** *Academic Year:* EAP students in the United Kingdom usually study in their major or an allied field. Most academic disciplines are available. Participating institutions are:

England. *University of Birmingham, University of Bristol, University of East Anglia, University of Essex, University of Exeter, University of Kent at Canterbury, University of London (Queen Mary & Westfield College, King's College), University of Nottingham, University of Lancaster, University of Leeds, University of Sheffield, University of Sussex, University of Warwick, and University of York.*

Ireland. *National University of Ireland, Cork & National University of Ireland, Galway; University of Dublin (Trinity College).*

Scotland. *University of Edinburgh, University of Glasgow, University of St. Andrews, University of Stirling.*

### **Middle East**

**Egypt.** *The American University, Cairo.* Most UC students enroll in liberal arts classes which have an emphasis on the Middle East and are taught in English. Full-time Arabic study is possible at *Arabic Language Institute* for students with at least one year of university-level Arabic preparation.

**Israel.** *Academic Year.* A compulsory language course (ulpan) precedes the beginning of the academic year. Students have a choice of taking the ulpan at either Haifa University or the Hebrew University.

*Hebrew University, Jerusalem.* Most UC students enroll in courses taught in English at the University's Rothberg School for Overseas Students. Of particular interest are courses in Middle Eastern and Judaic studies. Students

with an advanced level of Hebrew have access to a broader curriculum throughout the Hebrew University.

*Ben-Gurion University of the Negev, Beersheva.* Negev Research Program: Advanced students may participate in a fall, spring, or year program at Ben-Gurion University that focuses on research in English in one of two tracks: social-scientific study of Israel's ethnic minorities, or laboratory study in the health sciences and the natural sciences in areas related to Israel's environment. A six-week intensive language program at Ben-Gurion precedes the program, and Hebrew study is required each term.

### **Asia**

**India.** EAP offers a fall semester program that begins with a month of Hindi language study in Mussoorie. Students then enroll in regular university classes at the University of Delhi and take special UC core courses in selected fields.

**China.** Both the academic year program at Peking University and the semester-long program at Beijing Normal University begin in early July with an orientation and seven-week intensive language program at Tsinghua University in Beijing.

Fall Program at *Beijing Normal University (BNU)* concentrates on Chinese language acquisition in written and spoken Chinese. One year of university-level Chinese is required. BNU students may petition to extend their participation from fall to the year at Peking University or BNU.

Year Program at *Peking University ("Beida").* Students take classes in standard Chinese (grammar, oral and written expression) and literature at the Center for Teaching Chinese to Foreigners at Peking University. Students with adequate language ability are encouraged to take regular university classes. Preference for the Peking program will be for students with two or more years of Chinese, although those with one year may also apply.

**Taiwan.** *National Taiwan University, Taipei.* Fall and year programs are offered. In addition to intensive language instruction, students take specifically designed EAP courses (in English) in Chinese and Asian area studies. Those with adequate language skills may also take regular university courses taught in standard Chinese.

Two years of university-level Chinese are required.

**Hong Kong.** *Academic Year at Chinese University in Hong Kong.* UC students enroll in a wide range of fields and take regular university courses taught in English in addition to studying Chinese. Linguistically qualified students may enroll in a wider range of courses taught in standard Chinese or Cantonese.

*Semester or Academic Year at the Hong Kong University of Science and Technology.* Business, engineering and science students may study their disciplines in English at HKUST.

**Japan.** *Academic Year in English and/or Japanese:* EAP offers programs that are unrestricted as to fields of study, in addition to specialized programs in economics and engineering. UC students are placed at an institution based on academic need, language ability, and class level. Some universities offer course work completely or partially in English, and others teach exclusively in Japanese. Six to eight weeks of intensive Japanese language study precede the academic year. One to three years of university-level Japanese required, depending on the program. Participating institutions include: Hitotsubashi University, Tokyo; Kyoto University; Osaka University; Tohoku University, Sendai; Tokyo Institute of Technology; The University of Tokyo, Hongo and Komaba campuses; University of Tsukuba; Doshisha University, Kyoto; International Christian University, Tokyo; Sophia University, Tokyo.

*Engineering Semester or Year In English:* A spring semester and academic year engineering program in English is available at Tohoku University.

*Global Security and Economic Development Program in English:* A specialized program in global security and economic development, taught in English, is offered spring semester at Meiji Gakuin University in Yokohama. The program is open to students with at least sophomore standing at UC who have a serious academic interest in these fields.

**Korea.** Students study for either summer/fall or a year at *Yonsei University in Seoul.* The academic program includes language study and courses taught in English through the Division of International Education, with Asian studies and Korean language/literature especially strong. EAP students proficient in Korean may enroll in regular university courses in a wide range of fields.

**Indonesia.** EAP offers a fall semester and an academic year option. EAP students begin with a four-week orientation and language program, followed by a fall semester at *Gadjah Mada University* in Yogyakarta. The curriculum includes language study and courses taught in English in anthropology, development studies, economics, history, the arts, and Asian studies. During the second semester, students take regular university courses taught in Indonesian in a wide range of fields at either *Gadjah Mada* or the *Indonesian Arts Institute.*

**Singapore.** EAP offers a fall semester and academic year program at the National University of Singapore. UC students will take regular university courses taught in English with emphasis on biology, business, economics, sociology, and Southeast Asian studies.

**Thailand.** EAP offers primarily a fall semester program in Thailand. Undergraduate and graduate students with advanced proficiency in Thai language and approved academic course or research goals may be able to extend participation through the second semester. Most EAP students begin their studies in July with a four-week intensive language program (ILP) at Chiang Mai University, followed in the fall by continued language study and courses in English on Thai history, culture, and Southeast Asian studies. Those proficient in Thai may enroll directly in regular university courses in a wide range of fields at Chiang Mai University or Chulalongkorn University in Bangkok.

## Africa

**Ghana.** *Academic Year at the University of Ghana Legon.* Recommended are courses in development studies, the natural sciences, and African studies courses.

After a fall semester at the University of Ghana, a few selected students may spend the spring semester at the *University of Science & Technology, Kumasi.* UC students will have access to courses in the following areas: the College of Art, the Faculty of Agriculture, the Faculty of Environmental and Development Studies, and the Institute of Renewable Resources.

**South Africa.** *University of Natal in Pietermaritzburg.* A full year program focuses on South African and African Studies. Students are integrated into the university in a wide

range of courses, primarily in the following fields: colonial, post-colonial and South African literature, sociology, political science, history, wildlife science, zoology, rural resources and management, and Zulu language and culture. The prerequisite is one course in Africa-related studies.

A program at the *University of Capetown* is expected to be available starting in January, 1999.

## Caribbean

**Barbados.** *Semester or Academic Year at the University of the West Indies, Cave Hill.* Instruction is in English and students take interdisciplinary courses with an emphasis on Caribbean Studies.

## Latin America

**Argentina.** Semester or year option at *National University of Cuyo in Mendoza* (pending approval).

**Brazil.** The program begins in January with intensive language study at a site outside of Rio, and then a semester (March to July) or year (March to December) of study in Rio de Janeiro at the *Pontifical University of Rio de Janeiro (PUC-Rio).* Students take regular university courses taught in Portuguese in a wide range of fields.

**Chile.** The program begins in January with four weeks of intensive language study. Participants then study for a semester or academic year in Santiago, taking regular university courses taught in Spanish at either the *University of Chile, Santiago.* or the *Pontifical Catholic University, Santiago.*

**Costa Rica.** There are two distinct programs:

*University of Costa Rica.* Students have the option of studying for a semester or a year. Following an intensive language program, students take regular university courses, taught in Spanish, in the humanities, social sciences and natural sciences.

*Tropical Biology Program.* During spring or fall quarter, students who meet certain biology prerequisites (BIEB 100, 120, and ecology lab) may study tropical biology in the rain forest of Monteverde or Las Cruces. Previous Spanish is preferred.



**Mexico.** EAP offers a fall semester and academic year program at the Universidad Nacional Autonoma de Mexico (UNAM) in Mexico City, fall and spring semester Field Research Programs (FRP) at various sites throughout Mexico, and Language and Society programs at San Nicolas de Hidalgo University of Michoacan in Morelia (summer) and at UNAM's School of Foreigners (CEPE) in Taxco (winter).

*La Universidad Nacional Autonoma de México (UNAM).* EAP students may study at UNAM for two quarters or a full year, taking regular university courses in a wide range of disciplines. The program begins with a six-week Intensive Language Program (ILP).

*Field Research Program (FRP).* EAP offers fall and spring semester programs which include intensive study of Spanish language, Mexican culture, and field methods, followed by two months of field research or internships in various parts of Mexico.

*Language and Society Summer Program. La Universidad Michoacana de San Nicolas de Hidalgo in Morelia.* Completion of two terms of university work and one year of university-level Spanish are required for the ten-week summer program, which provides the equivalent of the entire second year of Spanish.

*Language and Society Program, Taxco.* EAP offers a winter Language and Culture Quarter at UNAM's School for Foreigners in Taxco. The curriculum is designed for students who have already completed one or more years of Spanish and want to add a year's worth of language training in a short period abroad. Students with at least sophomore standing are eligible.

*Business and Economics Program.* EAP participants learn how business is conducted in Mexico and study Mexican perspectives on the future of NAFTA during the fall or spring semester at the Monterrey Institute of Technology. Course work is in English and/or Spanish.

### **South Pacific**

**Australia.** *Academic Year:* UC students in Australia enroll in courses in their major or an allied field; most academic disciplines are available. The academic year runs from early February to early December. Participating institutions are: The Australian National University, Canberra; The Flinders University of South Australia, Adelaide; La Trobe University, Melbourne;

Monash University, Melbourne; University of Adelaide; The University of Melbourne; The University of New South Wales, Sydney; The University of Queensland, Brisbane; University of Sydney; University of Western Australia, Perth; University of Wollongong.

**New Zealand.** UC students in New Zealand take courses in their major or an allied field. Most academic disciplines are available. The academic year runs from early February to mid-November. Participating institutions are: Lincoln University, Canterbury; Massey University, Palmerston North; University of Auckland, University of Canterbury, Christchurch; University of Otago, Dunedin; The University of Waikato, Hamilton; Victoria University of Wellington.

### **North America**

**Canada.** *The University of British Columbia (UBC)* is located outside of Vancouver. This academic-year program will consist of courses in the major or an allied field through the regular university system. Most disciplines can be accommodated. A fall semester program can be accommodated in certain fields. UBC is renowned for agriculture, anthropology, Asian studies, biological sciences, Canadian studies, engineering, forestry, Pacific Region studies, and women's studies.

### **Selection**

Undergraduate selection is subject to the following minimum qualifications: 3.0 cumulative grade-point average at the time of departure (good academic standing is the minimum requirement for a few select programs), junior standing by time of departure (not required for some short-term and special-focus programs); support of the UCSD EAP Selection Committee; and completion of university-level language courses when required (one, two, or three years, depending on the host institution) with a 3.0 grade-point average in language.

In addition to academic criteria for selection, the faculty committee attaches much importance to indications of the student's seriousness of purpose, maturity, and capacity to adapt to the experience of study abroad. As part of the screening process, students are required to consult with their college academic and department advisers.

Graduate students may apply for most study centers if they have completed at least one year

of graduate work prior to departure and have the support of their academic department and the dean of Graduate Studies.

Transfer students from other colleges and universities are eligible if they have completed at least one quarter at the University of California at the time of selection.

### **Student Conduct and Parental Approval**

It is anticipated that the students selected for the Education Abroad Program will be of high caliber, committed to profiting from both the intellectual and social aspects of the experience. Since they will be guests in another country and another university, their conduct will reflect on both the University of California and the United States.

Participation in the program by students who are minors must be approved by their parents or guardians. In approving such participation, parents and guardians should be aware that a greater degree of personal freedom is afforded to students in the foreign university and that the University of California cannot take responsibility for closely supervising the activities of individual students. The directors of the centers will be available to students with problems and will maintain close contact with the student group as a whole. The university provides for comprehensive medical and hospitalization coverage for all participants.

### **UCSD Opportunities Abroad Program**

OFFICE: Programs Abroad Office in the International Center (corner of Gilman Drive and Library Walk)

William O'Brien, Literature, *Faculty Director*  
Mary Corrigan, Theatre, *Faculty Director*  
Robert Schmidt, Biology, *Faculty Director*  
Mary Dhooge, *Dean of International Education*

Kimberly Burton, William Clabby, and Joan Adamo, *Advisers*

Students interested in going abroad should also investigate possibilities through the Opportunities Abroad Program which can assist with placement in a wide range of other academic programs. These programs include study for an academic year, semester, quarter, or summer.



They may be sponsored by other U.S. universities, or include direct enrollment in foreign institutions. Academic credit may also be earned on a number of overseas internship programs which combine work experience and courses.

Students going abroad through the Opportunities Abroad Program earn transfer credit from the sponsoring institution. Courses taken abroad may satisfy general-education, major or minor requirements, depending on department or college approval. Financial aid for approved plans of study abroad is available to students who enroll concurrently at UCSD through the Opportunities Abroad Program. Special study abroad scholarships are also available.

In addition to these academic programs, the Programs Abroad Office and its extensive resource library can assist students in selecting a wide range of volunteer, paid work, and educational travel programs.

## Eleanor Roosevelt College

OFFICE: Provost, Eleanor Roosevelt College, Building 412, University Center

### The Making of the Modern World/Writing Program

OFFICE: Eleanor Roosevelt College Writing Program, Building 412, University Center

See "The Making of the Modern World" program for Eleanor Roosevelt Writing.

### Eleanor Roosevelt College Honors Program

OFFICE: Provost, Eleanor Roosevelt College, Building 412, University Center

Honors programs at Eleanor Roosevelt College have been established to provide exceptionally motivated and capable students with enhanced educational experiences through close interaction with faculty and other honors students. There are two main components to

the program: the Freshman Honors Program and the Sophomore Honors Research Project. Participation in both is by invitation.

In the fall quarter of their freshman year, selected students are invited to enroll in the Freshman Honors Seminar, a two to three-quarter course. During the fall quarter, students meet with a variety of faculty members to learn more about their research, and about academic enrichment opportunities at UCSD. The seminar continues during the winter quarter, focusing on an international theme with faculty speakers. Honors students may receive opportunities for particular cultural and social events. Second-year students with GPAs of 3.5 or higher have the opportunity to pursue independent study with individual faculty.

Additional honors opportunities are offered in the Making of the Modern World (MMW) sequence. Students with excellent grades in MMW 1, 2, and 3 and high cumulative grade point averages are eligible to take MMW 4H, 5H, and 6H. Students attend course lectures, but meet in separate honors sections. They may also be invited to special guest lectures and enrichment activities connected with MMW.

There are also opportunities for university-wide honors, including provost's honors. Students who maintain a GPA of 3.5 for a full academic year are awarded certificates of merit by the college. UCSD's reputation for excellence is also reflected in the numbers of students who enroll in departmental senior honors programs and who receive college or university honors or election to Phi Beta Kappa.

#### 10. ERC Freshman Honors Seminar (0)

Weekly seminar with faculty members from a variety of disciplines. This seminar provides students with the opportunity to learn more about research and scholarly activities available to them, and acquaints them with UCSD faculty members. *Prerequisite: by invitation only. Pass/Not Pass grades only. (F)*

#### 20. Freshman Honors Seminar: International Themes (1)

This weekly seminar focuses on a chosen international theme with faculty speakers. The structure of the seminar is informal, giving students the opportunity to participate in interactive discussions. *Prerequisite: by invitation only. Pass/Not Pass only. May be taken for credit two times. (W,S)*

#### 92. Honors Project (2)

Individual project on a topic chosen by the student, done under direction of a faculty member. *Prerequisite: by invitation only. Pass/Not Pass only. Repeatable for credit twice, up to a total of six units over three quarters.*

#### 196. Honors Project (4)

Senior thesis research project for students who have been accepted into the Eleanor Roosevelt College Individual Studies major. Project will be carried out under supervision of one or

more faculty members. Depending on scope of the project, may be taken for four or eight units of credit in a single quarter, or eight units distributed over two quarters. *Prerequisite: admission to Eleanor Roosevelt Individual Studies major.*

#### 199. ERC Independent Studies (4)

The content of this independent study course, which may not duplicate any existing course on campus, will be determined by a supervising faculty member and tailored to fit specific content needs of students pursuing the Eleanor Roosevelt College Individual Studies major. *Prerequisite: admission to ERC Individual Studies major.*

### Eleanor Roosevelt Seminar

OFFICE: Provost, Eleanor Roosevelt College, Building 412, University Center

#### 90. Undergraduate Seminar (1)

A seminar intended for exposing undergraduate students, especially freshmen and sophomores, to exciting research programs conducted by the faculty. *Prerequisite: none. Pass/Not Pass only. (F,W,S)*

## Engineering, Jacobs School of

OFFICE: 7301 Engineering Building Unit 1, Warren College

The Irwin and Joan Jacobs School of Engineering at UCSD comprises the Departments of Applied Mechanics and Engineering Sciences (AMES), Bioengineering (BE), Computer Science and Engineering (CSE), and Electrical and Computer Engineering (ECE). The AMES Department oversees traditional programs in aerospace, chemical, mechanical, and structural engineering. The Jacobs School is directed by the dean of engineering. The departments offer many undergraduate and graduate degree programs. Students interested in engineering should consult the individual department listings which follow this section of the catalog.

The general-education requirements of UCSD's five undergraduate colleges differ noticeably. In some cases, these requirements can extend the time required to obtain a B.S. degree in engineering. Prospective students should review the general-education requirements and take them into account when selecting a college.

### Admission to the Jacobs School of Engineering

Student demand exceeds program capacity in several of the undergraduate majors. Therefore, admission into an engineering major is based on academic excellence demonstrated at UCSD in high school or at a community college. Admission will be granted to the maximum number of students in each major program consistent with maintaining acceptable program quality.

#### FRESHMAN

Freshman are admitted to engineering majors in one of two ways, either directly into the major of their choice or into a preliminary pre-major of their choice. This selection is based on the student's high school GPA and SAT performance as well as the ability of the particular major to accept new students. The pre-major is a provisional status and acceptance to major status is dependent on performance in selected screening courses. Students are notified of their status when they are admitted to UCSD. Major and pre-major students both receive the same college and departmental advising and are expected to take the same courses. In addition to the required science, math, and engineering courses required by the departments, it is expected that all students will also take twelve to eighteen units of general-education college requirements during their first year.

It is strongly suggested that both majors and pre-majors consult their department's academic adviser at an early stage to plan their lower-division engineering courses, and that they consult with a college academic counselor to arrange general-education courses around the required screening courses. Students admitted fall quarter should attend the engineering department's orientation meetings during Welcome Week.

**Pre-major engineering students** are expected to apply for admission to a major during the spring quarter of their freshman year. Selected introductory math, science, and engineering courses will be used as screening courses in order to determine which of the pre-major students will be accepted into a major and which will not be accommodated by the Jacobs School of Engineering. Admission to a major is based on the grade point average in

the screening courses only for those students who are able to apply by the end of their third quarter. The grade point average required for admission to the major by pre-majors is set individually by each engineering program and varies substantially according to the ability of the program to accommodate extra students. Pre-majors should consult their departments concerning the appropriate screening courses and the current grade point average standards for admission. However, a B average in the screening courses will guarantee admission to any of the majors when application is made before the end of the third quarter of study at UCSD.

**Pre-major engineering students** who are not able to apply before the end of their third quarter, or who wish to reapply following an unsuccessful application, must apply before the end of their sixth quarter of study at UCSD. **No admission to an engineering major will be considered after six quarters of study.** The admission review after the third quarter will not be based only on the grade point average in the screening courses alone. Admission review, after the third quarter, will also include consideration of the student's entire academic record, progress in science, math and engineering courses, and other factors such as course load and trends in performance.

#### TRANSFERS

Transfer students entering the university with 36.0 or more quarter units may apply for admission to the major **no later than their third quarter of study at UCSD.** Students seeking admission to CSE may apply for admission to the major upon entry to UCSD. Students seeking admission to ECE should complete the screening courses listed under the ECE section, "Undergraduate Regulations and Requirements" prior to submitting an application. Students seeking admission to AMES should complete at least six courses (science, mathematics, and/or engineering) at UCSD prior to submitting an application. Two of the six courses may be in progress when applying in the third quarter. Students seeking admission into BE must complete at least two required pre-bioengineering or bioengineering courses, one of which must be an upper-division course. AMES and BE transfer students are evaluated on an individual basis on performance at UCSD and their previous schools. Transfer students entering the university with fewer than 36.0

quarter units will have six quarters to apply. Transfer students must seek a preliminary appraisal by the department as soon as possible after they arrive on campus.

Since admissions are restricted, pre-engineering students may apply to more than one major degree program. Applications must be submitted to the appropriate Undergraduate Affairs Office, in AMES (182 Engineering Building II), Bioengineering (4103 Engineering Building I), CSE (3402 Applied Physics and Mathematics Building), or ECE (2718 Engineering Building I). These offices may be consulted for additional details.

### Admission of Non-Engineering Majors to the Jacobs School of Engineering Courses

The number of students admitted to some courses offered by the Jacobs School of Engineering must be restricted to meet the resources available. Students who have successfully completed all prerequisite courses will be admitted to these restricted courses in the following order:

1. Students admitted by the department to a major curriculum
2. Students admitted by the department to a minor curriculum
3. Students fulfilling a requirement for another major
4. All others, with permission of the department and instructor

Students should check with the departments concerning the limitations on specific courses and the requirements needed prior to attempting to enroll.

### Double Majors and Minors

It is the Jacobs School of Engineering policy not to approve double majors within engineering. Students who qualify for admission to graduate school and who have the extra time are encouraged to consider co-terminal B.S./M.S. degrees in one or two engineering disciplines. Engineering minors may be taken only by non-engineering majors.

## Engineering Student Services (ESS)

The Jacobs School of Engineering supports several programs that promote academic and professional development for undergraduate students across all engineering departments.

**ESS** programs are coordinated with the faculty and departments and include the Undergraduate Engineering Student Council and Engineering Student Professional Organizations, Engineering Student Employment Opportunities, the Internship Program, Pre-College Outreach, and the **MESA** Engineering Program (**MEP**).

MESA, the Mathematics, Engineering and Science Achievement Program, is a statewide effort to prepare more students from historically underrepresented backgrounds for careers in mathematics and science-based professions. MEP has been established to attract and retain qualified underrepresented students in engineering. MEP programs include academic advising and workshops, scholarships, opportunities for summer employment, and a variety of social events throughout the year. Strong support from local industry provides students the opportunity to explore career possibilities as early as their freshman year.

All engineering students are encouraged to become involved with ESS programs. Further information can be obtained at the ESS office in Room 304, Engineering Building II.

## COURSES

### 101. Team Engineering (4)

Fundamental principles of team engineering practice. Team formation and leadership, project creation and management, statistical tools for quality improvement, engineering business economics, law, and ethics. Interdisciplinary student teams will research, refine, and propose the design, manufacture, and marketing of a novel engineering product. Four hours of lecture. Prerequisite: a course in probability of statistics.

## Advanced Manufacturing Program

### Student Affairs:

Science and Engineering Research  
Facility (SERF), Room 107,  
Warren College  
(619) 534-7398, fax: (619) 534-7427,  
email: PAM@ece.ucsd.edu

World Wide Web home page:  
<http://bison.ucsd.edu/>

### Faculty:

Mike Bailey, Ph.D., *AMES/SDCC*  
Roger Bohn, Ph.D., *IR/PS*  
Charles Elkan, Ph.D., *CSE*  
Joseph Goguen, Ph.D., *CSE*  
David Gough, Ph.D., *BioEng*  
Clark Guest, Ph.D., *ECE*  
Ramesh Jain, Ph.D., *CSE*  
Kenneth Kreutz-Delgado, Ph.D., *ECE*  
Hidenori Murakami, Ph.D., *AMES*  
Anthony Sebald, Ph.D., *ECE*  
Mohan Trivedi, Ph.D., *ECE*

### Industry support

Industry support provided by leading engineering, electronic, and manufacturing companies in the USA and greater San Diego area.

The cross-departmental master of science specialization in Advanced Manufacturing at UCSD is designed to provide students with the knowledge of advanced manufacturing technologies as well as management, cultural, and international issues relevant to today's globally competitive, multicultural manufacturing environments. The two-year program is comprised of three tracks of study: engineering, management, and practical. The practical track includes a full-time, nine-month internship in a manufacturing company to ensure industry relevance and gain additional hands-on learning.

Today's successful manufacturing engineers are required to be knowledgeable in all aspects of the manufacturing process from design to production of the product. The interdisciplinary nature of the program is ideally suited to address this requirement. The Program is supported by the Departments of Applied

Mechanics and Engineering Sciences (AMES), Computer Science and Engineering (CSE), Electrical and Computer Engineering (ECE), and the Graduate School of International Relations and Pacific Studies (IR/PS), as well as the San Diego Supercomputer Center (SDCC), the Center for Magnetic Recording Research (CMRR), and the Center for Information Engineering (CIE). Particular emphases within the program are information engineering in manufacturing and the practical application of engineering and management theory within the manufacturing process.

The program in Advanced Manufacturing is governed by its directors, a faculty steering committee, and an industry steering committee to produce a challenging academic program for training students for positions in manufacturing companies.

Undergraduate preparation for the master of science specialization in Advanced Manufacturing normally would include a degree in engineering or physical sciences, such as physics or chemistry. Interested students would have a strong mathematics and engineering sciences background. Students admitted into the program will also have a minimum of three years of industrial experience in a manufacturing company. The criteria used for student selection include: work experience, undergraduate preparation and GPA, letters of recommendation, statement of purpose, and GRE scores. Prior to being admitted into the program all candidates advanced to the final selection stage will be interviewed by a panel consisting of UCSD faculty and industry representatives.

Students will be admitted into the program through one of the following SOE home departments: AMES, CSE, or ECE. Upon graduation, students will be awarded an M.S. degree in their home department with a specialization in Advanced Manufacturing, e.g., M.S. in ECE (Advanced Manufacturing).

The requirements for the M.S. degree are as follows:

1. All students must complete a total of sixty-eight units (includes twelve units of research credit for internship).
2. All students must complete the following core courses:

ECE 211 (four quarters); ECE 210; AMES 261; AMES 262; CSE 255; IRGN 441; IRGN

442; IRGN 444; Nine-month Internship/299 Level Research (twelve units).

Course descriptions are located in the *UCSD General Catalog* under the appropriate department.

3. An elective concentration based on any combination of classes totaling twenty units taken from the various engineering departments or the Graduate School of International Relations and Pacific Studies must be taken to complete the fifty-six-unit (core and electives classes) requirement for the M.S. degree. No more than two courses making up the elective concentration can be at the 100-level and up to twelve units of 298, Independent Study, can be used under the guidance of the student's faculty adviser.
4. Students must complete a thesis (Plan 1) as described in the "Graduate Studies" section of this catalog. A student's M.S. thesis committee consists of the student's faculty research adviser and two other faculty members from the School of Engineering or the Graduate School of International Relations and Pacific Studies. At least one faculty member from the student's home department must serve on the student's thesis committee. Additionally, the student's industry adviser may sit on their committee as a fourth member of the committee only. However, this is optional.
5. Students must meet all other requirements established by the university.

## **Applied Mechanics and Engineering Sciences (AMES)**

STUDENT AFFAIRS: 182 Engineering Building II, Warren College

### **Professors**

R. J. Asaro, Ph.D.  
 R. Cattolica, Ph.D.  
 R. W. Conn, Ph.D., *Dean, School of Engineering*  
 A. W. Elgamal, Ph.D.  
 C. H. Gibson, Ph.D.  
 J. D. Goddard, Ph.D.

G. A. Hegemier, Ph.D.  
 J. Lasheras, Ph.D.  
 P. Linden, Ph.D., *Blasker Chair in Environmental Engineering*  
 J. E. Luco, Ph.D., *Associate Dean, School of Engineering*  
 X. Markenscoff, Ph.D.  
 M. A. Meyers, Ph.D.  
 D. R. Miller, Ph.D., *Associate Vice Chancellor for Academic Affairs; Academic Senate Distinguished Teaching Award*  
 H. Murakami, Ph.D.  
 S. Nemat-Nasser, Ph.D., *Director, Center of Excellence for Advanced Materials*  
 C. Pozrikidis, Ph.D., *Vice Chair*  
 M. J. N. Priestley, Ph.D.  
 F. Seible, Ph.D.  
 K. Seshadri, Ph.D.  
 R. E. Skelton, Ph.D.  
 J. B. Talbot, Ph.D.  
 F. E. Talke, Ph.D., *CMRR Endowed Chair*  
 F. A. Williams, Ph.D., *Director, Center for Energy and Combustion Research, Department Chair*

### **Professors Emeritus**

H. Bradner, Ph.D.  
 P. A. Libby, Ph.D.  
 S.-C. Lin, Ph.D.  
 S. Middleman, Ph.D.  
 J. W. Miles, Ph.D.  
 W. Nachbar, Ph.D.  
 D. B. Olfe, Ph.D.  
 S. S. Penner, Ph.D.  
 S. Rand, Ph.D., *Associate Professor*  
 A. M. Schneider, Sc.D.  
 H. W. Sorenson  
 C. W. Van Atta, Ph.D.

### **Associate Professors**

D. J. Benson, Ph.D.  
 P. C. Chau, Ph.D.  
 R. K. Herz, Ph.D.  
 A. Hoger, Ph.D.  
 V. Karbhari, Ph.D.  
 J. B. Kosmatka, Ph.D.  
 M. Krstic, Ph.D.  
 J. M. McKittrick, Ph.D.  
 V. Nesterenko, Ph.D. (*In-Residence*)  
 S. Sarkar, Ph.D.  
 C. M. Uang, Ph.D.  
 K. S. Vecchio, Ph.D.

### **Assistant Professors**

S. Ashford, Ph.D.  
 K. Nomura, Ph.D.

### **Affiliated Faculty**

L. Armi, Ph.D., *Professor, SIO*  
 M. J. Bailey, Ph.D., *Associate Adjunct Professor of Computer Graphics*  
 R. Englekirk, Ph.D., *Adjunct Professor of Structural Engineering*  
 A. S. Gordon, Ph.D., *Adjunct Professor of Engineering Chemistry*  
 K. Melville, Ph.D., *Professor, SIO*  
 F. Najmabadi, *Associate Professor of Electrical and Computer Engineering*  
 N. Peters, Ph.D., *Adjunct Professor of Engineering*  
 R. J. Seymour, Ph.D., *Adjunct Professor of Engineering; Center for Coastal Studies, SIO*  
 M. T. Simnad, Ph.D., *Adjunct Professor of Nuclear Engineering and Materials Science*

### **Professional Research Staff**

J. Boedo, Ph.D., *Assistant Research Scientist*  
 A. Didwania, Ph.D., *Assistant Research Scientist*  
 Y. Hirooka, Ph.D., *Research Scientist*  
 T. Impelluso, Ph.D., *Assistant Research Scientist*  
 B. Kad, Ph.D., *Associate Research Scientist*  
 S. C. Li, Ph.D., *Associate Research Engineer*  
 S. Luckhardt, Ph.D., *Research Scientist*  
 K. Lund, Ph.D., *Associate Research Engineer*  
 R. Moyer, Ph.D., *Associate Research Scientist*  
 L. Ni, Ph.D., *Associate Project Engineer*  
 N. Okada, Ph.D., *Assistant Project Scientist*  
 R. L. Palmer, B.S., *Associate Project Scientist*  
 M. Siegel, Ph.D., *Assistant Research Scientist*  
 A. Strutt, Ph.D., *Assistant Project Scientist*  
 D. Sze, Ph.D., *Assistant Project Scientist*  
 M. Tillack, Ph.D., *Associate Research Scientist*  
 J. L. White, Ph.D., *Research Engineer*  
 D. Whyte, Ph.D., *Assistant Project Scientist*

### **Department Focus**

The instructional and research programs are grouped into three major areas: chemical engineering, mechanical and aerospace engineering, and structural engineering. Both the undergraduate and graduate programs are characterized by strong interdisciplinary relationships with the Departments of Physics, Mathematics, Bioengineering, Chemistry, Electrical and Computer Engineering, Computer Science and Engineering, the Materials Science Program, and associated campus institutes such as the UCSD Center for Energy and Combustion.

tion Research, the Institute for Nonlinear Science, Institute of Geophysics and Planetary Physics, Institute for Pure and Applied Physical Sciences, Institute for Biomedical Engineering, Institute for Mechanics and Materials, Center for Magnetic Recording Research, Center of Excellence for Advanced Materials, California Space Institute, and Scripps Institution of Oceanography.

The programs and curricula of AMES are based on the fundamentals of engineering sciences. These principles provide a common foundation for all engineering sub-specialties. Education with this emphasis is intended to serve students at a time when engineering practice changes rapidly.

### **The Undergraduate Program**

#### ***Degree and Program Options***

AMES offers traditional ABET accredited engineering programs leading to the B.S. degree in chemical engineering, mechanical engineering, and structural engineering. AMES also offers traditional nonaccredited engineering programs leading to the B.S. degree in aerospace engineering and engineering science. The B.S. programs require a minimum of 192 units.

All AMES programs of study have strong components in laboratory experimentation, numerical computation, and engineering design. Design is emphasized throughout the curricula by open-ended homework problems, by laboratory and computer courses which include student-initiated projects, and finally by senior design project courses which often involve teams of students working to solve engineering design problems brought in from industry. The AMES programs are designed to prepare students receiving bachelor's degrees for professional careers or for graduate education in their area of specialization. In addition, the programs can also be taken by students who intend to use their undergraduate engineering education as preparation for post-graduate professional training in nontechnical fields such as business administration, law, or medicine.

**Chemical engineering** encompasses studies in organic and physical chemistry, fluid mechanics, heat and mass transfer, separation

processes, and reactor and plant design. Many chemical engineering students pursue M.S. or Ph.D. degrees, but most seek employment at the B.S. level. They are employed not only in the traditional petrochemical, food, and polymers industries but also in high-technology industries such as biotechnology, electronics, and aerospace, and emerging fields such as environmental engineering.

**Mechanical engineering** is a traditional four-year curriculum in mechanics, vibrations, thermodynamics, fluid flow, heat transfer, structures, materials, control theory, and mechanical design. Graduates find employment in the mechanical and aerospace industries as well as electro-mechanical or biomedical industries. Mechanical engineers are involved in material processing, manufacturing, assembling, and maintenance of life-line facilities such as power plants.

Mechanical design includes conceptual design, drafting with 3D CAD programs, stress, dynamics, heat transfer or fluid dynamics analyses, and the optimization of the total system for superior performance and customer satisfaction. In manufacturing, the objective is to enhance efficiency and economy by utilizing numerical control (NC) of machine tools, mechatronics, micro-machining, and rapid prototyping. Currently, engineers have available computers, process models, and sensors to improve the quality and productivity of the manufacturing lines. In preparation for this modern era, the mechanical engineering curriculum emphasizes CAD courses, computer courses, laboratory courses, and design courses in addition to providing a strong background in basic science.

**Structural engineering** is concerned with the design and analysis of civil, mechanical, aerospace, marine, naval, and offshore structures. Examples include bridges, dams, buildings, aircraft, spacecraft, ships, oil platforms, automobiles, and other transportation vehicles. This field requires a thorough knowledge of linear and nonlinear behavior of solids (concrete, soils, rock, metals, composite materials, and plastics), fluid mechanics as it relates to structural loads, dynamics as it relates to structural response, mathematics for the generation of theoretical structural models and numerical analysis, and computer science for simulation purposes associated with computer-aided de-

sign, response analyses, and data acquisition. Basic understanding of material behavior and structural performance is enhanced by laboratory courses involving static and dynamic stress and failure tests of structural models.

**Aerospace engineering** is a four-year curriculum that begins with fundamental engineering courses in mechanics, thermodynamics, materials, solid mechanics, fluid mechanics, and heat transfer. Additional courses are required in aerospace structures, aerodynamics, flight mechanics, propulsion, controls, and aerospace design. Graduates of this program will normally enter the aerospace industry to develop aircraft and spacecraft, but also may find employment in other areas that use similar technologies, such as mechanical and energy-related fields. Examples include automobile, naval, and sporting equipment manufacturers.

The **engineering science** program resembles the Mechanical Engineering Program, except the amount of mechanical design is reduced and control theory is not required. In addition to core courses in dynamics, vibrations, structures, fluid mechanics, thermodynamics, heat transfer, and laboratory experimentation, a large number of technical electives are scheduled. This aspect of the curriculum allows flexibility by permitting specialization and in-depth study in one area of the engineering sciences or through a sequence of courses on various emerging technologies. Students must consult their advisers to develop a sound course of study to fulfill the technical elective of this program. Although a sequence in non-sciences may be permitted, the faculty advisers may insist on a substantial number of AMES or other science courses as technical electives.

#### ***Other Undergraduate Programs of Study in AMES***

The **engineering mechanics minor** involves successful completion of seven AMES courses, including at least five upper-division courses open to pre-AMES students who meet the course prerequisites: one must be 121A; one must be 101A (or 103A) or 130A (or both may be taken); and the balance must be selected from AMES 9 or 10, 11, 15, 102, 110, 111, 121B, 153 or 154, and 163. This set of courses provides a good introduction to engineering analysis and would be useful to nonengineering

majors desiring a background that could be used in professional communication with engineers.

**Other minor** options are restricted. Students wishing to arrange a sequence of AMES courses to satisfy minor requirements, or to meet particular academic interests, must consult the AMES Student Affairs Office for referral to the appropriate AMES faculty member.

### Program Accreditation

The B.S. programs in chemical engineering, mechanical engineering, and structural engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET/EAC).

### Major Requirements

Specific course requirements for each major program are outlined in tables in this section of the catalog. In addition to the required technical courses specifically indicated, a suggested scheduling of humanities and social science courses (HSS) are distributed in the curricula for students to use to meet college general-education requirements. To graduate, students must maintain an overall GPA of at least 2.0, and the department requires at least a C- grade in each course required for the major.

Deviations from these programs of study must be approved by the Undergraduate Affairs Committee prior to taking alternative courses. In addition, technical elective (TE) course selections must have departmental approval *prior* to taking the courses. In the accredited programs, TE courses are restricted to meet ABET standards. Courses such as AMES 195, 197, and 198 are not allowed as technical electives in meeting the upper-division major requirements. AMES 199 can be used as a technical elective only under restrictive conditions. Policy regarding these conditions may be obtained from the department's Student Affairs Office.

Students with different academic preparation may vary the scheduling of lower-division courses such as math, physics and chemistry, but should consult the department. Deviations in scheduling AMES upper-division courses is discouraged and requires prior approval. Most lower-division courses are offered more than once each year to permit students some flexibility in their program scheduling. However, most

AMES upper-division courses are taught only once per year, and courses are scheduled to be consistent with the curricula as shown in the tables. When possible AMES does offer large enrollment courses more than once each year. A tentative schedule of course offerings is available from the department each spring for the following academic year.

### General-Education/College Requirements

For graduation each student must satisfy general-education course requirements determined by the student's college as well as the major requirements determined by the department. The five colleges at UCSD require widely different general-education courses, and the number of such courses differs from one college to another. Each student should choose his or her college carefully, considering the special nature of the college and the breadth of general education.

Each AMES program allows for humanities and social science (HSS) courses so that students can fulfill their college requirements. In the ABET accredited programs, students must develop a program that includes a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. It should be noted, however, that some colleges require more than the nine or ten HSS courses indicated in the curriculum tables. Accordingly, students in these colleges would take longer to graduate than the indicated four-year schedule. Students must consult with their college to determine which HSS courses to take.

### Professional Licensing

After graduation, all students are encouraged to take the Engineering-in-Training (EIT) examination as the first step in becoming licensed as a professional engineer (PE). Students graduating from an accredited program can take the PE examination after EIT certification and two years of work experience; students graduating from a nonaccredited program can take the PE examination after EIT certification and four years of work experience.

For further information please contact your local Board of Registration for Professional Engineers and Land Surveyors.

### Four-Year Programs in Engineering

**\*Students who start their preparation in mathematics with Math. 20A in the fall quarter of their freshman year must complete the mathematics sequence in the following order: Math. 20A (F), Math. 20B (W), Math. 21C (S), Math. 21D (F), Math. 20F (W), and Math. 20E (S). Students with advanced placement starting with Math. 20B in the fall quarter of their freshman year can complete the sequence in the following order: Math. 20B (F), Math. 20C (W), Math. 20D (S), Math. 20E (F), and Math. 20F (W).**

Two computer languages, C/C++ (AMES 9) and FORTRAN (AMES 10) are offered to AMES students but only one course is required. FORTRAN (AMES 10) is recommended for students interested in software development of large-scale computer codes for calculation of the response of structures and machines, and for the simulation of new products and manufacturing processes. C/C++ (AMES 9) is recommended for students who plan to be involved in data acquisition, parallel processing over the network, and use of CAD software for design and graphics.

### Mechanical Engineering (ABET Accredited Program)

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Math. 20A*	Math. 20B*	Math. 21C*
AMES 9 or 10	Phys. 2A*	Phys. 2B*/2BL
Chem. 6A* <sup>2</sup>	Chem. 6B/6BL	AMES 11
HSS <sup>1</sup>	HSS	HSS
<b>SOPHOMORE YEAR</b>		
Math. 21D	Math. 20F	Math. 20E
Phys. 2C/2CL	AMES 15	AMES 130A
AMES 121A	AMES 121B	HSS
HSS	HSS	HSS
<b>JUNIOR YEAR</b>		
AMES 105	AMES 102	AMES 170
AMES 163	AMES 110	AMES 121C
AMES 130B	AMES 154	Math. 183
HSS	HSS	HSS
<b>SENIOR YEAR</b>		
AMES 101A	AMES 101B	AMES 101C
TE <sup>3</sup>	AMES 171A	AMES 171B
AMES 141	TE <sup>4</sup>	TE <sup>3</sup>
AMES 158	AMES 156A	AMES 156B

\* Six of the eight courses used to compute the performance index upon which pre-engineering majors are admitted to the major at the end of the freshman year. Of the other two courses used in this computation, one must be in engineering and one must be in engineering, science, or mathematics.



In fulfilling the humanities and social science requirements (HSS), students must take a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. Ten HSS courses are listed here; individual college requirements may be higher.

- 1 Chem. 6AH-BH sequence may be taken in place of Chem. 6A-B.
- 2 One technical elective (TE) must be an upper-division or graduate course in the engineering sciences, natural sciences or mathematics; the other TE must be selected from a list of approved energy, thermo-science courses available in AMES' student affairs office. Both must be selected with prior approval of the department to meet ABET standards.
- 3 TE restricted to AMES 157, a second energy or thermal science TE to meet ABET standards.

### Structural Engineering (ABET Accredited Program)

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Math. 20A*	Math. 20B*	Math. 21C*
AMES 9 or 10	Phys. 2A*	Phys. 2B*/2BL
Chem. 6A*	AMES 15	AMES 11
HSS <sup>2</sup>	HSS	HSS
<b>SOPHOMORE YEAR</b>		
Math. 21D	Math. 20F	Math. 20E
Phys. 2C/2CL	HSS	HSS
HSS	AMES 102	AMES 110
AMES 121A	AMES 121B	AMES 130A
<b>JUNIOR YEAR</b>		
AMES 105	AMES 163	AMES 170
AMES 130B	AMES 130C	AMES 121C
AMES 154	AMES 132A	AMES 132B
HSS	HSS	HSS
<b>SENIOR YEAR</b>		
Math. 120A	AMES 135	Math. 183 <sup>3</sup>
AMES 103A	AMES 131A <sup>4</sup>	TE <sup>5</sup>
AMES 133	AMES 158	AMES 136 <sup>6</sup>
AMES 134	AMES 173	HSS

- \* Six of the eight courses used to compute the performance index upon which pre-engineering majors are admitted to the major at the end of the freshman year. Of the other two courses used in this computation, one must be in engineering and one must be in engineering, science, or mathematics.
- 1 Chem. 6AH may be taken in place of Chem. 6A.
- 2 In fulfilling the humanities and social science requirements (HSS), students must take a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. Ten HSS courses are listed here; individual college requirements may be higher.
- 3 Math. 183 may be replaced by AMES 139.
- 4 Students pursuing aerospace structures may take AMES 138 in lieu of AMES 131A.
- 5 Technical elective (TE) course must be an upper-division or graduate course in the engineering sciences, natural sciences or mathematics, selected with prior approval of the department to meet ABET standards.
- 6 Students pursuing aerospace structures may take AMES 137 instead of AMES 136 and may replace AMES 134 and 135 with department approved aerospace related courses. Civil structures students may replace AMES 136 with other structural design courses with prior department approval.

### Chemical Engineering (ABET Accredited Program)

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Math. 20A*	Math. 20B*	Math. 21C*
AMES 9 or 10	Phys. 2A*	Phys. 2B*
Chem. 6A*	Chem. 6B/6BL	Chem. 6C
HSS <sup>1</sup>	HSS	HSS
<b>SOPHOMORE YEAR</b>		
Math. 21D	Math. 20F	Math. 20E
Phys. 2C/2CL	AMES 111	AMES 153
Chem. 131	Chem. 132	Chem. 128 <sup>2</sup>
HSS	HSS	HSS
<b>JUNIOR YEAR</b>		
Chem. 140A	TE <sup>3,4</sup>	TE
AMES 103A	AMES 163	AMES 170
HSS	AMES 103B	AMES 103C
HSS	HSS	HSS
<b>SENIOR YEAR</b>		
AMES 112	AMES 114A	AMES 114B
AMES 113A	AMES 113B	
AMES 140	AMES 176A	AMES 176B
TE	TE	TE

- \* Six of the eight courses used to compute the performance index upon which pre-engineering majors are admitted to the major at the end of the freshman year. Of the other two courses used in this computation, one must be in engineering and one must be in engineering, science, or mathematics.
- 1 Ten arts, humanities, and social sciences (HSS) courses are listed here; individual college requirements may be higher.
- 2 Chem. 128 may be replaced by Chem. 133 if 128 is not offered.
- 3 Technical elective (TE) courses must be upper-division or graduate courses in the engineering sciences, natural sciences or mathematics, selected with prior approval of the department to meet ABET standards.
- 4 To meet ABET requirements, a minimum of two technical electives must be in upper-division chemistry chosen from Chem. 140B-C, 120A-B, 114A-B, 135, 143A, 105A and 106.

### Engineering Science

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Math. 20A*	Math. 20B*	Math. 21C*
AMES 9 or 10	Phys. 2A*	Phys. 2B*/2BL
Chem. 6A* <sup>2</sup>	Chem. 6B/6BL	AMES 11
HSS <sup>1</sup>	HSS	HSS
<b>SOPHOMORE YEAR</b>		
Math. 21D	Math. 20F	Math. 20E
Phys. 2C/2CL	AMES 15	HSS
AMES 121A	AMES 121B	AMES 130A
HSS	HSS	HSS
<b>JUNIOR YEAR</b>		
AMES 101A	AMES 163	AMES 121C
AMES 130B	AMES 101B	AMES 101C
AMES 154	AMES 110	AMES 170
HSS	HSS	HSS
<b>SENIOR YEAR</b>		
AMES 158	AMES 171A	Math. 183
TE <sup>3</sup>	TE	TE
TE	TE	TE
HSS	HSS	HSS

- \* Six of the eight courses used to compute the performance index upon which pre-engineering majors are admitted to the major at the end of the freshman year. Of the other two courses used in this computation, one must be in engineering and one must be in engineering, science, or mathematics.
- 1 Humanities and social science (HSS) courses should be selected to meet general-education requirements of the colleges. Individual college requirements may be higher or lower than what is listed here.
- 2 Chem. 6AH-BH sequence may be taken in place of Chem. 6A-B.
- 3 Technical elective (TE) courses must be upper-division or graduate courses in the engineering sciences, natural sciences or mathematics, selected with prior approval of the department. A sequence of nonscience courses may also be selected with prior approval (see program description).

### Aerospace Engineering

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Math. 20A*	Math. 20B*	Math. 21C*
AMES 9 or 10	Phys. 2A*	Phys. 2B*/2BL
Chem. 6A* <sup>2</sup>	Chem. 6B/6BL	AMES 11
HSS <sup>1</sup>	HSS	HSS
<b>SOPHOMORE YEAR</b>		
Math. 21D	Math. 20F	Math. 20E
Phys. 2C/2CL	AMES 15	AMES 130A
AMES 121A	AMES 121B	AMES 110
HSS <sup>1</sup>	HSS	HSS
<b>JUNIOR YEAR</b>		
AMES 163	AMES 102	AMES 121C
AMES 130B	AMES 154	AMES 170
AMES 101A	AMES 101B	AMES 101C
AMES 105	HSS	HSS
<b>SENIOR YEAR</b>		
HSS	TE	AMES 159
AMES 104	AMES 175A	AMES 175B
AMES 141	AMES 142	HSS
AMES 137	AMES 155A	AMES 155B

- \* Six of the eight courses used to compute the performance index upon which pre-engineering majors are admitted to the major at the end of the freshman year. Of the other two courses used in this computation, one must be in engineering and one must be in engineering, science, or mathematics.
- 1 In fulfilling the humanities and social science requirements (HSS), students must take a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. Ten HSS courses are listed here; individual college requirements may be higher.
- 2 Chem. 6AH-BH sequence may be taken in place of Chem. 6A-B.

### Policies and Procedures for AMES Undergraduate Students

#### Application for Admission to the Major

Admission to the department as an AMES major or minor, or to fulfill a major in another department which requires AMES courses, is in



accordance with the general requirements established by the School of Engineering. The admission requirements and procedures are described in detail in the section on "Admission to the School of Engineering" in this catalog. Applicants who have demonstrated excellent academic performance prior to being admitted to UCSD will be admitted directly to the engineering major of their choice. These directly admitted students and all students are expected to complete lower- and upper-division courses, as suggested in the curriculum tables, in a timely fashion in the sequences outlined. Students not admitted directly to an engineering major are identified as pre-engineering majors and may be admitted by petition to the department. The Undergraduate Affairs Committee judges these petitions, taking into consideration the student's entire academic record. Pre-AMES students should complete at least the following eight courses during their freshman year and apply for admission during the spring quarter of their freshman year:

1. Math. 20A, 20B, and 21C (or Math. 20B, 20C, and 20D for those starting with Math. 20B in fall).
2. Phys. 2A and 2B
3. Chem. 6A or 6AH
4. AMES 9 or 10
5. One additional course in science, mathematics, or engineering.

Pre-engineering majors who have achieved an average GPA of 2.8 or better in the eight required pre-engineering courses by the end of the freshman year are assured of admission. Pre-engineering majors whose GPA is less than 2.8 may inquire at the departmental advising office about current minimum GPA requirements in effect for each major, which may vary due to enrollment. Students not admitted to a major by the end of the freshman year must apply, or reapply in the case of denial, before the end of the sixth quarter of study at UCSD. It is expected that students have completed or have in progress all eight prerequisite courses when applying by the third quarter. A minimum of eight, ten, and twelve courses must be completed if applying by the fourth, fifth, and sixth quarter of study. Pre-AMES students denied admission to an AMES major will automatically have their major converted from "Pre-AMES"

to "Undeclared" by the department at the time of their denial.

### *Transfer Students*

Transfer students are initially admitted as Pre-AMES majors and must apply for admission to full major status by the end of the third quarter of study at UCSD after having completed at least six required mathematics, physics, chemistry, and/or engineering courses at UCSD. *At the time of full admission to the AMES major, students must have substantially completed all of the courses listed under the freshman and sophomore years in the curriculum tables for the major.*

Requirements for admission as an AMES major or minor, or into AMES courses, are the same for transfer students as they are for continuing students (see section on "Admission to the School of Engineering" in this catalog). Accordingly, when planning their program, transfer students should be mindful of lower-division prerequisite course requirements upon which admission to the major is based, as well as for meeting collegiate requirements.

Students who have taken equivalent courses elsewhere may request to have transfer credit apply toward the department's major requirements. This is accomplished by submitting a petition for transfer credit together with a transcript and catalog course description from the institution where the course(s) were taken. These documents are reviewed for approval by AMES' Undergraduate Affairs Committee. Transfer petitions are available from the Student Affairs Office.

### *Academic Advising*

Upon admission to the major, students must make an appointment with the undergraduate adviser in AMES' Student Affairs Office to plan a program of study. The program plan may be revised in subsequent years, but revisions involving curricular requirements require approval by the undergraduate adviser or the Undergraduate Affairs Committee. Because some course and/or curricular changes may be made every year, it is imperative that students consult with the department's undergraduate adviser on an annual basis.

Many AMES courses are offered only once a year and therefore should be taken in the recommended sequence. If courses are taken out

of sequence, it may not always be possible to enroll in courses as desired or needed. If this occurs, students should seek immediate departmental advice. When a student deviates from the sequence of courses specified for each curriculum in this catalog, it may be impossible to complete an AMES major within the normal four-year period. AMES advisers will be monitoring the progress of all freshmen in order for students to remain on track.

In addition to the advising available through the Student Affairs Office, programmatic or technical advice may be obtained from AMES faculty members. A specific AMES faculty adviser is assigned to each AMES or Pre-AMES student. All AMES or Pre-AMES students are required to meet with their faculty adviser at least once a year, preferably before the beginning of fall quarter.

### *Program Alterations/ Exceptions to Requirements*

Variations from or exceptions to any program or course requirements are possible only if a petition is approved by the AMES Undergraduate Affairs Committee before the courses in question are taken. Petition forms may be obtained from the AMES Student Affairs Office and must be processed through this office.

### *Independent Study*

AMES students may take AMES 199, Independent Study for Undergraduates, under the guidance of an AMES faculty member. Normally, this course is taken as an elective on a P/ NP basis. Under very restrictive conditions, however, it may be used to satisfy upper-division technical elective course requirements for the major. Students interested in this alternative must identify a faculty member with whom they wish to work and propose a two-quarter research or study topic. After obtaining the faculty member's concurrence on the topic and scope of the study, the student must submit a Special Studies Course form (each quarter) and an AMES 199 as Technical Elective Contract form to the Undergraduate Affairs Committee. These forms must be completed, approved, and processed **prior** to the beginning of the quarter in which the course is to be taken. This should not be done during the add/drop period. Detailed policy in this regard and the requisite

forms may be obtained from the Student Affairs Office.

### Teaching

Students interested in participating in the instructional activities of the department may take AMES 195, Undergraduate Teaching. Normally, this course is taken as an elective on a P/NP basis. Under very restrictive conditions, it may be used to satisfy upper-division technical elective course requirements for the major. Policy in this regard and the appropriate forms may be obtained from the Student Affairs Office.

### Integrated Bachelor's/Master's Degree Program

An integrated program leading to a bachelor of science and a master of science degree in engineering is offered to undergraduate students who are enrolled in any of the major programs offered by the Department of AMES. Before the last quarter of their junior year (during the fourth quarter *prior* to the receipt of the B.S. degree), students interested in obtaining the M.S. degree within one year following receipt of the B.S. degree may apply to the department for admission to the program. (Contact the Department of AMES Graduate Student Affairs Office.)

The program is open only to UCSD undergraduates. The Department of AMES does not have financial assistance available for students enrolled in this program.

To be eligible, students must have completed the first two quarters of their junior year in residence at UCSD and have an upper-division GPA of 3.5 or better and a 3.0 overall UC GPA. Twelve units of AMES graduate level courses must be completed during the student's senior undergraduate year, *in addition* to the requirements for the bachelor's degree; these twelve units will count toward the requirements for the master's degree only and must be taken for a letter grade. It is the responsibility of the prospective B.S./M.S. student to select an AMES faculty member who is willing to serve as the student's adviser. The student will also arrange (with their faculty adviser's approval) a schedule of courses for the senior year that will fulfill the requirements for the B.S. degree while also serving the program planned for the M.S. degree. Students are expected to meet the re-

quirements for the M.S. degree in one year (three consecutive academic quarters) from the date of the receipt of the B.S. degree.

### The Graduate Program

The Department of Applied Mechanics and Engineering Sciences offers graduate instruction leading to the **M.S. and Ph.D. degrees in engineering sciences** with a designated specialization in each of the following areas: aerospace engineering, applied mechanics, applied ocean sciences, chemical engineering, engineering physics, mechanical engineering, and structural engineering. The department, in collaboration with the Department of Electrical Engineering and Computer Sciences and the School of International Relations and Pacific Studies, also offers a M.S. degree in engineering sciences with specialization in advanced manufacturing. For more information on this option, please refer to page 00.

Admission is in accordance with the general requirements of the graduate division, which requires a B.S. and/or M.S. degree in some branch of engineering, the physical sciences, or mathematics; an overall GPA of 3.0; and three letters of recommendation from individuals who can attest to the academic or professional competence and to the depth of their interest in pursuing graduate study. In addition, all applicants are required to submit GRE General Test scores. A minimum score of 550 on the Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. Students who score below 600 on the TOEFL examination are strongly encouraged to enroll in an English as a second language program before beginning graduate work. (UCSD Extension offers an excellent English language program during the summer as well as the academic year.) Applicants are judged competitively. Based on the candidate's background, qualifications, and goals, admission to the program is in one of three categories: M.S. *only*, M.S., or Ph.D. Admission to the M.S. *only* category is reserved for students for whom the MS degree is likely to be the terminal graduate degree. The M.S. designation is reserved for students currently interested in obtaining an M.S. degree but who

at a later time may wish to continue in the doctoral degree program. Admission to the Ph.D. program is reserved for qualified students whose final aim is a doctoral degree. Policies for possible changes in status are given under the "Master's Degree Program" below.

Students are welcome to seek enrollment in AMES courses via UC Extension's concurrent registration program, but an extension student's enrollment in an AMES graduate course must be approved by the instructor.

### Master's Degree Program

The M.S. program is intended to extend and broaden an undergraduate background and/or equip practicing engineers with fundamental knowledge in their particular fields. The degree may be terminal, or obtained on the way to the Ph.D. The degree is offered under both the Thesis Plan I and the Comprehensive Examination Plan II (see "Graduate Studies: Master's Degree"). A strong effort is made to schedule M.S.-level course offerings so that students may obtain their M.S. degree in one year of full-time study or two years of part-time study.

**M.S. Time Limit Policy:** Full-time M.S. students are permitted seven quarters in which to complete all requirements. While there are no written time limits for part-time students, the department has the right to intervene and set individual deadlines if it becomes necessary.

**Course requirements** are flexible in the applied mechanics, chemical engineering, and engineering physics programs (see sample program below). Course requirements for the aerospace engineering, mechanical engineering, and structural engineering programs are outlined in the M.S. program charts below. Specific departmental requirements for the M.S. degree are as follows:

**Thesis Plan I:** This plan of study involves both course work and research, culminating in the preparation of a thesis. A total of forty-eight units of credit is required: thirty-six units (nine courses) must be in course work, and twelve units must be in research. The student's program is arranged, with prior approval of the faculty adviser, according to the following policies:

1. Course work must include sixteen units (four courses) of AMES 200-level courses.

2. Units obtained in AMES 206, 259, 281, or 299 may not be applied toward the course work requirement.
3. No more than a total of eight units of AMES 296 and 298 may be applied toward the course work requirement.
4. No more than twelve units of upper-division 100-level courses may be applied toward the course work requirement.
5. Twelve units of AMES 299 must be taken to fulfill the research requirement.

Students must maintain at least a B average in the courses taken to fulfill the degree requirements. A thesis based on the research is written and subsequently reviewed by the thesis adviser and two other faculty members appointed by the dean of Graduate Studies. The review is normally an oral defense of the thesis.

**Comprehensive Examination Plan II:** This plan of study involves course work only and culminates in a comprehensive examination. A total of forty-eight units of credit (twelve courses) is required. The student's program is arranged, with prior approval of the faculty adviser, according to the following policies:

1. At least sixteen units (four courses) must be AMES 200-level courses.
2. Units obtained in AMES 206, 259, 281, or 299 may not be applied toward the degree requirements.
3. No more than a total of eight units of AMES 296 and 298 may be applied toward the degree requirements.
4. No more than twelve units of upper-division 100-level courses may be applied toward the degree requirements.

Students must maintain at least a B average in the courses taken to fulfill the degree requirements. The comprehensive examination is conducted by the adviser and at least two other faculty members. The examination committee normally conducts an oral examination in two areas of specialization covered by course work taken by the student. A student working toward the Ph.D. degree who has successfully passed two areas of the department's Ph.D. examination need not take the comprehensive examination for the M.S. degree.

**Change of Degree Aim.** Upon completion of the requirements for the M.S. degree, stu-

dents admitted as M.S. only or M.S. candidates are not automatically eligible for admission to the Ph.D. program.

M.S. only candidates who subsequently wish to pursue a doctorate must submit an application for a change in status to the Committee on Graduate Affairs (CGA). The committee will appoint three AMES faculty to examine the applicant in one mutually agreed-upon and well-defined topic. The results of this examination, together with any other relevant information, e.g., the student's graduate record, will form the basis for a positive or negative recommendation to the CGA. If the recommendation is positive and the request approved, the student must submit a general petition for graduate students to effect the change of status. In addition, the examining committee may recommend that the examination satisfy one of the four topics required in the departmental qualifying examination for the doctorate.

M.S. candidates who subsequently wish to pursue a doctorate must also submit an application for a change in status to the Committee on Graduate Affairs. In this case, a special examination is not required. The application, however, must be approved and signed by an AMES faculty member who expects to serve as the student's Ph.D. adviser. When the request is approved, the student must submit a general petition for graduate students to effect the change of status. If the student elects the comprehensive examination plan for the M.S. degree, this examination may be used not only to fulfill the requirement for the M.S. degree but also to satisfy one of the four topics required in the departmental qualifying examination for the doctorate. In fact, the M.S. examination may be part of the doctoral examination.

### M.S. Program in Aerospace Engineering

To obtain an M.S. degree with specialization in aerospace engineering, students must select any four of the following five sequences of classes.

FALL	WINTER	SPRING
Fluid Mechanics 210A	Fluid Mechanics 210B	Fluid Mechanics 210C

Foundations of Solid Mechanics or 231A or Advanced Structural Analysis 230	Elasticity 231B or Structural Stability 236	Anelasticity 231C or Structural Dynamics 237 or Mechanics of Laminated Composite Structures 241
Numerical Methods 290A	Numerical Methods for Differential Equations 290B	Design in Mech in Computer Tech. 291 or Computer-aided Design Analysis 292 or Computational Fluid Dynamics 223 or Finite-Element Methods Solid Mechanics 232B
Statistical Thermodynamics 220A	Introductory Compressible Flow 212A	Mechanics of Propulsion 213
ECE 251A	ECE 251B	ECE 251C or
ECE 270A	ECE 270B	ECE 270C or
ECE 271A	ECE 271B	ECE 271C or
ECE 273A	ECE 273B	ECE 273C or
AMES 262	AMES 261	ECE 171A or
ECE 250*	ECE 109*	ECE 153*

\* This sequence is taken in the order of ECE 109, ECE 153, and ECE 250.

**Note:** Not all courses are offered every year.

### M.S. Program in Chemical Engineering

FALL	WINTER	SPRING
Fluid Mechanics 210A	Fluid Mechanics 210B	Fluid Mechanics 210C
Heat and Mass Transfer 221A	Heat and Mass Transfer 221B	Chemical Reaction Engineering 252 or Heterogeneous Catalysis 253
Numerical Methods 290A	Numerical Methods 290B	TE <sup>1</sup>
Chem. 211 or <sup>2</sup> MATS. 201A or AMES 211	Chem. 211 or MATS. 201A or AMES 212 or 220A	Chem. 213 or MATS. 201C or AMES 213 or 220B

**Note:** Not all courses are offered every year.

<sup>1</sup> Consult faculty adviser on the choice of elective course to complement with the fourth course sequence.

<sup>2</sup> The recommended course sequences are biochemistry, materials science, and energy/thermal science. Consult faculty adviser on additional choices or alternatives, including special areas in bioengineering, electrical and computer engineering, physics, and mathematics.

### M.S. Program in Mechanical Engineering

FALL	WINTER	SPRING
Foundations of Solid Mechanics 231A or Fluid Mechanics 210A	Elasticity 231B or Fluid Mechanics 210B	Anelasticity 231C or Fluid Mechanics 210C
Finite Element Methods in Solid Mechanics 232A or Numerical Methods 290A	Finite Element Methods in Solid Mechanics 232B or Numerical Methods for Differential Equations 290B	Finite Element Methods in Solid Mechanics 232C or Computational Fluid Dynamics 223
Fracture Mechanics 233A or Materials Science	Micromechanics 233B or TE <sup>2</sup>	Adv. Mech. of Composite Materials 233 C or Des. and Mech. in Computer Technology 291 or Computer-Aided Des. and Anal. 292
ECE 251A	ECE 251B	ECE 251C or
ECE 270A	ECE 270B	ECE 270C or
ECE 271A	ECE 271B	ECE 271C or
ECE 273A	ECE 273B	ECE 273C or
AMES 262	AMES 261	ECE 171A or
ECE 250 <sup>3</sup>	ECE 109 <sup>3</sup>	ECE 153 <sup>3</sup>

**Note:** Not all courses are offered every year.

- <sup>1</sup> To be selected from graduate course offerings in materials science.
- <sup>2</sup> AMES graduate courses selected must be approved by the student's faculty adviser.
- <sup>3</sup> This sequence is taken in the order of ECE 109, ECE 153, and ECE 250.

### M.S. Program in Applied Ocean Sciences

To obtain an M.S. degree with specialization in applied ocean sciences, students may substitute some of the courses in the M.S. program in mechanical engineering with courses taken at Scripps Institution of Oceanography. These courses might include SIO 211A-B (Ocean Waves), SIO 212A-B (Dynamic Oceanography), SIO 204A-B-C (Advanced Acoustics), SIO 213/ AMES 214A (Ocean Turbulence and Mixing), and SIO 219 (Special Topics in Physical Oceanography), depending on the interests of the student.

### M.S. Program in Structural Engineering\*

FALL	WINTER	SPRING
Foundations of Solid Mechanics 231A	Elasticity 231B	Anelasticity 231C
Advanced Structural Analysis 230	Structural Dynamics 237	Structural Stability 236
Advanced RC/PC Design 240 or Finite Element Methods 232A	Bridge Design 242 or Finite Element Methods 232B	Advanced Structural Steel Design 245 or Mechanics of Laminated Structures 241
Applied Mathematics 105 or Methods in Applied Mechanics 294A	Numerical Methods 290A or Methods in Applied Mechanics 294B	Numerical Methods 290B or Methods in Applied Mechanics 294C

\* Includes civil structures and aerospace and marine structures.

**Note:** Not all courses are offered every year.

### Doctoral Degree Program

The AMES Ph.D. program is intended to prepare students for a variety of careers in research and teaching. Therefore, depending on the student's background and ability, research is initiated as soon as possible. In general, there are no formal course requirements for the Ph.D. All students, in consultation with their advisers, develop course programs that will prepare them for the AMES Departmental Qualifying Examination and for their dissertation research. However, these programs of study and research must be planned to meet the time limits established to advance to candidacy and to complete the requirements for the degree. Doctoral students who have passed the Departmental Examination may take any course for an S/U grade with the exception of any course that the student's Departmental or Ph.D. Qualifying Examination Committee stipulates must be taken in order to remove a deficiency. It is strongly recommended that all AMES graduate students take a minimum of two courses (other than research) per academic year after passing the Departmental Qualifying Examination. Specific details in this regard can be obtained from AMES' Student Affairs Office.

**Doctoral Examinations:** An AMES Ph.D. student is required to pass three examinations. The first is a **Departmental Qualifying Examination** which should be taken within three to six quarters of full-time graduate study. This examination is intended to determine the candidate's ability to pursue successfully a research project at a level appropriate for the doctorate. It is administered by at least four faculty, three of whom must be in AMES. Although the student may elect to satisfy one examination area by course work, he or she is responsible for four areas. In order to insure appropriate breadth, the areas are sub-divided into two which are closely related to the student's research interests and two others which are peripheral thereto. Since the examination areas must be approved by the department's Committee on Graduate Affairs, students are advised to seek such approval well before their expected examination date, preferably while planning their graduate studies. Although students are not required to take particular courses in preparation for the departmental examination, the scope of the examination in each area is associated with a set of graduate courses, generally AMES courses. Thus a candidate can develop a sense of the level of knowledge expected to be demonstrated during the examination by studying the appropriate syllabi and/or discussing the course content with faculty experienced in teaching the courses involved.

The **Teaching Experience** is required of all AMES Ph.D. students prior to taking the Ph.D. Qualifying Exam. The teaching experience is defined as lecturing one hour per week in either a problem-solving section or regular lecture for one quarter in a course designated by the department. The requirement can be fulfilled by teaching assistant service or taken as a course for academic credit (AMES 501). Students must contact the Student Affairs Office to plan for completion of this requirement.

The **Ph.D. Qualifying Examination** is the second examination required of AMES Ph.D. students. In preparation for the Ph.D. Qualifying Examination, students must have completed the Departmental Qualifying Examination and the Departmental Teaching Experience requirement, obtained a faculty research adviser, and have identified a topic for their dissertation research and have made initial

progress. At the time of application for advancement to candidacy, a doctoral committee responsible for the remainder of the student's graduate program is appointed by the Graduate Council. The committee conducts the Ph.D. Qualifying Examination, during which students must demonstrate the ability to engage in thesis research. This involves the presentation of a plan for the thesis research project. The committee may ask questions directly or indirectly related to the project and general questions that it determines to be relevant. Upon successful completion of this examination, students are advanced to candidacy and are awarded the Candidate in Philosophy degree (see "Graduate Studies" section in this catalog).

The **Dissertation Defense** is the final Ph.D. examination. Upon completion of the dissertation research project, the student writes a dissertation that must be successfully defended in an oral examination and public presentation conducted by the doctoral committee. A complete copy of the student's dissertation must be submitted to each member of the doctoral committee approximately four weeks before the defense. It is understood that this copy of the dissertation given to committee members will not be the final copy, and that the committee members may suggest changes in the text at the time of the defense. This examination may not be conducted earlier than three quarters after the date of advancement to doctoral candidacy. Acceptance of the dissertation by the Office of Graduate Studies and Research and the university librarian represents the final step in completion of all requirements for the Ph.D.

There is no formal foreign language requirement for doctoral candidates. Students are expected to master whatever language is needed for the pursuit of their own research.

**Ph.D. Time Limit Policy.** Pre-candidacy status is limited to four years. Doctoral students are eligible for university support for six years (engineering physics, seven years). The defense and submission of the doctoral dissertation must be within seven years (engineering physics, eight years).

**Evaluations.** In the spring of each year, the faculty evaluate each doctoral student's overall performance in course work, research, and prospects for financial support for future years. A written assessment is given to the student

after the evaluation. If a student's work is found to be inadequate, the faculty may determine that the student cannot continue in the graduate program.

### ***Joint Doctoral Program with San Diego State University***

The Department of Applied Mechanics and Engineering Sciences at UCSD participates in a joint doctoral program with the Graduate Group in Applied Mechanics at SDSU. The program leads to the degree of doctor of philosophy in engineering sciences (applied mechanics). Participants in the program are required to spend one year enrolled at UCSD; their dissertation research is carried out under the supervision of an SDSU faculty member.

Information regarding admission may be obtained from the departmental Student Affairs Office.

## **COURSES**

*All students enrolled in AMES courses or admitted to an AMES program (including premajors) are expected to meet prerequisite and performance standards, i.e., students may not enroll in any AMES courses or courses in another department which are required for the major prior to having satisfied prerequisite courses with a C- or better. (The department does not consider D or F grades as adequate preparation for subsequent material.) Additional details are given under the various program outlines, course descriptions, and admission procedures for the School of Engineering in this catalog. Furthermore, the majority of AMES courses have enrollment restrictions which give priority to or are open only to declared pre-engineering students and/or to students who have been admitted to an AMES major. Where these restrictions apply, the registrar will not enroll other students except by department stamp on class enrollment cards. The department expects that students will adhere to these policies of their own volition and enroll in courses accordingly. Students are advised that they may be dropped at any time from course rosters if prerequisites and/or performance standards have not been met.*

*While most lower-division courses are offered more than once each year, most AMES upper-division courses are taught only once per year, and courses are scheduled to be consistent with the curricula as shown in the tables. When possible, AMES does offer selected large enrollment courses more than once each year. A tentative schedule of course offerings is available from the department each spring for the following academic year.*

### **LOWER-DIVISION**

#### **1. Introduction to Engineering and Design (4)**

A general introduction to the various specialities in engineering with emphasis on mechanical, structural, chemical, and aerospace engineering. A discussion of the role of engineers in research, design and development, testing, manufacturing, construction, sales, consulting, government, management, and teaching. Introduction to the design process and to the analysis of costs and benefits. Professional ethics.

#### **5. Quantitative Computer Skills (4)**

Introductory course for nonengineering majors. Use of computers in solving problems; applications from life science, physical science, and engineering. Students run existing computer programs and complete some programming in BASIC. (F,W,S)

#### **9. C/C++ Programming (4)**

C/C++ computer programming under UNIX environment with applications to numerical problems fundamental to computational mechanics. Arithmetic operations, branches, arrays, data structures, and use of pointers are introduced. Introduction to C/FORTRAN bindings to enable C codes to call FORTRAN routines and vice versa. (Students who have taken CSE 9A-B or CSE 10 may not receive credit for AMES 9) (F,W)

#### **10. FORTRAN for Engineers (4)**

FORTRAN 90 computer programming under UNIX environment with applications to numerical problems relevant to engineering applications. Arithmetic operations, control constructs, subprograms, arrays and array processing, Input/Output handling and some advanced features of FORTRAN 90 are introduced. (F,W)

#### **11. Elements of Materials Science (4)**

The structure of engineering materials (metals, ceramics, glasses, semiconductors, superconductors, and polymers) and how these structures can be controlled to produce desired, useful properties. Mechanical, electrical, optical, superconducting, and magnetic properties will be discussed. *Prerequisites:* Chem. 6A, Phys. 2A or 4A, Math. 21C or Math. 20D (or concurrent enrollment). Priority enrollment given to pre-engineering and engineering majors. (F,S)

#### **15. Introduction to Engineering Graphics and Design (4)**

Introduction to engineering graphics and computer-aided design (CAD). Engineering graphics topics include orthographic, oblique, and axonometric projections; auxiliary and sectional views; and dimensioning. AutoCAD and C programming assignments for 2-D graphics and solid modeling. Guest lectures on engineering design. *Prerequisites:* grade of C- or better in AMES 9 or 10. Enrollment restricted to pre-engineering and engineering majors. (W,S)

#### **90. Undergraduate Seminar (1)**

Selected topics of interest to the faculty will be used to introduce students to engineering science concepts. (Not open to upper-division engineering students.) (F,W,S)

UPPER-DIVISION

**101A-B. Introductory Fluid Mechanics (4-4)**

Hydrostatics with application to submerged surfaces and structure of atmospheres. Bernoulli's equation, its extension and application. Integral momentum and energy theorems, similitude and dimensional analysis. Potential flow, boundary layers, compressible flow including shock waves, generalized one-dimensional flow. *Prerequisites: admission to the major and grades of C- or better in Phys. 2A, Math. 21D or 20D, 20E. Enrollment in 101B requires grades of C- or better in AMES 101A and AMES 110 (or concurrent enrollment).* (F,W)

**101C. Heat Transfer (4)**

Extension of AMES 101A-B to viscous, heat-conducting flows. Application of the energy conservation equation to heat transfer ducts and external boundary layers. Introduction to heat conduction and radiation transfer. Calculation of heat coefficients in forced and free convection. Design applications and heat exchangers. *Prerequisites: admission to the major and AMES 101A-B with grades of C- or better.* (S)

**102. Mechanical Behavior of Materials (4)**

Mechanical tests, elasticity and anelasticity, dislocations and microplasticity of crystals, plastic deformation and creep, fracture and strengthening mechanisms, ceramics and other inorganic nonmetallics, polymers. Laboratory demonstrations of selected topics. *Prerequisites: grades of C- or better in AMES 11.* Priority enrollment given to pre-engineering and engineering majors. (W,S)

**103A. Introductory Fluid Mechanics (4)**

Equations of motion; non-Newtonian fluids; hydrostatics; Bernoulli's equation; viscous flows; turbulence, applications to chemical engineering, bioengineering, and structural engineering. (Students may not receive credit for both AMES 101A and AMES 103A; priority enrollment will be given to bioengineering, chemical engineering, and structural engineering majors.) *Prerequisites: admission to the major and grades of C- or better in Phys. 2A and Math. 21D or 20D, 20E.* (F)

**103B. Mass Transfer (4)**

Diffusive and convective mass transfer in solids, liquids, and gases; steady and unsteady state; mass transfer coefficients; applications to chemical engineering and bioengineering. (Priority enrollment will be given to bioengineering and chemical engineering majors.) *Prerequisites: admission to the major and AMES 103A or 101A with grade of C- or better.* (W)

**103C. Heat Transfer (4)**

Conduction, convection, radiation heat transfer; design of heat exchangers. (Students may not receive credit for both AMES 101C and AMES 103C; priority enrollment will be given to chemical engineering majors.) *Prerequisites: admission to the major and grades of C- or better in AMES 103A-B or AMES 101A-B.* (S)

**104. Aerodynamics (4)**

Basic relations describing flow field around wings and bodies at subsonic and supersonic speed. Thin-wing theory. Slender-body theory. Formulation of theories for evaluating forces and moments on airplane geometries. Application to the design of high-speed airplanes. *Prerequisites: admission to the major and grade of C- or better in AMES 101A-B.* (F)

**105. Introduction to Mathematical Physics (4)**

Fourier series, Sturm Liouville theory, elementary partial differential equations, integral transforms with applications to problems in vibration, wave motion, and heat conduction. *Prerequisites: Admission to the major and grades of C- or better in Phys. 2A-2B and Math. 20D or Math. 21D.* (F,S)

**110. Thermodynamics (4)**

Application of the first and second laws to power and refrigeration cycles; control volume analysis, non-ideal compressible substances; gas mixtures; psychometrics; combustion. *Prerequisites: grades of C- or better in Phys. 2C and Chem. 6A (or equivalent). Priority enrollment given to pre-engineering and engineering majors.* (W,S)

**111. Chemical Engineering Thermodynamics (4)**

Thermodynamic behavior of pure substances and mixtures. Properties of solutions, phase equilibria. Thermodynamic cycles. Chemical equilibria for homogeneous and heterogeneous systems. *Prerequisites: admission to the major and grade of C- or better in Chem. 131.* (W)

**112. Separation Processes (4)**

Principles of analysis and design of systems for separation of components from a mixture. Topics will include staged operations (distillation, liquid-liquid extraction), and continuous operations (gas absorption, membrane separation) under equilibrium and nonequilibrium conditions. *Prerequisites: admission to the major and grades of C- or better in AMES 103B and AMES 153.* (F)

**113A. Chemical Reaction Engineering (4)**

Principles of analysis and design of chemical reactors with emphasis on homogeneous reactions. Treatment of kinetic data, design of batch and continuous reactors, nonisothermal effects, selectivity considerations, residence time distribution. *Prerequisites: admission to the major and grades of C- or better in Chem. 132 and AMES 103B.* (F)

**113B. Chemical Reaction Engineering (4)**

Introduction to heterogeneous chemical reactions, including heterogeneous catalysis, heat and mass transfer effects. Strong emphasis on numerical simulation and computer-aided design of chemical reactors. *Prerequisites: admission to the major and grades of C- or better in AMES 113A.* (W)

**114A. Computer-Aided Design of Chemical Processes (4)**

Introduction to techniques for computer-aided analysis of chemical processing systems. Development of mathematical models to describe dynamic and steady-state process behavior. Representation of the structure of complex, interconnected chemical processes with arbitrary recycle stream. Numerical methods for solving resulting systems of nonlinear differential and algebraic equations. *Prerequisites: admission to the major and grades of C- or better in AMES 112, 113A.* (W)

**114B. Plant and Process Design (4)**

Engineering and economic analysis of integrated chemical processes, equipment, and systems. Cost estimation, heat and mass transfer equipment design and costs. Integrated plant design. Optimal design. Profitability. *Prerequisites: admission to the major and grades of C- or better in AMES 114A.* (S)

**118A. Energy: Non-Nuclear Energy Technologies (4)**

Oil recovery from tar sands and oil shale. Coal production, gasification, liquefaction. The hydrogen economy. Energy storage systems. Techniques for direct energy conversion. Solar energy utilization. Energy from windmills. Tidal and wave energy utilization. Hydroelectric power generation. Hydrothermal energy. Geothermal energy from hot rocks. Electrical power production, transmission, and distribution. *Prerequisites: consent of instructor.*

**118B. Energy: Nuclear Energy Technologies (4)**

A brief survey of energy demands and resources. Available nuclear energy, physical background—thermal dynamics—atomic and nuclear physics; fission and fusion processes, physics of fission reactions—engineering aspects—safety and environmental effects, fusion, scaling laws, and start-up criteria—laser fusion, magnetic confinement—equilibrium instability. *Prerequisite: consent of instructor.*

**118C. Introduction to Fusion Science and Technologies (4)**

Overview of basic fusion processes, high-temperature plasma characteristics, and fusion power plant features. Emphasis on the enabling technologies for practical fusion and related applications outside of fusion, such as plasma-material interactions, plasma heating and wave-particle interactions, high heat flux engineering, superconductivity, advanced materials, and nuclear technology. *Prerequisite: consent of instructor.*

**119. Topics in Energy and Thermodynamic Systems (4)**

Advanced topics in energy processes and cycles and/or thermodynamic analysis of energy and power cycles such as non-renewable cycles, cogeneration and combined power cycles, and economic, energy, and optimization analysis of thermodynamic systems. *Prerequisite: AMES 110 or 111.*

**121A. Mechanics I: Statics (4)**

Principles of statics. Three-dimensional equilibrium analysis with unit vector representation. Analysis of simple, statically determinate structures under discrete and distributed loading; hydrostatics, internal forces of beams. Problem formulation and problem solution with application to realistic engineering problems. *Prerequisites: Math. 21C or Math. 20D and Phys. 2A, with grades of C- or better. Priority enrollment given to pre-engineering and engineering majors.* (F,W)

**121B. Mechanics II: Dynamics (4)**

Kinematics and kinetics of particles in three-dimensional vector representation; orbital mechanics. Work, energy and power for particle motion, conservative forces and conservation principles. Principle of impulse and momentum, impulsive motion and impact. Relative motion and conservation principles for systems of particles with variable mass; applications to fluid flow and rocket propulsion. Rigid body kinematics, rolling and sliding motions. Impact of rigid bodies. One-degree of freedom undamped vibrating systems resonance under sinusoidal excitation. Lectures include methods of problem formulation and problem solution with application to realistic engineering problems. *Prerequisites: Math. 20D or 21D and AMES 121A with grades of C- or better. Priority enrollment given to pre-engineering and engineering majors.* (W,S)

**121C. Mechanics III: Vibrations (4)**

Free and forced vibrations of damped one-degree of freedom systems; vibration isolation, impact and packaging problems. Analysis of discrete multiple-degree of freedom systems using matrix representation; normal mode of frequencies and modal matrix formulation. Applications include response of buildings to ground motion. Lagrange's equations. Modal superposition for analysis of continuous vibrating systems. Problems of elastic bars and beams include free, impact-excited and sinusoidally forced vibrations. Lectures include methods of problem formulation and problem solution with application to realistic engineering problems. *Prerequisites: admission to the major and grades of C- or better in Math. 20F and AMES 121B.* (F,S)

**130A. Solid Mechanics I (4)**

Mechanics of deformable bodies under axial, torsional, shearing, and bending loads. Elastic and plastic uniaxial material response as well as three-dimensional Hooke's law. Mohr's circle for stress and strain. Problems of design for rods, shafts, beams, columns, pressure vessels, and thin-walled members. *Prerequisites: grades of C- or better in Math. 20D or 21D, 20F; and AMES 121A. Priority enrollment given to pre-engineering and engineering majors.* (F,S)

**130B. Solid Mechanics II (4)**

Continuum mechanics of solids and its application to the mechanical response of machine and structural elements. Stress and strain in indicial notation; field equations and constitutive relations. Linear elastic stress analysis in torsion, plane stress, and plane strain; stress concentrations; fracture mechanics. Extremum principles and structural stability. Viscoelasticity, plas-



ticity, and failure criteria. Theorems of plastic limit analysis. *Prerequisites: admission to the major and grades of C- or better in AMES 130A, and 105 (or concurrent enrollment).* (F,W)

### 130C. Solid Mechanics III (4)

Small deflection theory of plates. Solutions for rectangular and circular plates. Buckling of rectangular plates. Large deflections and shear deformations. Energy methods and finite element method of analysis. *Prerequisites: admission to the major and grade of C- or better in AMES 130B.* (W)

### 131A. Soil Mechanics (4)

General introduction to physical and engineering properties of soils. Soil classification and identification methods. Soil exploration, sampling, and in-situ testing techniques. Permeability, seepage, and consolidation phenomena. Bearing capacity equations, stress distribution, and settlements. Lectures, three hours per week; lab, three hours per week. *Prerequisites: admission to the major and grades of C- or better in AMES 130A-B.* (W)

### 131B. Foundation Engineering (4)

Application of soil mechanics to the analysis, design, and construction of foundations for structures. Settlement of structures, bearing capacities of shallow and deep foundations; earth pressures on retaining structures and slope stability. *Prerequisites: admission to the major and grade of C- or better in AMES 131A.* (S)

### 132A-B. Structural Analysis (4-4)

Step-by-step development of computer codes for the analysis of civil, mechanical, and aerospace structures from the matrix formulation of the classic structural theory, through the direct stiffness formulation, to production-type structural analysis programs. *Prerequisites: admission to the major and grade of C- or better in AMES 130A, AMES 154. AMES 132A for 132B.* (W,S)

### 133. Finite Element Methods (4)

Development of stiffness and mass matrices based upon variational principles and application to static, dynamic, and stability design problems in structural and solid mechanics. Architecture of computer codes for linear and nonlinear finite element analysis and basic computer implementation. The use of general purpose finite element structural analysis codes. *Prerequisites: admission to the major and grades of C- or better in AMES 130A-B and 154.* (F)

### 134. Structural Design Principles—Application to Steel Structures (4)

Design concepts and loadings for structural systems. Working stress and ultimate strength design theories. Properties of structural steel. Elastic design of tension members, beams, and columns. Design of bolted and welded concentric and eccentric connections. Introduction to plastic design. (Priority enrollment given to structural engineering majors.) *Prerequisites: admission to the major and grade of C- or better in AMES 132A.* (F)

### 135. Analysis and Design of Reinforced Concrete Structures (4)

Principles and general code provisions for reinforced concrete design. Concrete and reinforcement properties. Design of concrete members, including beams, slabs, and columns. Bond, anchorage, and detailing problems. Design, behavior, and serviceability of reinforced concrete structures. Introduction to seismic design principles. (Priority enrollment given to structural engineering majors.) *Prerequisites: admission to the major and grades of C- or better in AMES 132A-B and 134.* (W)

### 136. Design of Prestressed Concrete Structures (4)

Concept of prestressing. Materials and prestressing systems. Design of prestressed concrete members. Statically determinate and indeterminate structural systems. Prestress losses and time dependent effects. Application of prestressed concrete

for buildings, bridges, and shells. Prestressing for the rehabilitation of structures. Determination of stress states and stronger design criteria. (Priority enrollment given to structural engineering majors.) *Prerequisites: admission to the major and grade of C- or better in AMES 135.* (S)

### 137. Aerospace Structural Analysis (4)

Aspects of structural analysis pertinent to the design of flight vehicles: aerodynamic/inertial loadings, aerospace laminated materials, elements of plate theory, aeroelastic divergence, introduction of matrix methods for structural dynamics and buckling. *Prerequisites: admission to major and grade of C- or better in AMES 121C and AMES 130A-B.* (F)

### 138. Design of Composite Structures (4)

Design and analysis of lightweight structures composed of laminated composite materials. Stiffness, strength, failure mechanisms, micromechanics, and hygrothermal behavior. Fabrication and experimental testing. Design projects that involve computer implementation. *Prerequisites: admission to the major and grade of C- or better in AMES 121C and AMES 130A-B.* (S)

### 139. Reliability of Engineering Systems (4)

Introduction to probability and basic statistics. Analytical models for random phenomena and associated mathematical properties. Analysis and assessment of reliability. Probability-based design. Structural component and systems reliability. *Prerequisites: admission to the major and grades of C- or better in Math. 21C or Math. 20D, Math. 20E, and AMES 132A-B.*

### 140. Chemical Process Dynamics and Control (4)

Optimum steady-state design and control. Dynamical behavior of chemical process units such as chemical reactors, separation units, and heat exchangers. Examination of linear, linearized, and nonlinear process models. Stability analysis. Design of simple PID controllers. Bode diagrams and root locus techniques. Introduction to multivariable control systems. Cascade, modal, and feed-forward control. Selection of control and measurement variables. (Students may not receive credit for both AMES 140 and 141A.) *Prerequisites: admission to the major and grades of C- or better in Math. 21C or Math. 20D.* (F)

### 141. Linear Control: Theory and Applications (4)

Analysis and design of controllers for linear dynamic systems. Transient and steady-state behavior are analyzed using transfer functions and Laplace transforms. Stability is assessed via the root locus, Bode, and Nyquist plots. P.I.D. and other compensators. State variables are briefly introduced. Examples are selected from Mechanical and Aerospace Engineering. *Prerequisites: admission to the major and C- or better in AMES 105 (may be concurrent) and AMES 163.* (S)

### 142. Flight Mechanics (4)

Theory of flight, airfoil, lift, drag, applied aerodynamics. Static stability and its relation to airplane performance and design. The mathematics of translation and rotation in three-dimensions. Dynamic stability—general and simplified equations of motion. Stability derivatives. Characteristic longitudinal and lateral motions. Design of autopilots. *Prerequisites: admission to the major and grade of C- or better in AMES 104 and AMES 141.* (W)

### 144A. Space Science and Engineering I (4)

Introduction to space science. Earth, planetary atmospheres, especially upper atmospheres. Magnetospheres, energetic particles. Electromagnetic spectrum. Atmospheric attenuation, windows. Detection methods, instruments. Imaging systems, image processing. Observations from space. Newtonian mechanics of bound orbits. Science on manned, unmanned missions. *Prerequisites: upper-division standing in physics, chemistry, or engineering department.*

### 144B. Space Science and Engineering II (4)

Introduction to space engineering. Kinematics of rockets. Types of rocket engines. Relation of engine performance and rocket characteristics to mission phases—takeoff, on-orbit maneuvers, reentry, and landing. Space structures and materials, with emphasis on new developments. Fabrication of structures from materials obtained in space. Communication systems: design characteristics, requirements, performance. Robotics and control. Tethers. Astrodynamics. *Prerequisites: upper-division standing in physics, chemistry, or engineering department.*

### 151A-Z. Topics in Engineering Science (4)

A course to be given at the discretion of the faculty in which topics of current interest in engineering will be presented by visiting or resident faculty members. *Prerequisite: admission to the major or consent of instructor.* (F,W,S)

### 153. Process Modeling and Computation in Chemical Engineering (4)

Introduction to elementary numerical methods with applications to chemical engineering problems using a variety of problem solving strategies. Error analysis. Concepts of mathematical modeling, material and energy balances and probability and statistics with applications to design problems. *Prerequisites: admission to the major and grades of C- or better in AMES 9 or AMES 10; and AMES 111.* (S)

### 154. Numerical Methods in Engineering (4)

This course discusses numerical methods for applications for engineering problems. Topics include solution of systems of linear and nonlinear equations, function interpolation and curve fitting, function approximation, computation of integrals, numerical differentiation, and solution of systems of ordinary differential equations. *Prerequisites: admission to the major and grades of C- or better in AMES 9 or 10 and Math. 20F.* (F,W)

### 155A-B. Aerospace Engineering Design (4-4)

Fundamental principles of design in aerospace engineering. Trade-off studies in aerospace design by application of pertinent technical areas, including structures, aerodynamics, propulsion, and flight mechanics. Project involving the preliminary design for an aircraft, spacecraft, or propulsion system. *Prerequisites: admission to the major and grade of C- or better in AMES 104, 137; AMES 142 and 159 may be taken concurrently.* (W,S)

### 156A-B. Mechanical Engineering Design I, II (4-4)

Fundamental principles of mechanical design. Application of engineering mechanics to the design of mechanical components. Design project involving a preliminary design for a realistic engineering application. (Priority enrollment given to mechanical engineering majors.) *Prerequisites: admission to the major and grades of C- or better in AMES 11 or 102, 15, 121A-B, and 130A. Enrollment in 156B requires grades of C- or better in 156A and 158 (or concurrent enrollment).* 156A: (F,W); 156B: (W,S)

### 157. Computer Graphics for Engineers and Scientists (4)

Computer graphics algorithms studied using the C programming language and also by use of the computer-aided design software package AutoCAD. Applications in engineering and science. Topics include line-drawing algorithms, color, the user interface in CAD, spline curves and surfaces, 2-D and 3-D transformations, 3-D viewing, wireframe and solid models, and hidden-surface elimination. Weekly computer laboratory assignments plus a final graphics design project. *Prerequisites: admission to the major and grade of C- or better in AMES 15; college-level programming course in C or FORTRAN.* (F,S)

### 158. Computer-Aided Analysis and Design (4)

The use of computers for the design and analysis of engineering systems. *Prerequisites: admission to the major and grade of C- or better in AMES 130B, 154, and concurrent enrollment in AMES 101A or AMES 103A.* (F,W)



**159. Fundamentals of Propulsion (4)**

Compressible flow, thermodynamics, and combustion relevant to aircraft and spacecraft propulsion, as well as to stationary power plants, analysis and design of components for gas turbines, including turbines, inlets, combustion chambers, and nozzles. Solid and liquid propellant rockets. Analysis of airplane propellers and wind turbines. *Prerequisites: AMES 110 or 111; AMES 101A-B-C or 103A-B-C.*

**160. Advanced Materials: Processing, Selection and Design (4)**

Introduction to various techniques used in fabricating useful bodies with optimal structural, magnetic, optical, or electronic properties. Influence of the type of raw material, densification techniques, and methods to tailor composition and microstructure. Ceramics, metals, semiconductors, and composites will be discussed. *Prerequisite: AMES 102 or consent of instructor.*

**163. Linear Circuits (4)**

Steady-state and dynamic behavior of linear, lumped-parameter systems, including electrical, mechanical, and thermal systems. Kirchoff's laws. RLC circuits. Amplifiers. Dependent sources. Response of first- and second-order systems to impulse and step inputs. Laplace transforms. Design applications in engineering. *Prerequisites: admission to the major and grades of C- or better in Math. 21D or Math. 20D, Math. 20F and Phys. 2B. (F,W)*

**170. Experimental Techniques (4)**

Principles and practice of measurement and control and the design and conduct of experiments. Technical report writing. Lectures relate to dimensional analysis, error analysis, signal-to-noise problems, filtering, data acquisition and data reduction, as well as background of experiments and statistical analysis. Experiments relate to the use of electronic devices and sensors. *Prerequisites: grade of C- or better in Phys. 2CL, AMES 163, and junior standing in major. (F,S)*

**171A-B. Mechanical Engineering Laboratory (4-4)**

Design and analysis of experiments in fluid and solid mechanics using large facilities, e.g., pipe flow systems, wind tunnels, water channels, vibration table, testing machines. Students operate facilities, obtain data, complete engineering analysis, and write major reports. (Priority enrollment given to mechanical engineering, engineering science, and applied mechanics majors.) *Prerequisites: grade of C- or better in AMES 101A or 103A, AMES 102, AMES 141, and AMES 170, and senior standing in major. Enrollment in 171B requires a grade of C- or better in AMES 101B and 171A. (W,S)*

**173. Structures and Materials Laboratory (4)**

Introduction to instrumentation and testing techniques for structures under static and dynamic loads. Discussion of standard tension and compression tests for structural materials. Similitude relationships for structural models. Term project involving design, construction, testing, and data acquisition of a model structure. Preparation of a complete engineering report on the theory, design, and results of the term project. Observation and discussions of ongoing large-scale structural research projects in the Charles Lee Powell Structural Systems Laboratory. (Priority enrollment given to structural engineering majors.) *Prerequisites: grade of C- or better in AMES 170 and senior standing in the major. (W)*

**175A-B. Aerospace Engineering Laboratory (4-4)**

Design and analysis of aerospace engineering experiments, using large facilities (as wind tunnels, testing machines, vibration tables, heat transfer apparatus) in areas related to mechanics, gas dynamics, thermodynamics, and heat transfer. Students propose and design experiments, complete engineering analysis, and write major reports. *Prerequisites: admission to the major, a grade of C- or better in AMES 170, 101A-B, and senior standing in the major. (W,S)*

**176A-B. Chemical Engineering Process**

**Laboratory (4-4)**

Laboratory projects in the areas of applied chemical research and unit operations. Emphasis on applications of engineering concepts and fundamentals to solution of practical and research problems. Training in planning research projects, execution of experimental work, and articulation (both oral and written) of the research plan and results in the areas of applied chemical technology and engineering operations related to mass, momentum, and heat transfer. (Priority enrollment given to chemical engineering majors.) *Prerequisites: 176A requires grades of C- or better in AMES 112, and 113A for 176A; and C- or better in AMES 176A for 176B. (W,S)*

**195. Teaching (2-4)**

Teaching and tutorial assistance in an AMES course under supervision of instructor. Not more than four units may be used to satisfy graduation requirements. (P/NP grades only.) *Prerequisite: B average in major and consent of department chair. (F,W,S)*

**197. Engineering Internship (1-4)**

An enrichment program, available to a limited number of undergraduate students, which provides work experience with industry, government offices, hospitals and their practices. Subject to the availability of positions, students will work in a local industry or hospital (on a salaried or unsalaried basis) under the supervision of a faculty member and industrial supervisor. Coordination of the Engineering Internship is conducted through UCSD's Academic Internship Program. Time and effort to be arranged. Units may not be applied towards major graduation requirements unless prior approval of a faculty adviser is obtained and internship is an unsalaried position. *Prerequisites: completion of ninety units with a 2.5 GPA and consent of AMES faculty coordinator. (F,W,S)*

**198. Directed Group Study (1-4)**

Directed group study, on a topic or in a field not included in the regular department curriculum, by special arrangement with a faculty member. (P/NP grades only.) *Prerequisite: consent of instructor. (F,W,S)*

**199. Independent Study for Undergraduates (4)**

Independent reading or research on a problem by special arrangement with a faculty member. (P/NP grades only.) *Prerequisite: consent of instructor. (F,W,S)*

**GRADUATE**

**205. Graduate Seminar (0)**

Each graduate student in AMES is expected to attend a weekly seminar of his or her choice dealing with current topics in fluid mechanics, solid mechanics, systems science, applied ocean sciences, or energy. (S/U grades only.) (F,W,S)

**207A-Z. Topics in Engineering Science (4)**

A course to be given at the discretion of the faculty in which topics of current interest in engineering will be presented. *Prerequisite: consent of instructor.*

**210A-B-C. Fluid Mechanics (4-4-4)**

Physical properties of fluids, kinematics; potential flow, wing theory; surface waves; Navier-Stokes equations; boundary layers; turbulence. *Prerequisites: AMES 101A-B and AMES 110, or consent of instructor.*

**211. Introduction to Combustion (4)**

Fundamental aspects of flows of reactive gases, with emphasis on processes of combustion, including the relevant thermodynamics, chemical kinetics, fluid mechanics, and transport processes. Topics may include deflagrations, detonations, diffusion flames, ignition, extinction, and propellant combustion.

*Prerequisites: AMES 101A-B-C or AMES 103A-B-C, AMES 110, or consent of instructor.*

**212. Introductory Compressible Flow (4)**

Equations of motion for compressible fluids; one-dimensional gas dynamics and wave motion, waves in supersonic flow, including oblique shock waves; flow in ducts, nozzles, and wind tunnels; methods of characteristics. *Prerequisites: AMES 101A-B-C or AMES 103A-B-C, AMES 110, or consent of instructor.*

**213. Mechanics of Propulsion (4)**

Fluid mechanics, thermodynamics, and combustion processes involved in propulsion of aircraft and rockets by air-breathing engines, and solid and liquid propellant rocket engines; characteristics and matching of engine components; diffusers, compressors, combustors, turbines, pumps, nozzles. *Prerequisites: AMES 101A-B, AMES 110, or consent of instructor.*

**214A. Introduction to Turbulence and Turbulent Mixing (4)**

Introductory concepts and definitions. Basic observations and experiments. Hydrodynamic stability. Kolmogoroff universal similarity hypotheses, length and time scales. Turbulent transport. Reynolds equations. Reynolds analogy. Dynamics of turbulence, kinetic energy, vorticity, temperature variance conservation. *Prerequisites: AMES 101A-B-C or equivalent or consent of instructor.*

**214B. Introduction to Turbulence and Turbulent Mixing (4)**

Universal similarity hypotheses of turbulent mixing; length, time, and scalar scales. Phenomenology of free shear flows and wall bounded flows. Statistical description of turbulence; transport, spectral dynamics, statistical geometry. *Prerequisite: AMES 214A or equivalent or consent of instructor.*

**215. Hydrodynamic Stability (4)**

Kelvin-Helmholtz instability of shear layers, the Orr-Sommerfeld equation and its solution for inviscid and viscous flows. Taylor instability of circular Couette flows; finite amplitude stability; chaos; transition to turbulence. *Prerequisite: AMES 210A-C or equivalent. (F)*

**220A. Physics of Gases (4)**

Thermodynamics of gases for use in gasdynamics. Derivation of thermodynamic functions from statistical mechanics. Applications of classical and quantum statistical mechanics to chemical, thermal, and radiative properties of gases. Equilibrium and nonequilibrium radiation, chemical equilibrium, and elements of chemical kinetics. Laser and reacting-flow applications. *Prerequisite: AMES 110 or consent of instructor.*

**220B. Physical Gasdynamics (4)**

Velocity distribution functions, the Boltzmann equation, moment equations and the Navier-Stokes equations. The dynamics of molecular collisions. The Chapman-Enskog expansion and transport coefficients: shear and bulk viscosity, heat conduction, molecular and thermal diffusion. Linearizations about equilibrium: applications to acoustics and supersonic flows with relaxation. *Prerequisites: AMES 101A-B-C or AMES 103A-B-C, AMES 220A or consent of instructor.*

**220C. Nonequilibrium Gasdynamics (4)**

Applications of thermodynamics, statistical mechanics, kinetic theory of gases and fluid mechanics to nonequilibrium flow problems. Shock structure. Chemical relaxation. Chemically reacting boundary layers. Ionized gases. Radiative heat transfer. *Prerequisite: AMES 220B or consent of instructor.*

**221A-B-C. Heat and Mass Transfer (4-4-4)**

Conduction, convection, and radiation heat transfer and mass transfer. Development of energy and species conservation equations. Analytical and numerical solutions to transport problems. Specific topics and applications may vary according to inter-

ests of instructor. (Not necessarily taught as a sequence nor offered every quarter.) *Prerequisites:* AMES 101A-B-C or AMES 103A-B-C or consent of instructor.

#### 222A-B-C. Advanced Fluid Mechanics (4-4-4)

Contemporary problems in broad areas of fluid mechanics, e.g., turbulent flows, hydrodynamic stability, geophysical fluid dynamics, transport phenomena, acoustics, boundary layers, etc. (Not necessarily taught as a sequence nor offered every quarter.) *Prerequisites:* AMES 210A-B-C or consent of instructor.

#### 223. Computational Fluid Dynamics (4)

Numerical methods in fluid dynamics and convective transport processes. Numerical solution of the Euler and Navier-Stokes equation. Additional topics will vary according to instructor; examples include eigenvalue problems in hydrodynamic stability, vortex methods, spectral and panel methods. *Prerequisite:* AMES 101A or equivalent course or consent of instructor.

#### 224. Environmental Fluid Dynamics (4)

Single-layer flows with a free surface, two-layer flows including exchange flows in harbors, estuaries, seas, and buildings. Continuously stratified flows with meteorological and oceanographic applications. Topographic effects, plumes, jets, and thermals. Planetary boundary layers. *Prerequisite:* introductory graduate level course in fluid mechanics.

#### 226. Advanced Engineering Physics (4)

Contemporary problems in many areas of engineering physics. Examples include combustion, quantitative spectroscopy and opacity calculations, relaxation phenomena and nonequilibrium flows, propagation of electromagnetic radiation through matter, laser theory and kinetics, advanced radiative heat transfer, laser-induced photochemistry, etc. *Prerequisites:* AMES 220A-B-C or consent of instructor.

#### 229A. Mechanical Properties (4)

Review of basic concepts in mechanics of deformation: elasticity, plasticity, viscoelasticity and creep; effects of temperature and strain-rate on inelastic flow; microstructure and mechanical properties; application of basic concepts to selected advanced materials. *Prerequisite:* consent of instructor. Crosslisted with Materials Science 211A.

#### 229B. Advanced Mechanical Behavior (4)

Rate mechanisms in crystalline solids. Kinetics and dynamics of plastic flow by slip at low and high strain rates. Mechanisms of inelasticity in non-metals, metals, and polymeric materials. Mechanisms of failure and effects of strain rates. *Prerequisite:* AMES 229A or consent of instructor. Crosslisted with Materials Science 211B.

#### 230. Advanced Structural Analysis (4)

Applications of advanced analytical concepts to structural engineering problems. The course is designed to show and emphasize the physical nature of the finite element method in structural engineering. Effects of approximations in the discretization and the type of finite elements under consideration are evaluated. An introduction is given to the nonlinear behavior of structural systems focusing on basic concepts and computational techniques. *Prerequisites:* Courses in structural analysis and finite element theory such as AMES 132 and AMES 133 or equivalent or consent of instructor.

#### 231A. Foundations of Solid Mechanics (4)

Specification of stress and strain; infinitesimal and finite deformation; conservation equations; typical constitutive equations; minimum potential energy principle. *Prerequisite:* AMES 130B or consent of instructor.

#### 231B. Elasticity (4)

Basic field equations. Typical boundary value problems of classical linear elasticity. Problems of plane stress and plane strain.

Variational principles. *Prerequisite:* AMES 231A or consent of instructor.

#### 231C. Anelasticity (4)

Mechanical models of viscoelastic, plastic, and viscoplastic behavior in simple shear or uniaxial stress. Constitutive relations for three-dimensional states of stress and strain. Application to selected technological problems. *Prerequisite:* AMES 231B or consent of instructor.

#### 232A-B-C. Finite Element Methods in Solid Mechanics (4-4-4)

Finite element methods for linear and nonlinear problems in solid mechanics. Basic methods and linear problems are discussed in the first quarter; dynamics, structural elements and material nonlinearities are discussed in the second quarter; and the third quarter emphasizes methods for problems with both material and geometrical (large deformations) nonlinearities. *Prerequisites:* graduate standing for 232A-B; AMES 231A for 232C. AMES 230 or 232A for AMES 232B and AMES 232C.

#### 233A. Fracture Mechanics (4)

Theoretical strength; stress concentration. Linear fracture mechanics: stress singularity; fracture modes; stress field near a crack tip; energy method and energy release-rate; the J-integral. Nonlinear fracture mechanics: crack tip plastic zone; crack opening displacement; the Dugdale model; the R-curve, compliance method; the shape of plastic zone; power-law materials; the J-integral and the effective stress intensity factor; perfectly plastic solid; slip-line theory and stress field at crack tip; stability consideration. Fatigue; special topics. *Prerequisites:* AMES 231A-B or consent of instructor.

#### 233B. Micromechanics (4)

General theory of transformation strains and corresponding elastic fields; Green's functions and other solution methods; dislocations; inclusions and inhomogeneities; micromechanics of plastic flow and micromechanically based plasticity theories; microcracking, cavitation, and damage in crystalline and other solids, and the corresponding overall response and failure modes; selected topics. *Prerequisites:* AMES 231A-B-C or consent of instructor.

#### 233C. Advanced Mechanics of Composite Materials (4)

Three-dimensional anisotropic constitutive theories, anisotropic fracture mechanics, composite micromechanics, edge effects and interlaminar shear stresses, impact damage and energy absorbing mechanisms, and surface wave. *Prerequisites:* AMES 130A-B-C, 231A-B or consent of instructor.

#### 235A. Theory of Shells (4)

General mathematical formulation of the theory of thin elastic shells; linear membrane and bending theories; finite strain and rotation theories; shells of revolution; shallow shells; selected static and dynamic problems; survey of recent advances. *Prerequisites:* AMES 130A-B-C or consent of instructor.

#### 236. Structural Stability (4)

Static, dynamic, and energy-based techniques and predicting elastic stability. Linear and nonlinear analysis of classical and shear deformable beams and plates. Ritz, Galerkin, and finite element approaches for frames and reinforced shells. Nonconservative aerodynamic (divergence flutter) and follower forces. *Prerequisite:* AMES 130B or consent of instructor.

#### 237. Structural Dynamics (4)

Matrix analysis of the free and forced vibrations of discrete linear systems; response to periodic and transient excitations. Frequency response and generalized normal mode methods. Dynamics of continuous systems. *Prerequisites:* AMES 231A-B or consent of instructor.

#### 238. Stress Waves in Solids (4)

Linear wave propagation; plane waves; reflection and refraction; dispersion induced by geometry and by material properties. Application of integral transform methods. Selected topics in nonlinear elastic, anelastic, and anisotropic wave propagation. *Prerequisites:* AMES 231A-B-C or consent of instructor.

#### 239. Earthquake Engineering (4)

Introduction to plate tectonics and basic concepts in seismology including rupture mechanism, measures of magnitude and intensity, descriptions of earthquake occurrence and its relation to geologic and tectonic processes. Measurements and description of strong earthquake ground motion; site effects on ground motion. Response of structures to earthquake excitation; soil-structure interaction effects; full-scale testing of structures; design criteria and code requirements. *Prerequisites:* AMES 231A-B, AMES 237 (or concurrent enrollment) or consent of instructor.

#### 240. Advanced Reinforced and Prestressed Concrete Design (4)

Advanced topics in concrete design, including frame and shear wall structures, are discussed. Special emphasis is given to the design of connections and to confinement and ductility requirements under seismic loads. Complete reinforced and prestressed concrete systems are evaluated for seismic resistance. Upper and lower bound theories for slab design are derived. Analysis and design of circular prestressed concrete structures are discussed. *Prerequisite:* AMES 135, AMES 136 or equivalent background in basic RC/PC design or consent of instructor.

#### 241. Mechanics of Laminated Composite Structures (4)

Macro- and micro-material modeling. Classical and shear deformable laminate beam and plate theories developed via energy principles. Ritz, Galerkin, and finite element based solutions to static, vibration, and stability problems. Assignments include computer program development and use of existing commercial programs. *Prerequisites:* AMES 121C, 130B, 138 or equivalent.

#### 242. Bridge Design (4)

The course covers different aspects relevant to the design and the analysis of bridge structures. Construction methods and corresponding load conditions are investigated for various bridge types and geometries. Special problems in the analysis of box girder bridges, curved and skewed bridges and bridge structures under traffic loads, environmental, and seismic loads are discussed. Bearings and expansion joints are evaluated in connection with time and temperature dependent superstructure deformations. *Prerequisites:* AMES 230 and fundamental courses in RC and PC design or consent of instructor.

#### 243. Masonry Structures (4)

Analysis and design of unreinforced and reinforced masonry structures, using advanced analytical techniques and design philosophies. Masonry material properties, stability, and buckling of unreinforced masonry. Flexural strength, shear strength, stiffness, and ductility of reinforced masonry elements. Design of masonry shear wall systems for seismic loads. *Prerequisites:* AMES 135 or equivalent basic reinforced concrete course or consent of instructor.

#### 245. Advanced Structural Steel Design (4)

Load and Resistance Factor Design (LRFD) philosophy. Behavior and design of steel elements for global and local buckling. Bracing requirements for stability. Conventional and advanced analysis techniques for P-delta effects. Cyclic behavior of steel structures. Ductility requirement for seismic design. Composite construction. *Prerequisites:* AMES 230, AMES 134 or equivalent course or consent of instructor.

#### 251. Thermodynamics (4)

Principles of thermodynamics of single and multicomponent systems. Phase equilibria. Estimation, calculation, and correla-

tion of properties of liquids and gases. *Prerequisite: consent of instructor.*

**252. Chemical Reaction Engineering (4)**

Analysis of chemical rate processes; complex kinetic systems. Chemical reactor properties in steady state and transient operations; optimal design policies. The interaction of chemical and physical transport processes in affecting reactor design and operating characteristics. Uniqueness/multiplicity and stability in reactor systems. Applications of heterogeneous reactor systems. *Prerequisite: consent of instructor.*

**253. Heterogeneous Catalysis (4)**

Physics and chemistry of heterogeneous catalysis; adsorption/desorption kinetics, chemical bonding, isotherms, kinetic models, selection of catalysts, poisoning, experimental techniques. *Prerequisite: consent of instructor.*

**254. Biochemical Engineering Fundamentals (4)**

Introduction to microbiology as relevant to the main topic, biological reactor analysis. Fermentation and enzyme technology. *Prerequisite: consent of instructor.*

**256. Rheology of Fluids (4)**

Continuum mechanics of fluids; definition of material functions for viscous and viscoelastic liquids; principles of rheological measurement; relationship to molecular structure. *Prerequisite: consent of instructor.*

**257A. Polymer Processing (4)**

Analysis of flow fields encountered in major methods of polymer fabrication: extrusion, coating, fiber spinning, injection molding, mixing. *Prerequisite: consent of instructor.*

**258. Special Topics in Chemical Engineering (4)**

Directed study of some area of specialization not covered in depth in the regular course offerings. *Prerequisite: consent of instructor.*

**259. Seminar in Chemical Engineering (1)**

Presentations on research progress by graduate students and by visitors from industrial and academic research laboratories. (May be repeated for credit; S/U grades only; course does not apply toward fulfillment of degree requirements.) *Prerequisite: consent of instructor.*

**261. Sensors and Measurements (4)**

Manufacturing sensors and measurement systems, measurement techniques, modern metrology, statistical methods, and experiment design. *Prerequisite: none.*

**262. Manufacturing Systems (4)**

The manufacturing process as a system. Design, production, inspection, quality control, inventory control, material handling, and other functional engineering components. Information flow among components and the effect of components on the whole system. Statistical and process control techniques. *Prerequisite: none.*

**270. Mechanics of Powder Processing (4)**

Powder packing structures. Methods of powder manufacturing, rapid prototyping. Fundamentals of the continuum mechanics of powder deformation, densification in non-uniform temperature fields. Micromechanical models of cold powder yielding. Hot consolidation fundamentals, micromechanical models of plastic yielding, power-law creep, diffusion. *Prerequisites: AMES 231A-C, 223B or consent of instructor.*

**290A. Numerical Methods in Science and Engineering (4)**

A general introductory course to numerical methods. Introduction to linear calculus, solution of systems of linear and nonlinear algebraic equations, the algebraic eigenvalue problem, polynomial and trigonometric function interpolation, function differentiation and integration, function approximation. *Prerequisite: AMES 154 or consent of instructor.*

**290B. Numerical Methods for Differential Equations (4)**

Numerical solution of differential equations in mathematical physics and engineering, engineering, ordinary and partial differential equations. Linear and nonlinear hyperbolic parabolic, and elliptic equations, with emphasis on prototypical cases described by the convection equation, the convection-diffusion equation, Laplace's and Poisson equation. Finite difference methods will be considered in depth, and additional topics will be drawn from spectral, finite-element and discrete-particle methods. *Prerequisite: AMES 290A.*

**291. Design and Mechanics in Computer Technology (4)**

Design and mechanics problems inherent in computer peripherals such as disk files, tape drives, and printers. Formulation and solution of problems involving mechanics, fluid mechanics, and materials; Reynolds equation, slider bearings; friction and wear; surface roughness; vibrations of rotating disks; introduction to actuator design, dimensional stability of substrate; instrumentation; experimental methods; impact printing; fluid jets; silicon micromechanics. *Prerequisite: consent of instructor.*

**292. Computer-Aided Design and Analysis (4)**

Introduction to 2-D and 3-D computer-aided design. Design problems may include: ball bearing kinematics, Weibull statistics, non-repeatable spindle run-out, design and analysis of four bar linkages, beam deflection and vibration, design of magnetic head suspension, hydrodynamic theory of lubrication, design of air bearings, heat transfer in computer chips, optimization of optical servo, design of ink jet print head. *Prerequisite: consent of instructor.*

**293. Advanced Computer Graphics for Engineers and Scientists (4)**

Advanced topics used to enhance scientific and engineering visualization. C programming assignments and the use of advanced graphics software. Continuation of topics from AMES 157, including color, computational geometry, 3-D contouring, volume visualization, and hardware architectures. *Prerequisite: AMES 157 or consent of instructor.*

**294A-B-C. Methods in Applied Mechanics, I,II,III (4-4-4)**

Various methods of analysis are covered with emphasis on application. Topics range over the broad fields of complex analysis, ordinary and partial differential equations (linear and nonlinear), asymptotic analysis, integral equations and weighted residuals. Specifics include Dirichlet and Neumann problems. Cauchy concepts. Green functions, Riemann mapping, eigenfunctions, phase-plane analysis, steepest descents, multiple scales. WKB method, matched asymptotic expansions, transform techniques, Fredholm theory. Wiener-Hopf method. Galerkin method. *Prerequisites: Math. 110, Math. 120A or consent of instructor.*

**296. Independent Study (4)**

*Prerequisite: consent of instructor.*

**298. Directed Group Study (1-4)**

Directed group study on a topic or in a field not included in regular department curriculum, by special arrangement with a faculty member. *Prerequisite: consent of instructor. (S/U grades permitted.)*

**299. Graduate Research (1-12)**

(S/U grades only.)

**501. Teaching Experience (2)**

Teaching experience in an appropriate AMES undergraduate course under direction of the faculty member in charge of the course. Lecturing one hour per week in either a problem-solving section or regular lecture. (S/U grade only.) *Prerequisites: consent of instructor and the AMES department.*

**Bioengineering**

**STUDENT AFFAIRS:**

4103 Engineering Building I, Warren College

**Professors**

S. Chien, M.D., Ph.D., *Chair; Director, Institute for Biomedical Engineering*

J. A. Frangos, Ph.D.

Y. C. Fung, Ph.D., *Professor Emeritus*

D. A. Gough, Ph.D.

M. Intaglietta, Ph.D.

A. D. McCulloch, Ph.D.

B. O. Palsson, Ph.D.

G. W. Schmid-Schoenbein, Ph.D.

**Associate Professors**

R. L. Sah, M.D., Sc.D.

L. A. Sung, Ph.D.

**Assistant Professor**

S. Bhatia, Ph.D., *In-Residence*

**Adjunct Professors**

P. C. Johnson, Ph.D., *Adjunct Professor of Bioengineering*

T. D. Pollard, Ph.D., *Adjunct Professor of Bioengineering*

S. S. Sobin, M.D., Ph.D., *Adjunct Professor of Physiology*

L. K. Waldman, Ph.D., *Associate Adjunct Professor of Bioengineering*

**Affiliated Faculty**

P. C. Chau, Ph.D., *Associate Professor of Applied Mechanics and Engineering Science*

J. W. Covell, M.D., *Professor of Medicine*

M. H. Ellisman, Ph.D., *Professor of Neurosciences*

A. Fronek, M.D., Ph.D., *Professor Emeritus of Surgery*

A. Hoger, Ph.D., *Associate Professor of Applied Mechanics and Engineering Science*

R. L. Lieber, Ph.D., *Professor of Orthopaedics*

J. H. Omens, Ph.D., *Assistant Adjunct Professor of Medicine*

K. L. P. Sung, Ph.D., *Professor In Residence of Orthopaedics*

P. D. Wagner, M.D., *Professor of Medicine*

J. B. West, M.D., Ph.D., *Professor of Medicine*

### Professional Research Staff

D. Baker, Ph.D., *Assistant Research Scientist*  
 Y. S. Li, Ph.D., *Assistant Project Scientist*  
 D. Lim, Ph.D., Sc.D., *Project Scientist*  
 G. Kassab, Ph.D., *Assistant Project Scientist*  
 J. Price, M.D., Ph.D., *Assistant Research Scientist*  
 J. Shyy, Ph.D., *Assistant Research Scientist*  
 B. Skierczynski, Ph.D., *Assistant Project Scientist*  
 A. Tsai, Ph.D., *Assistant Project Scientist*  
 S. Usami, M.D., Ph.D., *Research Scientist*  
 Y. H. Zhao, Ph.D., *Assistant Project Scientist*

### Departmental Focus

**Bioengineering** is an interdisciplinary major in which the principles and tools of traditional engineering fields, such as mechanical, materials, electrical, and chemical engineering, are applied to biomedical problems. Engineering plays an increasingly important role in medicine in projects that range from basic research in physiology to advances in biotechnology and the improvement of health care delivery. By its very nature, bioengineering is broad and requires a foundation in the engineering sciences as well as in physiology and other biological sciences.

At the undergraduate level, the department offers a four-year engineering curriculum leading to a **B.S. in bioengineering**, which prepares students for careers in the biomedical industry or for further education in graduate school. Students completing the B.S. in bioengineering have sufficient preparation in mechanics to permit employment in traditional engineering areas other than the biomedical industry, if they wish. This degree is accredited by the Accreditation Board for Engineering and Technology (ABET). The department also offers a two-year, upper-division curriculum which, together with required lower-division courses, leads to a **B.S. in premedical bioengineering**. This curriculum is designed to meet the requirements for admission to medical schools and is also suitable for those planning to enter graduate school in bioengineering, physiology, neurosciences, or related fields. It has less engineering content but more biological sciences and is one of many majors that can serve as preparation for further training in medical, veterinary, or allied health professions. Some graduates have obtained jobs in industry.

In addition, the department offers a **B.S. in biotechnology**. This is a four-year engineering curriculum designed to be creditable by ABET, that prepares students for careers in the emerging biotechnology industry or for further education in graduate school. This curriculum has a strong engineering foundation with emphasis on biochemical process applications.

The programs and curricula of bioengineering emphasize education in the fundamentals of engineering sciences that form the common basis of all engineering subspecialties. Education with this emphasis is intended to provide students with a solid engineering foundation for a career in which engineering practice may change rapidly. In addition, elements of bioengineering design are incorporated at every level in the curricula. This is accomplished by integration of laboratory experimentation, computer applications, and exposure to real bioengineering problems throughout the program. Students also work as teams in senior design project courses to solve multidisciplinary bioengineering problems suggested by industrial and clinical experience.

At the graduate level, specialized curricula lead to the **M.S.** and **Ph.D.** degrees, as well as an integrated **B.S./M.S.** degree. There are also **M.D./M.S.** and **M.D./Ph.D.** degrees offered in conjunction with UCSD Medical School, pending independent admission to the Medical School. The graduate programs are characterized by strong interdisciplinary relationships with the other engineering departments and Departments of Physics, Mathematics, Biology, Chemistry and Biochemistry, Medicine, and others, as well as with campus organizations such as the Institute for Biomedical Engineering, Institute for Mechanics and Materials, and the School of Medicine.

### The Undergraduate Program

#### Major Requirements

Specific course requirements for each program are outlined in tables below. In addition to the required technical courses specifically indicated, a suggested scheduling of humanities and social science courses (HSS) are distributed in the curricula for students to use to meet college general-education requirements. To graduate, students must maintain an overall

GPA of at least 2.0, and the department requires at least a C- grade in each course required for the major. All courses required for the major must be taken for a letter grade. The B.S. in bioengineering, the B.S. in premedical bioengineering, and the B.S. in biotechnology require a completion of a minimum of 192 units.

Deviations from the required programs of study must be approved by the Undergraduate Affairs Committee *prior* to taking alternative courses. In addition, students must obtain departmental approval of technical elective (TE) course selections *prior* to taking the course. In the accredited program, TE courses are restricted to those that meet ABET standards. Courses such as Bioengineering 196, 197, and 198 are not allowed as technical electives in meeting the upper-division major requirements. Bioengineering 195 and 199 can be used as technical electives under certain conditions. Policy information may be obtained from the Student Affairs Office.

Students with accelerated academic preparation upon admission to the university may vary the scheduling of lower-division courses such as mathematics, physics, and chemistry, but must first consult the department. Most lower-division courses are offered more than once each year to permit students some flexibility in their program scheduling, but most bioengineering upper-division courses are taught only once each year. **Deviations in the scheduling of upper-division bioengineering courses are discouraged, as such changes usually lead to a delay in graduation.** The curricula shown in the tables below are consistent with present scheduling.

Minors are not offered in bioengineering and double major options are restricted. Students interested in double majors should consult the Student Affairs Office as early as possible.

#### General-Education/College Requirements

For graduation, each student must satisfy general-education course requirements determined by the college to which the student belongs, as well as the major requirements determined by the department. The five colleges at UCSD require different general-education courses, and the number of such courses differs from one college to another. Each stu-

dent should choose his or her college carefully, considering the special nature of the curriculum and the breadth of general education.

The bioengineering programs allow for humanities and social science (HSS) courses so that students can fulfill their college requirements. In the bioengineering ABET accredited program, students must develop a program that includes a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. It should be noted, however, that some colleges require more than the ten HSS courses indicated in the bioengineering and biotechnology curriculum tables. Accordingly, students in these colleges may take longer to graduate than as indicated in the four-year schedule. Students must consult with their college to determine which HSS courses to take.

**BIOENGINEERING  
(ABET Accredited Program)**

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Math. 20A*	Math. 20B*	Math. 21C*
AMES 10**	Phys. 2A*	Phys. 2B*/2BL
Chem. 6A*	Chem. 6B/6BL	BILD 1
HSS <sup>1</sup>	BE 1 <sup>2</sup>	HSS
<b>SOPHOMORE YEAR</b>		
Math. 21D	Math. 20F	Math. 20E
Phys. 2C/2CL	AMES 163	BE 100
AMES 121A	AMES 121B	AMES 15
HSS	HSS	HSS
<b>JUNIOR YEAR</b>		
BE 110	BE 112A	BE 112B
AMES 154	BE 186B	BE 172
AMES 103A	AMES 103B	BE 140B
AMES 170	BE 140A	HSS
<b>SENIOR YEAR</b>		
BE 186A	BE 122A	BE 186C
Chem. 131	AMES 158	BE 122B
AMES 105	TE <sup>3</sup>	TE
HSS	HSS	HSS
	BE 191 <sup>4</sup>	

\* Students are admitted by departmental approval during the sophomore year based upon these screening courses and others listed on the department's application form.

\*\*Students with programming experience may take AMES 9 in place of AMES 10. Prior approval must be obtained from the Student Affairs Office before enrollment in AMES 9.

<sup>1</sup> Ten HSS courses are listed here; individual college requirements may be higher.

<sup>2</sup> BE 1 may be taken in sophomore year.

<sup>3</sup> Technical electives must be selected from a departmental approved list. Consult the Student Affairs Office.

<sup>4</sup> Recommended course, not required. Graduating seniors only.

**BIOTECHNOLOGY  
(ABET Accreditable Program)**

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Math. 20A*	Math. 20B*	Math. 21C*
AMES 10**	Phys. 2A*	Phys. 2B*
Chem. 6A*	Chem. 6B/6BL	Chem. 6C
HSS <sup>1</sup>	HSS	HSS
	BE 1 <sup>2</sup>	
<b>SOPHOMORE YEAR</b>		
Math. 21D	Math. 20F	Math. 20E
Chem. 131	Phys. 2C/CL	BILD 1
Chem. 140A	Chem. 140B	Chem. 143A
HSS	HSS	BE 100
<b>JUNIOR YEAR</b>		
BIBC 100	BIBC 102	BIBC 103
AMES 103A	AMES 103B	AMES 153
AMES 163	BICD 100	BIMM 100
HSS	BE 122A	HSS
<b>SENIOR YEAR</b>		
BE 186A	BE 162	BE 160C
BE 160A	BE 160B	TE <sup>4</sup>
AMES 170	BE 166A	HSS
HSS	BE 191 <sup>3</sup>	HSS

\* Students are admitted by departmental approval during the sophomore year based upon these screening courses and others listed on the department's application form.

\*\*Students with programming experience may take AMES 9 in place of AMES 10. Prior approval must be obtained from the Student Affairs Office before enrollment in AMES 9.

<sup>1</sup> Ten HSS courses are listed here; individual college requirements may be higher.

<sup>2</sup> BE 1 may be taken in sophomore year.

<sup>3</sup> Recommended course, not required. Graduating seniors only.

<sup>4</sup> Technical electives must be selected from a departmental approved list. Consult the Student Affairs Office.

**PREMEDICAL BIOENGINEERING**

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Math. 20A*	Math. 20B*	Math. 21C*
AMES 10**	Phys. 2A*	Phys. 2B*/2BL
Chem. 6A*	Chem. 6B/6BL	Chem. 6C
HSS <sup>1</sup>	BE 1 <sup>2</sup>	HSS
	HSS	
<b>SOPHOMORE YEAR</b>		
Math. 21D	Math. 20F	Math. 20E
Phys. 2C/2CL	Chem. 140A	BE 100
BILD 1	BILD 2	Chem. 140B
HSS	HSS	HSS

**JUNIOR YEAR**

BE 110	BE 112A	BE 112B
Chem. 143A	AMES 163	AMES 170
Chem. 140C <sup>3</sup>	BICD 100	BIBC 100
HSS	HSS	HSS

**SENIOR YEAR**

BE 186A	BE 186B	BE 172
BIPN 140	BIPN 100	BIPN 102
TE <sup>4</sup>	TE	TE
HSS	HSS	HSS

\* Six of the eight courses used to compute the performance index upon which pre-bioengineering majors are admitted to the major at the end of the freshman year. Of the other two courses used in this computation, one must be AMES 9, 10, or 15 and the other must be in engineering, science, or mathematics.

\*\*Students with programming experience may take AMES 9 in place of AMES 10, prior approval must be obtained from the Student Affairs Office before enrollment in AMES 9.

<sup>1</sup> Twelve HSS courses are listed here; individual college requirements may be higher.

<sup>2</sup> BE 1 may be taken in sophomore year.

<sup>3</sup> Chem. 140C is not required for the major and can be used as a technical elective. Chem. 140C is a requirement for application to most medical schools.

<sup>4</sup> Technical elective (TE) courses must be upper-division or graduate courses in the engineering sciences, natural sciences or mathematics, selected with prior approval of the department.

**Policies and Procedures**

**Application for Admission to the Bioengineering and Bioengineering Premedical Major**

Because of the strong student interest in the bioengineering programs and the limited resources available to accommodate this demand, it is necessary to limit enrollments to only the most qualified students. Admission to the department as a bioengineering major is in accordance with the general requirements established by the School of Engineering described in detail in the section on "Admission to the School of Engineering" in this catalog. Applicants who have demonstrated excellent academic performance prior to being admitted to UCSD may be admitted directly to the bioengineering major of their choice. Other students intending to complete a bioengineering major are initially identified as pre-bioengineering majors and may be admitted by petition to the department based on academic performance. It is expected that students will have completed or have in progress all eight

prerequisite courses when applying. Each petition is evaluated by the departmental Undergraduate Affairs Committee, taking into consideration the student's entire academic record. Pre-bioengineering majors who have achieved a GPA of 3.0 or better in the eight required pre-bioengineering courses (Mathematics 20A, 20B, 21C; Physics 2A, 2B; Chemistry 6A; AMES 9/10, or 15) and one other pre-bioengineering course by the end of the freshman year are assured of admission. Students not admitted to a major by the end of the freshman year must reapply before the end of the sixth quarter of study at UCSD. Pre-bioengineering students not obtaining admission to a bioengineering major will automatically have their major converted from "Pre-bioengineering" to "Undeclared" by the department at the end of the sixth quarter. All students, regardless of admission route, are expected to complete lower- and upper-division courses given in the curriculum tables in a timely fashion in the sequences outlined.

### Transfer Students

Transfer students may apply for admission to any of the undergraduate programs. Transfer students may apply for admission before the end of the first quarter of study at UCSD and must complete at least two required pre-bioengineering or bioengineering courses, one of which must be an upper-division course. Accordingly, when planning their program, transfer students should be mindful of lower-division prerequisite course requirements upon which admission to the major is based, as well as meeting college requirements. Students who have taken equivalent courses elsewhere may request to have transfer credit applied toward the department's major requirements. This is done by submitting a petition for transfer credit together with a transcript and catalog course description from the institution where the course(s) were taken. These documents are reviewed for approval by the Bioengineering Undergraduate Affairs Committee. Transfer petitions are available from the Student Affairs Office.

**Please note: at this time, students are admitted to the biotechnology major by departmental approval only.**

### Academic Advising

Upon admission to the major, students must make an appointment with an undergraduate

adviser in the Bioengineering Student Affairs Office, Room 4103, Engineering Building Unit 1, to plan a program of study. The program plan may be revised in subsequent years, but revisions involving curricular requirements require approval of the undergraduate adviser and the Undergraduate Affairs Committee. As the department may make a small number of course and/or curricular changes every year, it is imperative that students consult the undergraduate adviser on an annual basis.

In order to enroll in any courses required for a bioengineering major, a student must have satisfied prerequisite courses with a C- or better. (The department does not consider D or F grades as adequate preparation for subsequent material.) Furthermore, the majority of bioengineering courses have enrollment restrictions and are open only to declared pre-engineering students and/or to students who have been admitted to a bioengineering major. Where these restrictions apply, the registrar will not enroll other students except by department stamp on class enrollment cards. The department expects students to adhere to these policies and enroll in courses accordingly. Students are advised that they may be dropped from course rosters if prerequisites and/or performance standards have not been met.

Bioengineering courses are offered only once a year and therefore should be taken in the recommended sequence. If courses are taken out of sequence, it may not always be possible to enroll in courses as desired or needed for timely graduation. If this occurs, students should seek immediate departmental advice.

Pre-bioengineering majors can obtain programmatic advice from the Student Affairs Office. In addition, technical advice may be obtained from a specific bioengineering faculty member. A specific bioengineering faculty adviser is assigned to each student upon admission to the major.

### Program Alterations and Exceptions to Requirements

Variations from or exceptions to any program or course requirements are possible only if approved by the Undergraduate Affairs Committee before the courses in question are taken. Petition forms may be obtained from the Bioengineering Student Affairs Office.

Bioengineering students may take Bioengineering 199, Independent Study for

Undergraduates, under the guidance of a bioengineering faculty member. This course is taken as an elective on a P/NP basis. Under certain conditions, however, it may be used to satisfy upper-division technical elective course requirements for the major. Students interested in this alternative must identify a faculty member with whom they wish to work and propose a two-quarter research or study topic for bioengineering (the other technical elective must be an engineering course) and biotechnology majors, and a one-quarter research topic for pre-medical bioengineering majors. After obtaining the faculty adviser's concurrence on the topic and scope of the study, the student must submit a Special Studies Course form (each quarter) and a Bioengineering 199 as Technical Elective Contract form to the Undergraduate Affairs Committee. These forms must be completed, approved, and processed **prior** to the beginning of the quarter in which the course is to be taken. This should not be done during the add/drop period. Detailed policy in this regard may be obtained from the Student Affairs Office.

### Teaching

Students interested in participating in the instructional activities of the department may take Bioengineering 195, Undergraduate Teaching as an elective on a P/NP basis. Under certain conditions, it may be used to satisfy upper-division technical elective course requirements for the premedical bioengineering major. Policy in this regard may be obtained from the Student Affairs Office.

### Integrated Bachelor's/Master's Degree Program

An integrated program leading to a bachelor of science and a master of science degree in bioengineering is offered to undergraduate students who are enrolled in any of the major programs offered by the Department of Bioengineering. Students interested in obtaining the M.S. degree within one year following completion of the B.S. degree may apply to the department for admission to the program during the fourth quarter *prior* to the receipt of the B.S. degree. The program is open only to UCSD undergraduates.

To be eligible, students must have completed the first two quarters of their junior year in residence at UCSD and have an upper-division



GPA of 3.5 or better and a 3.0 overall UC GPA. Twelve units of bioengineering graduate level courses must be completed during the student's senior undergraduate year, *in addition* to the requirements for the bachelor's degree; these twelve units will count toward the requirements for the master's degree only and must be taken for a letter grade. It is the responsibility of the prospective B.S./M.S. student to select a bioengineering faculty member who is willing to serve as the student's adviser. The student will also arrange (with their faculty adviser's approval) a schedule of courses for the senior year that will fulfill the requirements for the B.S. degree while also serving the program planned for the M.S. degree. Students are expected to meet the requirements for the M.S. degree in one year (three consecutive academic quarters) from the date of the receipt of the B.S. degree.

### Industrial Internship Program

The Department of Bioengineering in collaboration with industry offers an Industrial Internship Program designed to complement the department's academic curriculum with practical industry experience. The program provides an opportunity for UCSD bioengineering undergraduates, particularly juniors and seniors, to earn academic credit under Bioengineering 196, Bioengineering Industrial Internship, by spending ten weeks or more as interns in an industrial setting where the practical aspects of their bioengineering training can be cultivated. The intern may be involved in a range of activities including design, analysis, manufacturing, testing, regulatory affairs, etc., under the direction of a mentor in the workplace. At the completion of the internship experience, students are required to submit a brief report to the mentor and faculty adviser describing their activities. Students interested in this program should contact the Bioengineering Industrial Internship Office (4124 Engineering Building I, Warren College) well in advance of the quarter in which they would like to start their internship.

### The Graduate Program

Admission to the M.S. and Ph.D. programs is in accordance with the general-requirements of

the graduate division. Applicants are required to have completed a B.S. and/or M.S. degree by time of admission in a branch of engineering, physical sciences, mathematics, or quantitative life sciences. Applicants must have a GPA of 3.4 or better in technical courses and must submit GRE General Test scores, as well as three letters of recommendation from individuals who can attest to the academic or professional competence and to the depth of their interest in pursuing graduate study. A minimum score of 550 on the Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. Students who score below 600 on the TOEFL examination are strongly encouraged to enroll in an English as a Second Language program before beginning graduate work. (UCSD Extension offers an English language program during the summer as well as the academic year.) Applicants are judged competitively. Based on the candidate's background, qualifications, and goals, admission to the program is in one of two categories: M.S. or Ph.D. Admission to the M.S. or Ph.D. is designated when the applicants are judged to be appropriately qualified to pursue the degree requested at the time of application.

Both M.S. and Ph.D. bioengineering students are required to take the bioengineering core graduate courses—Bioengineering 231A, B, C and Bioengineering 252 A, B, C—and pass with a grade of B or better. A new graduate student who does not meet the prerequisites of these core courses may have to take some basic courses to make up the deficiency. Thus, a student deficient in mathematics and mechanics may have to take Math. 110, AMES 103B, Bioengineering 110, 122A, B in the first year and Bioengineering 252A, B, C in the second year. A student deficient in biology and chemistry may have to take Chemistry 131 and BIPN 100, 102 in the first year and Bioengineering 231A, B, C in the second year.

Students are welcome to seek enrollment in bioengineering courses via UC Extension's concurrent registration program, but such enrollment in a bioengineering graduate course must be approved by the instructor.

### Master's Degree Programs

The M.S. program is intended to extend and broaden an undergraduate background and equip the graduates with fundamental knowledge in bioengineering. The M.S. degree may be terminal or may be obtained on the way to the Ph.D. The M.S. degree is offered under both the Thesis Plan I, which involves a combination of course work and original research, and the Comprehensive Examination Plan II (see "Graduate Studies: Master's Degree"), which is composed entirely of course work followed by an oral examination equivalent to the Ph.D. qualifying exam. A strong effort is made to schedule M.S.-level course offerings so that students may obtain their M.S. degree in one year of full-time study or two years of part-time study (see regulations on part-time study under "Graduate Studies"). Students are required to take the bioengineering core graduate courses and pass with a grade of B or better. Entering students who do not meet the prerequisites of these core courses may have to take some basic courses to make up the deficiency.

A candidate admitted for the M.S. degree who wishes to transfer to the Ph.D. program must petition to the Student Affairs Office for the transfer before completion of the M.S. program. See section on **Change of Degree Aim**.

### Course requirements

Certain core course work requirements are common to both plans. These are as follows:

1. Course work must include Bioengineering 231A, B, C and Bioengineering 252 A, B, C.
2. Units obtained in Bioengineering 281, or 299 or 501 may not be applied toward the course work requirement.
3. No more than a total of eight units of Bioengineering 296 and 298 may be applied toward the course work requirement.
4. No more than twelve units of upper-division 100-level Bioengineering courses may be applied toward the course work requirement.

Students must maintain at least a B average in the courses taken to fulfill the degree requirements. Additional requirements of each plan are as follows:



### Thesis Plan I

An individualized program is agreed upon by the student and a faculty adviser. The plan of study must involve both course work and research, culminating in the preparation of a thesis. A total of forty-eight units of credit is required: thirty-six units (nine courses) in course work and twelve units of Bioengineering 299 to fulfill the research requirement. A thesis based on the research is written and subsequently reviewed by the thesis adviser and two other faculty members appointed by the dean of Graduate Studies. The oral defense of the thesis constitutes the departmental master's exam.

### Comprehensive Examination Plan II

This plan involves course work only and culminates in a comprehensive examination. A total of forty-eight units of credit (or twelve courses) is required. The student's program is arranged according to the requirements above, with prior approval of the faculty adviser. The comprehensive examination is conducted by the adviser and at least two other faculty members appointed by the dean of Graduate Studies. The examination committee conducts an oral examination in the areas of specialization covered by course work taken by the student, two of which must be physiology and biomechanics. A student working toward the Ph.D. degree who has successfully passed two areas of the department's Ph.D. examination need not take the comprehensive examination for the M.S. degree. The Student Affairs Office should be contacted for further details.

### Change of Degree Aim

Upon completion of the requirements for the M.S. degree, students are not automatically eligible for admission to the Ph.D. program.

M.S. candidates who wish to pursue a doctorate must submit an application for a change in status to the Committee on Graduate Affairs. The application must be approved and signed by a bioengineering faculty member who expects to serve as the student's Ph.D. adviser. Petitions will be reviewed by an ad hoc faculty committee. If the committee recommends that the student has good potential for success in the doctoral program, the student will be given the opportunity to take an oral examination equivalent to the Ph.D. Departmental Qualifying Examination. At the time of

that exam, an assessment will be made on admission to the Ph.D. program.

A change of status from a master's program to the doctoral program requires that the student meet the minimal grade point average required by the department of doctoral candidates.

### M.S. Time Limit Policy

Full-time M.S. students are permitted seven quarters in which to complete all requirements. While there are no written time limits for part-time students, the department has the right to intervene and set individual deadlines if necessary.

### Doctoral Degree Program

The Bioengineering Ph.D. Program is intended to prepare students for a variety of careers in research and teaching. Therefore, depending on the student's background and ability, research is initiated as soon as possible. Bioengineering students have specific core course requirements and must maintain a minimum grade point average of 3.4 in these courses. Students, in consultation with their advisers, develop course programs that will prepare them for the departmental qualifying examination and for their dissertation research. These programs of study and research must be planned to meet the time limits established to advance to candidacy and to complete the requirements for the degree. Doctoral students who have passed the departmental examination may take any course for an S/U grade with the exception of courses required by the Departmental or Senate Qualifying Examination Committee. It is recommended that all bioengineering graduate students take a minimum of two courses (other than research) per academic year after passing the departmental qualifying examination. Details can be obtained from the Student Affairs Office.

### Doctoral Examinations

A bioengineering Ph.D. student is required to pass three examinations. The first is a Departmental Qualifying Examination which must be taken immediately following the candidate's first academic year of enrollment. The exam is designed to ensure that all successful candidates possess a strong command of the scientific fundamentals in a sufficiently broad range

of topics that form the foundations of bioengineering research at a level appropriate for the doctorate. It is administered by a committee designated by the department, consisting of departmental faculty members and, in some cases, one other faculty member from a related academic department (e.g., AMES, ECE, Medicine). The student is responsible for four subject areas, each of which is defined by the material covered respectively in a cohesive series of three graduate courses. The oral examination is based on three of the areas, whereas the fourth area may be satisfied by course work. In order to ensure adequate breadth, a maximum of two areas can be closely related to the student's research interests. The examination areas, courses comprising each area, and composition of the examination committee must be approved by the departmental Committee on Graduate Affairs. Students are advised to seek such approval well in advance of their expected examination date, preferably while planning graduate studies.

**Teaching Experience** is required of all bioengineering Ph.D. students prior to taking the Senate Qualifying Exam described below. The teaching experience is defined as service as a graduate student instructor in a course designated by the department. The total teaching requirement for new Ph.D. students is four quarters at 25 percent effort (ten hours per week). At least one quarter of teaching experience is required during the first year (prior to the departmental qualifying examination). The teaching experience can be fulfilled as a requirement for student support or taken as a course for academic credit (Bioengineering 501). Students must contact the Student Affairs Office to plan for completion of this requirement.

The **Senate Qualifying Examination** is the second examination required of bioengineering Ph.D. students. In preparation for this examination, students must have completed the departmental qualifying examination and the departmental teaching experience requirement, obtained a faculty research adviser, and identified a topic for their dissertation research and made initial progress. At the time of application for advancement to candidacy, a doctoral committee responsible for the remainder of the student's graduate program is appointed by the Graduate Council. The committee conducts the

Senate Qualifying Examination, during which students must demonstrate the ability to engage in thesis research. This involves the presentation of a plan for the thesis research project. The committee may ask questions directly or indirectly related to the project and general questions that it determines to be relevant. Upon successful completion of this examination, students are advanced to candidacy and are awarded the candidate in philosophy degree (see "Graduate Studies" section in this catalog).

The **Dissertation Defense** is the final Ph.D. examination. Upon completion of the dissertation research project, the student writes a dissertation that must be successfully defended in a public presentation and oral examination conducted by the doctoral committee. A complete copy of the student's dissertation must be submitted to each member of the doctoral committee approximately four weeks before the defense. It is understood that this copy of the dissertation given to committee members will not be the final copy, and that the committee members may suggest changes in the text at the time of the defense. This examination must be conducted after at least three quarters of the date of advancement to doctoral candidacy. Acceptance of the dissertation by the Office of Graduate Studies and Research and the university librarian represents the final step in completion of all requirements for the Ph.D.

There is no formal foreign language requirement for doctoral candidates. Students are expected to master whatever language is needed for the pursuit of their own research.

### Ph.D. Time Limit Policy

Pre-candidacy status is limited to four years. Doctoral students are eligible for university support for six years. The defense and submission of the doctoral dissertation must be within seven years.

### Evaluations

In the spring of each year, the faculty evaluate each doctoral student's overall performance in course work, research, and prospects for financial support for future years. A written assessment is given to the student after the evaluation. If a student's work is found to be inadequate, the faculty may determine that the student cannot continue in the graduate program.

## COURSES

**Note:** The department will endeavor to offer the courses as outlined below; however, unforeseen circumstances sometimes mandate a change of scheduled offerings. Students are strongly advised to check with the department's Student Affairs Office. This is of particular importance in planning schedules for graduate requirements. The following schedule is tentative for the academic year 1998-99 only.

It should not be assumed that the same schedule will continue after this academic year. It is the student's responsibility to contact the Student Affairs Office to determine the specific quarter that courses will be offered.

Prerequisites are enforced when adding courses. Students who have satisfied prerequisites at another institution or by AP credit need to be pre-authorized to T-Reg in these courses. Please come to the Student Affairs Office before your scheduled T-Reg time to be pre-authorized. If the class is full on T-Reg, please place your name on the waitlist via T-Reg and attend the first class meeting.

### LOWER-DIVISION

#### 1. Introduction to Bioengineering (1)

An introduction to the central topics of bioengineering in a seminar format. The principles of problem definition, team design, engineering inventiveness, information access, communication, ethics, and social responsibility will be emphasized. P/NP grading only. *Prerequisite:* none. (W).

#### 90. Undergraduate Seminar (1)

Selected topics of interest to the faculty will be used to introduce students to bioengineering science, and design concepts. (Not open to upper-division bioengineering students.) (F,W,S)

### UPPER-DIVISION

#### 100. Introduction to Bioengineering Design (4)

A general introduction to bioengineering design, including examples of engineering analysis and design applied to representative topics in biomechanics, bioinstrumentation, biomaterials, biotechnology, and related areas. A review of technological needs, design methodology, testing procedures, statistical analysis, governmental regulation, evaluation of costs and benefits, quality of life, and ethical issues. *Prerequisites:* grade of C- or better in Math. 21C or Math. 20C and Math. 20D, and Phys. 2C. (S)

#### 110. Continuum Mechanics (4)

An introduction to continuum mechanics of both living and non living bodies. The laws of motion and free-body diagrams. Stresses. Deformation. Compatibility conditions. Constitutive equations. Properties of common fluids and solids. Derivation of field equations and boundary conditions. Applications to

bioengineering design. *Prerequisites:* admission to the major and grades of C- or better in Phys. 2A-C. (F)

#### 112A. Biomechanics (4)

Introduction to physiological systems, with emphasis on structure and function of major tissues and organs. Application of mechanics to understand the behavior of these tissues and organs at gross and microscopic levels. Bioelastic solids. Rigid body biomechanics. Biofluids. Bioengineering and medical design. *Prerequisites:* grade of C- or better in BE 110; majors only. (W)

#### 112B. Biomechanics (4)

Basic mechanical properties of collagen and elastin, bone, cartilage, muscles, blood vessels, and other living tissues. Application of continuum mechanics to hard and soft tissues. Biomechanical engineering design for clinical applications. *Prerequisites:* grade of C- or better in BE 112A; majors only. (S)

#### 122A. Biosystems and Control (4)

Systems and control theory applied to bioengineering. Modeling, linearization, transfer functions, Laplace transforms, closed-loop systems, design and simulation of controllers. Dynamic behavior and control of first and second order processes. PID controllers. Stability. Bode design. Features of biological control systems. A simulation term project using MATLAB and an oral presentation are required. *Prerequisites:* grade of C- or better in AMES 105; majors only or junior standing in the biotechnology major or consent of department. (W)

#### 122B. Biomedical Electronics (4)

Measurement circuits and signal analysis in biological systems and medicine. Nonlinear devices. Signals in continuous and discrete time systems. Modulation. Digital signal processing. Sampling. Noise. Digital filters. Computer design and use for biomedical instrumentation. A term project and oral presentation are required. *Prerequisites:* grade of C- or better in BE 122A and BE 186B; majors only. (S)

#### 140A. Bioengineering Physiology (4)

Introductory mammalian physiology for bioengineering students, with an emphasis on control mechanisms and engineering principles. Basic cell functions; biological control systems; muscle; neural; endocrine, and circulatory systems. Not intended for premedical bioengineering students. *Prerequisites:* grade of C- or better in Chem. 6A and 6B, Physics 2A, 2B and 2C, BILD 1. (W)

#### 140B. Bioengineering Physiology (4)

Introductory mammalian physiology for bioengineering students, with an emphasis on control mechanisms and engineering principles. Digestive, respiratory, renal, and reproductive systems; regulation of metabolism, and defense mechanisms. *Prerequisite:* grade of C- or better in BE 140A; majors only. (S)

#### 160A. Metabolic Engineering (4)

Engineering systems analysis of metabolic processes common to all living organisms. Kinetics of individual enzymatic reactions. Computer simulations of metabolic networks. The stoichiometric matrix, systemic sensitivity coefficients, bifurcations and redirection of metabolic fluxes. Temporal decompositions of metabolic processes into multiple time scales and the physiologic roles of metabolic events in each scale. *Prerequisites:* grade of C- or better in BIBC 102 (may be concurrent), BE 122A and admission to the major. (F)

#### 160B. Biochemical Engineering (4)

Industrial microbial production strains, bioreactor and fermenter designs, bioprocess monitoring and control. *Prerequisite:* BE 160A; majors only. (W)

#### 160C. Biochemical Engineering (4)

Bioseparations. Commercial production of biochemical commodity products. *Prerequisite:* BE 160B; majors only. (S)

**162. Biotechnology Laboratory (4)**

Laboratory practices and design principles for biotechnology. Culture of microorganisms and mammalian cells, recombinant DNA bioreactor design and operation. Design and implementation of biosensors. A team design-based term project and oral presentation required. *Prerequisites:* admission to the major, AMES 170, concurrent enrollment in BE 160B. (W)

**166A. Cell and Tissue Engineering (4)**

Engineering analysis of physico-chemical rate processes that affect, limit, and govern the function of cells and tissues. Cell migration, mitosis, apoptosis, and differentiation. Dynamic and structural interactions between mesenchyme and parenchyme. The role of the tissue microenvironment, extracellular matrix, and growth factor communication. The design of functional tissue units. Clinical Applications. *Prerequisites:* concurrent enrollment in BE 160B and admission to the major. (W)

**172. Bioengineering Laboratory (4)**

A laboratory course which demonstrates basic concepts of bioengineering design through experimental procedures involving humans and experimental animals. Statistical principles of experimental design. Study of possible errors. Experiments include nerve action, electrocardiography, mechanics of muscle, membranes, and noninvasive diagnostics in humans. *Prerequisites:* grade of C- or better in AMES 170 and junior or senior standing in the major. (S)

**186A. Principles of Biomaterials Design (4)**

Fundamentals of materials science as applied to bioengineering design. Natural and synthetic polymeric materials. Materials characterization and design. Wound repair, blood clotting, foreign body response, transplantation biology, biocompatibility of materials, tissue engineering. Artificial organs and medical devices. Government regulations. Patenting. Ethical issues. A term project and oral presentation are required. *Prerequisite:* grade of C- or better in BE 112B or senior standing in the biotechnology major or consent of department. (F)

**186B. Principles of Bioinstrumentation Design (4)**

Biophysical phenomena, transducers, and electronics as related to the design of biomedical instrumentation. Potentiometric and amperometric signals and amplifiers. Biopotentials, membrane potentials, chemical sensors. Mechanical transducers for displacement, force and pressure. Temperature sensors. Flow sensors. Light-based instrumentation. Electrical safety. A term project and oral presentation are required. *Prerequisites:* grade of C- or better in AMES 163 and 170. (W)

**186C. Bioengineering Design (4)**

Preparation of formal engineering reports on a series of engineering analysis and design problems illustrating methodology from various branches of applied mechanics as applied to bioengineering problems. Statistical analysis. Governmental regulations. Bioethical issues. A term project and oral presentation are required. *Prerequisites:* grades of C- or better in AMES 103A-B, 121A-B, 154, BE 112B, and 186B; majors only. (S)

**191. Senior Seminar I: Professional Issues in Bioengineering (2)**

Role of bioengineers in industry. Professional identity. Structure of bioengineering industries and product development process. Job market analysis. Current employment opportunities. Recruiting process and interview. Analysis of the employer. Marketing vs engineering. Management by objective. Role of higher degrees. *Prerequisite:* consent of instructor. (W)

**195. Teaching (2-4)**

Teaching and tutorial assistance in a bioengineering course under supervision of instructor. Not more than four units may be used to satisfy graduation requirements. (P/NP grades only.) *Prerequisites:* B average in the major and departmental approval. (F,W,S)

**196. Bioengineering Industrial Internship (1-4)**

Under the joint supervision of a faculty adviser and industry mentor, the student will work at a bioengineering industrial site to gain practical bioengineering experience. No more than twelve units may be used to satisfy graduation unit requirements. (P/NP grades only) *Prerequisites:* consent of department and completion of all lower-division course requirements, including general-science requirements. Some laboratory experience is needed. Completion of ninety units with a 2.5 GPA and consent of a bioengineering faculty coordinator. (F,W,S,Su)

**197. Engineering Internship (1-4)**

An enrichment program, available to a limited number of undergraduate students, which provides work experience with industry, government offices, hospitals and their practices. Subject to the availability of positions, students will work in a local industry or hospital (on a salaried or unsalaried basis) under the supervision of a faculty member and industrial supervisor. Coordination of the Engineering Internship is conducted through UCSD's Academic Internship Program. Time and effort to be arranged. Units may not be applied towards major graduation requirements unless prior approval of a faculty advisor is obtained and internship is an unsalaried position. *Prerequisites:* completion of ninety units with a 2.5 GPA and consent of a bioengineering faculty coordinator. (F,W,S)

**198. Directed Group Study (1-4)**

Directed group study, on a topic or in a field not included in the regular department curriculum, by arrangement with a bioengineering faculty member. (P/NP grades only.) *Prerequisite:* consent of instructor. (F,W,S)

**199. Independent Study for Undergraduates (4)**

Independent reading or research by arrangement with a bioengineering faculty member. (P/NP grades only.) *Prerequisite:* consent of instructor. (F,W,S)

## GRADUATE

**207. Topics in Bioengineering (4)**

Course given at the discretion of the faculty on current topics of interest in bioengineering.

**231A. Cell and Molecular Biology (4)**

A general survey of structure-function relationships at the molecular and cellular levels. Emphasis on basic genetic mechanisms; control of gene expression; membrane structure, transport and traffic; cell signaling; cell adhesion; mechanics of cell division; and cytoskeleton. *Prerequisites:* BIPN 100 and 102, or consent of instructor. (F)

**231B. Cardiovascular Physiology (4)**

Physical concepts of behavior of heart, large blood vessels, vascular beds in major organs and the microcirculation. Physical and physiological principles of blood flow, blood pressure, cardiac work, electrophysiology of the heart. Special vascular beds, including their biological and hemodynamic importance. Integration through nervous and humoral controls. *Prerequisites:* BIPN 100, 102, and BE 231A, or consent of instructor. (W)

**231C. Respiratory and Renal Physiology (4)**

Mechanics of breathing. Gas diffusion. Pulmonary blood flow. Stress distribution. Gas transport by blood. Kinetics of oxygen and carbon dioxide exchange. VA/Q relations. Control of ventilation. Glomerular and proximal tubule functions. Water metabolism. Control of sodium and potassium in the kidney. *Prerequisites:* BIPN 100, 102, and BE 231B, or consent of instructor. (S)

**241A. Foundations of Tissue Engineering Science (4)**

Molecular and cell biological basis of tissue engineering science. Paracrine control of tissue growth and differentiation.

Biomechanics and the molecular basis of cell-cell and cell-matrix interactions. Cell motility, mechanics of tissue growth and assembly, tissue repair. Mass transfer in tissues. Microcirculation of blood and lymph. *Prerequisite:* BE 231A or consent of instructor. (F)

**241B. Methods in Tissue Engineering Science (4)**

Isolation of cells, cell and tissue culture systems. Fluorescence and confocal microscopy. Intracellular imaging. Mechanical testing of tissues. Micromechanical measurement and analysis of cell deformability and cell interaction. Methods in microcirculation and angiogenesis. *Prerequisite:* BE 241A. (W)

**241C. Applications of Tissue Engineering Science (4)**

A lecture/seminar series featuring speakers from academia and industry emphasizing principles of tissue engineering science as applied to clinical medicine and industrial production. Topics include skin replacement, guide tubes for nerve regeneration, blood substitutes, pancreatic islet replacement, and drug delivery devices, among others. Ethics of tissue replacement. *Prerequisite:* BE 241B. (S)

**252A. Biomechanics (4)**

An introduction to biomechanics and transport phenomena in biological systems at the graduate level. Biorheology, biosolid mechanics, muscle mechanics, mass transfer, momentum transfer, energy transfer. *Prerequisites:* AMES 103B and BE 112B, or consent of instructor. (F)

**252B. Biomedical Transport Phenomena (4)**

Nonequilibrium thermodynamic analysis of transport phenomena. The osmotic effect. Diffusion and exchange in biological systems. *Prerequisite:* BE 252A or consent of instructor. (W)

**252C. Advanced Biomechanics (4)**

Modern development of biomechanics at an advanced mathematical level. Selected topics in the dynamics of heart, pulsatile, blood flow, microcirculation, and muscle mechanics. *Prerequisite:* BE 252B or consent of instructor. (S)

**255. Biodynamics: Flow, Motion, and Stress (4)**

Stress distribution in organs. Body dynamics. Fluid movement. Flying and swimming. Growth and change. Strength and tolerance. Trauma and design for safety. *Prerequisite:* BE 252A.

**264. Advanced Biomedical Transport Phenomena (4)**

Applications of heat, mass, and momentum transfer in biomedical systems. Extension of the principles encountered in BE 252B-C to practical biomedical systems. *Prerequisite:* BE 252B-C.

**265. Biomechanics of Cells (4)**

A survey of mechanical properties of cells and intracellular components. Elastic, viscous, and viscoelastic behavior of cell membranes, cytoplasm, pseudopods, and erythrocytes, leukocytes, endothelial cells, muscle. Experimental techniques and theoretical analysis. Applications to individual cell testing, filtration tests, and cell division. *Prerequisites:* BE 231A and 252A.

**266. Methodology for Single Cell Studies (4)**

Technology for the characterization and measurement of biophysical properties of single live cells. Imaging techniques. Membrane mechanics. Mechanical and fluid mechanical manipulation. Electrodes and electrical methods. Flow and image cytometry. Automated cell recognition and sorting. *Prerequisite:* consent of instructor.

**267. Microcirculation in Health and Disease (4)**

Structural and functional aspects of transport and blood-tissue exchange in key organs during circulatory shock, bacterial toxemia, hypertension. Physical and ultrastructural techniques used to analyze small-vessel dynamics. *Prerequisite:* consent of instructor.

**268. Blood Substitutes (4)**

Principles of oxygen transport to tissue and transfusion physiology. Development and clinical use of artificial oxygen carriers, i.e., blood substitutes. Physiology of tissue oxygenation. Current developments. Experimental models for the study of oxygen transfer and measurement techniques. Medical applications. *Prerequisite: consent of instructor.*

**269. Selected Topics in Biophysics (4)**

Selected topics on the structure and function of biological membrane, fluid and ion transport, excited states, wave propagation, muscle contraction, chemotaxis, chemical sensors, enzyme probes, swimming, and flying. *Prerequisite: BE 252C or consent of instructor.*

**275. Computational Biomechanics (4)**

Finite element methods for anatomical modeling and boundary value problems in the biomechanics of tissues and biomedical devices. Nonlinear biodynamics, heat flow, cardiac impulse propagation, anatomic modeling, and biomechanics. *Prerequisite: consent of instructor.*

**281. Seminar in Bioengineering (1)**

Weekly seminars by faculty, visitors, postdoctoral research fellows, and graduate students concerning research topics in bioengineering and related subjects. May be repeated for credit. This course does not apply toward the M.S. graduation requirements. (S/U grades only.) (F,W,S)

**296. Independent Study (4)**

*Prerequisite: consent of instructor.*

**298. Directed Group Study (1-4)**

Directed group study on a topic or in a field not included in regular department curriculum, by special arrangement with a faculty member. *Prerequisite: consent of instructor. (S/U grade only.)*

**299. Graduate Research (1-12)**

(S/U grades only.)

**501. Teaching Experience (2)**

Teaching experience in an appropriate bioengineering undergraduate course under direction of the faculty member in charge of the course. Lecturing one hour per week in either a problem-solving section or regular lecture. (S/U grade only.) *Prerequisites: consent of instructor and departmental approval.*

## Computer Science and Engineering (CSE)

OFFICES:

Undergraduate Affairs 3402  
Graduate Affairs 3402  
Applied Physics and Mathematics Building,  
Muir College  
<http://www.cs.ucsd.edu>

**Professors**

Donald W. Anderson, Ph.D.  
Francine D. Berman, Ph.D.

Kenneth L. Bowles, Ph.D., *Professor Emeritus*

Walter A. Burkhard, Ph.D.  
J. Lawrence Carter, Ph.D.  
Chung-Kuan Cheng, Ph.D.  
Andrew Chien, Ph.D.  
Garrison W. Cottrell, Ph.D.  
Flaviu Cristian, Ph.D.  
Jeanne Ferrante, Ph.D.  
Fan Chung Graham, Ph.D.  
Ronald Graham, Ph.D.  
Joseph A. Goguen, Ph.D.  
William E. Howden, Ph.D.  
T. C. Hu, Ph.D.  
Ramesh C. Jain, Ph.D.  
Sidney Karin, Ph.D., (*In-Residence*)  
Joseph C. Pasquale, Ph.D.  
Venkat P. Rangan, Ph.D.  
Walter J. Savitch, Ph.D.  
Victor D. Vianu, Ph.D.  
S. Gill Williamson, Ph.D.

**Associate Professors**

Scott B. Baden, Ph.D.  
Richard K. Belew, Ph.D.  
Mihir Bellare, Ph.D.  
Charles P. Elkan, Ph.D.  
William G. Griswold, Ph.D.  
Russell Impagliazzo, Ph.D.  
Keith Marzullo, Ph.D.  
Alex Orailoglu, Ph.D.  
Ramamohan Paturi, Ph.D.  
George Polyzos, Ph.D.

**Assistant Professors**

Bradley G. Calder, Ph.D.  
Yannis Papakonstantinou, Ph.D.  
Dean M. Tullsen, Ph.D.  
Bennet S. Yee, Ph.D.

**Adjunct Faculty**

Michael J. Bailey, Ph.D.  
Samuel R. Buss, Ph.D.  
Walter H. Ku, Ph.D.  
Reagan Moore, Ph.D.  
Jeffrey B. Rummel, Ph.D.  
J. B. Rosen, Ph.D.  
Terrence J. Sejnowski, Ph.D.

**Research Faculty**

Christof W. Fetzer, Ph.D.  
Eric Mjolsness, Ph.D.  
Richard Wolski, Ph.D.

### The Undergraduate Programs

The department offers computer science and computer engineering curricula leading to the bachelor of science (B.S.) degree as well as the bachelor of arts (B.A.) degree in computer science. The courses of study prepare students for graduate study in these fields as well as immediate employment. The B.A. degree is intended to provide a more flexible program of study allowing significant studies beyond computer science and engineering.

These degrees are four-year endeavors. Students in the B.S. programs need to enroll in no more than sixteen units per quarter during their junior and senior years to meet their major requirements. The B.A. program has fewer major requirements. In addition, each student must satisfy general-education course requirements determined by the student's college.

### B.S. Computer Science Program

The lower-division B.S. computer science program is designed to provide a strong foundation in mathematics, physics, electrical engineering, programming methodology, and skills, and computer organization. Upper-division core courses deal with the theory and design of algorithms, hardware, and software. Students can gain additional breadth and/or depth in computer science and engineering by an appropriate selection of technical electives.

Students should have sufficient background in high school mathematics so that they can take freshman calculus in their first quarter. Courses in high school physics and computer programming, although helpful, are not required for admission to the program.

The department requires a total of 146 units for the B.S. computer science program. There are three varieties of requirements: lower-division, upper-division and technical electives.

#### 1. LOWER-DIVISION REQUIREMENTS

Students are expected to complete the following seventy units by the end of their sophomore year.

**Computer Science and Engineering:** CSE 8B or 9B or 10 or 11, 12, 20, 21 and 30; twenty units.

**Mathematics:** Math. 20A, 20B, either 21C(2C) and 21D(20D) or 20C and 20D, and 20F; twenty units.

**Physics:** Phys. 2A, 2B, 2C; 12 units. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the Department of Mathematics placement test permits them to start with Math. 20B or a higher course may take Phys. 2A in the fall quarter of the freshman year; all others will take Phys. 2A in the winter quarter of the freshman year. Students who received high grades in both calculus and Physics in high school may substitute the major's sequence, Phys. 4A, 4B, 4C for Phys. 2A, 2B, 2C.

**Physics Lab:** Phys. 2BL or 2CL or 2DL; two units. The lab course should be taken concurrently with the Phys. 2 or Phys. 4 sequence.

**Introduction to Electrical Engineering:** ECE 53A and ECE 53B; eight units. ECE 53A/B are courses that give a comprehensive introduction to electrical engineering.

**Probability and Statistics:** Math. 183; four units.

**Science/Mathematics Elective:** Students are required to take one of the following four-unit science/mathematics courses: Phys. 2D, Math. 20E(2F), Chem. 6A, BILD 1, 10, 12, 14, 30.

## 2. UPPER-DIVISION REQUIREMENTS

All B.S. computer science students are required to take CSE 100, 101, 105, 120, 130, 131A, 131B, 140, 140L, 141 and 141L; forty units.

Students are expected to complete almost all of these courses by the end of their junior year. If students want to accelerate their program, they should consider taking CSE 100, CSE 105, and/or CSE 140 and 140L in the sophomore year.

## 3. TECHNICAL ELECTIVES

B.S. computer science students are required to take nine technical electives for a total of thirty-six units. Students must take a least one of the following systems course: CSE 121, 123A, 126, 132A. Of the remaining eight electives, at least five must be computer science and engineering upper-division or graduate courses.

The remaining three technical electives can be chosen from the wider set of courses that includes computer science and engineering

upper-division courses, graduate courses, and other electives as listed under the section titled **Electives**. Other restrictions in the selection of technical electives are also given in the section **Electives**.

## B.S. Computer Engineering Program

(Curriculum is the same in both the CSE and ECE departments.)

The B.S. computer engineering program is jointly administered by the Departments of Computer Science and Engineering and Electrical and Computer Engineering. Students wishing to take the computer engineering program must be admitted to one of the departments.

The lower-division computer engineering program is designed to provide strong foundation in mathematics, physics, electrical engineering, programming methodology and skills, and computer organization. Upper-division core courses deal with the theory and design of algorithms, hardware and software, as well as electronic systems. Students can gain additional breadth and/or depth in computer science and engineering by an appropriate selection of technical electives.

Students should have sufficient background in high school mathematics so that they can take freshman calculus in their first quarter. Courses in high school physics and computer programming, although helpful, are not required for admission to the program.

B.S. computer engineering program requires a total of 146 units. There are three varieties of requirements; lower-division, upper-division and technical electives.

## 1. LOWER-DIVISION REQUIREMENTS

Students are expected to complete the following seventy units by the end of their sophomore year.

**Computer Science and Engineering:** CSE 8B or 9B or 10 or 11, 12, 20, 21 and CSE 30; twenty units.

**Mathematics:** Math. 20A, 20B, either 21C(2C) and 21D(20D) or 20C and 20D, and 20F; twenty units.

**Physics:** Phys. 2A, 2B, 2C, 2D; sixteen units. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the Department of Mathematics placement test permits them to

start with Math. 20B or a higher course may take Phys. 2A in the fall quarter of the freshman year; all others will take Phys. 2A in the winter quarter of the freshman year. Students who received high grades in both calculus and physics in high school may substitute the major's sequence, Phys. 4A, 4B, 4C, 4D for Phys. 2A, 2B, 2C, 2D.

**Physics Lab:** Phys. 2BL or 2CL or 2DL; two units. The lab courses should be taken concurrently with the Phys. 2 or Phys. 4 sequence.

**Introduction to Electrical Engineering:** ECE 53A and ECE 53B; eight units. ECE 53A/B are new courses that give a comprehensive introduction to electrical engineering.

**Probability and Statistics:** ECE 109; four units.

## 2. UPPER-DIVISION REQUIREMENTS

All B.S. computer engineering students are required to take CSE 100, 101, 105, 120, 131A, 131B, 140, 140L, 141, and 141L; thirty-six units.

In addition, all B.S. computer engineering students have to fulfill the following upper-division ECE requirements.

**Linear Systems:** ECE 101, ECE 171A; eight units.

**Electronic Circuits and Systems:** ECE 102, ECE 108; eight units.

If students want to accelerate their program, they should consider taking CSE 100, CSE 105, and/or CSE 140 and 140L in the sophomore year.

## 3. TECHNICAL ELECTIVES

All B.S. computer engineering students are required to take six technical electives for a total of twenty-four units. One of these courses must be either CSE 145, ECE 111, ECE 117, or ECE 119. Of the remaining five courses, four must be computer science and engineering or electrical and computer engineering upper-division or graduate courses.

The remaining course can be any computer science and engineering or electrical and computer engineering upper-division or graduate course, or any other course listed under the section titled **Electives**. Other restrictions in the selection of technical electives are also given in the section **Electives**.

## B.A. Computer Science Program

The B.A. computer science program gives students more latitude in designing their course of study. The lower-division program is designed to provide a strong foundation in mathematics, physics, programming methodology and skills, and computer organization. Upper-division core courses deal with the theory and design of algorithms, hardware, and software. Students can gain additional breadth and/or depth in computer science and engineering by an appropriate selection of technical electives. By requiring fewer technical electives, the B.A. computer science program serves those students desiring more time for undergraduate studies outside their major subject.

The department requires a total of 104 units for the B.A. computer science program. There are three varieties of requirements: lower-division, upper-division and technical electives.

### 1. LOWER-DIVISION REQUIREMENTS

Students are expected to complete the following fifty-two units by the end of their sophomore year.

**Computer Science and Engineering:** CSE 8B or 9B or 10 or 11, 12, 20, 21 and 30; twenty units.

**Mathematics:** Math. 20A, 20B, either 21C(2C) and 21D(20D) or 20C and 20D, and 20F; twenty units.

**Physics:** Phys. 2A, 2B, 2C; twelve units. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the Department of Mathematics placement test permits them to start with Math. 20B or a higher course may take Phys. 2A in the fall quarter of the freshman year; all others will take Phys. 2A in the winter quarter of the freshman year. Students who received high grades in both calculus and physics in high school may substitute the major's sequence, Phys. 4A, 4B, 4C for Phys. 2A, 2B, 2C.

### 2. UPPER-DIVISION REQUIREMENTS

All B.A. computer science students are required to take CSE 100, 101, 105, 120, 131A, 131B, 140, 140L, 141 and 141L; thirty-six units.

Students are expected to complete almost all of these courses by the end of their junior year. If students want to accelerate their program, they should consider taking CSE 100, CSE 105,

and/or CSE 140 and 140L in the sophomore year.

### 3. TECHNICAL ELECTIVES

B.A. computer science students are required to take four technical electives for a total of sixteen units. Of these four electives, at least two must be computer science and engineering upper-division or graduate courses.

The remaining two technical electives can be chosen from a wider set of courses that includes computer science and engineering upper-division courses, graduate courses, and other electives as listed under the section titled **Electives**. Other restrictions in the selection of technical electives are also given in the section **Electives**.

#### Electives

The discipline of computer science and engineering interacts with a number of other disciplines in a mutually beneficial way. These disciplines include mathematics, electrical engineering, and cognitive science. The following is a list of upper-division courses from these and other disciplines that can be counted as technical electives.

At most four units of CSE 197, 198 or 199 may be used towards technical elective requirements. CSE 195 cannot be used towards course requirements. Undergraduate students must get instructor's permission and departmental stamp to enroll in a graduate course.

Students may not get duplicate credit for equivalent courses. The *UCSD General Catalog* should be consulted for equivalency information and any restrictions placed on the courses. Additional restrictions are noted below. Any deviation from this list must be petitioned.

**Mathematics:** All upper-division courses except Math. 166A-B, 168A-B, 176A-B, 179A-B, 184A-B, 186A-B, 188, 189A-B-C, and 195-199.

If a student has completed CSE 167, then he or she cannot get elective credit for Math. 155A. Students may receive elective credit for only one of the following courses: CSE 164A, ECE 104, Math. 174, Math. 173, Phys. 105, AMES 153, AMES 154. No credit for any of these courses will be given if Math. 170A-B-C is taken.

**Electrical and Computer Engineering:** All ECE upper-division courses except 195-199.

CSE 143 is equivalent to ECE 165. Students may not get credit for both CSE 123A and ECE 158A or for both ECE 151 and ECE 109.

**Cognitive Science:** Fundamental Cognitive Phenomena 101A-B-C, Cognitive Neuroscience 107A-B-C, Theory of Computation and Formal Systems 108A, Symbolic Modeling of Cognition 108B (108P), Everyday Cognition 130, Distributed Cognition 131, Cognitive Engineering 132, Observation, Protocol, and Discourse Analysis 141, Semantics 150, Language Comprehension 153, Natural and Artificial Symbolic Representational Systems 170, Neural Network Models of Cognition II 181, Artificial Intelligence Modeling II 182.

Students may not get credit for both CSE 150 and Neural Network Models 108C or for both CSE 151 and Artificial Intelligence Modeling II 182.

**Applied Mechanics and Engineering:** All upper-division AMES courses except AMES 163A-B and AMES 195-199.

Students may receive elective credit for only one of the following courses: CSE 164A, ECE 104, Math. 174, Math. 173, Phys. 105, AMES 153, AMES 154. Students may only get credit for one of the two courses, CSE 167 or AMES 157.

**Economics:** Microeconomics 100A-B, Game Theory 109, Macroeconomic 110A-B, Mathematical Economics 113, Econometrics 120A-B-C, Applied Econometrics 121, QEDS Microeconomics 170A-B, Decisions Under Uncertainty 171, Introduction to Operations Research 172A-B-C, Economic and Business Forecasting 178.

**Linguistics:** Phonetics 110, Phonology I 111, Phonology II 115, Grammatical Structure 120, Syntax I 121, Syntax II 125, Semantics 130, Mathematical Background in Formal Linguistics 160, Computational Linguistics 163, Psycholinguistics 170, Language and the Brain 172, and Sociolinguistics 175.

**Engineering:** Team Engineering 101.

**Music:** Programming for Musical Applications 161, Introduction to Computer Music 162.

### Minor and Program of Concentration

Effective January 1, 1998, the CSE minor requires successful completion of a total of nine CSE courses. To be admitted into the minor,



students must have 2.0 GPA and a C- or better in CSE 8B or 11 or 9B or 10, 12, 20, 21, 30. The remaining four CSE courses can be selected from the following upper-division sequences. If a student wishes other CSE courses than the ones listed, CSE faculty approval is required. In order for the minor to be awarded students must receive an average 2.0 GPA in the upper-division courses.

Students should consult their college provost's office concerning the rules for the minor or program of concentration.

*Artificial Intelligence:* CSE 100, 133, 150, and 151 or one graduate AI course

*Computer Software:* CSE 100, 110, 131A, and 131B or 120 or 130

*Computer Hardware:* CSE 100, 140, 140L, 141, and 141L

*Computer Theory:* CSE 100, 101, 105, and a course in Security and Cryptography

*Computer Systems:* 100, 120, 121, and 122 or 123A

*Computer Networks:* CSE 100, 120, 123A, and 123B

*Scientific Computation:* CSE 100, 160, 164A, and 164B

*Storage Systems:* CSE 100, 102, 120, and 123A

### ***Computing Courses for Non-majors***

Computer science and engineering lower-division courses are available to all students. Also, the department offers three slower-paced courses providing a practical introduction to computers, computation, and programming: CSE 1 an introduction to computers and CSE 5A-B an introduction to structured programming using the C programming language.

### ***Policies and Procedures for CSE Undergraduates***

#### **ADMISSION TO MAJORS**

Freshman students who have excelled in high school and have declared CSE on their application will be directly admitted by the Dean of the School of Engineering into their major. These students will be notified directly of their status. Because of heavy student interest in departmental programs, and the limited resources available to accommodate this demand,

maintenance of a high quality program makes it necessary to limit enrollments to the most qualified students. Admission to the department as a major, transfer, or minor is in accordance with the general requirements established by the School of Engineering. Effective fall 1998, pre-major status is limited to selected transfer students. These requirements and procedures are described in detail in the section on "Admission to the School of Engineering" in this catalog. For enrollment in CSE courses, see the following section.

Students admitted prior to fall 1998, admission to computer science and engineering majors is based on performance in the following required lower-division courses: Math. 20A, 20B, 20C/21C, Phys. 2A, 2B, and CSE 8B or 9B or 10 or 11, 12, 20, 30. Currently students who have a GPA of 3.0 or better in the screening courses and are within six quarters of enrollment will be guaranteed admission into the major of their choice.

Students classified as "Pre-CSE" majors are encouraged to apply to the computer science and engineering major after a minimum of three quarters of study here but no later than six quarters (or three quarters for transfers.) Applications may be obtained from the Undergraduate Affairs Office in Room 3402 Applied Physics and Mathematics Building.

"Pre-CSE" students denied admission to a computer science and engineering major will automatically have their major converted from "Pre-CSE" to "Undeclared" by the department at the time of their denial. "Pre-CSE" students will not be allowed to continue to enroll in upper-division computer science and engineering courses beyond the fall quarter of their junior year.

However, computer science and engineering minors and students in related majors who are required to take computer science and engineering courses will be allowed to enroll in upper-division courses as long as they have completed the required prerequisites or equivalents.

#### **TRANSFER STUDENTS**

Transfer students who have declared pre-CSE and entering the university with 36.0 or more quarter units must apply for admission to the major no later than their third quarter of study here. Requirements for admission to upper-division courses and to the major curricula are

the same for transfer students as for continuing students. When planning their program, students should be mindful of lower-division prerequisites necessary for admission to upper-division courses. Transfer students should be prepared either to petition equivalent courses with the appropriate departments and/or present a copy of their records prior to making application to a computer science and engineering major.

Students who wish to enter a major curriculum directly must make application to the department before the beginning of the fall quarter, submitting course descriptions and transcripts for courses used to satisfy their lower-division requirements. Although admission is not normally restricted to the fall quarter, transfer students entering in the winter or spring quarter should be aware that scheduling difficulties may occur because upper-division sequences normally begin in the fall quarter.

#### **ENROLLMENT IN CSE COURSES**

Student demands exceed capacity in many CSE courses. Accordingly, many CSE courses may have enrollment restrictions which give priority to students in the following order:

1. CSE majors, CSE M.S., and CSE Ph.D. students.
2. CSE pre-majors, and ECE CE majors and pre-majors, and Math-CS majors. Pre-major status is conferred to transfer students and to those students admitted prior to fall 1998.
3. Students fulfilling a non-elective requirement in another program.
4. CSE minors.
5. All other majors or pre-majors in other SOE departments.
6. All others, with permission of the department of Computer Science and Engineering.

Where these restrictions apply, the registrar will not enroll low-priority students in the course.

#### **ENROLLING IN UPPER-DIVISION COURSES**

The Department of Computer Science and Engineering will attempt to provide sufficient sections of all lower-division courses. Students will, however, be screened to ensure that they meet all course enrollment restrictions.

Admission to upper-division courses will be restricted to students having completed all prerequisites with a C- or better (or consent of the instructor.) Courses have enrollment restrictions which give priority in the following order: students admitted by the department to a major or minor curriculum; students fulfilling a requirement for another major; all others. Within these categories, priority is determined on the basis of graduation date and/or credits completed. Where these restrictions apply, the registrar will not enroll nonmajors except by department approval. Students who are undeclared will not be admitted to upper-division computer science and engineering courses.

Those students not in compliance with the above restrictions should be forewarned that they will automatically be dropped from course rosters (at any time during the quarter) when it comes to the attention of the department that a student is enrolled in a course without being eligible because of restrictions and/or performance standards have not been met. Admission to all computer science and engineering courses will require obtaining either authorization through telephone registration or department stamps on an add/drop card, and it will be given only by the student affairs personnel.

### GRADUATION REQUIREMENTS

All upper-division major requirements and technical electives except CSE 197, 198, or 199 must be taken for a letter grade. To graduate, a grade-point average of 2.0 will be required in upper-division courses in the major, including technical electives. In addition, each student must satisfy general-education course requirements determined by the student's college, as well as major requirements determined by the department. The five colleges at UCSD require widely different numbers of general-education courses. Each student should choose his or her college carefully, considering the special nature of the college and breadth of education, realizing that some colleges require considerably more courses than others.

### Five-Year Bachelor's-Master's Program

Undergraduate students in the Department of Computer Science and Engineering who are enrolled in the B.S. or B.A. computer science or

B.S. computer engineering degree programs, and who have a cumulative GPA of a 3.4 and also GPA of 3.4 in at least seven of the nine core courses, are eligible to apply for the Five Year Bachelor's-Master's Degree Program. The deadline to apply is the fourth week of the fourth quarter before graduation. Acceptance into this program is an honor which carries with it practical benefits—the graduate application process is simplified (no GREs required), students accepted into this program can be admitted fall and spring quarter, no winter admission, based upon availability of openings in the program. Advanced students are given access to graduate level courses and have the opportunity to do graduate level research earlier under the direct supervision of UCSD's faculty, and students are able to complete the B.A., B.S. and M.S. degree within a five-year time period. Courses taken can be used toward either the B.A., B.S. or M.S. degree, but not counted toward both degrees. Additional information and applications can be obtained by contacting the CSE Student Affairs Office, APM 3402.

### Advanced Manufacturing

A master of science degree in this department with a specialization in advanced manufacturing exists. More information on this option can be found under the "Advanced Manufacturing Program" section of this catalog.

### The Graduate Program

The graduate program offers master of science and doctor of philosophy degrees in computer science and computer engineering. To be accepted into either course of study, a student must have a B.A./B.S. degree in computer science, computer engineering, or a related area.

The graduate program is concerned with fundamental aspects of computation; emphasis is divided among the areas of theory, hardware, software systems, and artificial intelligence. The computer engineering specialization places a greater emphasis on hardware and the design of computer systems.

Admission to the graduate program is done through the Office of Graduate Admissions, Department of CSE. Deadline for application is

January 15. Admissions are always effective the following fall quarter.

Admission decisions for the M.S. and Ph.D. programs are made separately. An M.S. student who wishes to enter the Ph.D. program must submit a new application to the CSE admissions committee.

### Computer Science Program

#### Master of Science Program

The department offers the master of science degree in computer science. The degree can be pursued under either the Thesis Plan I or the Comprehensive Examination Plan II. Each plan requires forty-nine units of work. For full-time students, all the requirements must be completed within two years. Students with an adequate background in computer science can complete the M.S. program within four to five quarters of full-time study.

#### THESIS OR COMPREHENSIVE EXAM

There are two plans of study for the master's degree: Plan I, in which the student writes a thesis, and Plan II, in which the student takes a set of comprehensive exams.

#### Plan I: Thesis Option, No Comprehensive Exam

This plan involves both course work and research, culminating in the preparation of a thesis. The student must take twelve units of CSE 298 (Independent Study) to fulfill the research requirement, and a thesis based on research must be written and subsequently reviewed by the thesis committee. This committee, which is appointed by the dean of Graduate Studies and Research, consists of three faculty members, with at least two members from within the CSE department.

#### Plan II: Comprehensive Examination, No Thesis

Under this plan, the student must pass a written comprehensive examination designed to test the student's knowledge in basic computer science material. The examination can normally be passed with a thorough knowledge of topics covered in the undergraduate and first-year graduate computer science programs. It is offered every year in the first few weeks of

the fall quarter and in the first few weeks of the spring quarter. If fewer than seven people sign up, then the department may cancel the examination in the spring quarter. Each student is allowed three attempts to pass the examination. The student must secure at least a master's-level pass in the written comprehensive examination. More information regarding the comprehensive examination can be found in a separate document provided by the CSE graduate office.

In particular, the written examination is structured around the three CSE core areas; algorithms and data structures; operating systems; and computer architecture and digital logic design.

### Required Courses

Students entering the M.S. Program in Computer Science will choose an area of concentration from among eleven areas. Each concentration is an area in which the faculty has significant research expertise.

The typical concentration is a collection of four courses which are designed to give the student in-depth training in the chosen field. Additionally, to ensure breadth, all students are required to take four "core courses".

Core courses must be completed with an average grade of B, and no grade below B-. The four core courses required of all students are as follows:

- CSE 202. Algorithms Design and Analysis
- CSE 221. Operating Systems
- CSE 240. Principles of Computer Architecture
- CSE 292. Faculty Research Seminar

The department expects to offer concentrations in the following areas:

- Artificial Intelligence
- Communication Networks
- Computer Architecture and Compilers
- Database and Information Retrieval
- Design Automation for Microelectronic Designs
- Distributed Computing
- Multimedia Systems
- Parallel and Scientific Computing
- Software Engineering
- Storage Systems
- PhD-Preparation

The specific courses involved in each of the concentrations are detailed in a separate bulletin

which is available in the Graduate Student Affairs Office, 3402 AP&M.

### Project

Students electing Plan II are required to execute a project while enrolled in four units of CSE 293.

### Electives

In addition to completing the required core courses and fulfilling either the thesis or comprehensive examination requirements described above, the student must also complete additional approved courses to bring the total number of units to forty-nine. The number of units of electives depends upon whether the student chooses Plan I or Plan II. The electives consist of other CSE graduate courses or courses from a list of approved electives. Units obtained in the courses CSE 293, 298, 299, 501, 502, and any of the seminar courses CSE 209, 229, 259, 269, 290, and 294 do not count toward the elective requirement.

### Doctoral Program

The general requirements for the Ph.D. program are stated in the "Graduate Studies" section of the catalog. A brief summary of the general requirements is also provided in the section titled "All Doctoral Programs." Consistent with these requirements, the department has established a set of requirements to be fulfilled in the first two to three years of the Ph.D. program as described below.

### COURSE REQUIREMENTS

Ph.D. students are expected to complete the course requirements in the first two years of the program. They are expected to maintain, on an annual basis, a 3.4 grade-point average for the core courses.

Ph.D. students entering with a master's degree may petition for a waiver of the core courses or for substitution by alternative courses.

### CORE COURSES

Each Ph.D. student must take all of the following courses. A student typically completes all the core courses within the first year of the graduate study.

- CSE 200
- CSE 202

- CSE 221
- CSE 230
- CSE 240
- CSE 292

### ELECTIVES

Each Ph.D. student must take four technical electives consisting of other CSE graduate courses or approved alternatives.

### TEACHING ASSISTANTSHIP REQUIREMENT

Starting with the incoming class of fall 1998, all students enrolled in the Ph.D. program must have one quarter of training as a teaching assistant. This is a formal degree requirement and must be completed before the student is permitted to graduate. The requirement is met in one of two ways:

1. serving as a fifty percent teaching assistant with pay (taking CSE 501)
2. taking CSE 502 (teaching experience)

### COMPREHENSIVE EXAMINATION REQUIREMENT

The comprehensive examination for Ph.D. students consists of two parts. The first part is a written examination, identical to that required for master's degree students. This examination tests the student's knowledge of basic computer science and can be passed with a thorough knowledge of undergraduate and first-year graduate computer science material. The written examination is structured around the following five CSE core areas: algorithms and data structures; computability, complexity and logic; programming languages; operating systems; and computer architecture and digital logic design. It is offered every year in the first few weeks of the fall quarter and in the first few weeks of the spring quarter. If fewer than seven people sign up, then the department may cancel the examination in the spring quarter. Each student is allowed three attempts to pass the examination. All Ph.D. students should complete their written comprehensive examination successfully within two years following the quarter in which they are admitted to the Ph.D. program. However, a student typically completes the written part of the comprehensive examination successfully by the fall quarter of the second year. More information regarding the comprehensive examination can be found

in a separate document provided by the CSE graduate office.

### RESEARCH EXAMINATION REQUIREMENT

The second part of the examination for Ph.D. students is an oral research examination designed to get an early assessment of the Ph.D. student's research ability in some field in computer science. The content of this exam is developed by the student in collaboration with a faculty adviser in CSE. Students are expected to take this examination within one year following the quarter in which they pass the written comprehensive examination.

### Computer Engineering Program

Computer engineering, jointly administered between the CSE and ECE departments, offers the master of science and doctoral degrees with the degree title computer science and engineering (computer engineering). Computer engineering explores the engineering analysis and design aspects of algorithms and technology. Specific research areas include computer systems, signal processing systems, architecture, networks, computer-aided design, fault tolerance, and data storage systems.

### Master of Science Program

The degree can be pursued under either the Thesis Plan I or the Comprehensive Examination Plan II. Each plan requires forty-nine units of work. For full-time students, all the requirements must be completed within two years. Students with an adequate background in computer engineering can complete the M.S. program within four to five quarters of full-time study.

#### PLAN I: THESIS OPTION, NO COMPREHENSIVE EXAM

This plan of study involves both course work and research, culminating in the preparation of a thesis. A total of forty-nine units of credit is required, as follows:

#### Core Courses

The following core courses must be completed with an average grade of B, and no grade below B-:

#### Three Software Courses:

CSE 202  
CSE 221  
CSE 231

#### Three Hardware Courses:

CSE 240  
ECE 260A  
CSE 243 or ECE 251A or ECE 263A

#### Two Analysis Courses:

CSE 200 or CSE 201  
CSE 222 or ECE 257A

and:

CSE 292

#### Electives

Students must elect at least four technical units among graduate courses within the Departments of AMES, CSE, ECE, Mathematics, and Physics.

#### Thesis

Twelve units of CSE 298 must be taken with a faculty member in CSE or ECE who agrees to act as adviser for the thesis to fulfill the research requirement.

A thesis based on research must be written and subsequently reviewed by a committee, consisting of three faculty members, with at least two members from within the CSE department. The committee is appointed by the dean of Graduate Studies.

#### PLAN II: COMPREHENSIVE EXAMINATION, NO THESIS

In order to receive the M.S. degree in computer engineering under this plan, a student must complete the course requirements listed below and pass a written comprehensive examination.

The written examination is structured around the following three CSE core areas: algorithms and data structures; operating systems; and computer architecture and digital logic design.

#### Core Courses

#### Three Software Courses:

CSE 202  
CSE 221  
CSE 231

#### Three Hardware Courses:

CSE 240  
ECE 260A  
CSE 243 or ECE 251A or ECE 263A

#### Two Analysis Courses:

CSE 200 or CSE 201  
CSE 222 or CSE 257A

and

CSE 292

#### Electives

Students must elect at least twelve technical units among graduate courses within the Departments of AMES, CSE, ECE, Mathematics, and Physics.

#### Project

Four units of CSE 293.

#### Comprehensive Examination

The comprehensive examination is designed to test the student's knowledge in basic computer science and engineering material. The examination can normally be passed with a thorough knowledge of topics covered in the undergraduate and the first-year graduate computer science or computer engineering programs.

It is offered every year in the first few weeks of the fall quarter and in the first few weeks of the spring quarter. If fewer than seven people sign up, then the department may cancel the examination in the spring quarter. Each student is allowed three attempts to pass the examination. The student must secure at least a master's-level pass in the written comprehensive examination.

This examination is the same for both the computer science and the computer engineering graduate programs. More information about the comprehensive examination can be obtained in a separate document from the CSE graduate office.

#### Doctoral Program

The general requirements for the Ph.D. program are stated in the "Graduate Studies" section of the catalog. A brief summary of the general requirements is also provided in the section titled "All Doctoral Programs." Consistent with these requirements, the department has established a set of requirements to be fulfilled in the first two to three years of the Ph.D. program as described below.

#### COURSE REQUIREMENTS

Ph.D. students are expected to complete the following computer engineering curriculum of

forty-nine unit course requirement within the first two years. Ph.D. students entering with a master of science degree may petition to waive individual core course requirements or to substitute approved alternative courses. All Ph.D. students must attain a cumulative grade-point average of 3.4 in the core courses.

### CORE COURSES

Each Ph.D. student must complete the following core requirements:

#### Three Software Courses:

CSE 202

CSE 221

CSE 231

#### Three Hardware Courses:

CSE 240

ECE 260A

CSE 243 or ECE 251A or ECE 263A

#### Two Analysis Courses:

CSE 200 or CSE 201

CSE 222 or ECE 257A

and

CSE 292

### ELECTIVES

Students must elect at least sixteen technical units among graduate courses within the Departments of AMES, CSE, ECE, Mathematics, and Physics.

### TEACHING ASSISTANTSHIP REQUIREMENT

Starting with the incoming class of fall 1998, all students enrolled in the Ph.D. program must have one quarter of training as a teaching assistant. This is a formal degree requirement and must be completed before the student is permitted to graduate. The requirement is met in one of two ways:

1. serving as a fifty percent teaching assistant with pay (Students must also be enrolled in four units of CSE 501)
2. taking CSE 502 (teaching experience)

### COMPREHENSIVE EXAMINATION REQUIREMENT

The comprehensive examination for Ph.D. students consists of two parts. The first part is a written examination, identical to that required for master's degree students. This examination tests the student's knowledge of basic com-

puter science and engineering and can be passed with a thorough knowledge of undergraduate and first-year graduate computer science and engineering material. The written examination is structured around the following five CSE core areas: algorithms and data structures; computability, complexity and logic; programming languages; operating systems; and computer architecture and digital logic design. This examination is the same for both the computer science and the computer engineering graduate programs.

It is offered every year in the first few weeks of the fall quarter and in the first few weeks of the spring quarter. If fewer than seven people sign up, then the department may cancel the examination in the spring quarter. Each student is allowed three attempts to pass the examination. All Ph.D. students should complete their written comprehensive examination successfully within two years following the quarter in which they are admitted to the Ph.D. program. However, a student typically completes the written part of the comprehensive examination successfully by the fall quarter of the second year. More information regarding the comprehensive examination can be found in a separate document provided by the CSE Graduate Office.

### RESEARCH EXAMINATION REQUIREMENT

The second part of the examination for Ph.D. students is an oral research examination designed to get an early assessment of the Ph.D. student's research ability in some field in computer science. The content of this exam is developed by the student in collaboration with a faculty adviser in CSE or ECE. Students are expected to take this examination within one year following the quarter in which they pass the written comprehensive examination.

### All Doctoral Programs

### Qualifying Examination and Advancement to Candidacy

The qualifying examination is the second examination (the first being the written and the oral comprehensive examination) taken by the Ph.D. students and is a requirement to advancement to candidacy. Prior to taking the qualifying examination a student must have satisfied the departmental graduate require-

ments and have been accepted by a CSE faculty member as a Ph.D. thesis candidate. All doctoral students must be advanced to candidacy by the end of four years from the first quarter of registration. It is administered by a doctoral committee appointed by the dean of Graduate Studies and Research and consists of faculty from CSE and other departments. More information on the composition of the committee can be obtained from the CSE graduate office. The examination is taken after the student and his or her adviser have identified a topic for the dissertation and initial progress has been made. The candidate is expected to describe his or her accomplishments to date and plans for future work.

### Dissertation

The dissertation defense is the final Ph.D. examination. A candidate for the Ph.D. is expected to write a dissertation and defend it in an oral examination conducted by the doctoral committee.

### Financial Aid

Financial support is available to qualified graduate students in the form of fellowships, loans, and assistantships. Anticipated stipends for half-time research assistantships are \$1212 per month, with the possibility of full-time employment during the summer months. For a half-time teaching assistantship, the anticipated stipend will be \$1452 per month. Requests for application forms for admission and financial support should be directed to the Department of Computer Science and Engineering. The department offers support to graduate students in the Ph.D. program only.

### Departmental Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

## COURSES

Student demand exceeds capacity in many CSE courses. Accordingly, many CSE courses

may have enrollment restrictions which give priority to students in the following order:

- CSE majors, CSE M.S., and CSE Ph.D. students
- CSE pre-majors, ECE CE majors and pre-majors, and Math-CS majors
- students fulfilling a non-elective requirement in another program
- CSE minors
- all other majors or pre-majors in other SOE departments
- all others, with permission of the Department of Computer Science and Engineering

Where these restrictions apply, the registrar will not enroll low-priority students in the course.

A tentative schedule of course offerings is available from the department, APM 3402, each spring for the following academic year. The tentative schedule for 1998-99 is also found at <http://www-cse.ucsd.edu/ugrad/offerings98-99.html>.

## LOWER-DIVISION

### CSE 1. Introduction to Computers (4)

(Formerly CSE 60) The main technical topic is the use of Macintosh and UNIX computers. Lectures cover the history of computing, how computers are used in society today, an introduction to software development using Hypercard, worldwide information access through the Internet, and a few topics in computer science. *Prerequisite: none. This course is not suitable for engineering majors.*

### CSE 2. Computers & Society (4)

(Formerly CSE 69) This course will be of interest to three kinds of people: Those who will be involved in the design and implementation of computer technology; those who will use computer technology; and those who will in one way or another be affected by computer technology. In short, everybody. *Prerequisite: none.*

### CSE 5A. Introduction to Programming I (4)

(Formerly CSE 62A) Introduction to algorithms and top-down problem solving. Introduction to the C language including functions, arrays, and standard libraries. Basic skills for using a graphical user interface operating system environment. File maintenance utilities are covered. (A student may not receive credit for CSE 5A after receiving credit for CSE 10 or an equivalent course.) *Prerequisite: A familiarity with high-school level algebra is expected, but this course assumes no prior programming knowledge.*

### CSE 5B. Introduction to Programming II (4)

(Formerly CSE 62B) Introduction to algorithms and top-down problem solving. Completion of the C programming language including structures, pointers, multi-dimensional array, C-processor, and standard libraries. Simple data structure techniques. Continuation within the pc operating system environment; graphical user interface. (A student may not receive credit for CSE 5B after receiving credit for CSE 10 or an

equivalent course.) *Prerequisites: Math. 1A/2A /20A and CSE 5A or CSE 62A.*

### CSE 8A. Introduction to Computer Science: Java (4)

Basic Unix. Basics of Java language. Classes, methods, and parameters. Modularity and abstraction. Documentation techniques. Testing and verification techniques. Basic Inheritance. Event driven programming. Programming with AWT library or other similar library. CSE 8A-B is a slower paced version of CSE 11 with more programming practice. (Students who have taken CSE 9A or CSE 9B or CSE 10 or CSE 11 may not take CSE 8A.) *Prerequisite: high school algebra.*

### CSE 8B. Introduction to Computer Science: Java (4)

Continuation of the Java language. Continuation of programming techniques. More on Inheritance. Exception handling. CSE 8A-B is a slower paced version of CSE 11 with more programming practice. (Students who have taken CSE 9A or CSE 9B or CSE 10 or CSE 11 may not take CSE 8B.) *Prerequisite: high school algebra.*

### CSE 9A. Introduction to Computer Science with C++ (4)

Introduction to programming using C++; basic UNIX commands; introduction to the C++ language including classes; modularity and top-down design; abstract data types; documentation; testing. CSE 9A-B is a slower paced version of CSE 10 with more programming practice. (Students who have taken CSE 10 or CSE 11 may not take CSE 9A.) *Prerequisite: high school algebra.*

### CSE 9B. Introduction to Computer Science with C++ (4)

Introduction to programming using C++; the C++ language including arrays and classes; abstract data types; documentation; testing and verification. CSE 9A-B is a slower paced version of CSE 10 with more programming practice. (Students may receive credit for only one of CSE 9B, CSE 10, CSE 11.) *Prerequisite: high school algebra.*

### CSE 10. Introduction to Computer Science with C++ (Accelerated Pace) (4)

Introduction to programming; basic UNIX commands; the C++ language including arrays and classes; modularity and top-down design; abstract data types; documentation; testing and verification. A faster paced version of CSE 9A-B for students with some previous programming experience. (Students may receive credit for only one of CSE 9B, CSE 10, CSE 11.) *Prerequisite: high school algebra; previous programming experience recommended.*

### CSE 11. Introduction to Computer Science: Java (Accelerated Pace) (4)

Introduction to computer science using Java language. Basic UNIX. Modularity and abstraction. Arrays. Basic object-oriented programming including inheritance. Documentation techniques. Testing and verification techniques. Exception handling. Event driven programming. Experience with AWT library or other similar library. (Student may receive credit for only one of CSE 11, CSE 8B, CSE 10, CSE 9B, CSE 65, and CSE 62B.) *Prerequisites: high school algebra; previous programming experience recommended.*

### CSE 12. Basic Data Structures and Object-oriented Programming (4)

Basic data structures including: static and dynamic implementation of trees, and balanced tree techniques. Basic object-oriented programming including: classes and abstract data types, inheritance, overloading and virtual methods, constructors and destructors. Uses the C++ programming language. *Prerequisite: CSE 8B or CSE 9B or CSE 10 or CSE 11.*

### CSE 20. Discrete Mathematics (4)

(Formerly CSE 160A) Propositional and predicate logic; methods of proof; mathematical induction; number systems; discrete structure such as sets, functions, relations, strings, partial

orders and equivalence relations; pigeonhole principle; infinite sets; diagonalization; uncomputability. These topics will be illustrated with applications to digital logic design, elementary number theory, program correctness, and others. *Prerequisite: CSE 8B or CSE 9B or CSE 10 or CSE 11.*

### CSE 21. Mathematics for Algorithm and Systems Analysis (4)

(Formerly CSE 160B) This course introduces mathematical tools for the qualitative and quantitative analysis of algorithms and computer systems. Topics to be covered include basic enumeration and counting techniques; recurrence relations; graph theory; asymptotic notation; elementary applied discrete probability. *Prerequisite: CSE 20, CSE 12 is strongly recommended.*

### CSE 30. Computer Organization and Systems Programming (4)

(Formerly CSE 70) Introduction to computer organization of modern digital computers - understanding the various components of a computer and their inter-relationships. Study of a specific architecture/machine with emphasis on systems programming in C and Assembly languages in a UNIX environment. *Prerequisites: CSE 12 and CSE 20; or consent of the instructor.*

### CSE 80. UNIX Lab (2)

The objective of the course is to help the programmers create a productive UNIX environment. Topics include customizing the shell, file system, shell programming, process management, and UNIX tools. (P/NP grades only.) *Prerequisite: CSE 8B or CSE 9B or CSE 10 or CSE 11.*

### CSE 81. The Internet and the World Wide Web (4)

Introduction to communication networks and the World Wide Web, a set of interconnected multimedia information servers, from a user's perspective. Students obtain hands-on experience with web browsers and search engines, and learn to design HTML documents and CGI scripts. *Prerequisite: CSE 1 or CSE 5A or CSE 8A or CSE 8B or CSE 9A or CSE 9B or CSE 10 or CSE 11.*

## UPPER-DIVISION

### CSE 100. Data Structures (4)

(Formerly CSE 161A) Descriptive and analytic introduction to data structures and algorithms. Lists, tables, priority queues, disjoint subsets, dictionaries data types. Data structuring techniques including linked lists, arrays, hashing, trees. Run time performance using Big-O notations; worst case and amortized analysis. *Prerequisites: CSE 12, CSE 21, and CSE 30, or consent of the instructor.*

### CSE 101. Design and Analysis of Algorithms (4)

(Formerly CSE 179) Introduction to the design and analysis of efficient algorithms. Basic techniques for analyzing the time requirements of algorithms. Algorithms for sorting, searching, and pattern matching, algorithms for graphs and networks, NP-complete problems. *Prerequisites: CSE 12, CSE 21, and CSE 100.*

### CSE 102. File and Storage Structures (4)

(Formerly CSE 161B) Descriptive and analytic introduction to file structures and storage media. Sequential files, external sorting; index structures, B-trees, linear hashing, Patricia, grid; random and sequential access storage devices, WORM, data compression. *Prerequisite: CSE 100 or consent of the instructor.*

### CSE 105. Introduction to the Theory of Computation (4)

(Formerly CSE 165) Introduction to formal languages; regular languages; regular expressions, finite automata, minimization, closure properties, decision algorithms, and non-regular languages; context-free languages: context-free grammars, push-



down automata, parsing theory, closure properties, and noncontext-free languages; computable languages: turing machines, recursive functions, Church's thesis, undecidability, and the halting problem. *Prerequisites: CSE 8B or CSE 9B or CSE 10 or CSE 11, and CSE 20, or consent of the instructor.*

#### **CSE 110. Software Engineering (4)**

(Formerly CSE 180) Different aspects of software engineering will be studied. Topics include design methods, requirements and specification, validation and program testing, maintenance, and programming methodology. *Prerequisites: CSE 100 and either CSE 130 or CSE 131A.*

#### **CSE 120. Principles of Computer Operating Systems (4)**

(Formerly CSE 171A) This course introduces the basic concepts used to structure computer operating systems. Examples of notions introduced and discussed are batch processing, multi-programming, input/output, pooling, interrupt handling, processes, descriptors, process synchronization, interprocess communication, memory management, virtual memory, caching, buffers, naming, files, interactive command interpreters, and processor scheduling. *Prerequisites: CSE 100 and CSE 141, or consent of the instructor.*

#### **CSE 121. Operating Systems: Architecture and Implementation (4)**

(Formerly CSE 171B) Case study of architecture and implementation of a selected modern operating system. In-depth analysis through a detailed study of source code. Topics include process creation, context-switching, memory allocation, synchronization mechanisms, interprocess communication, I/O buffering, device drivers, and file systems. *Prerequisite: CSE 120.*

#### **CSE 122. Operating Systems Laboratory (4)**

(Formerly CSE 171C) Laboratory for experimenting with a selected operating system. Modification of major mechanisms and scheduling policies. Topics include context-switching, memory management algorithms, CPU scheduling algorithms, interprocess communication mechanisms, performance analysis, device driver design. *Prerequisite: CSE 121.*

#### **CSE 123A. Computer Networks (4)**

(Formerly CSE 166) Introduction to concepts, principles, and practice of computer communication networks with examples from existing architectures, protocols, and standards. Layering and the OSI model; switching; local, metropolitan, and wide area networks; datagrams and virtual circuits; routing and congestion control; internetworking. *Prerequisite: CSE 120 or consent of the instructor.*

#### **CSE 123B. Communications Software (4)**

Protocol software structuring, The Internet protocol suite, Inter-process communication, Protocols for real-time and multimedia (digital audio and video) communication, multicast, bridging, and group communication protocols, protocols for mobile and personal communication networks, application-level protocols, secure communication. *Prerequisite: CSE 120 or consent of the instructor. CSE 123A is strongly recommended.*

#### **CSE 126. Multimedia Systems (4)**

Multimedia technologies; multimedia storage models and structures; data models and interfaces; multimedia information systems; video/audio networking; media synchronization; image computing and information assimilation; conferencing paradigms and structured interaction support. *Prerequisite: CSE 120 or consent of the instructor.*

#### **CSE 130. Programming Languages: Principles and Paradigms (4)**

(Formerly CSE 173) Introduction to programming languages and paradigms, the components that comprise them, and the principles of language design, all through the analysis and

comparison of a variety of languages (e.g., Pascal, Ada, C++, PROLOG, ML.) Will involve programming in most languages studied. *Prerequisites: CSE 12 and CSE 100.*

#### **CSE 131A. Compiler Construction I (4)**

(Formerly CSE 163A) Introduction to the compilation of programming languages, principles and practice of lexical and syntactic analysis, error analysis, syntax-directed translation, and type checking. *Prerequisites: CSE 30, CSE 100, and CSE 105.*

#### **CSE 131B. Compiler Construction II (4)**

(Formerly CSE 163B) Principles and practice for the design and implementation for the back-end of translators for programming languages, symbol tables, syntax-directed translation, code generation, optimization, and compiler structure. *Prerequisites: CSE 30, CSE 100, CSE 105 and CSE 131A.*

#### **CSE 132A. Database System Principles (4)**

Basic concepts of databases, including data modeling, relational databases, query languages, optimization, dependencies, schema design, and concurrency control. Exposure to one or several commercial database systems. Advanced topics such as deductive and object-oriented databases, time allowing. *Prerequisite: CSE 100.*

#### **CSE 132B. Database Systems Applications (4)**

Design of databases, transactions, use of trigger facilities and datablades. Performance measuring, organization of index structures. *Prerequisite: CSE 132 or CSE 132A or equivalent.*

#### **CSE 133. Information Retrieval (4)**

(Formerly CSE 181) How to find "relevant" documents (e.g., and electronic mail message or a book) from very large corpora (e.g., all the world's electronic mail or the library.) Students will construct and experimentally evaluate a complete IR system for a modest textual corpus. *Prerequisite: CSE 102.*

#### **CSE 134A. Web Server Languages (4)**

Design and implementation of interactive World Wide Web documentation using server-side programs. Languages covered include HTML, Perl, and JavaScript. Other languages as time allows. *Prerequisite: CSE 100.*

#### **CSE 134B. Web Client Languages (4)**

Design and implementation of interactive World Wide Web clients using helper applications and plug-ins. The main language covered will be Java. *Prerequisite: CSE 100.*

#### **CSE 140. Components and Design Techniques for Digital Systems (4)**

(Formerly CSE 170A) Design of Boolean logic and finite state machines; two-level, multi-level combinational logic design, combinational modules and modular networks, Mealy and Moore machines, analysis and synthesis of canonical forms, sequential modules. *Prerequisites: CSE 20, CSE 30. CSE 140L must be taken concurrently.*

#### **CSE 140L. Digital Systems Laboratory (2)**

(Formerly CSE 175B) Implementation with computer-aided design tools for combinational logic minimization and state machine synthesis. Hardware construction of a small digital system. *Prerequisites: CSE 20, CSE 30. CSE 140 must be taken concurrently.*

#### **CSE 141. Introduction to Computer Architecture (4)**

(Formerly CSE 170B) Introduction to computer architecture. Computer system design: Processor design. Control design. Memory & I/O systems. *Prerequisites: CSE 140, CSE 140L, or consent of the instructor. CSE 141L must be taken concurrently.*

#### **CSE 141L. Project in Computer Architecture (2)**

Hands-on computer architecture project aiming to familiarize students with processor, control and memory, and I/O systems.

*Prerequisites: CSE 140, CSE 140L, or consent of the instructor. CSE 141 must be taken concurrently.*

#### **CSE 142. Advanced Digital Logic Design (4)**

(Formerly CSE 170C) Digital logic optimization; functional decomposition and symmetric functions; reliable design and fault diagnosis; structure of sequential machines; asynchronous circuit design. Assignments using logic synthesis tools. *Prerequisites: CSE 140, CSE 140L*

#### **CSE 143. Microelectronic System Design (4)**

(Formerly CSE 172A) VLSI process technologies; circuit characterization; logic design styles; clocking strategies; computer-aided design tools; subsystem design; design case studies. System design project from hardware description, logic synthesis, physical layout to design verification. *Prerequisites: CSE 140, CSE 141.*

#### **CSE 144. Computer-Aided Design of VLSI Circuits (4)**

(Formerly CSE 172B) Introduction to Computer-Aided Design. Placement, assignment and floor planning techniques. Routing. Symbolic layout and compaction. Module generation and silicon compilation. *Prerequisites: CSE 141 and CSE 141L, or consent of the instructor.*

#### **CSE 145. Microprocessor Systems Design (4)**

(Formerly CSE 175C) Writing and debugging programs on a microprocessor development system. Real time interfacing considerations with peripheral integrated circuits. Introduction to implementation of a real time operating system, an online debugger and real time interrupts for timing and I/O. *Prerequisites: CSE 30, CSE 140, and CSE 140L.*

#### **CSE 150. Programming Languages for Artificial Intelligence (4)**

(Formerly CSE 162) Experience using LISP, Prolog, and an object-oriented language to solve typical problems from artificial intelligence. Examples involving search and inference, including forward and backward chaining, and resolution theorem proving. Relative advantages and disadvantages of these languages, and considerations for selecting a language for a particular problem will be discussed. *Prerequisites: CSE 8B or CSE 9B or CSE 10 or CSE 11, CSE 12, and CSE 100. CSE 100 may be taken concurrently.*

#### **CSE 151. Introduction to Artificial Intelligence (4)**

An introduction to theoretical issues and computational techniques arising from a comparison of human and machine intelligences. Knowledge representation languages; problem-solving heuristics; machine learning and application areas including vision, robotics, and natural language understanding will be reviewed. *Prerequisite: CSE 150 or consent of the instructor.*

#### **CSE 160. Introduction to Parallel Computation (4)**

(Formerly CSE 174) General introduction to parallel computation focusing on important current topics and issues in parallel architecture, algorithms and software. Topics include parallel machine organization, parallel algorithm paradigms, parallel programming environments and tools, and heterogeneous computing. Parallel programming and project assignments given to provide hands-on experience. *Prerequisite: CSE 100.*

#### **CSE 164A. Introduction to Scientific Computation (4)**

Basic techniques for solving numerical problems: Taylor series, error-analysis, interpolation, numerical differentiation and integration, root finding, systems of linear equations, and other topics at the discretion of the instructor. (Students may receive credit for only one of the following courses: CSE 64, CSE 164A, ECE 104, Math. 74, 173, 174, Phys. 105, AMES 153, 154. No credit for CSE 164A will be given if Math. 170ABC has already been taken.) *Prerequisites: CSE 12 and Math. 2DA/20D/21D, or consent of the instructor.*

**CSE 164B. Solving Problems with Parallel Computers (4)**

Exploration of efficient implementation techniques for solving problems on parallel computers, including load balancing, pipelining, and communication optimization. Students apply such techniques to real world applications such as neural networks, genome sequencing and image processing numerical linear algebra. This course is a departure point for research in high-performance computation. *Prerequisite: majors only, or consent of instructor.*

**CSE 167. Computer Graphics (4)**

(Formerly CSE 177) Representation and manipulation of pictorial data. Two-dimensional and three-dimensional transformations, curves, surfaces. Projection, illumination and shading models. Raster and vector graphic I/O devices; retained-mode and immediate-mode graphics software systems and applications. *Prerequisites: Math. 2EA/20F and CSE 100.*

**CSE 190. Topics in CSE (4)**

Topics of special interest in computer science and engineering. Topics may vary from quarter to quarter. May be repeated for credit with the consent of instructor. *Prerequisite: department stamp required.*

**CSE 191. Seminar in CSE (1-4)**

A seminar course on topics of current interest. Students, as well as, the instructor will be actively involved in running the course/class. This course cannot be counted toward a technical elective. *Prerequisite: consent of instructor.*

**CSE 195. Teaching (2 or 4)**

Teaching and tutorial assistance in a CSE course under the supervision of the instructor. (P/NP grades only.) *Prerequisite: consent of the department chair. Department stamp required.*

**CSE 197. Field Study in Computer Science and Engineering (4, 8, 12, or 16)**

Directed study and research at laboratories away from the campus. (P/NP grades only.) *Prerequisite: consent of the instructor and approval of the department. Department stamp required.*

**CSE 198. Directed Group Study (2 or 4)**

Computer science and engineering topics whose study involves reading and discussion by a small group of students under the supervision of a faculty member. (P/NP grades only.) *Prerequisite: consent of the instructor. Department stamp required.*

**CSE 199. Independent Study for Undergraduates (2 or 4)**

Independent reading or research by special arrangement with a faculty member. (P/NP grades only.) *Prerequisite: consent of the instructor. Department stamp required.*

**GRADUATE**

**200. Computability and Complexity (4)**

(Formerly CSE 265B.) Undecidability, recursive and r.e. sets. Recursive function theory, primitive and general recursive functions. Time and space complexity. Theory of NP: reducibilities, approximation, completeness. Intractability and complete problems for EXSPACE. *Prerequisite: CSE 105 or CSE 206 or equivalent.*

**201. Applied Computability and Complexity (4)**

(Formerly CSE 261.) Models of computation: finite automata, context-free grammars, Turing machines, random access machines and circuits. Undecidability. First order logic. Complexity: time and space, theory of NP and P, intractability. Intended for students in the computer engineering program. *Prerequisite: CSE 105 or CSE 206 or equivalent. A student may not receive credit for both CSE 201 and CSE 200.*

**202. Algorithm Design and Analysis (4)**

(Formerly CSE 279.) The basic techniques for the design and analysis of algorithms. Divide-and-conquer, dynamic programming, data structures, graph search, algebraic problems, randomized algorithms, lower bounds, probabilistic analysis, parallel algorithms. *Prerequisite: CSE 101 or consent of instructor.*

**203. Combinatorial Algorithms (4)**

(Formerly CSE 268A.) This course presents combinatorial algorithms commonly used in computer science. These algorithms include shortest paths, maximum flow, multi-terminal maximum flows, PERT network, dynamic programming, backtrack, binary trees, greedy algorithms, and matrix computation. *Prerequisite: consent of instructor.*

**204. Mathematical Programming (4)**

(Formerly CSE 268B.) Convex function, separating hyperplanes. Linear programming, simplex method, quality complementary slackness. Revised simplex method, column-generating techniques in LP. Integer programming. *Prerequisite: consent of instructor.*

**205. Complexity of Intractability (4)**

(Formerly CSE 265C.) Intractability. Relativized complexity. Circuit complexity: size and depth, alternation. Efficient and optimal algorithms: matrix and arithmetic. Axiomatic complexity. Other advanced topics. *Prerequisites: CSE 200 and consent of instructor.*

**206. Automata, Formal Languages, and Computability (4)**

(Formerly CSE 265A.) Finite automata: non-determinism, regular expressions, regular grammars, 2-way FSAs, minimal state FSAs, context-free languages: normal forms, pumping lemmas, recognition algorithms, push-down automata, DCFLs. Turing Machines; variations on TMs, recursive and r.e. sets, universal TMs, Church's thesis, diagonalization, reducibility, Chomsky Hierarchy. *Prerequisites: CSE 105 or equivalent, consent of instructor.*

**207. Cryptography and Network Security (4)**

Introduction to modern cryptography emphasizing provable security and its applications. Topics include private and public key cryptography; encryption; authentication; digital signatures; key distribution; protocols. *Prerequisite: CSE 200 or CSE 201 or CSE 202 or equivalent.*

**208A. Topics in Complexity of Algorithms and Data Structures (4)**

(Formerly CSE 268C.) Advanced topics in concrete complexity, including decision trees and branching programs, advanced data structures, boolean circuits, communication complexity, and randomized algorithms. Content may vary from year to year; may be repeated for credit with consent of instructor.

**208B. Topics in Parallel Complexity Theory (4)**

(Formerly CSE 281Z.) Advanced seminar in theoretical aspects of parallelism, including variants of parallel computation thesis, circuits and PRAM models, speedup of sequential computations, universal parallel machines, inherently sequential problems, complexity classes AC, NC, SC. (S/U grades permitted.) *Prerequisites: CSE 200 and consent of instructor.*

**208C. Topics in Theoretical Computer Science (1-4)**

Topics of special interest in theoretical computer science. Topics may vary from quarter to quarter. May be repeated for credit with the consent of instructor. *Prerequisite: consent of instructor. (S/U grades permitted.)*

**208D. Logic in Computer Science (4)**

Basic material on mathematical logic (as a tool in computer science) for foundations of descriptive complexity, logic programming, non-monotonic reasoning, temporal logic, and rea-

soning about knowledge and belief. Applications to databases, automatic theorem proving, program verification, and distributed systems. *Prerequisite: CSE 200 for graduates; CSE 105 for undergraduates.*

**209. Seminar in Theoretical Computer Science (1-4)**

Topics of special interest in theoretical computer science to be presented by staff members and students under faculty direction. May be repeated for credit. *Prerequisite: consent of instructor. (S/U grades only.)*

**210. Principles of Software Engineering (4)**

(Formerly CSE 264A.) General principles in modern software engineering. Both theoretical and practical topics are covered. Theoretical topics include proofs of correctness, programming language semantics, and theory of testing. Practical topics include structured programming, modularization techniques, design of languages for reliable programming, and software tools. *Prerequisites: CSE 100, 131A, 120, or consent of instructor.*

**211. Software Testing and Analysis (4)**

Survey of testing and analysis methods. Introduction to advanced topics in area as well as traditional production methods. Topics include inspections and reviews, formal analysis, verification and validation standards, non-statistical testing, statistical-testing and reliability models, coverage methods, testing an analysis tools, and organization management and planning. Methods special to special development approaches such as object-oriented testing will also be described. *Prerequisite: undergraduate major in computer science or extensive industrial experience.*

**218. Advanced Topics in Software Engineering (4)**

This course will cover a current topic in software engineering in depth. Topics in the past have included software tools, impacts of programming language design, and software system structure. (S/U grades permitted.) *Prerequisite: none.*

**220. Computer Systems (4)**

Review of basic principles of computer systems. Key topics from the areas of operating systems, networks, distributed systems and performance evaluation: parallel processes, synchronization, communication protocols, distributed systems, hierarchical and distributed storage architectures, distributed concurrency control and transactions, computer security, and queuing models.

**221. Operating Systems (4)**

(Formerly CSE 264B.) Operating system structures, concurrent computation models, scheduling, synchronization mechanisms, address spaces, memory management protection and security, buffering, streams, data-copying reduction techniques, file systems, naming, caching, disk organization, mapped files, remote file systems, case studies of major operating systems. *Prerequisites: CSE 120 and 121, or consent of instructor.*

**222. Communication Networks (4)**

(Formerly CSE 281L.) Computer communication network concepts, techniques, protocols, and architectures, with emphasis on analysis of algorithms and protocols, performance trade-offs, and design methodologies. Topics will include layering, data link control, routing, flow control, topological design, performance evaluation techniques (measurements, analysis, and simulation). *Prerequisite: CSE 123A or consent of instructor. (S/U grades permitted.)*

**223. Distributed Systems (4)**

(Formerly CSE 281N.) Basic structuring concepts: service, server, client-server relations, basic network architecture and point-to-point communication services, variable communication delays and failures, logical and physical time, time services, request/reply transport services, remote procedure calls, naming and directory services, distributed concurrency control, distributed file and database services, transactions and the atomic

commit problem, security in distributed systems. (S/U grades permitted.) *Prerequisite:* CSE 220 or CSE 221, or consent of instructor.

#### 224. Computer System Performance Analysis (4)

(Formerly CSE 281R.) Experimental and analytical approaches. Design, measurement, simulation, and modeling for system performance evaluation. Measurement tools such as workloads, benchmarks, experimental design: confidence intervals, analysis of data; simulation: trace driven, Monte Carlo, transient removal; modeling: Little's Law, queueing, mean-value analysis. (S/U grades permitted.) *Prerequisite:* CSE 220 or consent of instructor.

#### 228A. I/O Systems Software (4)

This course focuses on the general architecture and basic mechanisms of I/O system software, including device drivers and device-independent software which allows interaction between the kernel or user processes, and devices. Topics to be covered include I/O system architecture design, device driver design, buffering, caching, programmed I/O vs. DMA, synchronization, flow control, memory-mapped devices, bus architectures (e.g., SCSI, S-bus, Turbochannel, Microchannel), and efficiently moving data. (S/U grades permitted.)

#### 228B. Storage Systems (4)

(Formerly 281F.) Secondary and tertiary storage systems, optical and magnetic media, performance analysis, modeling, reliability, redundant arrays of inexpensive disks, striping, log and maximum distance separable data organizations, sparing. *Prerequisite:* CSE 220 or consent of instructor.

#### 228C. Communications Software (4)

Internetworking: concept and architectural model, and comparison with other network architectures. Addressing and address resolution, conventions. The Internet datagram Protocol, gateway protocols and routing. The ICMP and network control and testing. Transport layer protocols, adaptive flow control, high-speed extensions. Experimental and other protocols. *Prerequisites:* CSE 221 and CSE 123A, or consent of instructor. (S/U grades permitted.)

#### 228D. Real-Time Systems (4)

Basic concepts (periodic, sporadic processes, static vs. dynamic scheduling) specification, time and clocks, scheduling and timing analysis, real-time programming languages, real-time operating systems, software engineering. *Prerequisite:* CSE 221 or CSE 220, or consent of instructor. (S/U grades permitted.)

#### 228E. Fault-Tolerant Systems (4)

(Formerly CSE 281E.) Services, servers, and the depends-upon relation, failure classification, failure semantics, failure masking, exception handling: detection, recovery, masking and propagation, termination vs. resumption in exception handling, fail-stop processors and I/O controllers, reliable storage, reliable communication, process groups, synchronous and asynchronous group membership and broadcast services, automatic redundancy management, case studies of fault-tolerant systems. *Prerequisite:* CSE 220 or CSE 221, or consent of instructor.

#### 228F. Multimedia Systems (4)

Emerging multimedia technologies; multimedia storage models and structures; video/audio networking; intra-media continuity; inter-media synchronization; admission control and support for real time; distributed multimedia systems; structured interaction support (collaboration and teamwork); multimedia encoding. *Prerequisite:* consent of instructor. (S/U grades permitted.)

#### 228G. Wireless Networks (4)

Topics in wireless networks with emphasis on packet-switching integrated services networks. Multiaccess protocols, link layer protocols, TCP/IP over wireless, mobile IP, wireless ATM, PCS, satellite networks. Hand-off strategies, capacity/resource

allocation, interface with wireline networks, multimedia. *Prerequisite:* CSE 123A or CSE 222, or consent of instructor.

#### 229. Seminar in Computer Systems (1-4)

Topics of special interest in computer systems to be presented by staff members and students under faculty direction. May be repeated for credit. *Prerequisite:* consent of instructor. (S/U grades only.)

#### 230. Principles of Programming Languages (4)

(Formerly CSE 273.) Functional versus imperative programming. Type systems and polymorphism; the ML language. Higher order functions, lazy evaluation. Abstract versus concrete syntax, structural and well-founded induction. The lambda calculus, reduction strategies, combinators. Denotational semantics, elementary domain theory. *Prerequisite:* CSE 130 or equivalent, or consent of instructor.

#### 231. Advanced Compiler Design (4)

(Formerly CSE 264C.) Advanced material in programming languages and translator systems. Topics include compilers, code optimization, and debugging interpreters. *Prerequisites:* CSE 100, 131A-B, or consent of instructor.

#### 232. Principles of Database Systems (4)

(Formerly CSE 264D.) Database models including relational, hierarchic, and network approaches. Implementation of databases including query languages and system architectures. *Prerequisite:* CSE 100 or consent of instructor.

#### 233. Database Theory (4)

(Formerly CSE 280Z.) The course is a rigorous introduction to the theory of databases. Topics include the theory of query languages, dependency theory, deductive databases, complex objects, object-oriented databases, and other advanced topics and research issues as time allows. Evaluation will be done by homework and research projects. (S/U grades permitted.) *Prerequisites:* one of CSE 132 or CSE 232, and CSE 200 or consent of instructor.

#### 238. Topics in Programming Language Design and Implementation (4)

Current topics in programming language design and implementation such as intermediate representations for software tools, cost models, optimizing for high-performance or parallelism, optimization of object-oriented languages, and use of AI techniques in compilers. (S/U grades permitted.) May be repeated three times for credit. *Prerequisite:* CSE 231 or consent of instructor.

#### 238A. Topics in Knowledge Bases (4)

(Formerly CSE 281S.) The course will cover a variety of topics lying at the intersection of databases and artificial intelligence. Possible topics include reasoning about knowledge; logic and complexity; logic and probability (0/1 laws); logic programming for databases representing and handling negative, incomplete, and indefinite (disjunctive) information; deductive databases; logic databases; "smart" query systems. (S/U grades permitted.) *Prerequisite:* consent of instructor.

#### 240. Principles in Computer Architecture I (4)

(Formerly CSE 270A.) Architectural description tools, performance evaluation, uniprocessor issues, including I-unit and E-unit concepts, RISC/CISC issues, bottlenecks, I/O channels and processors, micro- and nano-programming, memory hierarchy, virtual machines, high-level language machines. Performance enhancements: pipelining, instruction lookahead, branch prediction, reduced semantic dependencies. *Prerequisite:* CSE 141 or consent of instructor.

#### 241. Advanced Computer Architecture (4)

Parallel computer architecture (shared memory, processor-memory interconnect), multithreading, advanced topics in memory hierarchy design and instruction-level parallelism. This

course is a departure point for research in high-performance computing and computer architecture. *Prerequisite:* consent of instructor.

#### 242. Design Systems for VLSI Circuits (4)

(Formerly CSE 281U.) Introduction to VLSI circuits; layout design entry; logic design entry; symbolic layout; layout compaction; logic simulation; circuit simulation; design for testability; two-level logic synthesis; multi-level logic synthesis. (S/U grades permitted.) *Prerequisite:* consent of instructor.

#### 243. Computer-Aided Design for VLSI (4)

(Formerly CSE 281V.) Microarchitecture synthesis; logic synthesis; synthesis systems for testability insertion; intelligent silicon compilation; synthesis systems for digital signal processing; expert systems in design automation; control unit synthesis; hardware description language issues; design automation databases. (S/U grades permitted.) *Prerequisite:* consent of instructor.

#### 248A. Application of Combinatorial Algorithms to CAD (4)

(Formerly CSE 281D.) Description of models in VLSI design. Current literature in CAD. Application of combinatorial algorithms and mathematical programming techniques to circuit layout, array computation, etc.

#### 250A. Artificial Intelligence I (4)

(Formerly CSE 278A.) Issues in knowledge representation (using logic, semantic networks, production systems, and connectionist representations) will be the focus of this course. A discussion of logic programming languages (like PROLOG) and automatic theorem proving will then lead to a discussion of heuristic search. *Prerequisite:* CSE 151 or equivalent.

#### 250B. Artificial Intelligence II (4)

(Formerly CSE 278B.) This course will discuss knowledge representations used to search for solutions, make deductions, plan, and problem solve. The application of these techniques to "expert systems" will be mentioned. Machine learning will also be a major topic of this course. *Prerequisite:* CSE 250A.

#### 251. Natural Language Processing (4)

(Formerly CSE 281W.) A survey of the traditional approaches to natural language processing, including basic parsing, knowledge representation, and discourse analysis. Material covered in the survey will be chosen from such topics as augmented transition networks, case grammars, semantic networks, and unification grammar. (S/U grades permitted.) *Prerequisites:* graduate standing and either 151 or consent of instructor.

#### 252. Computer Vision (4)

(Formerly CSE 281M.) Illuminant, surface, and camera models. The role of irradiance, chrominance, stereo disparity, optical flow, and texture in computing interpretations of images. Edge detection, image segmentation, local and global constraints from segment boundaries. Object representations and algorithms for recognition. Extremum problems in vision, including regularization and maximum-likelihood techniques. Relation to human vision. *Prerequisite:* Math. 2ABCE or equivalent. (S/U grades permitted.)

#### 253. Neural Networks (4)

This course covers Hopfield networks, application to optimization problems, layered perceptrons, recurrent networks, and unsupervised learning. Programming exercises explore model behavior, with a final project on a cognitive science, artificial intelligence, or optimization problem of the student's choice. *Prerequisites:* knowledge of C and consent of instructor. (S/U grades permitted.)

#### 254. Machine Learning (4)

(Formerly CSE 281T.) This course will discuss a wide range of techniques used to allow computers to learn directly from ex-

perience with their environment rather than requiring programming by humans. The survey will span both high- and low-level learning techniques as well as theoretical models that allow these various techniques to be compared. (S/U grades permitted.) *Prerequisite:* 250B.

**255. Intelligent Systems (4)**

Basic knowledge representation and problem-solving method. Expert system architectures, languages, and tools. Scheduling, planning, diagnosis, and training applications. Fuzzy logic and heuristic control. Neural network, decision tree, and statistical methods for data mining. Guidelines for successful intelligent system deployment. (S/U grades permitted.) *Prerequisite:* CSE 151 or graduate standing in the Advanced Manufacturing Program, or consent of instructor.

**256. Statistical Natural Language Processing (4)**

An introduction to modern statistical approaches to natural language processing: part of speech tagging, work sense disambiguation and parsing, using Markov models, hidden Markov models and probabilistic context free grammars. *Prerequisite:* CSE 250B or equivalent experience.

**258A. Connectionists Natural Language Processing (4)**

(Formerly CSE 281P.) This course will explore connectionist (or parallel distributed processing) models and their relation to cognitive processes. The course will cover various learning algorithms and the application of the paradigm to models of language processing, memory, sequential processes, and vision. (S/U grades permitted.) *Prerequisite:* CSE 250B or equivalent experience.

**258B. Topics in Distributed Artificial Intelligence (4)**

(Formerly CSE 281Q.) Topics in distributed artificial intelligence, including task decomposition; organizational structures; dealing with uncertainty; global coherence; decentralized decision making; cooperation and coordination techniques; computation vs. communication tradeoffs; real-time decentralized control; survey of past work. (S/U grades permitted.) *Prerequisite:* graduate standing, consent of instructor, CSE 250B recommended.

**259. Seminar in Artificial Intelligence (1)**

A weekly meeting featuring local (and occasional external) speakers discussing their current research in Artificial Intelligence Neural Networks, and Genetic Algorithms. (S/U grades only.) *Prerequisite:* none.

**260. Parallel Computation (4)**

(Formerly CSE 274A.) This course provides an overview of parallel hardware, algorithms, models and software. Topics include Flynn's taxonomy, interconnection networks, memory organization, a survey of commercially available multiprocessors, parallel algorithm paradigms and complexity criteria, parallel programming environments and tools for parallel debugging, language specification, mapping, performance, etc. *Prerequisite:* graduate standing or consent of instructor.

**261. Parallel and Distributed Computation (4)**

(Formerly CSE 274B.) The course concentrates on developing easy-to-parallelize numerical algorithms for optimization without being specific on the implementation. Topics are selected from iterative methods for linear and nonlinear equations; network problems; asynchronous algorithms and partially asynchronous iterative methods. *Prerequisite:* consent of instructor.

**262. System Support for Applications of Parallel Computation (4)**

This course will explore design of software support for applications of parallel computation. Topics include: programming languages, run time support, portability, and load balancing. The course will terminate in a project. *Prerequisite:* consent of instructor.

**263. Parallel Algorithms (4)**

(Formerly CSE 274D.) An introductory course in parallel algorithms on mesh, tree, hypercube, PRAM, and related architectures. The algorithms include sorting and routing, matrix algorithms, graph algorithms, and fast Fourier transform. *Prerequisites:* CSE 202, CSE 260, or consent of instructor.

**268A. Topics in Parallel Computation (4)**

(Formerly CSE 281Y.) Current topics of interest in parallel computation will be discussed such as heterogeneous computing, advanced topics in parallel programming environments, parallel programming models, performance criteria, etc. (S/U grades permitted.) *Prerequisite:* graduate standing or consent of instructor.

**268B. Topics in Advanced Scientific Computation (4)**

(Formerly CSE 281B.) Current topics of interest in parallel scientific computation will be considered, including dynamic load balancing, efficient implementation techniques, and performance issues.

**268C. Topics in High-Performance Programming (4)**

A systematic approach to the design, writing, and tuning of programs to sustain near-peak performance with particular emphasis on RISC processors and massively parallel computers. A project will involve measuring and improving the performance of a computational kernel. *Prerequisite:* CSE 141 or consent of instructor.

**269. Seminar in Parallel Computation (1-4)**

A seminar course in which topics of special interest in parallel computation will be presented by staff members and graduate students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. *Prerequisite:* consent of instructor. (S/U grades only.)

**270. Statistics and Probability for Manufacturing (4)**

This course covers probability and conditional probability for discrete and continuous random variables, combinations and permutations, joint random variables, estimation, hypothesis testing, and statistical quality control, with a view to applications in manufacturing. *Prerequisite:* none.

**271. User Interface Design: Social and Technical Issues (4)**

Web technologies (HTML, Java, JavaScript, etc.) can quickly build superb new systems, as well as phenomenally ugly systems that still fully meet their performance and functional requirements. This course explores interface usability and representation issues, with some focus on hypermedia and cooperative work. *Prerequisites:* CSE 20, CSE 100, or equivalent.

**290. Seminar in Computer Science and Engineering (1-4)**

(Formerly CSE 280A.) A seminar course in which topics of special interest in computer science and engineering will be presented by staff members and graduate students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. (S/U grades only.) *Prerequisite:* consent of instructor. (Offered as faculty resources permit.)

**291. Topics in Computer Science and Engineering (1-8)**

(Formerly CSE 281A.) Topics of interest in computer science and engineering. Topics may vary from quarter to quarter. May be repeated for credit with the consent of instructor. (S/U grades permitted.) *Prerequisite:* consent of instructor. (Offered as faculty resources permit.)

**292. Faculty Research Seminar (1)**

(Formerly CSE 282.) Computer science and engineering faculty will present one hour seminars of the current research work in their areas of interest. *Prerequisite:* CSE graduate status.

**293. Special Project in Computer Science and Engineering (1-8)**

(Formerly CSE 269.) The student will conceive, design, and execute a project in computer science under the direction of a faculty member.

The project will typically include a large programming or hardware design task, but other types of projects are possible. One-six units may be repeated to a total of nine units. *Prerequisite:* CSE graduate student status. (S/U grades only.)

**294. Research Meeting is CSE (2)**

Advanced study and analysis of active research in computer science and computer engineering. Discussion of current research and literature in the research specialty of the staff member teaching the course. *Prerequisite:* consent of instructor.

**298. Independent Study (1-16)**

Open to properly qualified graduate students who wish to pursue a problem through advanced study under the direction of a member of the staff. (S/U grades only.) *Prerequisite:* consent of instructor.

**299. Research (1-16)**

*Prerequisite:* consent of instructor. (S/U grades only.)

**501. Teaching Assistantship (2-4)**

Teaching and tutorial activities associated with courses. May be used to meet teaching experience requirement for candidates for the Ph.D. degree. Number of units for credit depends on number of hours devoted to class or section assistance, and student contact. (S/U grades only.) *Prerequisite:* consent of department chair.

**502. Teaching Experience (2)**

Teaching experience in an appropriate CSE Undergraduate Course under direction of the faculty member in charge of the course. Lecturing at least twice during the quarter in either a problem-solving session or regular lecture. Meets teaching experience requirement for candidates for the Ph.D. degree. (S/U grades only.) *Prerequisites:* consent of instructor and department chair.

## Electrical and Computer Engineering (ECE)

OFFICE: 2904 Engineering Building, Unit 1, Warren College

**Professors**

- Anthony S. Acampora, Ph.D.
- Victor C. Anderson, Ph.D., *Professor Emeritus*
- Peter M. Asbeck, Ph.D.
- H. Neal Bertram, Ph.D.
- William S. C. Chang, Ph.D., *Research Professor*
- Rene L. Cruz, Ph.D.
- William A. Coles, Ph.D., *Chair*
- Sadik C. Esener, Ph.D.
- Shaya Fainman, Ph.D.
- Jules A. Fejer, D.Sc., *Professor Emeritus*
- Carl W. Helstrom, Ph.D. *Professor Emeritus*
- Ramesh Jain, Ph.D.
- Karen Kavanagh, Ph.D.
- Walter Ku, Ph.D.
- S. S. Lau, Ph.D.

Lawrence E. Larson, Ph.D.  
 Sing H. Lee, Ph.D.  
 Robert Lugannani, Ph.D.  
 Huey-Lin Luo, Ph.D.  
 Elias Masry, Ph.D.  
 D. Asoka Mendis, Ph.D., *Professor Emeritus*  
 Laurence B. Milstein, Ph.D.  
 Alon Orlitsky, Ph.D.  
 Kevin B. Quest, Ph.D.  
 Bhaskar Rao, Ph.D.  
 Barnaby J. Rickett, Ph.D.  
 Manuel Rotenberg, Ph.D., *Professor Emeritus*  
 M. Lea Rudee, Ph.D., *Research Professor*  
 Vitaly Shapiro, Ph.D.  
 Paul H. Siegel, Ph.D.  
 David Sworder, Ph.D., *Associate Dean, OGSR*  
 Mohan Trivedi, Ph.D.  
 Charles W. Tu, Ph.D., *Vice Chair*  
 Harry H. Wieder, Ph.D., *Professor Emeritus*  
 Jack K. Wolf, Ph.D.  
 Paul Yu, Ph.D.

**Associate Professors**

Paul Chau, Ph.D.  
 Sujit Dey, Ph.D.  
 Ian Galton, Ph.D.  
 Clark Guest, Ph.D.  
 Kenneth Kreutz-Delgado, Ph.D.  
 George J. Lewak, Ph.D., *Professor Emeritus*  
 (not-in-residence)  
 Ting-Ting Lin, Ph.D.  
 Farokh Najmabadi, Ph.D.  
 Ramesh Rao, Ph.D.  
 Anthony Sebald, Ph.D.  
 Edward T. Yu, Ph.D.  
 Kenneth A. Zeger, Ph.D.

**Assistant Professors**

Pamela C. Cosman, Ph.D.  
 Bill Lin, Ph.D.  
 Kenneth Y. Yun, Ph.D.

**Adjunct Professors**

Robert Hecht-Nielsen, Ph.D., *Hecht-Nielsen  
 Neurocomputing Corporation*  
 John A. Hildebrand, Ph.D., *Marine Physical  
 Laboratory*  
 James U. Lemke, Ph.D., *Center for Magnetic  
 Recording Research*  
 James Zeidler, Ph.D., *Naval Ocean Systems  
 Center*

**Associated Faculty**

Gustaf O. S. Arrhenius, Ph.D., *Professor, Scripps  
 Institution of Oceanography*

William B. Hodgkiss, Ph.D., *Professor, Scripps  
 Institution of Oceanography*

**The Undergraduate Programs**

The Department of Electrical and Computer Engineering offers undergraduate programs leading to the B.S. degree in **electrical engineering, engineering physics, and computer engineering**. Each of these programs can be tailored to provide preparation for graduate study or employment in a wide range of fields.

The Electrical Engineering Program has a common lower-division and a very flexible structure in the upper-division. After the lower-division core, all students take six breadth courses in the fall and winter quarters of the junior year. They must then satisfy a depth requirement which can be met with five courses focused on some speciality, and a design requirement of at least one project course. The remainder of the program consists of six electives which may range as widely or as narrowly as needed. The Electrical Engineering Program has been accredited by the Accreditation Board of Engineering and Technology (ABET).

The Engineering Physics Program is conducted in cooperation with the Department of Physics. Its structure is very similar to that of electrical engineering except the depth requirement focuses on basic physics and there are only four electives.

The Computer Engineering Program is conducted jointly with the Department of Computer Science and Engineering. It has a more prescribed structure. The program treats hardware design, data storage, computer architecture, assembly languages, and the design of computers for engineering, information retrieval, and scientific research.

For information about admission to the program and about academic advising, students are referred to the section on ECE departmental regulations. In order to complete the programs in a timely fashion, students must plan their courses carefully, starting in their freshman year. Students should have sufficient background in high school mathematics so that they can take freshman calculus in the first quarter.

For graduation, each student must also satisfy general-education requirements determined

by the student's college. The five colleges at UCSD require widely different numbers of general-education courses. Students should choose their college carefully, considering the special nature of the college and the breadth of education required. They should realize that some colleges require considerably more courses than others. Students wishing to transfer to another college should see their college adviser.

Graduates of community colleges may enter ECE programs in the junior year. However, transfer students should be particularly mindful of the freshman and sophomore course requirements when planning their programs.

These programs have strong components in laboratory experiments and in the use of computers throughout the curricula. In addition, the department is committed to exposing students to the nature of engineering design. This is accomplished throughout the curricula by use of open-ended homework problems, by exposure to engineering problems in lectures, by courses which emphasize student-initiated projects in both laboratory and computer courses, and finally by senior design-project courses in which teams of students work to solve an engineering design problem, often brought in from industry.

**IT IS IMPERATIVE THAT STUDENTS DISCUSS THEIR CURRICULUM WITH THE APPROPRIATE DEPARTMENTAL ADVISER IMMEDIATELY UPON ENTRANCE TO UCSD, AND THEN AT LEAST ONCE A YEAR UNTIL GRADUATION.**

***B.S. Electrical Engineering Program***

Students must complete 180 units for graduation, including the general Education Requirements (GER). Note that 144 units (excluding GER) are required.

**Lower-Division Requirements (total of 72 units) Recommended Schedule**

FALL	WINTER	SPRING
<b>FRESHMAN</b>		
Math. 20A	Math. 20B	Math. 20C
CSE 11 or 8B	Phys. 2A	Phys. 2B
Chem. 6A	ECE 20A	ECE 20B
GER	GER	GER

**SOPHOMORE**

Math. 20F	Math. 20D	Math. 20E
Phys. 2C	Phys. 2D	ECE 60L
ECE 30	ECE 60A	ECE 60B
GER	GER	GER

**Summary by Discipline**

**Mathematics (24 units):** Math. 20A-B-C-D-E-F. Students will be allowed to use another mathematics sequence **only** if they transfer from another department on campus, junior college, or other university.

**Physics (16 units):** Phys. 2A-B-C-D or Phys. 4A-B-C-D-E. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the mathematics placement test permits them to start with Math. 20B or higher may take Phys. 2A in the fall quarter of the freshman year.

**Chemistry (4 units):** Chem. 6A.

**Computer Science (4 units):** CSE 11 or 8B.

**Electrical Engineering (24 units):** ECE 20A-B (should be completed by the end of the freshman year), ECE 30, ECE 60A, ECE 60B, and ECE 60L.

**Upper-Division Requirements (total of 72 units) Recommended Schedule**

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
ECE 101	ECE 107	Elective (c)
ECE 102	ECE 108	Depth #1
ECE 103	ECE 109	Depth #2
GER	GER	GER
<b>SENIOR YEAR</b>		
Depth #3	Depth #4	Depth #5
Elective (c)	Eng. Design (b)	Elective (c)
Elective (c)	Elective (c)	Elective (c)
GER	GER	GER

**Summary by Discipline**

**a. Electrical Engineering BREADTH Courses (24 units)**

Courses required of all electrical engineering majors:

The six courses, ECE 101, 102, 103, 107, 108, and 109 are required of all electrical engineering majors and they are an assumed prerequisite for senior-level courses, even if they are not explicitly required. They are taught in two phases as shown below. Al-

though the courses are largely independent, there are some prerequisites. ECE 102 is a prerequisite for ECE 108, and ECE 101 and 103 should be taken either concurrently or before ECE 102. Students who delay some of the breadth courses into the spring should be careful that it does not delay their depth sequence.

**Fall and Winter**

- ECE 101 Linear Systems Fundamentals
- ECE 102 Introduction to Active Circuit Design
- ECE 103 Fundamentals of Devices and Materials

**Winter and Spring**

- ECE 107 Electromagnetism
- ECE 108 Digital Circuits
- ECE 109 Engineering Probability and Statistics

**b. Electrical Engineering DESIGN Course (4 units)**

**Note:** In order to fulfill the design requirement, students must complete one of the following courses with a grade C- or better.

The electrical engineering design requirement can be fulfilled in any of the following three ways:

1. Take ECE 191: Engineering Group Design Project
2. Take ECE 192: Engineering Design  
This course requires the department stamp. Specifications and enrollment forms are available in the undergraduate office.
3. Take one of the following courses:
  - ECE 111: Advanced Digital Design Project
  - ECE 118: Computer Interfacing
  - ECE 155B or 155C: Digital Recording Projects
  - Phys. 121: Experimental Techniques

Students who wish to take one of these courses to satisfy the design requirement must fill out an enrollment form and have departmental approval for the design credit. The project must meet the same specifications as ECE192.

**c. Electrical Engineering ELECTIVES (24 units)**

- Three upper-division engineering, mathematics, or physics courses.

- Three additional electives which students may use to broaden their professional goals. Normally these will be upper-division courses in engineering, mathematics, or natural science. Students may also choose electives from lower-division or from other departments, such as humanities, social sciences, or arts, provided that they fit into a coherent professional program. Electives other than upper-division engineering, mathematics, or natural science must be justified in terms of such a program, and must be approved by a faculty adviser.

(For additional information, please refer to the section on "Elective Policy for Electrical Engineering and Engineering Physics Majors".)

**d. Electrical Engineering Depth Requirement (20 units)**

Students must complete a "depth requirement" of at least five quarter courses to provide a focus for their studies. This set must include a clear chain of study of at least three courses which depend on the "breadth" courses. Students may choose one of the approved depth sequences listed below, or propose another with the approval of their faculty adviser. Some of the approved sequences have lower-division prerequisites and thus list six courses. Students choosing one of these sequences will have only two "professional" electives. Guidelines for meeting the depth requirement can be obtained from the undergraduate office.

Electronics Circuits and Systems:

- ECE 161 or 162A, 163, 164, 165, and 166 or 162B.

Electronic Devices and Materials:

- ECE 135A, 136L, 135B, 139, and 183.

Controls and Systems Theory:

- ECE 171A, 174, 171B, 118, and 173.

Machine Intelligence:

- ECE 173, 174, 172A, 175, and 186.

Photonics:

- ECE 181, 182, 183, 184, and 185.

Communications Systems:

- ECE 161, 153, 154A, 154B and 154C.

Networks:

- ECE 161, 153, 159A, 158A, and 158B.



**Queuing Systems:**

ECE 171A, 174, 159A, 159B, and 159C.

**Computer Design:**

CSE 12, 21, and 141, ECE 158A, 111 or 118, and 165.

**Software Systems:**

CSE 12, 21, 100, 101, 141, and 120.

**Visual Computing:**

CSE 12, ECE 78, 172A, 186, 178, and ECE 161 or 184 or CSE 167.

### B.S. Engineering Physics

The Engineering Physics degree combines a strong program in physics with most of the requirements for a B.S. degree in electrical engineering. Students must complete a total of 180 units for graduation, including the general education requirements. Note that 146 units are required for the major.

#### Lower-Division Requirements (total of 74 units) Recommended Schedule

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
CSE 11 or 8B	ECE 20A	ECE 20B
Math. 20A	Math. 20B	Math. 20C
Chem. 6A	Phys. 2A	Phys. 2B
GER	GER	GER
<b>SOPHOMORE YEAR</b>		
ECE 30	ECE 60A	ECE 60B
Math. 20F	Math. 20D	Math. 20E
Phys. 2C	Phys. 2D	ECE 60L
GER	Phys. 2DL	GER

#### Summary by Discipline

**Mathematics (24 units):** Math. 20A-B-C-D-E-F. Students will be allowed to use another mathematics sequence **only** if they transfer from another department on campus, or community college, or other university.

**Physics (16 units):** Phys. 2A-B-C-D or Phys. 4A-B-C-D-E. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the mathematics placement test permits them to start with Math. 20B or higher may take Phys. 2A in the fall quarter of the freshman year.

**Physics Lab (2 units):** Phys. 2DL is required.

**Chemistry (4 units):** Chem. 6A.

**Computer Science (4 units):** CSE 11 or 8B.

**Electrical Engineering (24 units):** ECE 20A and 20B (should be completed by the end of the freshman year), ECE 30, ECE 60A, ECE 60B and ECE 60L.

#### Upper-division requirements (72 units)

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Math. 110	ECE 101	ECE 108
Phys. 110A	ECE 102	ECE 109
ECE 103	ECE 107	Phys. 130A
GER	GER	GER
<b>SENIOR YEAR</b>		
ECE 124	Elective (d)	ECE 123
Phys. 130B	Eng. Design (c)	Elective (d)
Phys. 140A	Elective (d)	Elective (d)
GER	GER	GER

#### Summary by Discipline

##### a. Engineering Physics BREADTH Courses (24 units)

The electrical engineering breadth courses ECE 101, 102, 103, 107, 108, and 109, are also required of engineering physics majors. However, because of the scheduling of Math. 110, Phys. 110A and 130A, they can only be taken in the order scheduled above.

##### b. Engineering Physics DESIGN Course (4 units)

**Note:** In order to fulfill the design requirement, students must complete one of the following courses with a grade C- or better.

The engineering physics design requirement can be fulfilled in any of the following three ways:

1. Take ECE 191: Engineering Group Design Project
2. Take ECE 192: Engineering Design  
This course requires the department stamp. Specifications and enrollment forms are available in the undergraduate office.
3. Take one of the following courses:
  - ECE 111: Advanced Digital Design Project
  - ECE 118: Computer Interfacing
  - ECE 155B or 155C: Digital Recording Projects
  - Physics 121: Experimental Techniques
 Students who wish to take one of these courses to satisfy the design requirement

must fill out an enrollment form and have departmental approval for the design credit. The project must meet the same specifications as ECE192.

##### c. Engineering Physics ELECTIVES (16 units)

- One upper-division engineering, mathematics, or physics course.
- Three additional electives which students may use to broaden their professional goals. Normally these will be upper-division courses in engineering, mathematics, or natural science. Students may also choose electives from lower-division or from other departments, such as humanities, social sciences, or arts, provided that they fit into a coherent professional program. Electives other than upper-division engineering, mathematics, or natural science must be justified in terms of such a program, and must be approved by a faculty adviser.

(For additional information, please refer to the section on Elective Policy for Electrical Engineering and Engineering Physics Majors.)

##### d. Engineering Physics DEPTH Courses (28 Units)

All B.S. engineering physics students are required to take Phys. 110A, 130A, 130B, 140A, Math. 110, ECE 123-124.

#### Elective Policy for Electrical Engineering and Engineering Physics Majors

The following regulations apply to extra departmental courses used as electives in the Electrical Engineering and Engineering Physics curricula.

**Physics:** Students may not receive upper-division elective credit for any lower-division physics courses. Students may not receive credit for both Phys. 100A and ECE 107, Phys. 100B and ECE 107, Phys. 100C and ECE 123, Phys. 100C and ECE 124.

**Biology and Chemistry:** Of the three electives intended to allow for the professional diversity, one lower-division biology or chemistry course from BILD 1, 2, Chem. 6B, 6C may be counted for credit. Furthermore, this will count only if

the student can demonstrate to a faculty adviser that they constitute part of a coherent plan for professional/career development.

Upper-division biology and chemistry courses will count toward the three professional electives but not the three math/physics/engineering electives.

**Mathematics:** Math. 180A-B overlap ECE 109 and 153, and therefore will not qualify for elective credit of either type. Math. 183 will not be allowed as an elective. Math. 163 will only be allowed as a professional elective. All lower-division mathematics is excluded from elective credit of either type.

**AMES:** Credit will not be allowed for AMES 139, 141, 163, 170, or 105.

**Bioengineering:** The following series of courses will provide "core" preparation in bioengineering and will satisfy the ECE technical elective requirements:

- BILD 1, BILD 2, BE 100, BE 140A and BE 140B.

The bioengineering department will guarantee admission to these courses for ECE students who meet the eligibility requirements listed in the Undergraduate Handbook.

- Students may use BILD 186B to satisfy the ECE design requirements.

**CSE:** The following courses are excluded as electives: CSE 1, 2, 5A, 5B, 8A, 8B, 11, 140 (duplicates ECE 20B or 81), 140L (duplicates ECE 20B or 82), 143 (duplicates ECE 165). CSE 12, 20, and 21 will count toward the three professional electives.

**Special Studies Courses 195–199:** At most four units of 195–199 may be used for elective credit.

### B.S. Computer Engineering

Students wishing to pursue the Computer Engineering curriculum must be admitted to either the ECE or CSE department. **The set of required courses and allowed electives is the same in both departments;** please note that the curriculum requires twenty upper-division courses. The Computer Engineering Program requires a total of 144 units (not including the general-education requirements).

The Computer Engineering Program offers a strong emphasis on engineering mathematics and other basic engineering science as well as a firm grounding in computer science. Students

should have sufficient background in high school mathematics so that they can take freshman calculus in their first quarter. Courses in high school physics and computer programming, although helpful, are not required for admission to the program.

### Lower-Division Requirements (total of 70 units) Recommended Schedule

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Math. 20A CSE 11 or 8B GER	Math. 20B CSE 20 Phys. 2A GER	Math. 20C or 21C~ CSE 12 Phys. 2B GER
<b>SOPHOMORE YEAR</b>		
Math. 20D or 21D~ CSE 30 ECE 53A GER	Math. 20F Phys. 2C ECE 53B CSE 21	ECE 109 Phys. 2D Phys. Lab GER

~ either (20C and 20D) or (21C and 21D).

### Summary by Discipline

**Mathematics (20 units):** Math. 20A, 20B, either 20C and 20D or 21C and 21D, and 20F.

**Physics (16 units):** Phys. 2A-B-C-D, or Phys. 4A-B-C-D-E. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the mathematics placement test permits them to start with Math. 20B or higher may take Phys. 2A in the fall quarter of the freshman year.

**Physics lab (2 units):** Phys. 2BL or 2CL or 2DL. The lab course should be taken concurrently with the Phys. 2 or Phys. 4 sequence.

**Computer Science (20 units):** CSE 11 or 8B, 12, 20, 21, and CSE 30.

**Electrical Engineering (12 units):** ECE 53A and 53B, ECE 109.

### Upper-Division Requirements (total of 76 units)

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
ECE 102 CSE 100 CSE 140# CSE 140L#	ECE 108 CSE 101 CSE 141* CSE 141L*	GER CSE 105 CSE 120 T.E.
<b>SENIOR YEAR</b>		
ECE 101 CSE 131A T.E. GER	T.E. CSE 131B T.E. GER	GER T.E. ECE 171A or 162A T.E.

# CSE 140 and 140L must be taken concurrently.

\* CSE 141 and 141L must be taken concurrently.

### Summary by Discipline

a. All B.S. computer engineering students are required to take CSE 100, 101, 105, 120, 131A, 131B, 140, 140L, 141, 141L.

b. In addition, all B.S. computer engineering students must fulfill the following upper-division ECE requirements:

- Engineering Probability and Statistics ECE 109. This course can be taken in the sophomore year.
- Electronic Circuits and Systems ECE 102 and 108. The department recommends that these courses be taken in the junior year.
- Linear systems ECE 101 and 171A or 161, 162A.

c. Technical electives: All B.S. computer engineering majors are required to take six technical electives.

- One technical elective must be either CSE 145, ECE 111, or ECE 118.
- Of the remaining five technical electives, four must be ECE or CSE upper-division or graduate courses.
- The remaining course can be any upper-division course listed under the non-CSE/ECE electives. (See the section on electives below.)

### Electives

The discipline of computer engineering interacts with a number of other disciplines in a mutually beneficial way. These disciplines include mathematics, computer science, and cognitive science. The following is a list of upper-division courses from these and other disciplines that can be counted as technical electives.

At most four units of 197, 198, or 199 may be used towards technical elective requirements. ECE/CSE 195 cannot be used towards course requirements. Undergraduate students should get instructor's permission and departmental stamp to enroll in a graduate course.

Students may not get duplicate credit for equivalent courses. The *UCSD General Catalog*

should be consulted for equivalency information and any restrictions placed on the courses. Additional restrictions are noted below. Any deviation from this list must be petitioned.

**Mathematics:** All upper-division course except Math. 166A-B, 168A-B, 176A-B, 179A-B, 183, 184A-B, 186A-B, 188, 189A-B-C, and 195-199. If a student has completed CSE 167, then he or she cannot get elective credit for Math. 155A. Students may receive elective credit for only one of the following courses: CSE 164A, Math. 174, Math. 173, Phys. 105, AMES 153, AMES 154. No credit for any of these courses will be given if Math. 170A-B-C is taken.

**Computer Science and Engineering:** CSE 143 is equivalent to ECE 165. Students may not get credit for both CSE 123A and ECE 158A.

**Cognitive Science:** Fundamental Cognitive Phenomena 101A-B-C, Cognitive Neuroscience 107A-B-C, Theory of Computation and Formal Systems 108A, Symbolic Modeling of Cognition 108B (108P), Everyday Cognition 130, Distributed Cognition 131, Cognitive Engineering 132, Observation, Protocol, and Discourse Analysis 141, Semantics 150, Language Comprehension 153, Natural and Artificial Symbolic Representational Systems 170, Neural Network Models of Cognition II 181, Artificial Intelligence Modeling II 182.

Students may not get credit for both CSE 150 and Neural Network Models 108C or for both CSE 151 and Artificial Intelligence Modeling 182.

**Applied Mechanics and Engineering:** All upper-division AMES courses except AMES 163.

Students may receive elective credit for only one of the following courses: CSE 164A, Math. 174, Math. 173, Phys. 105, AMES 153, AMES 154. Students may only get credit for one of the two courses, CSE 167 or AMES 157.

**Economics:** Microeconomics 100A-B, Game Theory 109, Macroeconomic 110A-B, Mathematical Economics 113, Econometrics 120A-B-C, Applied Econometrics 121, QEDS Microeconomics 170A-B, Decisions Under Uncertainty 171, Introduction to Operations Research 172A-B-C, Economic and Business Forecasting 178.

**Linguistics:** Phonetics 110, Phonology I 111, Phonology II 115, Grammatical Structure 120, Syntax I 121, 125, Semantics 130, Mathematical Background in Formal Linguistics 160, Com-

putational Linguistics 163, Psycholinguistics 170, Language and the Brain 172, and Sociolinguistics 175.

**Engineering:** Team Engineering 101

**Music:** Programming for Musical Applications 161, Introduction to Computer Music 162.

### Minor Curricula

ECE offers three minors in accord with the general university policy that a minor requires five upper-division courses. **Students must realize that these upper-division courses have extensive lower-division prerequisites (please consult the ECE undergraduate office).** Students should also consult their college provost's office concerning the rules governing minors and programs of concentration.

**Electrical Engineering:** 20 units chosen from the breadth courses ECE 101, 102, 103, 107, 108, 109.

**Engineering Physics:** 20 units chosen from the junior year courses Phys. 110A, 130A, Math. 110, ECE 101, 102, 103, 107, 108, 109.

**Computer Engineering:** 20 units chosen from the junior year courses ECE 102, 108, CSE 100, 101, 105, 120, 140, 140L, 141, 141L.

The department will consider other mixtures of upper-division ECE, CSE, physics, and mathematics courses by petition.

### Undergraduate Regulations and Requirements

Because of heavy student interest in departmental programs, and the limited resources available to accommodate this demand, maintenance of a high quality program makes it necessary to limit enrollments to the most qualified students. Admission to the department as a major, pre-major, transfer, minor, or to fulfill a major in another department which requires (Dept) courses is in accordance with the general requirements established by the School of Engineering. These requirements and procedures are described in detail in the section on "Admission to the School of Engineering" in this catalog.

### Admission to ECE Majors

Admission to upper-division ECE courses is based on the GPA in required lower-division courses.

Students must complete the following courses in order to apply to the Department of Electrical and Computer Engineering:

#### Electrical Engineering and Engineering Physics majors:

1. Math. 20A-B-C
2. Phys. 2A-B
3. ECE 20A-B
4. CSE 11 or 8B

#### Computer Engineering majors:

1. Math. 20A-B-C
2. Phys. 2A-B
3. CSE 11 or 8B, 12, 20

Students who wish to enroll as ECE majors should apply to the department undergraduate office. Rules for transfer students are described below.

### Transfer Students

Requirements for admission to the major are the same for both transfer students and continuing students. When planning their program, students should be mindful of lower-division prerequisites necessary for admission to upper-division courses.

Students who wish to enter an ECE major curriculum must apply to the department before the beginning of the fall quarter, submitting course descriptions and transcripts for courses used to satisfy their lower-division requirements. Normally, admission will be for the fall quarter; students entering in the winter or spring quarter should be aware that scheduling difficulties may occur because upper-division sequences normally begin in the fall quarter.

### Grade Requirement in the Major

A GPA of 2.0 is required in all upper-division courses in the major, including technical electives. No more than two courses with a D grade may be counted towards the major. The grade of D will not be considered an adequate prerequisite for any ECE course. The engineering design requirement must be completed with a grade of C- or better.

### Advising

Students are required to complete an **Academic Planning form** and to discuss their curriculum with the appropriate departmental adviser immediately upon entrance to UCSD, and then every year until graduation. This is intended to help students in: a) their choice of depth sequence, b) their choice of electives, c) keeping up with changes in departmental requirements. An adviser will be assigned by the ECE department undergraduate office.

### New Transfer Students in Electrical Engineering and Engineering Physics

The entire curriculum is predicated on the idea of actively involving students in engineering from the time they enter as freshmen. The freshman course "Introduction to Engineering" has been carefully crafted to provide an overview of the engineering mindset with its interrelationships among physics, mathematics, problem solving, and computation. All later courses are specifically designed to build on this foundation. All transfer students should understand that the lower-division curriculum is demanding. **Transfer students will be required to take all lower-division requirements or their equivalent.**

- Transfer students will have to follow the new curriculum and start with ECE 20A in the fall quarter. Transfer students will be allowed to take ECE 20B and 60A concurrently. The recommended schedule for the lower-division ECE course is as follows:

#### Recommended Schedule

FALL	WINTER	SPRING
ECE 20A	ECE 20B	ECE 60B
CSE 11 or 8B	ECE 60A	ECE 60L

**Junior Year:** ECE 30 requires ECE 20B as a prerequisite and thus should be taken in the fall quarter of the junior year, concurrently with the upper-division breadth courses ECE 101, 102, and 103.

### ECE Honors Program

The ECE Undergraduate Honors Program is intended to give eligible students the opportunity to work closely with faculty in a project, and to honor the top graduating undergraduate students.

#### Eligibility for Admission to the Honors Program:

1. Students with a minimum GPA of 3.5 in the major and 3.25 overall will be eligible to apply. Students may apply at the end of the winter quarter of their junior year and no later than the end of the second week of fall quarter of their senior year. No late applications will be accepted.
2. Students must submit a project proposal (sponsored by an ECE faculty member) to the honors program committee at the time of application.
3. The major GPA will include ALL lower-division required for the major and all upper-division required for the major that are completed at the time of application (a minimum of twenty-four units of upper-division course work).

#### Requirements for Award of Honors:

1. Completion of all ECE requirements with a minimum GPA of 3.5 in the major based on grades through winter quarter of the senior year.
2. Formal participation (i.e. registration and attendance) in the ECE 290 graduate seminar program in the fall quarter of their senior year.
3. Completion of an eight unit approved honors project (ECE 193H: Honors Project) and submission of a written report **by the first day of spring quarter** of the senior year. This project must contain enough design to satisfy the ECE BS four-unit design requirement.
4. The ECE honors committee will review each project final report and certify the projects which have been successfully completed at the honors level approved in their application.

### Procedure for Application to the Honors Program:

By the end of the winter quarter of their junior year, and no later than the fall quarter (second week) of their senior year, interested students must advise the department of their intention to participate by submitting a proposal for the honors project sponsored by an ECE faculty member. Admission to the honors program will be formally approved by the ECE honors committee based on GPA and the proposal.

#### Unit Considerations

Except for the two unit graduate seminar, this honors program does not increase a participant's total unit requirements. The honors project will satisfy the departmental design requirement and students may use four units of their honors project course as a technical elective.

### Five-Year B.S./M.S. Program

Undergraduates in the ECE department who have maintained a good academic record in both departmental and overall course work are encouraged to participate in the five-year B.S./M.S. program offered by the department. Participation in the program will permit students to complete the requirements for the M.S. degree within one year following receipt of the B.S. degree. Complete details regarding admission to and participation in the program are available from the ECE undergraduate office.

#### Admission to the program

Students should submit an application for the B.S./M.S. program, including three letters of recommendation, by the end of the winter quarter of their junior year, or four quarters before they expect to graduate. Applications are available from the ECE undergraduate affairs office. No GRE's are required for application to the B.S./M.S. program. A GPA of at least 3.0 both overall and in the major, and good letters of recommendation are required for admission to the program.

In the fall of the senior year, applications of students admitted to the program will be forwarded by the department to the UCSD Office

of Graduate Studies and Research. Each student must submit the regular graduate application fee at this time for their application to be processed. Students who have been accepted into the B.S./M.S. program will automatically be admitted for graduate study beginning the following fall provided they maintain an overall GPA through the fall quarter of the senior year of at least 3.0. Upper-division (up to twelve units) or graduate courses taken during the senior year that are not used to satisfy undergraduate course requirements may be counted towards the forty-eight units required for the M.S. degree.

### *Continuation in the program*

Once admitted to the five-year B.S./M.S. program, students must maintain a 3.0 cumulative GPA in all courses through the fall of the senior year and in addition must at all times maintain a 3.0 cumulative GPA in their graduate course work. Students must have satisfied all B.S. degree requirements by the end of their fourth year, and must have been awarded their B.S. degrees prior to the fall quarter of their fifth year. Students who have not received their B.S. degree by the fall of the fifth year are not eligible to enroll as graduate students in the department.

*Admission for graduate study through the B.S./M.S. program will be for the M.S. degree only. Students wishing to continue towards the Ph.D. degree must apply and be evaluated according to the usual procedures and criteria for admission to the Ph.D. program.*

### *Curriculum*

Students in the five-year B.S./M.S. program must complete the same requirements as those in the regular M.S. program. Completion of the M.S. requirements within one year following receipt of the B.S. degree will generally require that students begin graduate course work in their senior year, perhaps continuing in the summer with work on a research project in preparation for the M.S. project. All requirements for the B.S. degree must be completed by the end of the senior (fourth) year, and the B.S. degree awarded prior to the start of the fifth year. Courses in the senior year may be counted toward the B.S. requirements or the M.S. requirements, but not both.

The five-year schedule assumes that the student is participating in the M.S. Plan 2 (comprehensive exam) program. This option requires that the student complete four units of ECE 297 (project) and pass the departmental comprehensive exam at the M.S. level. Students may also elect to participate in the M.S. Plan 1 (thesis) program, which requires twelve units of research and completion of a masters' thesis. However, the Plan 1 program is generally more time-consuming than the Plan 2 program. Note that of forty-eight units required for the M.S. degree, thirty-six must be graduate level; the remainder may be undergraduate level.

### **The Graduate Programs**

The department offers graduate programs leading to the **M.S.** and **Ph.D.** degrees. There are eleven Ph.D. research programs, two of which are interdepartmental. The research programs are discussed below.

#### *1. Applied Ocean Sciences*

This program in applied science related to the oceans is interdepartmental with the Graduate Department of the Scripps Institution of Oceanography (SIO) and the Department of Applied Mechanics and Engineering Sciences (AMES). It is administered by SIO. All aspects of man's purposeful and unusual intervention into the sea are included. The M.S. degree is not offered in this program.

#### *2. Applied Optics and Photonics*

Applied optics and photonics is an interdisciplinary area involving optical science and engineering, optical and opto-electronic materials and device technology, communication, and computer engineering as well as photonic systems engineering. Specific topics include ultrafast optical processes, nonlinear optics, quantum cryptography and communications, optical image science, multidimensional opto-electronic I/O devices, spatial light modulators and photodetectors, artificial dielectrics, multi-functional diffractive and micro-optics, volume and computer generated holography, opto-electronic and micro-mechanical device and packaging, modeling and design of photonic devices and systems, photonic integrated circuits and systems, optical sensors, fiber optics,

guided-wave modulators and detectors, optoelectronic semiconductor microstructures, injection lasers and photodetectors, etc. Applied optics and photonics research projects are focused on applications to such areas as integration of optical interconnects in high speed digital systems, optical multidimensional signal and image processing, ultra-high speed optical networks, 3-D optical memories and memory interfaces, and 3-D imaging and displays. The department has available various lithography, material growth, microfabrication and assembly equipment, cw and femtosecond pulse laser systems, detection systems, optical and electro-optic components and devices, electronic and optical characterization, and testing equipment.

#### *3. Communication Theory and Systems*

Communication theory and systems in ECE involves the detection of signals, the prediction and filtering of random processes, the design and analysis of communication systems, the analysis of protocols for communication networks, and the statistical processing of images. Specific topics include the use of signal processing and error correction techniques for both digital communication systems and recording data in magnetic storage media, the use of spread spectrum techniques for wireless communications, and the design and analysis of multi-user communication networks. Additional areas of research include time series analysis, adaptive filtering, sampling design, and wavelet theory. Applications are made to such fields as communications, radar, sonar, oceanography, holography, image processing, and visibility in air and water. Both theoretical and practical aspects of information processing are studied.

#### *4. Computer Engineering*

Computer engineering at UCSD consists of balanced programs of studies in both hardware and software, the premise being that knowledge and skill in both areas are essential both for the modern-day computer engineer to make the proper unbiased trade-offs in design, and for researchers to consider all paths towards the solution of research questions and problems. Toward these ends, the programs emphasize studies (course-work) and competency (comprehensive examinations, and disser-

tations or projects) in the areas of VLSI and logic design, and reliable computer and communication systems. Specific research areas include: computer systems, signal processing systems, multiprocessing and parallel and distributed computing, computer communications and networks, computer architecture, computer-aided design, fault-tolerance and reliability, and neuro-computing. The faculty is composed of interested members of the Departments of Electrical & Computer Engineering (ECE), Computer Science & Engineering (CSE), and related areas. The specialization is administered by both departments; the requirements are similar in both departments, with students taking the comprehensive exam, if necessary, given by the student's respective department.

### **5. Electronic Circuits and Systems**

The electronic circuits and systems program involves the study of the processes of analysis and design of electronic circuits and systems. Emphasis is on analog and digital integrated circuits, very large-scale integration (VLSI), analog and digital signal processing, and system algorithms and architectures. Particular areas of study are: analog, digital, radio frequency (RF) and microwave electronic circuits and systems, analog-to-digital and digital-to-analog converters, wireless communications transceivers, phase-locked loops, low-power integrated circuits, parallel and multiprocessor computing, electronic neural networks, and associative memories, VLSI and algorithmic/application-specific integrated circuit (ASIC) design, microwave and millimeter wave integrated circuits (MIMIC), gallium arsenide ultra-high-speed integrated circuits and devices (UHSIC), algorithms and architectures for analog and digital signal processing (DSP), high-speed digital communications, computer arithmetic and numerical analysis of finite word length processors, fault-tolerant VLSI systems, design for testability, the design of reliable digital electronic systems, computer-aided design (CAD), and computer-aided engineering (CAE) of DSP/communications systems.

### **6. Electronic Devices and Materials**

The field of electronic devices and materials includes the synthesis, characterization, and application of metals, semiconductors and dielectric materials in solid-state electronic and

optoelectronic devices. It encompasses the fabrication, characterization, and modeling of prototype electronic materials, devices, and integrated circuits based on silicon and III-V compound semiconductors, as well as processing methods employed in present-day and projected integrated circuits. Current research includes growth by molecular beam epitaxy and chemical vapor phase epitaxy; metallurgical aspects of interfaces; the electronic, optical, and electro-optic properties of heterostructures; and the study of superconductors and magnetic materials. Research thrusts cover the study of ultrasmall structures (nanotechnology) as well as ultrahigh speed transistors and optoelectronic devices. The department has available a complete facility for fabricating prototype silicon and III-V compound transistors and other devices, electron-beam lithography, a Rutherford backscattering facility, molecular beam, and organo-metallic vapor-phase epitaxy, cryogenic temperature facilities, scanning tunneling microscopes, microwave and mm-wave measurement facilities, as well as auxiliary apparatus for x-ray, optical, and galvanomagnetic characterization of materials, devices, and components.

### **7. Intelligent Systems, Robotics, and Control**

This field focuses on the application of advanced computer and mathematical techniques to the problem of analysis and control of complex, uncertain dynamical systems in real time.

Consider, for example, the closed loop control of multiple robot arms in a changing environment. The intent is for the arms to cooperate in the performance of some complex task. The control loop is subject to external disturbances (e.g., changes in the environment), and the robot structural properties vary with changing loads. Measurement of the relevant states is made by conventional position or force sensors as well as image sensors (video cameras). These measurements are subject to both noise-random perturbations in the sensor outputs and artifacts (e.g., partial obscuration of the image field.) The need for good planning and control for nominal performance as well as proper emergency capability also complicates the design problem. The system must operate properly in a wide range of operating modes.

Similar issues arise in biomedical control problems and aerospace guidance and control problems. All of these designs require fusion of a complicated suite of sensors, computers, and problem dynamics into one integrated system. Again, the wide range of events to which the system is subject create an environment in which the controller must adapt itself to its perception of the operational conditions.

Faculty in the systems science group are involved in virtually all aspects of the field. Individual faculty are focusing on topics, including biomedical identification and control, advanced digital signal and image processing, image-based tracking and guidance systems, control of teleoperated vehicles, analysis and control of mobile multiarmed robot manipulators, and the integration of nontraditional approaches including neural networks, fuzzy adaptive control, and rule-based descriptions from LISP and PROLOG. Typically, advanced mathematical and computational techniques play the fundamental role in this work. Extensive computational support includes the UCSD CRAY (on campus) and a network of workstations.

In summary, the group is interested primarily in the study of intelligent systems.

### **8. Magnetic Recording**

Magnetic recording is an interdisciplinary field involving physics, material science, communications, and mechanical engineering. The physics of magnetic recording involves studying magnetic heads, recording media, and the process of transferring information between the heads and the medium. General areas of investigation include: nonlinear behavior of magnetic heads, very high frequency loss mechanisms in head materials, characterization of recording media by micromagnetic and many body interaction analysis, response of the medium to the application of spatially varying vectorial head fields, fundamental analysis of medium nonuniformities leading to media noise, and experimental studies of the channel transfer function emphasizing non-linearities, interferences, and noise.

Current projects include numerical simulations of high-density digital recording in metallic thin films, micromagnetic analysis of magnetic reversal in individual magnetic particles, theory of recorded transition phase noise and magnetization induced nonlinear bit shift



in thin metallic films, and analysis of the thermal-temporal stability of interacting fine particles.

Research laboratories are housed in the Center for Magnetic Recording Research, a national center devoted to multi-disciplinary teaching and research in the field.

### 9. Radio and Space Science

The Radio Science program focuses on the study of radio waves propagating through turbulent media. The theory of such propagation is also studied with a view to removing the distorting effects of the turbulent medium on astronomical observations and providing an accurate restoration of the intrinsic signals.

Space science is concerned with the nature of the sun, its ionized and super-sonic outer atmosphere (the solar wind), and the interaction of the solar wind with various bodies in the solar system. Theoretical studies include: the interaction of the solar wind with the earth, planets, and comets; cosmic dusty-plasmas; waves in the ionosphere; and the physics of shocks. A major theoretical effort involves the use of supercomputers for modeling and simulation studies of both fluid and kinetic processes in space plasmas.

Students are trained in one or more of the interrelated fields, electromagnetics, space plasma physics, radio astronomy, wave propagation, numerical methods, and signal processing.

### 10. Signal and Image Processing

The signal and image processing program explores engineering issues related to the modeling of signals starting from the physics of the problem, developing and evaluating algorithms for extracting the necessary information from the signal, and the implementation of these algorithms on electronic and opto-electronic systems. Specific research areas include filter design, fast transforms, adaptive filters, spectrum estimation and modeling, sensor array processing, image processing, motion estimation from images, and the implementation of signal processing algorithms using appropriate technologies with applications in sonar, radar, speech, geophysics, computer-aided tomography, image restoration, robotic vision, and pattern recognition.

### 11. Advanced Manufacturing

The Program in Advanced Manufacturing is a unique interdisciplinary master's level program which provides university-industry-based education in state-of-art advanced manufacturing principles, with emphasis on international management and cross-cultural issues. It is a joint venture with industry and four UCSD departments: Departments of Electrical and Computer Engineering; Computer Science and Engineering; Applied Mechanics and Engineering Sciences; and the School of International Relations and Pacific Studies. The program places special emphasis on information technology and on organizational and social issues.

#### Research Facilities

Most of the research laboratories of the department are associated with individual faculty members or small informal groups of faculty. Larger instruments and facilities, such as those for electron microscopy and e-beam lithography are operated jointly. In addition the department operates several research centers and participates in various universitywide organized research units.

The department-operated research centers include: the NSF Industrial/University Cooperative Research Center (I/UCRC) for Ultra-High Speed Integrated Circuits and Systems (ICAS); Optoelectronics Technology Center (OTC) sponsored by the Advanced Project Research Agency; the Center for Wireless Communications which is a university-industry partnership; the Center for Information Engineering; and the Institute for Neural Computation.

Department research is associated with: the Center for Astronomy and Space Science, the Center for Magnetic Recording Research, the California Space Institute, and the Institute for Nonlinear Science. Departmental researchers also use various national and international laboratories, such as the National Nanofabrication Facility and the National Radio Astronomy Laboratory.

The department emphasizes computational capability and maintains numerous computer laboratories for instruction and research. One of the NSF national supercomputer centers is located on the campus. This is particularly useful for those whose work requires high data bandwidths.

#### Graduate Requirements and Regulations

##### Admission

Admission to the graduate programs is in accordance with the general requirements of the Graduate Division, which requires at least a B.S. degree in a branch of engineering, physical sciences, or mathematics. Applications from students who wish to take interdisciplinary programs will also be considered. A minimum upper division GPA of 3.0 and strong letters of recommendation are necessary. In addition, the department requires all applicants to submit GRE general test scores; TOEFL scores are required from international applicants whose native language is not English.

##### Financial Aid

Some financial support is available through the department in the form of fellowships, research assistantships, and teaching assistantships. Assistantships are never more than half time in the academic year (by university rules), however RAs may be full time in the summer. Research assistantships are supported by research grants obtained by individual faculty members and are administered by that faculty member. Teaching assistantships are allocated by the department on the basis of merit and competence to teach the courses which need to be staffed. Fellowships are allocated by the department solely on the basis of merit. Fellowships, research assistantships, and teaching assistantships pay slightly different monthly stipends.

The department makes every attempt to continue the support of Ph.D. students who are making satisfactory progress, which includes maintaining a 3.4 GPA in technical courses. M.S. students may often obtain support but this is less assured. Application for financial support should be made at the time of admission. Such applications will be considered at any time, but can seldom be granted after the start of the academic year.

##### Advising

Students should seek advice on procedures and requirements from the departmental graduate office. In particular the graduate office will provide information on examination

formats and schedules. All students will also be assigned a faculty academic adviser upon admission. Students in AOS should see the graduate office at SIO for advice on procedures and requirements; they will be assigned an academic adviser by that office.

Students in programs which require a thesis, i.e., M.S. Plan 1, and Ph.D., are responsible to find an adviser who is willing to supervise their research. This must be done in a timely manner and students should give it a high priority. Their research adviser will take over academic advising as well.

### ***Degree Programs***

The department offers both M.S. Plan 1 (thesis) and M.S. Plan 2 (comprehensive exam) and Ph.D. programs in accord with the general requirements of the university. Students admitted to the M.S. program may elect either Plan 1 or Plan 2 at any time. Students in either M.S. plan may apply for transfer to the Ph.D. program. If such application is approved by the admissions committee, the M.S. thesis or project may form the basis of the Ph.D. oral preliminary examination. Thus, it is wise to make any application for transfer well before taking the M.S. Plan 2 comprehensive examination, or presenting the M.S. Plan 1 thesis.

### ***Course Requirements***

The course requirements for the M.S. and Ph.D. programs are similar, forty-eight units of which at least thirty-six units must be in graduate courses. Note that this is greater than the minimum requirements of the university. The different programs maintain lists of core courses from which the thirty-six graduate units must be selected. These may be obtained from the graduate office. Students in interdisciplinary programs may select other core courses with the approval of their academic adviser. The course requirements must be completed within two years of full-time study.

Students in the M.S. Plan 1 (thesis option) must take twelve units of ECE 299 (research) as part of their thirty-six graduate units. Students in the M.S. Plan 2 (comprehensive exam option) and the Ph.D. programs may count no more than eight units of ECE 299 towards their core course requirements.

Students in the Ph.D. programs, who already hold an M.S. degree in electrical engineering,

must nevertheless satisfy the requirements for the core courses. However, graduate courses taken elsewhere can be substituted for specific courses with the approval of the academic adviser.

At least thirty-six units of graduate core course work must be taken for a letter grade except that ECE 299 (research) may only be taken on an S/U basis regardless of whether it is counted towards the core course requirements. Other courses used to fulfill degree requirements may be taken S/U only with the approval of the adviser. Students in the Ph.D. program must maintain a GPA of 3.4 in the core courses. Seminar courses in the 290 series, ECE 298 (independent study), and ECE 501 (teaching) may be taken only on an S/U basis.

### ***The Comprehensive Examination***

#### **M.S. Degree Requirements**

The M.S. program has been designed for maximal flexibility to allow for the intensive preparation needed for Ph.D. study and also to advance technical and professional education for working engineers. The program requires forty-eight quarter units of course credit, of which at least thirty-six must be at the graduate level. The course selections must demonstrate a clear focus as well as breadth.

Students should seek advice on procedural matters from the ECE graduate office. All M.S. students will also be assigned a faculty adviser, to help ensure that the program requirements are satisfied. The M.S. degree is offered either with a thesis (option 1) or with a comprehensive examination (option 2).

#### **The Focus Requirement**

The M.S. program should reflect, among other things, a certain continuity and focus in one subject area. The course selection must therefore include at least twenty units (five quarter courses) in closely related courses. The requirement may be met by selecting five courses from within one of the areas listed below. In some cases it may be appropriate to select five closely related courses from two of the areas listed below. Such cases must be approved by a faculty adviser. The five quarter courses may include one quarter of the project requirement described below.

#### **Engineering Project and Thesis Requirement**

The department offers both M.S. Plan 1 (thesis) and Plan 2 (comprehensive exam). Students admitted to the M.S. program may elect either Plan 1 or Plan 2 at any time. Students in Plan 1 (thesis) must submit a thesis as described in the general requirements of the university. Thesis research will require twelve units of ECE 299 (Research), of which four may be included in the focus requirement, the remaining eight must be included in the electives.

Students in Plan 2 (comprehensive exam) must undertake an engineering project. This may consist of four or eight units of ECE 299 (Research), of which four may be included in the focus requirement, the remaining four must be included in the electives. The engineering project is intended to demonstrate mastery in the focus area, preferably by applying some aspect of the course work to a realistic engineering problem. The project proposal must be approved in advance by a committee consisting of the project instructor and another instructional faculty member, at least one of whom must be an Academic Senate member in the ECE department. The project requires a written report which will be presented to the committee members and defended orally. The report and its defense will serve as the M.S. comprehensive examination.

#### **The Breadth Requirement**

A graduate student often cannot be certain of his or her future professional career activities and may not be aware of interesting opportunities in other subject areas. The breadth requirement is intended to provide protection against technical obsolescence, open up new areas of interest, and provide for future self-education. The minimum breadth requirement is eight units (two quarter courses) of ECE/CSE graduate courses from a list of courses maintained in the graduate office, in an area distinctly different from that of the focus requirement.

#### **Electives**

The electives are intended to maximize the flexibility of the program. They are designated "technical" or "general" as described below.

The technical electives are eight units (two courses) which must be graduate courses in engineering, mathematics, or natural science.

The general electives are the remaining four to twelve units depending on the number of units of ECE 299 taken to fulfill the project or thesis requirement. These may be upper-division undergraduate courses in engineering, mathematics or natural science. However, they may also be in other departments, such as economics or international relations and pacific studies, provided that they fit into a coherent professional program. Such courses must be approved by the faculty adviser.

### Scholarship Requirements

The forty-eight units of required course work must be taken for a letter grade (A-F), except for ECE 299 (Research) for which only S/U grades are allowed. Courses for which a D or F is received may not be counted. Students must maintain a GPA of 3.0 overall.

### Transfer to the Ph.D. Programs

M.S. students will be admitted to the department and may select any focus area after admission. They should be aware that Ph.D. students are admitted to programs which have well defined course requirements. The various programs maintain lists of courses which may be obtained from the graduate adviser. The entrance requirement to the Ph.D. programs is eight units of ECE 299 (Research) with a report, and an oral examination. M.S. students who are considering applying for transfer to the Ph.D. program should advise the graduate office of their intention as early as possible. They should make sure that (1) their M.S. program includes the right courses, and (2) their M.S. project satisfies the Ph.D. entrance requirement.

M.S. students planning to transfer to the Ph.D. program must make sure that (a) they take the courses required of that particular Ph.D. program, (b) they take eight units of ECE 299 (Research) and (c) they identify a regular ECE faculty member who agrees (in writing) to be their research adviser.

### Ph.D. Preliminary Evaluation

Students admitted into the Ph.D. program\* must pass the departmental preliminary exam to satisfy the department's Ph.D. requirements. Though students are required to take the preliminary exam before the end of their second year, they are encouraged to take this exam as early as possible. Prior to taking this exam, they are expected to be making satisfactory progress

toward the completion of required course work, identifying an adviser and area for Ph.D. research.

All first-year students not planning to take the exam in their first year will be evaluated in the spring, by a departmental committee. The evaluation is based on the overall record of the student's performance in course work and research.

Second-year students who have not taken the exam are encouraged to take the exam as early as possible, but no later than the spring quarter.

The oral exam is conducted by a three-member faculty committee. Students will give a thirty to forty-five minute presentation on a research topic of his or her interest, selected after consultation with the adviser. In addition, students will be examined for general proficiency in his or her area of specialization and material related to a two-quarter graduate sequence in ECE. This sequence is identified by the student prior to the exam and approved by the committee.

The Ph.D. preliminary evaluation is based on the student's overall record and performance, as well as the preliminary exam.

\*Students in the computer engineering discipline may elect to take two written comprehensive examinations in the Department of Computer Science and Engineering, according to the CSE guidelines, in place of the oral examination on a two-quarter sequence in ECE. They are required to give the thirty to forty-five minute presentation in the ECE department.

### Requirements Specific to the Doctoral Program

Students in the Ph.D. program must find a faculty member who will agree to supervise their research. This should be done before the start of the second year of study. They should then devote at least half their time to research and must pass a departmental preliminary examination by the end of their second year of study. This is an oral exam in which the student presents his/her research to a committee of three ECE faculty members.

Students should begin defining and preparing for their thesis research as soon as possible, definitely before the end of their second year. They must plan on taking the University Qualifying Examination by the end of their third year.

This is an oral exam at which the student will present his/her thesis proposal to a university-wide committee. After passing this exam the student is 'advanced to candidacy'. The final Ph.D. requirements are the submission of a thesis, and the thesis defense (as described under the Graduate Studies section of this catalog.) Students who are advanced to candidacy may register for any ECE course on an S/U basis.

### Departmental Time Limits

The departmental preliminary exam must be taken before the end of the second year. The course requirements must be finished within two years. The university qualifying exam must be taken before the end of the fourth year. Total university support cannot exceed seven years (six years with master's degree.) Total registered time at UCSD cannot exceed eight years (seven years with master's degree.)

## COURSES

The departmental will endeavor to offer the courses as outlined below; however, unforeseen circumstances sometimes require a change of scheduled offerings. Students are strongly advised to check the Schedule of Classes or the department before relying on the schedule below. The names appearing below the course descriptions are those of faculty members in charge of the course. For the names of the instructors who will teach the course, please refer to the quarterly Schedule of Classes.

### UNDERGRADUATE

#### LOWER-DIVISION

#### 1A-B-C. Mesa Orientation Course (1-1-1)

Students will be given an introduction to the engineering profession and our undergraduate program. Exercises and practicums will develop the problem-solving skills needed to succeed in engineering. One and a half hours of lecture. *Prerequisite: none.* (F,W,S) M.L. Rudee

#### 20A. Introduction to Electrical Engineering I (4)

Areas of electrical engineering from Ohm's Law to semiconductor physics to engineering ethics are discussed, demonstrated, and experienced. Principles introduced in lectures are put to use as student lab teams build a working system. The first quarter emphasizes analog electronics. Two hours of lecture, one hour of discussion, three hours of laboratory. *Prerequisite: Math. 20A with a grade of C- or better, Math. 20B may be concurrent.* (W) A. Sebald

**20B. Introduction to Electrical Engineering II (4)**

This continuation of ECE 20A emphasizes semiconductor devices and digital electronics. Lab teams complete their system as they learn engineering design methods. Students are prepared for proceeding toward their choice of an electrical engineering profession. Two hours of lecture, one hour of discussion, three hours of laboratory. *Prerequisites:* Math. 20B, ECE 20A with grades of C- or better, Math. 20C may be concurrent. (S) P. Yu

**30. Introduction to Computer Engineering (4)**

This course is designed to introduce the fundamentals of both the hardware and software in a computer system. Topics include: representation of information, computer organization and design, assembly and microprogramming, current technology in logic design. (Students who have taken CSE 30 may not take ECE 30 for credit.) Three hours of lecture, four hours of laboratory. *Prerequisite:* ECE 20B with a grade of C- or better. (F) T. T. Lin, K. Yun

**53A. Fundamentals of Electrical Engineering I (4)**

This is a coordinated lecture and laboratory course for students majoring in other branches of science and engineering. It covers analysis and design of passive and active circuits. The course emphasizes problem-solving and laboratory work on passive circuits. Three hours of lecture, one hour of discussion, one hour of laboratory. *Prerequisites:* Math. 20C or 21C, Phys. 2B with grades of C- or better. (F) K. Kavanagh

**53B. Fundamentals of Electrical Engineering II (4)**

This is a coordinated lecture and laboratory course for students majoring in other branches of science and engineering. It covers analog and digital systems and active circuit design. Laboratory work will include operational amplifiers, diodes and transistors. Two hours of lecture, one hour of discussion, three hours of laboratory. *Prerequisites:* Phys. 2B or BS, or 4C, Math. 20C or 21C, ECE 53A with grades of C- or better. (W) B. Rickett

**60A. Circuits and Systems I (4)**

Voltage-current relationships for circuit elements, Kirchhoff's voltage and current laws, source transformations, loop and node analysis, initial conditions, the Laplace transform, inverse transforms, partial fraction expansions. Three hours of lecture, one hour of discussion, one hour of laboratory. *Prerequisites:* Math. 20A-B-C-F, ECE 20A and 20B with grades of C- or better. Math. 20D may be concurrent. (W) R. Cruz

**60B. Circuits and Systems II (4)**

Solution of network equations using Laplace transforms; convolution integral; the concept of impedance; Thevenin's and Norton's theorems; transfer functions; poles and zeros; two-port networks, steady state sinusoidal response; Bode plots. Three hours of lecture, one hour of discussion. *Prerequisite:* ECE 60A with a grade of C- or better. (S) C. Tu

**60L. Circuits and Systems Laboratory (4)**

Essential aspects of electrical engineering. Topics covered include transient and steady-state response of RLC circuits, transistor circuits, operational amplifiers, nonlinear circuit components, power supplies, digital circuits and error analysis. The material complements the topics in ECE 60A and 60B. One and a half hours of lecture, three and a half hours of laboratory. *Prerequisites:* ECE 20B, Phys. 2B, and Math. 20C or equivalent with grades of C- or better. (S) F. Najmabadi

**78. Introduction to Image Engineering (4)**

Representation of images image file formats, image compression standards, image scanning and display, visual perception, and color spaces. Three hours of lecture, two hours of laboratory. *Prerequisite:* none. (F) P. Cosman

**90. Undergraduate Seminar (1)**

This seminar class will provide a broad review of current research topics in both electrical engineering and computer en-

gineering. Typical subject areas are signal processing, VLSI design, electronic materials and devices, radio astronomy, communications, and optical computing. One hour lecture. *Prerequisite:* none. (F,W,S)

**UPPER-DIVISION**

**101. Linear Systems Fundamentals (4)**

Complex variables. Singularities and residues. Signal and system analysis in continuous and discrete time. Fourier series and transforms. Laplace and z-transforms. Linear Time Invariant Systems. Impulse response, frequency response, and transfer functions. Poles and zeros. Stability. Convolution. Sampling. Aliasing. Three hours of lecture, one hour of discussion. *Prerequisites:* Math. 20A-B-C-D-F, ECE 60B and 60L or ECE 53-54 with grades of C- or better. (F,W) K. Zeger, P. Siegel

**102. Introduction to Active Circuit Design (4)**

Nonlinear active circuits design. Nonlinear device models for diodes, bipolar and field-effect transistors. Linearization of device models and small signal equivalent circuits. Circuit designs will be simulated by computer and tested in the laboratory. Three hours of lecture, one hour discussion, three hours of laboratory. *Prerequisites:* Math. 20A-B-C-D-F, Phys. 2D, ECE 60B and 60L or ECE 53-54 with grades of C- or better. (F,W) W. Coles, L. Larson

**103. Fundamentals of Devices and Materials (4)**

Introduction to semiconductor materials and devices. Semiconductor crystal structure, energy bands, doping, carrier statistics, drift and diffusion. p-n junctions, metal-semiconductor junctions. Bipolar junction transistors: current flow, amplification, switching, non-ideal behavior. Metal-oxide-semiconductor structures, MOSFET's, device scaling. Three hours of lecture, one hour of discussion. *Prerequisites:* Phys. 2D, Math. 20A-20F, ECE 60B and 60L with grades of C- or better. (F,W) E. Yu, H-L Luo

**107. Electromagnetism (4)**

Electrostatics and magnetostatics; electrodynamics; Maxwell's equations; plane waves; skin effect. Electromagnetics of transmission lines: reflection and transmission at discontinuities, Smith chart, pulse propagation, dispersion. Rectangular waveguides. Dielectric and magnetic properties of materials. Electromagnetics of circuits. Three hours of lecture, one hour of discussion. *Prerequisites:* Phys. 2D, Math. 20A-20F, ECE 60B and 60L with grades of C- or better. (W,S) K. Quest, N. Bertram

**108. Digital Circuits (4)**

Digital integrated electronic circuits for processing technologies. Analytical methods for static and dynamic characteristics. MOS field-effect transistors and bipolar junction transistors, circuits for logic gates, flip-flop, data paths, programmable logic arrays, memory elements. Three hours of lecture, one hour of discussion, three hours of laboratory. *Prerequisites:* ECE 102, ECE 30 or CSE 30 with grades of C- or better. (W,S) S. Esener, P. Chau

**109. Engineering Probability and Statistics (4)**

Axioms of probability, conditional probability, theorem of total probability, random variables, densities, expected values, characteristic functions, transformation of random variables, central limit theorem. Random number generation, engineering reliability, elements of estimation, random sampling, sampling distributions, tests for hypothesis. Three hours of lecture, one hour of discussion. *Prerequisites:* Math. 20A-B-C-D-F with grades of C- or better (ECE 101 recommended). (W,S) A. Acampora, R. Rao

**111. Advanced Digital Design Project (4)**

Advanced topics in digital circuits and systems. Use of computers and design automation tools. Hazard elimination, syn-

chronous/asynchronous FSM synthesis, synchronization and arbitration, pipelining and timing issues. Problem sets and design exercises. A large-scale design project. Simulation and/or rapid prototyping. *Prerequisite:* ECE 108 or CSE 140 with grades of C- or better. (F) K. Yun, B. Lin

**118. Computer Interfacing (4)**

Interfacing computers and embedded controllers to the real world: busses, interrupts, DMA, memory mapping, concurrency, digital I/O, standards for serial and parallel communications, A/D, D/A, sensors, signal conditioning, video, and closed loop control. Students design and construct an interfacing project. Three hours of lecture, four hours of laboratory. *Prerequisites:* ECE 30 or CSE 30 and ECE 60A-B-L or ECE 53A-B. CSE 145 recommended. (S) C. Guest

**120. Solar System Physics (4)**

General introduction to planetary bodies, the overall structure of the solar system, and space plasma physics. Course emphasis will be on the solar atmosphere, how the solar wind is produced, and its interaction with both magnetized and unmagnetized planets (and comets). Three hours of lecture, four hours of laboratory. *Prerequisites:* Phys. 2A-B or 4A-C and Math. 20A-B with grades of C- or better (Phys. 2C and Math. 20C recommended). (S) N. Omidi

**123. Electromagnetic Radiation (4)**

The magnetic vector potential; far-field radiation from electric and magnetic sources; antennas and antenna arrays; aperture radiation, Fraunhofer and Fresnel diffraction; geometric optics. Three hours lecture, one hour discussion. *Prerequisite:* ECE 107 with a grade of C- or better. (S) E. Yu, K. Quest

**124. Electromagnetic Wave Phenomena (4)**

Electromagnetic plane waves; reflection and transmission by discontinuities; guided waves: TEM, TE, TM modes; resonators and Q factors; dielectric waveguides and optical fibers; optical beam propagation; electromagnetic properties of materials. Three hours lecture, one hour discussion. *Prerequisite:* ECE 107 with a grade of C- or better. (F) E. Yu, K. Quest

**134. Electronic Materials Science of Integrated Circuits (4)**

Electronic materials science with emphasis on topics pertinent to microelectronics and VLSI technology. Concept of the course is to use components in integrated circuits to discuss structure, thermodynamics, reaction kinetics, and electrical properties of materials. Three hours of lecture. *Prerequisites:* Phys. 2C-D with grades of C- or better. (S) K. Kavanagh

**135A. Semiconductor Physics (4)**

Crystal structure and quantum theory of solids; electronic band structure; review of carrier statistics, drift and diffusion, p-n junctions; nonequilibrium carriers, imrefs, traps, recombination, etc; metal-semiconductor junctions and heterojunctions. Three hours of lecture. *Prerequisite:* ECE 103 with a grade of C- or better. (S) H. L. Luo

**135B. Electronic Devices (4)**

Structure and operation of bipolar junction transistors, junction field-effect transistors, metal-oxide-semiconductor diodes and transistors. Analysis of dc and ac characteristics. Charge control model of dynamic behavior. Three hours of lecture. *Prerequisite:* ECE 135A with a grade of C- or better. (F) C. Tu

**136. Fundamentals of Semiconductor Device Fabrication (4)**

Crystal growth, controlled diffusion, determination of junction-depth and impurity profile, epitaxy, ion-implantation, oxidation, lithography, chemical vapor deposition, etching, process simulation and robust design for fabrication. Three hours of lecture. *Prerequisite:* ECE 103 with a grade of C- or better. (S) P. Yu

**136L. Microelectronics Laboratory (4)**

Laboratory fabrication of diodes and field effect transistors covering photolithography, oxidation, diffusion, thin film deposition, etching and evaluation of devices. Two hours of lecture, three hours of laboratory. *Prerequisite:* ECE 103 with a grade of C- or better. (F,W,S) S. S. Lau

**137. Materials Laboratory (4)**

A laboratory course covering experimental concepts and approaches in the study of materials, including preparation, processing, alloying, crystal growing, physical metallurgy, and various techniques in the evaluation and characterization of materials. One hour lecture, four to six hours of laboratory. *Prerequisite:* some background in solid-state physics or consent of instructor. (S) H. L. Luo

**139. Semiconductor Device Design and Modeling (4)**

Device physics of modern field effect transistors and bipolar transistors, including behavior of submicron structures. Relationship between structure and circuit models of transistors. CMOS and BiCMOS technologies. Emphasis on computer simulation of transistor operation and application in integrated circuits. Three hours of lecture. *Prerequisites:* ECE 135A-B with grades of C- or better. (W) P. Asbeck

**145AL-BL-CL. Acoustics Laboratory (4-4-4)**

Automated laboratory based on H-P GPIB controlled instruments. Software controlled data collection and analysis. Vibrations and waves in strings and bars of electromechanical systems and transducers. Transmissions, reflection and scattering of sound waves in air and water. Aural and visual detection. Two hours of lecture, four hours lab. *Prerequisite:* ECE 107 with a grade of C- or better or consent of instructor. (F-W-S) J. Hildebrand

**146. Introduction to Magnetic Recording (4)**

A laboratory introduction to the writing and reading of digital information in a disk drive. Basic magnetic recording measurements on state-of-art disk drives to evaluate signals, noise, erasure, and non-linearities that characterize this channel. Lectures on the recording process will allow comparison of measurements with basic voltage expressions. E/M FEM software utilized to study geometric effects on the record and play transducers. One hour of lecture, three hours of laboratory. *Prerequisite:* ECE 107 with a grade of C- or better. (W) N. Bertram

**153. Probability and Random Processes for Engineers (4)**

Random processes. Stationary processes: correlation, power spectral density. Gaussian processes and linear transformation of Gaussian processes. Point processes. Random noise in linear systems. Three hours of lecture, one hour of discussion. *Prerequisite:* ECE 109 with a grade of C- or better. (S) R. Rao

**154A. Communications Systems I (4)**

Study of analog modulation systems including AM, SSB, DSB, VSB, FM, and PM. Performance analysis of both coherent and noncoherent receivers, including threshold effects in FM. Three hours of lecture, one hour of discussion. *Prerequisite:* ECE 153 with a grade of C- or better. (F) L. Milstein

**154B. Communications Systems II (4)**

Design and performance analysis of digital modulation techniques, including probability of error results for PSK, DPSK, and FSK. Introduction to effects of intersymbol interference and fading. Detection and estimation theory, including optimal receiver design and maximum-likelihood parameter estimation. Three hours of lecture, one hour of discussion. *Prerequisite:* ECE 154A with a grade of C- or better. (W) L. Milstein

**154C. Communications Systems III (4)**

Introduction to information theory and coding, including entropy, average mutual information, channel capacity, block

codes and convolutional codes. Three hours of lecture, one hour of discussion. *Prerequisite:* ECE 154B with a grade of C- or better. (S) L. Milstein

**155A. Digital Recording Systems (4)**

This course will be concerned with modulation and coding techniques for digital recording channels. Three hours of lecture. *Prerequisites:* ECE 109 and 153 with grades of C- or better and concurrent registration in ECE 154A required. *Department stamp required.* (F) J. Wolf

**155B-C. Digital Recording Projects (4-4)**

These courses will be concerned with modulation and coding techniques for digital recording channels. In winter and spring quarters, students will perform experiments and/or computer simulations. One hour lecture, four hours of laboratory. *Prerequisites:* ECE 109 and 153 with grades of C- or better and concurrent registration in ECE 154B-C required. *Department stamp required.* (W,S) J. Wolf

**158A. Data Networks I (4)**

Layered network architectures, data link control protocols and multiple-access systems, performance analysis. Flow control; prevention of deadlock and throughput degradation. Routing, centralized and decentralized schemes, static dynamic algorithms. Shortest path and minimum average delay algorithms. Comparisons. Three hours of lecture, three hours of laboratory. *Prerequisite:* ECE 109 with a grade of C- or better. ECE 159A recommended. (W) R. Rao

**158B. Data Networks II (4)**

Layered network architectures, data link control protocols and multiple-access systems, performance analysis. Flow control; prevention of deadlock and throughput degradation. Routing, centralized and decentralized schemes, static dynamic algorithms. Shortest path and minimum average delay algorithms. Comparisons. Three hours of lecture, three hours of laboratory. *Prerequisite:* ECE 158A with a grade of C- or better. (S) R. Cruz

**159A. Queuing Systems: Fundamentals (4)**

Analysis of single and multiserver queuing systems; queue size and waiting times. Modeling of telephone systems, interactive computer systems and the machine repair problems. Three hours of lecture. *Prerequisite:* ECE 109 with a grade of C- or better. (F) E. Masry

**159B. Queuing Systems: Computer Systems Performance (4)**

Computer systems applications; priority scheduling, time-sharing scheduling, modeling and performance of interactive multiprogrammed computer systems, a case study. Three hours of lecture. *Prerequisite:* ECE 159A with a grade of C- or better. (W) E. Masry

**159C. Queuing Systems: Networks & Operation Research Applications (4)**

Elements of computer-communication networks; delay analysis, capacity and flow assignments. Operation research applications, cost models and optimization, a case study, introduction to inventory systems. Three hours of lecture. *Prerequisite:* ECE 159B with a grade of C- or better. (S) E. Masry

**161. Introduction to Digital Processing (4)**

Review of discrete-time systems and signals, Discrete-Time Fourier Transform and its properties, the Fast Fourier Transform, Design of Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) filters, implementation of digital filters. Three hours of lecture, one hour of discussion. *Prerequisites:* ECE 101 and 109 with grades of C- or better. (F,S) W. Hodgkiss

**162A. Digital Signal Processing I (4)**

Design of linear filters in discrete time, including IIR, FIR, and frequency domain filters. Coefficient transformations. Discrete Fourier Transform algorithms and their properties. Digital sig-

nal processing structures and implementations. Quantization effects. Algorithms simulated by computer and tested in the laboratory. Three hours of lecture, one hour of discussion, three hours of laboratory. *Prerequisite:* ECE 101 with a grade of C- or better. (S) Staff

**162B. Digital Signal Processing II (4)**

Basic principles of adaptive algorithms. Algorithms for adaptive FIR (gradient, LMS, recursive techniques) and adaptive IIR filtering. Implementation issues. Introduction to fast transform algorithms (FFT, Winograd FFT, number theoretic transforms, DCT). Fast convolution and correlation. Algorithms simulated by MATLAB. Three hours of lecture, one hour of discussion, three hours of laboratory. *Prerequisite:* ECE 162A with a grade of C- or better. (S) P. Chau

**163. Electronic Circuits and Systems (4)**

Analysis and design of analog circuits and systems. Feedback systems with applications to operational amplifier circuits. Stability, sensitivity, bandwidth, compensation. Design of active filters. Switched capacitor circuits. Phase-locked loops. Analog-to-digital and digital-to-analog conversion. Three hours of lecture, one hour of discussion, three hours of laboratory. *Prerequisites:* ECE 101 and 102 with grades of C- or better. (S) W. Coles

**164. Analog Integrated Circuit Design (4)**

Design of linear and non-linear analog integrated circuits including operational amplifiers, voltage regulators, drivers, power stages, oscillators, and multipliers. Use of feedback and evaluation of noise performance. Parasitic effects of integrated circuit technology. Laboratory simulation and testing of circuits. Three hours of lecture, one hour of discussion, three hours of laboratory. *Prerequisite:* ECE 102 with a grade of C- or better. ECE 163 recommended. (F) Staff

**165. Digital Integrated Circuit Design (4)**

VLSI digital systems. Circuit characterization, performance estimation, and optimization. Circuits for alternative logic styles and clocking schemes. Subsystems include ALUs, memory, processor arrays, and PLAs. Techniques for gate arrays, standard cell, and custom design. Design and simulation using CAD tools. (Students who have taken CSE 143 may not take ECE 165 for credit.) Three hours of lecture, one hour of discussion, three hours of laboratory. *Prerequisite:* ECE 108 with a grade of C- or better. (W) P. Chau

**166. Microwave Systems and Circuits (4)**

Waves, distributed circuits and scattering matrix methods. Passive microwave elements. Impedance matching. Detection and frequency conversion using microwave diodes. Design of transistor amplifiers including noise performance. Circuits designs will be simulated by computer and tested in the laboratory. Three hours of lecture, one hour of discussion, three hours of laboratory. *Prerequisites:* ECE 102 and 107 with grades of C- or better. (S) P. Asbeck

**171A. Linear Control System Theory (4)**

Stability of continuous- and discrete-time single-input/single-output linear time-invariant control systems emphasizing frequency domain methods. Transient and steady-state behavior. Stability analysis by root locus, Bode, Nyquist, and Nichols plots. Compensator design. Three hours of lecture, one hour of discussion. *Prerequisite:* ECE 60B or ECE 53-54 or Ames 163B with a grade of C- or better. (S) D. Sworder

**171B. Linear Control System Theory (4)**

Time-domain, state-variable formulation of the control problem for both discrete-time and continuous-time linear systems. State-space realizations from transfer function system description. Internal and input-output stability, controllability/observability, minimal realizations, and pole-placement by full-state feedback. Three hours of lecture, one hour of discussion. *Prerequisite:* ECE 171A with a grade of C- or better. (F) D. Sworder



**172A. Introduction to Intelligent Systems: Robotics and Machine Intelligence (4)**

This course will introduce basic concepts in machine perception. Topics covered will include: edge detection, segmentation, texture analysis, image registration, and compression. *Prerequisite:* ECE 101 with a grade of C- or better, ECE 109 recommended. (F) P. Cosman

**172B. Introduction to Intelligent Systems: Robotics and Machine Intelligence (4)**

The second half will be concerned with techniques in machine intelligence, control theory, and robotics. Topics covered will include: problem solving, search, robot planning, and robot control. Three hours of lecture, one hour discussion. *Prerequisite:* ECE 172A with grade of C- or better. (W) R. Jain

**173. Theory and Applications of Neural Networks and Fuzzy Logic (4)**

Theory of fuzzy logic, reasoning and control; mathematical aspects of neural architectures for pattern classification, functional approximation, and adaptive estimation and control; theory of computer-assisted learning (supervised, unsupervised and hybrid); theory and practice of recurrent networks (stability, placement of equilibria); computer-aided design of fuzzy and neural systems, Bayes and minimax design. Four hours of lecture. *Prerequisite:* Math. 20F with a grade of C- or better. (S) A. Sebald

**174. Introduction to Linear and Nonlinear Optimization with Applications (4)**

The linear least squares problem, including constrained and unconstrained quadratic optimization and the relationship to the geometry of linear transformations. Introduction to nonlinear optimization. Applications to signal processing, system identification, robotics, and circuit design. Four hours of lecture. *Prerequisite:* Math. 20F with a grade of C- or better. (S) B. Rao

**175. Elements of Machine Intelligence: Pattern Recognition and Machine Learning (4)**

Decision functions. Pattern classification by distance and likelihood functions; deterministic and statistical trainable pattern classifiers; feature selection; issues in machine learning. Four hours of lecture. *Prerequisites:* ECE 109 and ECE 174 with grades of C- or better. (W) K. Kreutz-Delgado

**178. Visual Information Management Systems (4)**

Requirements of image and video information systems, data models, visual query environment, similarity methods, indexing techniques, features and primitives for describing visual information, visualization in databases. Three hours of lecture, one hour of discussion. *Prerequisites:* CSE 12, ECE 78, and ECE 172A. (S) R. Jain

**181. Geometrical Optics and Guided-wave Optics (4)**

Electromagnetic optics, reflection, refraction, and stratified media. Geometrical optics, ray tracing, aberrations, optical elements, and optical system design. Optical instruments, photometry, radiometry, and interferometers. Resonators, guided-wave and fiber optics. Labs: ray tracing, interferometry, guided-wave and fiber optics. Three hours of lecture, two hours of demonstration laboratory. *Prerequisites:* ECE 103 and 107 with grades of C- or better. (S) C. Guest

**182. Physical Optics and Fourier Optics (4)**

Diffraction: Kirchoff, Fraunhofer, and Fresnel. Fourier and Fresnel Transform optics and optical information processing. Holography, Gaussian beams, coherence, statistical optics and photon optics. Polarization and crystal optics. Labs: diffraction, Fourier and Fresnel Transforms, coherence. Three hours of lecture, two hours of demonstration laboratory. *Prerequisites:* ECE 103 and 107 with grades of C- or better. (F) S. Lee and S. Fainman

**183. Optical Electronics (4)**

Quantum electronics, interaction of light and matter in atomic systems, semiconductors. Laser amplifiers and laser systems.

Photodetection. Electrooptics and acoustooptics, photonic switching. Fiber optic communication systems. Labs: semiconductor lasers, semiconductor photodetectors. Three hours of lecture, two hours of demonstration laboratory. *Prerequisites:* ECE 103 and 107 with grades of C- or better. (W) C. Tu

**184. Optical Information Processing and Holography (4)**

Labs: optical holography, photorefractive effect, spatial filtering, computer generated holography. Two and a half hours of lecture, four hours of laboratory. *Prerequisite:* ECE 182 with a grade of C- or better. (W) S. Fainman and S. Lee

**185. Lasers and Modulators (4)**

Labs: CO2 laser, HeNe laser, electrooptic modulation, acoustooptic modulation, spatial light modulators. Two and a half hours of lecture, four hours of laboratory. *Prerequisite:* ECE 183 with a grade of C- or better. (S) S. Lee and S. Fainman

**186. Introduction to Robotic Vision (4)**

Visual perception, imaging geometry, camera model and calibration. Image processing fundamentals: image transforms, image enhancement using spatial- and frequency-domain methods, filtering and restoration. Introduction to photometric stereo, motion fields, and elements of pattern classification. Three hours of lecture, four hours laboratory. *Prerequisite:* ECE 101 with a grade of C- or better. (S) S. Fainman

**190. Design Tools and Procedures (4)**

Electrical and computer engineering design. Use of computer and development tools in the design process. Participation in and management of design performed by groups of engineers. Several short duration group design projects are completed. Three hours of lecture, four hours laboratory. *Prerequisites:* ECE 102 and ECE 108 with grades of C- or better or sponsorship of a faculty member. (F) C. Guest

**191. Engineering Group Design Project (4)**

Groups of students work to design, build, demonstrate, and document an engineering project. All students give weekly progress reports of their tasks and contribute a section to the final project report. Two hours of discussion, eight hours of laboratory. *Prerequisites:* Completion of all of the breadth courses and one depth course. (W) C. Guest

**192. Engineering Design (4)**

Students complete a project comprising at least 50 percent or more engineering design to satisfy the following features: student creativity, open-ended formulation of a problem statement/specifications, consideration of alternative solutions/realistic constraints. Written final report required. *Prerequisites:* Students enrolling in this course must have completed all of the breadth courses and one depth course. The department stamp is required to enroll in ECE 192. (Specifications and enrollment forms are available in the undergraduate office.)

**193H. Honors Project (4)**

An advanced reading or research project performed under the direction of an ECE faculty member. Must be taken for a letter grade. *Prerequisite:* admission to the ECE departmental honors program.

**195. Teaching (2 or 4)**

Teaching and tutorial activities associated with courses and seminars. Not more than four units of ECE 195 may be used for satisfying graduation requirements. (P/NP grades only.) Three hours of lecture. *Prerequisite:* consent of the department chair.

**197. Field Study in Electrical and Computer Engineering (4, 8, 12, or 16)**

Directed study and research at laboratories and observatories away from the campus. (P/NP grades only.) *Prerequisites:* consent of instructor and approval of the department.

**198. Directed Group Study (2 or 4)**

Topics in electrical and computer engineering whose study involves reading and discussion by a small group of students under direction of a faculty member. (P/NP grades only.) *Prerequisite:* consent of instructor.

**199. Independent Study for Undergraduates (2 or 4)**

Independent reading or research by special arrangement with a faculty member. (P/NP grades only.) *Prerequisite:* consent of instructor.

**GRADUATE**

**200. Research Conference (2)**

Group discussion of research activities and progress of group members. (S/U grades only.) *Prerequisite:* consent of instructor. (F,W,S) Staff

**210. Information Systems in Manufacturing (4)**

Basic problem solving and search techniques. Knowledge based and expert systems. Planning and decision support systems. Fuzzy logic and neural nets. Topics covered will include data models, query processing, distributed systems, enterprise computing and intelligent agents, fuzzy logic, neural nets. Four hours of lecture. *Prerequisite:* basic engineering and introduction to computers. (W) R. Jain

**211. Manufacturing Engineering Seminar and Laboratory (2)**

Combination of seminars, laboratory activities, and field trips. Seminars by top manufacturing engineers, managers, and student interns. Visits to manufacturing facilities. Techniques in accessing international technical and patent databases. *Prerequisite:* none. G. De Spain

**220. Space Plasma Physics (4)**

The nature of the solar wind interaction with different planets and comets leads to a variety of magnetospheres. This course will deal with both nature of the solar wind as well as these interactions. Three hours of lecture. *Prerequisite:* ECE 107 or equivalent or consent of instructor. (W) A. Mendis

**222A,B,C. Applied Electromagnetic Theory (4)**

Electrostatics and dielectric materials. Uniqueness, reciprocity, and Poynting theorems. Solutions to Maxwell's equations in rectangular, cylindrical, and spherical coordinates. Waves in isotropic and anisotropic media, transmission lines, waveguides, optical fibers, and resonant structures. Radiation, propagation, and scattering problems. Scattering matrices, microwave circuits, and antennas. Three hours of lecture. *Prerequisites:* ECE 107, 123, 124 or equivalent. (F,W,S) B. Rickett

**230A. Solid State Electronics (4)**

This course is designed to provide a general background in solid state electronic materials and devices. Course content emphasizes the fundamental and current issues of semiconductor physics related to the ECE solid state electronics sequences. Three hours of lecture. *Prerequisites:* fundamentals of quantum mechanics, ECE 135A-B, or equivalent. (F) S.S. Lau

**230B. Solid State Electronics (4)**

Physics of solid-state electronic devices, including p-n diodes, Schottky diodes, field-effect transistors, bipolar transistors, pnnp structures. Computer simulation of devices, scaling characteristics, high frequency performance, and circuit models. Three hours of lecture. *Prerequisite:* ECE 230A. (W) P. Asbeck

**230C. Solid State Electronics (4)**

This course is designed to provide a treatise of semiconductor devices based on solid state phenomena. Band structures carrier scattering and recombination processes and their influ-



ence on transport properties will be emphasized. Three hours of lecture. *Prerequisite:* ECE 230A or equivalent. (S) P. Yu

#### 230D. Characterization of Electronic Devices (4)

Characterization of the electrical and galvanomagnetic properties of semiconductors relevant to the technology of transistors and integrated circuits. Three hours of lecture. *Prerequisite:* consent of instructor. (F) H. Wieder

#### 230E. Introduction to Superconductivity (4)

Superconductivity phenomenon, two-fluid models and phenomenological theories, magnetic properties of ideal superconductors, type II superconductors, tunneling, microscopic theory, superconducting materials, current developments. Three hours of lecture. *Prerequisite:* consent of instructor. (F) H-L. Luo

#### 231. Thin Film Phenomena (4)

This course is designed to provide a general survey of thin film processes pertinent to microelectronics. Topics to be discussed include preparation methods, various modern analytical techniques, physical properties, growth morphology, interface reaction, and alloy formation and applications. Three hours of lecture. *Prerequisite:* consent of instructor. (W) S.S. Lau and H-L. Luo

#### 232. The Field Effect and Field Effect Transistors (4)

Physics of the field effect of elemental and III-V compound semiconductors related to the technology and characteristics of Schottky barrier gate, insulated gate, and junction gate field effect transistors. Three hours of lecture. *Prerequisite:* consent of instructor. (S) H. Wieder

#### 233. X-Ray Diffraction Analysis of Materials (4)

This class will cover the physics of x-ray diffraction and its application to the analysis of crystal structure, grain size, grain orientation, surface roughness, epitaxy, film thickness, etc. Experimental techniques to be discussed and will include theta-2theta diffractometry, high resolution x-ray rocking curves, Laue patterns, pole figures, reflectivity, small angle scattering, laboratory experiments, and computer simulations. Three hours of lecture, one hour of laboratory. *Prerequisite:* consent of instructor. (S) K. Kavanagh

#### 234A. Imperfections in Solids (4)

Point, line, and planar defects in crystalline solids, including vacancies, self-interstitials, solute atoms, dislocation interactions, stacking faults, grain boundaries, and their effects on the properties of solids. Hardening by localized obstacles, precipitates, and dispersoids. Three hours of lecture. *Prerequisite:* consent of instructor. (F) R.A. Asaro

#### 234B. Advanced Study of Defects in Solids (4)

Advanced topics in dislocation theory and dislocation dynamics. Defects and defects interactions. Atomistic and subatomic effects. Physical models based on microscopic considerations. Three hours of lecture. *Prerequisite:* ECE 234A or consent of instructor. (W) R.A. Asaro

#### 235. Transmission Electron Microscopy (4)

Lectures and laboratory experience giving an introduction to transmission electron microscopy (TEM) for materials science. The course will cover the basic theory of electron optics, kinematical and dynamical diffraction, and image contrast, and will include instruction on the operation and calibration of the TEM and techniques for specimen preparation. Multiple listing with Materials Science 240D. Three hours of lecture. *Prerequisite:* consent of instructor. (W) K. Kavanagh and M. L. Rudee

#### 236A. Semiconductor Heterostructure Materials (4)

This course covers the growth, characterization, and heterojunction properties of III-IV compound semiconductors and group-IV semiconductor heterostructures for the subsequent courses on electronic and photonic device applications.

Topics include epitaxial growth techniques, electrical properties of heterojunctions, transport and optical properties of quantum wells and superlattices. Three hours of lecture. *Prerequisites:* ECE 230A-B-C or consent of instructor. (F) C. Tu

#### 236B. Optical Processes in Semiconductors (4)

Absorption and emission of radiation in semiconductors. Radiative transition and nonradiative recombination. Ultra-fast optical phenomena. Laser and photodetector devices will be emphasized. Three hours of lecture. *Prerequisites:* ECE 230A and 230C or equivalent. (W) P. Yu

#### 236C. Heterojunction Field Effect Transistors (4)

Device physics and applications of isotype and anisotype heterojunctions and quantum wells, including band-edge discontinuities, band bending and space charge layers at heterojunction interfaces, charge transport normal and parallel to such interfaces, two-dimensional electron gas structures, modulation doping, heterojunction and insulated gate field effect transistors. Three hours of lecture. *Prerequisite:* consent of instructor. (S) H. Wieder

#### 236D. Heterojunction Bipolar Transistors (4)

Current flow and charge storage in bipolar transistors. Use of heterojunctions to improve bipolar structures. Transient electron velocity overshoot. Simulation of device characteristics. Circuit models of HBTs. Requirements for high-speed circuit applications. Elements of bipolar process technology, with emphasis on III-V materials. Three hours of lecture. *Prerequisite:* consent of instructor. (F) P. Asbeck

#### 237. Modern Materials Analysis (4)

Analysis of the near surface of materials via ion, electron, and x-ray spectrometers. Topics to be covered include particle solid interactions. Rutherford backscattering, secondary ion mass spectroscopy, electron energy loss spectroscopy, particle induced x-ray emission, Auger electron spectroscopy, extended z-ray absorption, fine structure and channeling. Three hours of lecture. *Prerequisite:* consent of instructor. (F) K. Kavanagh

#### 238A. Thermodynamics of Solids (4)

The thermodynamics and statistical mechanics of solids. Basic concepts, equilibrium properties of alloy systems, thermodynamic information from phase diagrams, surfaces and interfaces, crystalline defects. Multiple listed with Materials Science 201A. Three hours of lecture. *Prerequisite:* consent of instructor. (F) K. Kavanagh

#### 238B. Solid State Diffusion and Reaction Kinetics (4)

Thermally activated processes. Boltzman factor, homogeneous and heterogeneous reactions, solid state diffusion, Fick's law, diffusion mechanisms, Kirkendall effects, Boltzmann-Manato analysis, high diffusivity paths. Multiple listed with Materials Science 201B. Three hours of lecture. *Prerequisite:* ECE 238A. (W) K. Kavanagh

#### 239. Nanometer-Scale Probes and Devices (4)

Discussion of scanning tunneling microscopy, atomic force microscopy, and other high-resolution scanning probe techniques, including basic concepts, experimental considerations, and applications. Fabrication and properties of submicron structures, with emphasis on the study of semiconductor materials and devices. Three hours of lecture. *Prerequisite:* consent of instructor. (F) Edward T. Yu

#### 240A. Lasers and Optics (4)

Fresnel and Fraunhofer diffraction theory. Optical resonators, interferometry. Gaussian beam propagation and transformation. Laser oscillation and amplification, Q-switching and mode locking of lasers, some specific laser systems. Three hours of lecture. *Prerequisites:* ECE 123, 124 or equivalent; introductory quantum mechanics or ECE183. (F) W. Chang

#### 240B. Optical Information Processing (4)

Space-bandwidth product, superresolution, space-variant optical system, partial coherence, image processing with coherent and incoherent light, processing with feedback, real-time light modulators for hybrid processing, nonlinear processing. Optical computing and other applications. Three hours of lecture. *Prerequisite:* ECE 182 or equivalent. (W) S. Lee and S. Fainman

#### 240C. Optical Modulation and Detection (4)

Propagation of waves and rays in anisotropic media. Electro-optical switching and modulation. Acousto-optical deflection and modulation. Detection theory. Heterodyne detection, incoherent and coherent detection. Three hours of lecture. *Prerequisites:* ECE 181, 183 or equivalent. (S) S. Esener and P. Yu

#### 241A. Nonlinear Optics (4)

Second harmonic generation (color conversion), parametric amplification and oscillation, photorefractive effects and four-wave mixing, optical bistability, applications. Three hours of lecture. *Prerequisites:* ECE 240A, C, or consent of instructor. (F) S. Fainman and S. Lee

#### 241B. Optical Devices for Computing (4)

Application of electro-optic, magneto-optic, acousto-optic, and electro-absorption effects to the design of photonic devices with emphasis on spatial light modulation and optical storage techniques. Three hours of lecture. *Prerequisites:* ECE 240A, C, or consent of instructor. (F) S. Esener

#### 241C. Holographic Optical Elements (4)

Fresnel, Fraunhofer, and Fourier holography. Analysis of thin and volume holograms, reflection and transmission holograms, color and polarization holograms. Optically recorded and computer-generated holography. Applications to information storage, optical interconnects, 2-D and 3-D display, pattern recognition, and image processing. Three hours of lecture. *Prerequisite:* ECE 182 or equivalent, or consent of instructor. (W) S. Fainman

#### 241AL. Lasers and Holography Laboratory (2)

Laser resonator design, construction, alignment, characterizations. Operation and evaluation of molecular, gas, liquid dye, semiconductor lasers. Spatial and temporal coherence measurements. Design and fabrication of transmission, reflection, bleached, color, multiple exposure holograms. *Prerequisites:* ECE 181, 182, 183 or consent of instructor. (This course is cojoint with ECE 184. Graduate students will choose 50 percent of the experiments and receive two units of credit.) (F) S. Lee and S. Fainman

#### 241BL. Optical Signal Processing Laboratory (2)

Construction and characterization of Fourier/Fresnel transform, coherent/incoherent, imaging-processing systems. Design, coding, fabrication of spatial filters, computer-generated holograms. Experiments in nonlinear photorefractive phenomena and image-processing applications. Construction of vector-matrix multipliers. Optical systems design using Code-V. *Prerequisites:* ECE 181, 182, 183 or consent of instructor. (This course is cojoint with ECE 185. Graduate students will choose 50 percent of the experiments and receive two units of credit.) (W) S. Lee and S. Fainman

#### 241CL. Optoelectronics and Communications Laboratory (2)

Operation and characterization of electro-optic, acousto-optic modulators. Polarization manipulation techniques. Heterodyne detection schemes. Parametrization of P-I-N and avalanche detectors, LED sources. Evaluation of optical fiber, thin film wave-guide properties. Characterization of Hughes LCLV spatial light modulator. *Prerequisites:* ECE 181, 182, 183, or consent of instructor. Staff

**242A. Optical Systems (4)**

Principles of optical system design. Modeling of optical and opto-electronic components, modules, and systems. Signal integrity analysis. Design optimization using CAD. Assembly and testing. System scalability and manufacturability. Opto-electronic packaging. Three hours of lecture. *Prerequisites: ECE 240A-B-C, or consent of instructor.* (W) S. Lee

**242B. Optical Systems (4)**

Principles of optical system design. Modeling of optical and opto-electronic components, modules, and systems. Signal integrity analysis. Design optimization using CAD. Assembly and testing. System scalability and manufacturability. Opto-electronic packaging. Three hours of lecture. *Prerequisites: ECE 240A-B-C, or consent of instructor.* (S) S. Lee

**243A. Optical Fiber Communication (4)**

Optical fibers, waveguides, laser communication system. Modulation and demodulation; detection processes and communication receivers. Three hours of lecture. *Prerequisites: ECE 107, 123, 124, or equivalent: introduction to communication.* (W) W. Chang and P. Yu

**245A. Advanced Acoustics I (4)**

Boundary value problems in vibrating systems, wave propagation in strings, bars, and plates. Fundamentals of acoustical transducers. Three hours of lecture. *Prerequisite: concurrent registration in ECE 145AL recommended.* (F) J. Hildebrand

**245B. Advanced Acoustics II (4)**

Theory of radiation transmission and scattering of sound with special application to ocean acoustics. Three hours of lecture. *Prerequisite: ECE 245A or consent of instructor. Concurrent registration in ECE 145BL recommended.* (W) J. Hildebrand

**245C. Advanced Acoustics III (4)**

Signal processing in underwater acoustics. Theory and hardware embodiments. Three hours of lecture. *Prerequisite: ECE 245B or consent of instructor. Concurrent registration in ECE 145CL recommended.* (S) J. Hildebrand

**246A. Materials for Magnetic Recording (4)**

Properties of magnetic materials utilized as magnetic recording media and heads; magnetic structure of oxides and metals; fine particle magnetism: micromagnetic analysis; hysteresis and reversal mechanisms of hard materials; dynamic processes and domain patterns of soft materials; thermal fluctuations; multilayer phenomena: giant magnetoresistance. *Prerequisites: undergraduate electromagnetism and solid state physics or consent of instructor.* (alternate years) H.L. Luo, N. Bertram

**246B. Analysis of the Magnetic Recording Process (4)**

In-depth analysis of the magnetic recording process. Magnetic fields and Fourier transforms of fields and magnetized media and heads; playback process for single and multiple transitions. Reciprocity theorem for inductive and magnetoresistive heads; record process modeling; interferences and nonlinearities; medium noise mechanisms and correlations; signal to noise ratios. *Prerequisites: undergraduate electromagnetic theory and mathematical methods or consent of instructor.* (alternate years) N. Bertram

**246C. Magnetic Recording Laboratory (4)**

Basic measurements in magnetic recording. Fields and Fourier transforms of head structures using resistance paper measurements and computer analysis; inductance and B-H loop measurements of recording heads and core materials; recording system calibration and magnetization pattern investigation utilizing spectral measurements (FFT). *Prerequisites: ECE 246B and laboratory experience.* (alternate years) N. Bertram

**250. Random Processes (4)**

Random variables, probability distributions and densities, characteristic functions. Convergence in probability and in qua-

dratic mean, Stochastic processes, stationarity. Processes with orthogonal and independent increments. Power spectrum and power spectral density. Stochastic integrals and derivatives. Spectral representation of wide sense stationary processes, harmonizable processes, moving average representations. *Prerequisite: ECE 153 or equivalent or consent of instructor.* (F) R. Lugannani

**251A. Digital Signal Processing I (4)**

(Conjoined with ECE 161.) Review of discrete-time systems and signals, Discrete-time Fourier Transform and its properties, the Fast Fourier Transform, Design of Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) filters, implementation of digital filters. Three hours of lecture, one hour of discussion. *Prerequisites: ECE 10 1 and 109 with grades of C- or better.* (F,S) W. Hodgkiss

**251B. Digital Signal Processing II (4)**

Discrete random signals; finite word length effects; conventional (FFT-based) spectral estimation; coherence and transfer function estimation; model-based spectral estimation; applications. *Prerequisite: ECE 251A or consent of instructor.* (W) W. Hodgkiss and B. Rao

**251C. Digital Signal Processing III (4)**

Single and multichannel data processing in a time-varying environment; phase locked loops; Kalman filters; adaptive transversal and lattice filters; time-evolving, high-resolution spectral estimation; adaptive beamforming. *Prerequisite: ECE 251B or consent of instructor.* (S) W. Hodgkiss and B. Rao

**251D. Digital Signal Processing IV (4)**

Adaptive transversal and recursive least squares lattice algorithms, performance analysis of adaptive signal processing algorithms for channel equalization, interference suppression, and other applications, implementation of adaptive algorithms in DSP hardware, blind deconvolution. *Prerequisite: ECE 251C or consent of instructor.* (F) J. Zeidler

**252A. Speech Compression (4)**

Speech signals, production and perception, compression theory, high rate compression using waveform coding (PCM, DPCM, ADPCM, ...), DSP tools for low rate coding, LPC vocoders, sinusoidal transform coding, multi-band coding, medium rate coding using code excited linear prediction (CELP). *Prerequisite: ECE 251A or ECE 162A.* (W) B. Rao

**252B. Speech Recognition (4)**

Signal analysis methods for recognition, dynamic time warping, isolated word recognition, hidden markov models, connectedword, and continuous speech recognition. *Prerequisites: ECE 109, ECE 262A.* (S) B. Rao

**253A. Fundamentals of Digital Image Processing (4)**

Image quantization and sampling, image transforms, image enhancement, image compression. *Prerequisites: ECE 109, 153, ECE 162A-B and ECE 251A recommended.* (W) P. Cosman

**253B. Digital Image Analysis (4)**

Image morphology, edge detection, scene segmentation, texture analysis, registration and fusion, feature analysis, time-varying images. *Prerequisite: ECE 253A or consent of instructor.* (S) P. Cosman

**253C. Digital Image Restoration and Reconstruction (4)**

Theory and algorithms: deconvolution, additive and signal-dependent noise removal, band limited extrapolation, 2-D and 3-D reconstruction from full projections and limited view. Applications in remote sensing, electromagnetics, sonar, and medical imaging. *Prerequisites: ECE 253A recommended; ECE 176A-B.* (S) Staff

**254. Detection Theory (4)**

Hypothesis testing, detection of signals in white and colored Gaussian noise; Karhunen-Loève expansion, estimation of sig-

nal parameters, maximum-likelihood detection; resolution of signals; detection and estimation of stochastic signals; applications to radar, communications, and optics. *Prerequisite: ECE 153.* (F) R. Lugannani

**255AN. Information Theory (4)**

Introduction to basic concepts, source coding theorems, capacity, noisy-channel coding theorem. Three hours of lecture. *Prerequisite: ECE 154A-B-C or consent of instructor.* (F) Staff

**255BN/CN. Source Coding I, II (4/4)**

Theory and practice of lossy source coding, vector quantization, predictive and differential encoding, universal coding, source-channel coding, asymptotic theory, speech and image applications. Three hours of lecture. *Prerequisite: ECE 250 and 259A or consent of instructor.* (W,S) K. Zeger

**256A-B. Time Series Analysis and Applications (4-4)**

Recursive and nonrecursive prediction and filtering; Wiener-Hopf and Kalman-Bucy filters. Series expansions and applications. Time series analysis; probability density, covariance and spectral estimation. Inference from sampled-data, sampling theorems; equally and non-equally spaced data, applications to detection and estimation problem. *Prerequisite: ECE 250.* (W,S) E. Masry

**257A. Multiuser Communication Systems (4)**

M/G/1, G1/M/1 queues, imbedded chains. Ergodic theory of Markov chains, classification, ergodic theorems. Multiple access systems, random access protocols, capacity, stability, delay and control, reservation and hybrid schemes. *Prerequisites: ECE 153 and 159A, or equivalent. Note: ECE 159A is an integral part of this course and should be taken in the fall quarter.* (W) R. Rao

**257B. Principles of Wireless Networks (4)**

This course will focus on the principles, architectures, and analytical methodologies for design of multi-user wireless networks. Topics to be covered include cellular approaches, call processing, digital modulation, adaptive arrays, broadband networks, and wireless packet access for multimedia service. Three hours of lecture. *Prerequisites: ECE 159B and 154B.* (S) A. Acampora

**258A-B. Digital Communication (4-4)**

Digital communication theory including performance of various modulation techniques, effects of inter-symbol interference, adaptive equalization, spread spectrum communication. *Prerequisites: ECE 154A-B-C and ECE 254A or consent of instructor.* (W,S) L. Milstein

**259AN. Algebraic Coding (4)**

Fundamentals of block codes, introduction to groups, rings and finite fields, nonbinary codes, cyclic codes such as BCH and RS codes, decoding algorithms, applications. Three hours of lecture. *Prerequisite: consent of instructor.* (F) J. Wolf or P. Siegel

**259BN. Trellis-Coded Modulation (4)**

Coding theory developed from the viewpoint of digital communications engineering, Information theoretic limits for basic channel models, convolutional codes, maximum-likelihood decoding, Ungerboeck codes, codes based on lattices and cosets, rotational invariance, performance evaluation, applications of modem design. Three hours of lecture. *Prerequisites: ECE 154A-B-C, ECE 259A, or consent of instructor.* (W) P. Siegel

**259CN. Advanced Coding and Modulation for Digital Communications (4)**

Advanced coding and modulation techniques for bandwidth-efficient data transmission and recording; constellation shaping by regions, Voronoi constellations, shell mapping, coding for intersymbol-interference channels, precoding methods, multilevel coding; coding for fading channels, applications to wireline and wireless communications, digital recording. Three hours of lecture. *Prerequisites: ECE 259A-B.* (S) P. Siegel

**260A. VLSI Digital System Algorithms and Architectures (4)**

Custom and semicustom VLSI design from the system designer's perspective. VLSI system algorithms, parallel processing architectures and interconnection networks, and design mapping methodologies will be emphasized. VLSI computer-aided design (CAD) tools will be introduced. Knowledge of basic semiconductor electronics and digital design is assumed. Three hours of lecture. *Prerequisites:* undergraduate-level semiconductor electronics and digital system design; ECE 165 or equivalent or consent of instructor. (F) Paul M. Chau

**260B. VLSI Integrated Circuits and Systems Design (4)**

Computer arithmetic, control and memory structures for VLSI implementations at logic, circuit, and layout level. Computer-aided design and performance simulations, actual design projects for teams of two to three students per team. Layout done on CAD workstations for project IC chip fabrication. Design projects will be reviewed in class presentation. Three hours of lecture. *Prerequisite:* ECE 260A. (W) P. Chau

**260C. VLSI Advanced Topics (4)**

Advanced topics seminar with issues from system theory, to new technologies, to alternative design methodologies will be subject for review. Class discussion, participation and presentations of projects and special topics assignments will be emphasized. The testing results of fabricated IC chips from other VLSI design classes will be presented in class and in a final report. Three hours of lecture. *Prerequisite:* ECE 260B. (S) Paul M. Chau

**261A. Design of Analog and Digital GaAs Integrated Circuits I (4)**

Introduction to analytical and computer-aided design (CAD) techniques for microwave integrated circuits. Design of active two-ports using scattering parameters. Monolithic realization of low-noise amplifiers using GaAs FETs and HEMTs. Design of monolithic distributed amplifiers. Design of monolithic power amplifiers and mixers. Three hours of lecture. *Prerequisite:* consent of instructor. (W) W. Ku

**261B. Design of Analog and Digital GaAs Integrated Circuits II (4)**

Introduction to GaAs digital integrated circuits (IC). Design of simple digital GaAs ICs using DCFL. Design of digital building blocks for complex multipliers, FET butterfly chips, DDS, and oversampled A/D converters. Three hours of lecture. *Prerequisite:* consent of instructor. (S) W. Ku

**262A. RPG of ASICs (Rapid Prototyping and Generation of Application-Specific Integrated Circuits and Systems) (4)**

Rapid prototyping and generation (RPG) of very large scale integration (VLSI) application-specific integrated circuits and systems (ASICs). Formal methodology in top-down systems design with hands-on experimental application of new fast implementation techniques to real-world projects. Utilization of state-of-the-art commercial CAS software which provides for VHSIC hardware description language (VHDL), logic synthesis, and technology independent mapping to most ASIC and FPGA (field programmable gate array) vendors. Five hours of lecture, nine hours of laboratory. *Prerequisites:* ECE 164, 165, 166, and 81. (W) P. Chau

**262B. RPG of ASSPS (Rapid Prototyping and Generation of Applications-Specific Signal Processing Systems) (4)**

Introduction to concurrent engineering which can only be effectively treated through the employment of a multiprocessing environment. Strategies for partitioning of signal processing system designs and optimization of scheduling of task assignments in a distributed computing environment. Introduction to mixed-signal systems and reduced complexity system design. Testing of rapid prototyped ASICs. Three hours of lecture, nine hours of laboratory. *Prerequisite:* ECE 262A. (S) P. Chau

**263A. Reliable Design of Digital Systems (4)**

Fault tolerance and testability have the common objective of improving the reliability of computer hardware. Knowing the fault models, how faults manifest themselves, how to test fault existence, and how to keep system functioning when fault exists help the engineers choose different techniques in computing and VLSI systems designs. *Prerequisite:* completion of upper-division ECE/CE courses or consent of instructor. (F) T. T. Lin

**263B. Fault-Tolerant Computing and VLSI Testing I (4)**

This course will cover all aspects of fault-tolerant computing and VLSI testing. Topics include fundamental concepts of fault-tolerant hardware design, test pattern generation, signature analysis, system diagnosis and evaluation, and fault tolerance in VLSI-based systems. *Prerequisite:* ECE 263A or consent of instructor. (W) T. T. Lin

**263C. Fault-Tolerant Computing and VLSI Testing II (4)**

Fault tolerance and testability have the common objective of improving system reliability. The second part of the course emphasizes systemwide design issues. Topics include fault-tolerant architecture and systems, design for testability, and computer-aided reliability evaluation. Current research issues in fault-tolerant computing and VLSI testing will be addressed. *Prerequisites:* ECE 263A-B or consent of instructor. (S) T. T. Lin

**264A. CMOS Analog Integrated Circuits and Systems I (4)**

Frequency response of the basic CMOS gain stage and current mirror configurations. Advanced feedback and stability analysis; compensation techniques. High-Performance CMOS amplifier topologies. Switched capacitor circuits. Analysis of noise and distortion. Three hours of lecture, three hours of laboratory. *Prerequisites:* ECE 164 and 153 or equivalent courses. (W) I. Galton

**264B. CMOS Analog Integrated Circuits and Systems II (4)**

Continuous-time filters: synthesis techniques and CMOS circuit topologies. Switched-capacitor filters: synthesis techniques and CMOS circuit topologies. Overview of CMOS samplers, data converters, mixers, modulators, oscillators, and PLLs. Three hours of lecture. *Prerequisites:* ECE 264A and 251A. (S) I. Galton

**265A. Communication Circuit Design I (4)**

System design for communications. System budgeting for optimum dynamic range. Frequency plan tradeoffs. Linearity analysis techniques. PLL design for frequency synthesis. Down-conversion and up-conversion techniques. Modulation and De-Modulation. Microwave and RF system design communications. Current research topics in the field. Three hours of lecture. *Prerequisites:* consent of instructor. (F) L. Larson

**265B. Communication Circuit Design II (4)**

Radio Frequency Integrated Circuits: low-noise amplifiers, AGCs. Mixers, voltage-controlled oscillators, power amplifiers, filters. Comparison between BJT, CMOS and GaAs technologies for radio frequency and microwave applications. Design tradeoffs of linearity, noise, power dissipation, and dynamic range. Current research topics in the field. Three hours of lecture. *Prerequisites:* ECE 166 and 265A or consent of instructor. (W) L. Larson

**265C. Communication Circuit Design III (4)**

Radio Frequency Integrated Circuits with an emphasis on CMOS technological implementations. Mixer and LNA design in CMOS. Architectural tradeoffs for highly integrated single-chip transceivers. Design of CMOS voltage controlled oscillators and frequency synthesizers for low phase noise and high switching speed. Technology tradeoffs for CMOS implementations. Three hours of lecture. *Prerequisites:* ECE 265A, 265B. (S) L. Larson

**270A-B-C. Neurocomputing (4-4-4)**

Neurocomputing is the study of nonalgorithmic information processing. This three-quarter sequence covers neurocomputing

theory, design, and application, including sensor processing, knowledge processing, data analysis, and hands-on training with a neurocomputer. *Prerequisite:* graduate standing in ECE or CSE, or consent of instructor. (F,W,S) R. Hecht-Nielsen

**272A-B. Stochastic Processes in Dynamic Systems (4-4)**

Diffusion equations, linear and nonlinear estimation and detection, random fields, optimization of stochastic dynamic systems, applications of stochastic optimization to problems. *Prerequisites:* ECE 250; ECE 272B requires 272A. (W,S) D. Sworder

**273A-B-C. Optimization in Linear Vector Spaces (4-4-4)**

Hilbert spaces, Banach spaces, projection theorem, dual spaces, Hahn Banach theorem, hyperplanes, geometric form of H Banach theorem, modern statistical optimization routines (simulated annealing, evolutionary programming), approaches to large neural net problems derived from the physics literature (chaos, spin glass, basic statistical mechanics). *Prerequisites:* ECE 174. ECE 273B requires 273A and 273C requires 273B. (F,W,S) A. Sebald

**274A. System Identification (4)**

Model types for system identification (transfer function, state space, ma, arma, armax, Box-Jenkins, etc). Convergence and consistency (identifiability, asymptotic distribution of parameter estimates). Recursive methods, experimental design (sufficient excitation, pre-treatment of data, etc). Modern methods (simulated annealing and evolutionary programming). *Prerequisite:* ECE 275. (W) A. Sebald

**274B. System Identification (4)**

Adaptive control (integrating real-time system identification and control), basics of intelligent control (fuzzy control, evolutionary programming and control). Basics of neural net controllers. *Prerequisite:* ECE 274A. (S) A. Sebald

**275. Parameter Estimation (4)**

Least squares, bias, efficiency, consistency, tolerance intervals, hypothesis tests and other forms of figures of merit for practical estimation. Practical issues in L squares estimation (multicollinearity, heteroskedasticity), MMSE, maximum likelihood and MAP estimation, projection lemma in Hilbert space, numerical aspects, including QR and householder transformations, singular value decompositions and pseudoinverse. *Prerequisites:* ECE 109, 153 and ECE 271A (may be taken concurrently). (F) A. Sebald

**276A-B. Robot Kinematics, Dynamics, and Control (4-4)**

Kinematics of rigid bodies and serial-chain manipulators. The forward and inverse kinematics problem. Sufficient conditions for exact solvability of the inverse kinematics problem. Joint-space versus task-space control. Path/trjectory generation. Newton-Euler and Lagrangian formulation of manipulatory dynamics. Manipulability measures. Redundancy resolution by subtask functional optimization and side-constraint satisfaction. Pseudo-inverse kinematic control of redundant manipulators. PID and feedback-linearizing trajectory and force control. Issues in path planning and compliant assembly. Three hours of lecture. *Prerequisites:* ECE 171A, 171B, ECE 174 must be completed with grades of C- or better. (ECE 174 may be concurrent.) (W-S) K. Kreutz-Delgado

**277. Image Computing (4)**

Image representation, basic image analysis algorithms, and basic visualization algorithms will be presented. Role of data models, data models for image and video data, and other related topics from database systems will be introduced. Students will implement a system for a specific application to use the concepts learned in this course. *Prerequisites:* experience equivalent to CSE 12, 100 (Data Structures) is recommended, and experience with C or C++ . R. Jain

**COURSES**

**280. Special Topics in Electronic Devices and Materials (4)**

A course to be given at the discretion of the faculty at which topics of interest in electronic devices and materials will be presented by visiting or resident faculty members. It will not be repeated so it may be taken for credit more than once. Three hours of lecture. *Prerequisite: consent of instructor.* Staff

**281. Special Topics in Radio and Space Science (4)**

A course to be given at the discretion of the faculty at which topics of interest in radio and space science will be presented by visiting or resident faculty members. It will not be repeated so it may be taken for credit more than once. Three hours of lecture. *Prerequisite: consent of instructor.* Staff

**282. Special Topics in Optoelectronics (4)**

A course to be given at the discretion of the faculty at which topics of interest in optoelectronic materials, devices, systems, and applications will be presented by visiting or resident faculty members. It will not be repeated so it may be taken for credit several times. Three hours of lecture. *Prerequisite: consent of instructor.* Staff

**283. Special Topics in Electronic Circuits and Systems (4)**

A course to be given at the discretion of the faculty at which topics of interest in electronic circuits and systems will be presented by visiting or resident faculty members. It will not be repeated so it may be taken for credit more than once. Three hours of lecture. *Prerequisite: consent of instructor.* Staff

**284. Special Topics in Computer Engineering (4)**

A course to be given at the discretion of the faculty at which topics of interest in computer engineering will be presented by visiting or resident faculty members. It will not be repeated so it may be taken for credit more than once. Three hours of lecture. *Prerequisite: consent of instructor.* Staff

**285. Special Topics in Robotics and Control Systems (4)**

A course to be given at the discretion of the faculty at which topics of interest in robotics and control systems will be presented by visiting or resident faculty members. It will not be repeated so it may be taken for credit more than once. Three hours of lecture. *Prerequisite: consent of instructor.* Staff

**287A,B,C. Special Topics in Communication Theory and Systems (4)**

A course to be given at the discretion of the faculty at which topics of interest in information science will be presented by visiting or resident faculty members. It will not be repeated so it may be taken for credit more than once. Three hours of lecture. *Prerequisite: consent of instructor.* Staff

**288. Special Topics in Applied Physics (1-8)**

A course to be given at the discretion of the faculty at which topics of current interest in applied physics will be presented by visiting or resident faculty members. (S/U grades optional.) *Prerequisite: consent of instructor.* Staff

**290. Graduate Seminar on Current ECE Research (2)**

Weekly discussion of current research conducted in the Department of Electrical and Computer Engineering by the faculty members involved in the research projects. Staff

**292. Graduate Seminar in Radio and Space Science (2)**

Research topics in radio astronomy, space plasmas, and solar system physics. (S/U grades only.) B. Rickett

**293. Graduate Seminar in Communication Theory and Systems (2)**

Weekly discussion of current research literature. Staff

**294. Graduate Seminar in Applied Solid State Physics (2)**

Research topics in applied solid state physics and quantum electronics. H-L. Luo

**295. Graduate Seminar in Computer Engineering (2)**

Biweekly discussion of research topics in computer engineering. Computer engineering is currently the most impacted field both in industry and academia. Computer engineering is the science of searching for an optimum within constraints of available methods and resources. Three hours of seminar. *Prerequisite: consent of instructor.* (F,W,S) T. T. Lin

**296. Graduate Seminar in Optical Signal Processing (2)**

Research topics of current interest in holography. S. Lee

**298. Independent Study (1-16)**

Open to properly qualified graduate students who wish to pursue a problem through advanced study under the direction of a member of the staff. (S/U grades only.) *Prerequisite: consent of instructor.*

**299. Research (1-16)**

(S/U grade only.)

**501. Teaching (1-4)**

Teaching and tutorial activities associated with courses and seminars. Not required for candidates for the Ph.D. degree. Number of units for credit depends on number of hours devoted to class or section assistance. (S/U grade only.) *Prerequisite: consent of department chair.*

**English as a Second Language**

OFFICE: 3231 Literature Building, Warren College

**Director**

Margaret Loken, M.A.

The English as a Second Language Program (ESL) offers two writing courses for any interested non-native speakers, one writing course for non-native-speaking graduate students, and one seminar course for teaching assistants in the program.

Intermediate Writing is a requirement for all undergraduates who have not satisfied the Subject A requirement and who have been designated ESL based on the Subject A Proficiency Test. Students must earn a grade of C or better to pass from the program to Subject A. Those earning a B or better will be recommended to take the Subject A exit exam, with the possibility of going on to their college writing program should they pass. The course may be repeated once for credit, a second time for workload credit.

ESL Writing Workshop and ESL Writing for Graduate Students are offered for workload credit only and may be repeated.

**10. Intermediate Writing (4)**

This course is designed to provide intensive practice in the conventions of academic English to those students whose first language is not English. This course prepares students for the Subject A writing course. *Prerequisite: A department stamp is required.*

**11. Writing Workshop (2)**

This course is offered to any students who need additional help improving their writing. The course include class discussion and individualized instruction, and address students' grammar and syntax needs. *Prerequisite: A department stamp is required.*

**20. ESL Writing for Graduate Students (4)**

This course, designed for graduate students whose first language is not English, provides practice in the conventions of academic writing required in specific fields of study. Students deal with common rhetorical and grammatical issues but work on writing tasks for their respective disciplines. Workload credit only. May be repeated. *Prerequisite: A department stamp is required.*

**500. Apprentice Teaching of ESL (1-4)**

The course, designed for graduate students serving as teaching assistants, includes discussion of teaching theories, techniques, and materials under the supervision of the instructor in charge of the course. *Prerequisite: A department stamp is required.*

**Environmental Studies**

OFFICE: 2024 Humanities and Social Sciences Building, Muir College, (619) 534-3589

**Faculty**

- Georgios Anagnostopoulos, Ph.D., *Professor, Philosophy*
- Rae Blumberg, Ph.D., *Professor, Sociology*
- Richard Carson, Ph.D., *Professor, Economics*
- Pau Chau, Ph.D., *Associate Professor, AMES*
- Susan Davis, Ph.D., *Associate Professor, Communication*
- Michael Gilpin, *Professor, Biology*
- Mark Hineine, *Lecturer, History*
- Patrick Ledden, Ph.D., *Provost, Muir College*
- Sandra Mitchell, *Associate Professor, Philosophy*
- James Moore, Ph.D., *Associate Professor, Anthropology*
- Keith Pezzoli, Ph.D., *Director/Field Studies, Urban Studies and Planning*
- Fitz John P. Poole, Ph.D., *Associate Professor, Anthropology*
- Shirley Strum, Ph.D., *Professor, Anthropology*
- Mark Thiemens, Ph.D., *Professor, Chemistry*
- David Woodruff, Ph.D., *Professor, Biology*

**Minor in  
Environmental Studies**

The minor addresses the scientific, technical, social, and cultural issues raised by the conflicting needs of the worldwide complex of preindustrial, industrial, and postindustrial societies.

Some of the courses related to the minor, particularly those in Group A, have significant prerequisites; students planning an Environmental Studies minor should check catalog course descriptions carefully. Some credit toward the minor may be gained through independent study, field research, study abroad, the Academic Internship Program, and others (prior approval strongly recommended). Petitions for petitionable courses (noted with a # sign), transfer courses, and individual additions to the courses listed below must be approved by the chair of the Environmental Studies Steering Committee. For updates, individual advising, and quarterly lists of available courses, please come to the Environmental Studies Office: Muir Interdisciplinary Studies, 2024 HSS, mail code 0106, phone (619) 534-3589.

The minor is structured as follows:

**Required:**

Environmental Studies 30, usually offered in the fall quarter

Environmental Studies 130, usually offered in the spring quarter (need not be taken consecutively)

**Required:**

Five additional courses, at least four in the upper-division, from the following two groups. At least one course must be taken from Group A and one from Group B.

**Group A—Natural Sciences**

AMES 119B. Energy: Non-Nuclear Energy Technologies

Biology LD 3. Organismic and Evolutionary Biology

Biology EB 120. General Ecology

Biology EB 121. General Ecology Laboratory

Biology EB 130. Introductory Marine Ecology

#Biology EB 140. Biodiversity

Biology EB 176. Conservation and the Human Predicament (cross-listed with ANBI 132)

Biology EB 178. Principles of Conservation Biology

Biology EB 179. Conservation Biology Laboratory

Chemistry 15. Chemistry of the Universe

Chemistry 149A. Environmental Chemistry

Chemistry 149B. Environmental Chemistry

Chemistry 173. Atmospheric Chemistry

Earth Sciences 10. The Earth

Earth Sciences 12. History of Earth and Evolution

Earth Sciences 20. The Atmosphere

Earth Sciences 30. The Oceans

Earth Sciences 40. Earth Sciences and the Environment

#Earth Sciences 50. Environmental Perils

Environmental Studies 102. Selected Topics in Environmental Studies (when taught from a natural sciences perspective)

Science, Technology, Public Affairs 35: Society and the Sea

**Group B—Social Sciences/  
Humanities**

Anthropology GN 100. Origins of Agriculture and Sedentism (now ANGN 182)

#Anthropology GN 163. Technical Revolutions and Evolution

Anthropology BI 132. Conservation and the Human Predicament (cross-listed with BIEB 176)

Communication CUL 148. Communication and the Environment

#Communication CUL 175. Advanced Topics in Communication: Culture

Economics 131. Economics of the Environment

Economics 132. Energy Economics

Economics 145. Economics of Ocean Resources

Environmental Studies 102. Selected Topics in Environmental Studies (when taught from a humanities/social sciences perspective)

Environmental Studies 110. Environmental Law

#History SC 100. Understanding the Earth/ Historical Topics

#History SC 104. History of Popular Science

History SC 105. History of Environmentalism

#History US 114. California History

#History US 117. History of Los Angeles

History US 137. The Built Environment in the Twentieth Century

History US 154. Western Environmental History (cross-listed with USP 160)

†#IRPS GN 257. Policy Analysis

†#IRPS GN 290/490. Special Topics in Pacific International Affairs

†IRPS GN 458. International Environmental Policy

†IRPS GN 459. Conflict Resolution of Environmental Issues

#Literature EN 147. Metamorphoses of the Symbol

#Literature EN 148. Genres in English and American Literature

#Literature GN 160. Specialized Genres in Literature

#Literature WR 122. Writing for the Sciences

†#Literature WR 127. General Nonfiction Prose Workshop

Philosophy 148. Philosophy and the Environment

Philosophy 164. Technology and Human Values

#Political Science 154. Special Topics in International Relations

#Political Science 162. Environmental Policy

Sociology D 184. Societal Evolution and Economic Development

#Sociology D 185. The Political Economy of Development and Underdevelopment

Urban Studies & Planning 2. Urban World System

Urban Studies & Planning 105. Environmental and Urban Planning Problems: The U.S.-Mexico Border

Urban Studies & Planning 124. Land Use Planning

#Urban Studies & Planning 144. Environmental and Preventive Health Issues

Urban Studies & Planning 160. Western Environmental History (cross-listed with HIUS 154)

Urban Studies & Planning 171. Sustainable Development

Urban Studies & Planning 175. Environmental Problems of Urban Studies

#Visual Arts 107G. Earthworks to Ecological Art

#Visual Arts 131. Special Projects in Media

#These courses satisfy minor requirements only when taught with an emphasis on environmental considerations. They must be petitioned for minor credit.

†Instructor's approval required for enrollment.

**COURSES**

**30. Environmental Issues: Natural Sciences (4)**

Examines global and regional environmental issues. The approach is to consider the scientific basis for policy options.



Simple principles of chemistry and biology are introduced. The scope of problems include: air and water pollution, climate modification, solid-waste disposal, hazardous-waste treatment, and environmental impact assessment. *Prerequisite: none.*

**130. Environmental Issues: Social Sciences (4)**

Explores contemporary environmental issues from the perspective of the social sciences. It includes the cultural framing of environmental issues and appropriate social action, the analysis of economic incentives and constraints, and a comparison of policy approaches. *Prerequisite: upper-division standing or consent of instructor.*

**90. Undergraduate Seminar (1)**

Provides an introduction to environmental studies. Faculty members from departments in natural sciences, social sciences, and humanities offer perspectives on human interaction with the environment and the ways in which the interplay between nature and culture can be analyzed. May be repeated for credit as topics vary.

**102. Selected Topics in Environmental Studies (4)**

An interdisciplinary course focusing on one of a variety of topics related to environmental studies such as environmental policy and politics, foreign study in environmental problems, environmental history, nature writers, ethics and the environment. May be repeated for credit as topics vary. *Prerequisite: upper-division standing or consent of instructor.*

**110. Environmental Law (4)**

Explores environmental policy in the United States and the ways in which it is reflected in law. The social and political issues addressed include environmental justice and environmental racism, as well as the role of government in implementing environmental law. *Prerequisite: upper-division standing or consent of instructor.*

**198. Directed Group Study (4)**

Directed group research and study, normally with a focus on areas not otherwise covered in the curriculum. *Prerequisite: upper-division standing or consent of instructor. Department stamp required.*

**500. Apprentice Teaching in Environmental Studies (4)**

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty; handling of discussions, preparation and grading of examinations and other written exercises, and student relations. *Prerequisite: graduate standing.*

## Ethnic Studies

OFFICE: Social Science Building, Rm. 201

### Faculty

Charles Briggs, Ph.D., *Professor*  
 Paule Cruz Takash, Ph.D., *Assistant Professor*  
 Yen Le Espiritu, Ph.D., *Associate Professor*  
 Ross Frank, Ph.D., *Assistant Professor*  
 Ramon A. Gutierrez, Ph.D., *Associate  
 Chancellor, Chancellor's Associates Endowed  
 Chair and Professor*  
 Jonathan Holloway, Ph.D., *Assistant Professor*  
 George Lipsitz, Ph.D., *Professor and  
 Department Chair*

Jane Rhodes, Ph.D., *Assistant Professor*  
 Leland Saito, Ph.D., *Assistant Professor*  
 Sandhya Shukla, Ph.D., *Assistant Professor*

### Associated Faculty

James Cheatham, *Emeritus, Music*  
 Matthew Chen, *Linguistics*  
 Steve Cornell, *Sociology*  
 Anthony Curiel, *Theatre*  
 Steve Erie, *Political Science*  
 Claudio Fenner-Lopez, *Emeritus,  
 Communication/Visual Arts*  
 Floyd Gaffney, *Emeritus, Theatre*  
 Harry Hirsch, *Political Science*  
 Jorge Huerta, *Theatre*  
 Arend Lijphardt, *Emeritus, Political Science*  
 James Lin, *Mathematics*  
 Lisa Lowe, *Literature*  
 Cecil Lytle, *Music*  
 George Mariscal, *Literature*  
 Masao Miyoshi, *Literature*  
 Vicente Rafael, *Communication*  
 Edward Reynolds, *History*  
 Ramon Eduardo Ruiz, *Emeritus, History*  
 Marta Sanchez, *Literature*  
 Rosaura Sanchez, *Literature*  
 Faustina Solis, *Emeritus, Urban Studies/  
 Community and Family Medicine*  
 Ricardo Stanton-Salazar, *Sociology*  
 Olga Vasquez, *Communication*  
 Sherley Anne Williams, *Literature*

Ethnic studies is the study of the social, cultural, and historical forces that have shaped the development of America's diverse ethnic peoples over the last 500 years and which continue to shape our future. Focusing on immigration, slavery, and confinement, those three social processes that combined to create in the United States a nation of nations, ethnic studies intensively examines the histories, languages, and cultures of America's racial and ethnic minority groups in and of themselves, in their relationships to each other, and, particularly, in structural contexts of power.

The curriculum of the Department of Ethnic Studies is designed to 1) study intensively the particular histories of different ethnic and racial groups in the United States, especially intra-group stratification; 2) to draw larger theoretical lessons from comparisons among these groups; 3) to articulate general principles that shape racial and ethnic relations both currently and historically; and 4) to explore how ethnic

identity is constructed and reconstructed over time both internally and externally.

A degree in ethnic studies offers training of special interest to those considering admission to graduate or professional schools and careers in education, law, medicine, public health, social work, journalism, business, city planning, politics, psychology, international relations, or creative writing. A major in ethnic studies is designed to impart fundamental skills in critical thinking, comparative analysis, social theory and research analysis, and written expression. These skills will give students the opportunity to satisfy the increasingly rigorous expectations of graduate admissions committees and prospective employers for a broad liberal arts perspective.

An ethnic studies major offers excellent preparation for teaching in the elementary schools. If you are interested in earning a California teaching credential from UCSD, contact the Teacher Education Program for information about the prerequisite and professional preparation requirements. It is recommended that you contact TEP as early as possible in your academic career.

### The Major

To receive a B.A. degree with a major in ethnic studies, students must meet the following requirements:

1. A three-quarter course lower-division sequence (Ethnic Studies 1A-B-C). Ideally this sequence should be taken during the sophomore year as an intensive introduction to the history and theoretical dimensions of ethnic diversity in the United States. Ethnic Studies 1A-B-C, Introduction to Ethnic Studies, will consist of the following three courses: Population Histories of the United States, Immigration and Assimilation in American Life, Race and Ethnic Relations in the United States.
2. A minimum of twelve four-unit upper-division courses in the Department of Ethnic Studies must be completed from the following five categories:
  - A. One four-unit upper-division course that intensively explores the theory and comparative methods of ethnic studies (Ethnic Studies 100: Theories and Methods of



Ethnic Studies). All ethnic studies majors should complete this course before proceeding with the other requirements listed below.

- B. Four upper-division ethnic studies history and social science courses from those listed below:

- ETHN 105: Ethnic Diversity and the City  
 ETHN 106: Ethnoracial Transformations of U.S. Communities  
 ETHN 107: Ethnographic Field Work in Racial and Ethnic Communities  
 ETHN 112: History of Native Americans in the United States  
 ETHN 119: Multiracial Societies in the Americas  
 ETHN 120: Comparative Asian-American History, 1850–1965  
 ETHN 121: Contemporary Asian-American History  
 ETHN 123: Asian-American Politics  
 ETHN 130: Social and Economic History of the Southwest I  
 ETHN 131: Social and Economic History of the Southwest II  
 ETHN 150: Politics of Cultural Pluralism and National Integration  
 ETHN 151: Ethnic Politics in America  
 ETHN 152: Law and Civil Rights  
 ETHN 160: Black Politics and Protest in the Early 20th Century (1885–1941)  
 ETHN 161: Black Politics and Protest Since 1941  
 ETHN 162: Cultural Contact and Exchange  
 ETHN 163: Leisure in Urban America  
 ETHN 165: Sex and Gender in African American Communities  
 ETHN 166: The Black Press and Social Change  
 ETHN 170: Slavery and the Atlantic World  
 ETHN 171: Slavery and Freedom in the Nineteenth-Century United States

ETHN 197: Field Work in Racial and Ethnic Communities\*

ETHN 198: Directed Group Studies\*

ETHN 199: Supervised Independent Study and Research\*

\*Only two will be counted in fulfillment of this requirement.

### Colloquia

ETHN 180: Topics in Mexican-American History

ETHN 181: American Slave Communities in Comparative Perspective

ETHN 182: Segregation, Freedom Movements, and the Crisis of the Twentieth Century

ETHN 183: Gender, Race, Ethnicity, and Class

ETHN 184: Black Intellectuals in the Twentieth Century

ETHN 186: The Ethnic Press in the United States

ETHN 187: Black Nationalism

ETHN 189: Special Topics in Ethnic Studies

- C. At least three upper-division courses that focus on language and ethnicity:

ETHN 140: Language and American Ethnicity

ETHN 141: Language and Culture

ETHN 145: Spanish Language in the United States

ETHN 185: Discourse, Power and Inequality

Due to the limited course offerings in this general area during the 1997–98 academic year, this requirement may be fulfilled by taking either three upper-division courses in language (e.g., Chinese, Vietnamese, Spanish, etc.) or area studies (e.g., Latin American studies, Third World studies, Japanese studies, etc.), or some combination of language and area studies. Students must seek faculty advice on which three upper-division courses would best satisfy this requirement and yield the most rigorous training.

- D. At least three upper-division ethnic studies courses on the literature and cultural expressions of American racial and ethnic minorities:

ETHN 101: Ethnic Images in Film

ETHN 110: Cultural World Views of Native Americans

ETHN 111: Native American Literature

ETHN 122: Asian-American Culture and Identity

ETHN 124: Asian-American Literature

ETHN 132: Chicano Dramatic Literature

ETHN 133: Hispanic-American Dramatic Literature

ETHN 135: Development of Chicano Literature

ETHN 136: Themes and Motifs in Chicano Literature

ETHN 137: Chicano Prose

ETHN 138: Chicano Poetry

ETHN 139: Chicano Literature in English

ETHN 146A: Theatrical Ensemble

ETHN 164: African Americans and the Mass Media

ETHN 168: Comparative Ethnic Literature

ETHN 172: Afro-American Prose

ETHN 173: Afro-American Poetry

ETHN 174: Themes in Afro-American Literature

ETHN 175: Literature of the Harlem Renaissance

ETHN 176: Black Music/Black Texts: Communication and Cultural Expression

ETHN 177: African Heritage in Contemporary Drama: African, Caribbean, and African American

ETHN 178: Introduction to Oral Music

ETHN 179A-B: Music of African Americans

- E. One four-unit field methods course (Ethnic Studies 190: Research Methods: Studying Ethnic and Racial Communities).

3. Since the goal of the Department of Ethnic Studies is to intensively study both the par-

ticular histories of various ethnic and racial groups in the United States and to draw larger theoretical lessons from comparisons among and between groups, students may not fulfill requirements 2B and 2D by focusing all of the seven required courses on only one ethnic or racial group.

### **The Minor**

Students may minor in ethnic studies. Students wishing to minor in ethnic studies must take seven four-unit upper-division courses from the department's offerings. The department offers several options that allow students to take courses about a variety of ethnic groups or about one group. But all students minoring in ethnic studies must enroll in our two courses in analytic and comparative study of ethnicity—Theories and Methods of Ethnic Studies (ETHN 100) and Research Methods: Studying Ethnic and Racial Communities (ETHN 190.) The minor also requires that at least two, but no more than three of the five remaining courses be selected from either the ethnic studies history and social studies courses (listed above as 2B), or the ethnic studies literature and cultural expressions courses (listed above as 2D.) While the language and ethnicity courses currently offered may also be used to satisfy this requirement, foreign language and area studies courses from other departments may not.

Students interested in the African-American experience should consider the following courses:

- ETHN 160: Black Politics and Protest in the Early 20th Century (1885–1941)
- ETHN 161: Black Politics and Protest Since 1941
- ETHN 164: African Americans and the Mass Media
- ETHN 165: Sex and Gender in African American Communities
- ETHN 166: The Black Press and Social Change
- ETHN 170: Slavery in the Atlantic World
- ETHN 171: Slavery and Freedom in Nineteenth Century United States
- ETHN 172: Afro-American Prose
- ETHN 173: Afro-American Poetry

- ETHN 174: Themes in Afro-American Literature
- ETHN 175: Literature of the Harlem Renaissance
- ETHN 176: Black Music/Black Texts: Communication and Cultural Expression
- ETHN 177: African Heritage in Contemporary Drama: African, Caribbean, and African American
- ETHN 179A-B: Music of African Americans
- ETHN 181: American Slave Communities in Comparative Perspective
- ETHN 182: Segregation, Freedom Movements, and the Crisis of the Twentieth Century
- ETHN 184: Black Intellectuals in the Twentieth Century
- ETHN 187: Black Nationalism
- LTEN 188: Contemporary Caribbean Literature
- THHS 153: Dance History: Jazz Dance and Related Ethnic Studies

Students interested in the Chicano Experience should consider the following courses:

- ETHN 132: Chicano Dramatic Literature
- ETHN 133: Hispanic-American Dramatic Literature
- ETHN 135: The Development of Chicano Literature
- ETHN 136: Themes and Motifs in Chicano Literature
- ETHN 137: Chicano Prose
- ETHN 138: Chicano Poetry
- ETHN 139: Chicano Literature in English
- ETHN 145: Spanish Language in the United States
- ETHN 180: Topics in Mexican American History

Students interested in the Asian-American experience should consider the following courses:

- ETHN 120: Comparative Asian-American History
- ETHN 121: Contemporary Asian-American History

- ETHN 122: Asian-American Culture and Identity

- ETHN 123: Asian-American Politics
- ETHN 124: Asian-American Literature

Students interested in the Native American experience should consider the following courses:

- ETHN 110: Cultural World Views of Native Americans
- ETHN 111: Native American Literature
- ETHN 112: History of Native Americans in the United States
- SocD 181i: The Sociology of Indian-White Relations

### **The Graduate Program**

The UCSD Department of Ethnic Studies emphasizes comparative, analytic, and relational study of ethnicity and race in the United States. Our fields of emphasis include intercultural communication and conflict, population histories of the Americas, ethnicity and identity, immigration and assimilation, ethnic politics and social movements, race and racism, urban ethnicity, gender and ethnicity, intellectual and cultural histories of ethnic groups, cultural pluralism, national integration, language and ethnic life, and mass media representations of ethnic identity.

### **Admission**

New students are admitted in the fall quarter of each academic year. Prospective applicants should submit the official application for admission and awards (same form), one set of official transcripts from each institution attended after high school, official scores from the Graduate Record Examination, application fee, at least three letters of recommendation, and one or more samples of the applicant's own writing, such as term papers. Additionally, foreign applicants must submit official scores from the Test of English as a Foreign Language (TOEFL). Applicants are encouraged to visit the department to talk with faculty and graduate students. The application deadline is January 15.

### **Program of Study**

Students are required to enroll as full-time graduate students, to carry a minimum enroll-

ment of twelve units of graduate-level courses each quarter, and to maintain a grade-point average of 3.2 or better. To obtain an M.A. degree students must take fifty-one units of course work and write a master's thesis.

### **Core Curriculum Sequence Requirements**

1. **Ethnic Studies 200A-B-C, Core Seminar**  
All graduate students will be required to take the introductory three-quarter core seminar (four units each, twelve units total) during their first year in the program. This course covers ethnic studies methodology and theory, the history of ethnic studies, and controversies in ethnic studies.
2. **Ethnic Studies 210A-B, Research Seminar**  
During the first and second year of graduate study, all students will be required to take two (2) two-quarter research seminars, (four units each, sixteen units total). Research seminars teach students to design and execute research on areas of focused research within ethnic studies. Objects of study will vary as the course is taught by different instructors.
3. **Ethnic Studies 230, Department Colloquium**  
During the first two years of graduate study, all students will be required to enroll in three one-quarter colloquia required by the department. In Ethnic Studies 230, department faculty and visiting lecturers will make presentations about research in progress in our field. This colloquium is a one-unit course and must be taken for a total of three quarters.
4. **Ethnic Studies 240, Disciplinary Methods**  
During the first two years of graduate study, students must enroll in two (2) four-unit disciplinary methods courses. The first course must be Ethnic Studies 240; Advanced Theories and Methods of Ethnic Studies. Depending upon the student's research interests, the second course will be selected (in consultation with the student's graduate adviser) from those graduate methods courses offered by UCSD Humanities and Social Science Departments.
5. **Ethnic Studies 290A-B, Master's Thesis Preparation**  
Students are required to write a master's thesis as part of the requirements for the

master of arts in ethnic studies. Students should enroll in thesis preparation courses in the winter and spring quarters of the second year of graduate studies.

### **6. Ethnic Studies 295A-B-C, Dissertation Seminar**

By the end of their fourth year, all candidates for the Ph.D. degree must take Ethnic Studies 295A-B-C, the Dissertation Seminar. This is a three-quarter seminar about all phases of dissertation research and writing. Students will begin their dissertations while taking this seminar.

### **Foreign Language Requirement**

Competence in one or more foreign languages is encouraged but not required at the M.A. level. All doctoral candidates must satisfy the department's graduate committee that they have adequate linguistic competence in one foreign language relevant to their area of research by translating three pages of scholarly text written in the designated foreign language. The graduate committee may waive the language requirement and test the candidate on other specialized skills in instances where knowledge of a foreign language is not relevant to the candidate's areas of research.

### **Instruction in Quantification**

The department encourages graduate students to employ quantitative methods where appropriate. Instruction in quantitative methods can fulfill elective requirements; recommended courses include Sociology 205 and 206—Survey and Demographic Methods, Political Science 270—Quantitative Methods in Political Science. In cases where a reading knowledge of evidence assembled through quantitative methods would be useful, students who obtain the permission of the director of Graduate Studies may fulfill elective requirements by taking no more than two selected undergraduate courses including Sociology 103—Computer Applications to Data Management in Sociology, Sociology 107—Demographic Methods, Sociology 108—Quantitative Analysis of Survey Data, Sociology 109—Quantitative Analysis of Sociological Data, Political Science 170—Quantitative Political Science, among others.

### **The Master's Degree**

Students entering the ethnic studies doctoral program must first complete a master's degree

before continuing toward the doctorate. University regulations prohibit entering students who already have a master's degree in ethnic studies from receiving a second master's degree. Nonetheless, students who are admitted to the ethnic studies doctoral program with a master's degree must complete all the requirements for the ethnic studies master of arts degree. The M.A. will also be a terminal degree for those students denied admission to candidacy.

To obtain the M.A. degree, students must complete the department's course requirements satisfactorily. At the end of the second year in the graduate program, students must submit a written thesis to their Master's Thesis Committee (MTC). The committee will assess the quality of the work and determine whether it demonstrates the likelihood of success in conducting doctoral research.

The final decision regarding the M.A. degree is based on grades, the master's thesis, and yearly faculty evaluations. The Graduate Program Committee awards three possible grades: Pass, M.A. Only, and No Pass. All passing students (with the exception of those who already have a master's degree in ethnic studies from another institution) receive the master of arts degree and proceed in their course of studies for the doctorate. Students who receive M.A. Only evaluations gain the master's degree but may not continue in the department's Ph.D. program. Students who receive a No Pass evaluation must withdraw from the program without a graduate degree.

The master's degree is earned as one of the requirements for the Ph.D. and is based on the quality of the student's work during the first two years in the graduate program. At the end of the second year, students are evaluated by the Graduate Program Committee for the master's degree. At that time, the committee (GPC) ascertains the student's suitability for doctoral work and recommends either advancement to Ph.D. work or termination.

### **Requirements for the Qualifying Examinations**

When students complete all the core curriculum requirements and have taken five four-unit elective courses in appropriate areas or disciplines, they are eligible to take the qualifying examination for the Ph.D. degree. Students will be encouraged to take the exam by the end of

their third year in the program, but this examination must be completed by the end of the student's fourth year in the program. The qualifying exam is both written and oral; it consists of two parts. Part one tests the student's basic competence and knowledge of ethnic studies scholarship as spelled out in the Department of Ethnic Studies required graduate reading list. The reading list will be distributed to every student entering the graduate program. Over the next three years, students are required to read all of these books and articles, and to have their mastery of these readings tested during the qualifying examination. Part two of the examination requires the submission of a dissertation prospectus. The dissertation prospectus is a written document that 1) specifies the dissertation research topic; 2) places the dissertation research in the context of the relevant literature in the field; 3) identifies the significance of the project as original discovery scholarship; 4) explains and justifies the research methods to be employed; 5) establishes the feasibility of the research and identifies the primary sources or data bases to be used; 6) indicates the anticipated steps leading to completion of the project; and 7) provides a timetable for the research and writing phases of the project.

The Doctoral Committee consists of five persons proposed by the student and accepted by the department chair and the office of Graduate Studies and Research according to graduate council regulations. A sixth member of the committee may be added with the approval of the department chair. Students are expected to select the chair of their examination committee by the winter quarter of the third year of study. The chair of the Ph.D. Examination Committee serves as the student's adviser for the remainder of the student's graduate program. Three of the Examination Committee members must be Department of Ethnic Studies faculty; the other two must be from other departments.

Fourteen days before the scheduled qualifying examination, the student must submit the written dissertation prospectus to the examination committee. On this same day, the student will receive from the chair of the examination committee a three-question written exam testing knowledge of the required graduate reading list. Seven days before the scheduled

qualifying examination, the student must submit written answers to the questions that have been posed, distributing copies of these essays to all examination committee members. A two-hour oral examination will occur on the appointed date. At the two-hour oral exam, the student will answer questions posed by the committee about the student's dissertation prospectus, mastery of the required graduate reading list, answers to the written part of the exam, and comprehensive knowledge of ethnic studies scholarship. Based on written papers and on oral performance, three possible grades will be selected by the examination committee: No Pass, Pass, and High Pass. Students who receive a No Pass must retake the qualifying examination within one year and obtain a Pass grade to remain in the doctoral program.

### **The Doctoral Dissertation**

Once students pass the qualifying exam, they may begin dissertation research. Students are expected to consult with their committee members on a regular basis during the research process. All Ph.D. candidates must take Ethnic Studies 295A-B-C by the end of their fourth year.

All doctoral students will be evaluated annually by the doctoral committee and given a written report signed by the thesis adviser according to campus policy.

When the dissertation has been substantially completed and once committee members have had the opportunity to review drafts of the written work, the committee meets (with or without the student present at the discretion of the committee chair) to consider the progress made and to identify concerns, changes to be made, or further research to be done. Once the committee members are substantially satisfied with the written work, the student, in consultation with the committee, schedules the oral defense of the dissertation. By university regulation, the defense is open to the public.

The final version of the dissertation must be approved by each member of the doctoral committee. Having successfully defended the dissertation in oral examination, the student is eligible to receive the Ph.D. degree. The final version of the dissertation is then filed with the university librarian via the office of Graduate Studies and Research. Acceptance of the dissertation by the university librarian is the final step in completing all requirements for the Ph.D.

### **Departmental Ph.D. Time Limits Policy**

Pre-candidacy status, that is, the registered time before a student passes the qualifying examination and thereby advances to Ph.D. candidacy, may not exceed four years. Normative time for a Ph.D. in ethnic studies is six years. Normative time is defined as that period of time in which students under normal circumstances are expected to complete their doctoral program. To provide an incentive for students to complete the Ph.D. within normative time, students will only be eligible for departmental financial support for six years (eighteen quarters). By university policies, the doctoral dissertation must be submitted and defended within eight years. To meet this normative time limit, and to meet departmental requirements, students must complete the Qualifying Examination by the end of the fourth year.

In the spring quarter each year, the Graduate Program Committee will assess the progress of each pre-candidacy student on the basis of evaluations submitted by three faculty members chosen by the student. The committee will establish that the student is in good standing, recommend additional course work, or recommend dismissal. The committee may wish to meet with some students in person to discuss the student's evaluation and progress toward the degree.

## **COURSES**

### **LOWER-DIVISION**

#### **1A. Introduction to Ethnic Studies: Population Histories of the United States (4)**

This course examines the comparative historical demography of what is today the United States, focusing on the arrival, growth, distribution, and redistribution of immigrants from Asia, Europe, Africa, and Latin America.

#### **1B. Introduction to Ethnic Studies: Immigration and Assimilation in American Life (4)**

A history of immigration to the United States from colonial times to the present, with emphasis on the roles of ethnic and racial groups in economics, power relations between dominant and subordinate groups, and contemporary ethnic and racial consciousness.

#### **1C. Introduction to Ethnic Studies: Race and Ethnic Relations in the United States (4)**

This course examines the theoretical literature on race and ethnicity, focusing on issues of domination and subordination, and the historical emergence of racism and ethnic conflict. At-

tention is given to class and gender differences within racial and ethnic groups.

#### 90. Undergraduate Seminar (1)

A seminar intended for exposing undergraduate students, especially freshmen and sophomores, to exciting research programs conducted by department faculty. Enrollment is limited.

### UPPER-DIVISION

*Prerequisite: upper-division standing or consent of instructor.*

#### 100. Theories and Methods in Ethnic Studies (4)

An introduction to research in ethnic studies with special emphasis on theories, concepts, and methods. Students will explore how racial and ethnic categories are shaped by gender, class, and regional experiences and will study ethnicity and race in comparative perspective.

#### 101. Ethnic Images in Film (4)

An upper-division lecture course studying representations of ethnicity in the American cinema. Topics include ethnic images as narrative devices, the social implications of ethnic images, and the role of film in shaping and reflecting societal power relations.

#### 105. Ethnic Diversity and the City (4)

This course will examine the city as a crucible of ethnic identity exploring both the racial and ethnic dimensions of urban life in the U.S. from the Civil War to the present.

#### 106. Ethnoracial Transformations of U.S. Communities (4)

Course examines the rapid growth of ethnic/racial minority populations in U.S. cities; how long-term residents respond to these ethnoracial transformations; how ethnic/racial groups are/are not being incorporated into American institutions; and implications of these transformations for the nation.

#### 107. Ethnographic Field Work in Racial and Ethnic Communities (4)

This is a research methods course examining social, economic, and political issues in ethnic and racial communities through ethnographic field work that places the researcher directly into the social world under study. Topics are examined through field work and library research. (Cross-listed with USP 130.)

#### 110. Cultural World Views of Native Americans (4)

Using interdisciplinary methods, this course examines the cultural world views of various Native American societies in the United States through an exploration of written literary texts and other expressive cultural forms such as dance, art, song, religious and medicinal rituals.

#### 111. Native American Literature (4)

This course analyzes Native American written and oral traditions. Students will read chronicles and commentaries on published texts, historic speeches, trickster narratives, oratorical and prophetic tribal epics, and will delve into the methodological problems posed by tribal literature in translation.

#### 112. History of Native Americans in the United States (4)

This course examines the history of Native Americans in the United States, with emphasis on the lifeways, mores, warfare, and relations with the United States government. Attention is given to the background and evolution of acculturation up to the present day.

#### 119. Multiracial Societies in the Americas (4)

This course explores the genesis, evolution, and contradictions of racially heterogeneous societies in the Americas, from European conquest to the present. Topics: the social history of Indians, blacks, Asians, and their interactions with Europeans, and racial, sexual, and class divisions.

#### 120. Comparative Asian-American History 1850-1965 (4)

Using comparative methods of analysis, this course will examine the historical experience of Asian-Americans in areas such as immigration, settlement patterns, labor, economic development, race relations, community institutions, and occupational patterns between 1850 and 1965.

#### 121. Contemporary Asian-American History (4)

The course will study changes in Asian-American communities as a result of renewed immigration since 1965; the influx of refugees from Vietnam, Kampuchea, and Laos; the impact of contemporary social movements on Asian-Americans' current economic, social, and political status.

#### 122. Asian-American Culture and Identity (4)

A survey of Asian-American cultural expressions in literature, art, and music to understand the social experiences that helped forge Asian-American identity. Topics: culture conflict, media portrayals, assimilation pressures, the model minority myth, and interethnic and class relations.

#### 123. Asian-American Politics (4)

This course will examine the development of Asian-American politics by studying the historical and contemporary factors, such as political and economic exclusion, that have contributed to the importance and complexity of ethnicity as a mobilizing force in politics.

#### 124. Asian-American Literature (4)

Selected topics in the literature by men and women of Asian descent who live and write in the United States. May be repeated for credit when topics vary. (Cross-listed with LTEN 181.)

#### 130. Social and Economic History of the Southwest I (4)

This course examines the history of the Spanish and Mexican Borderlands (what became the U.S. Southwest) from roughly 1400 to the end of the U.S.-Mexican war in 1848, focusing specifically on the area's social, cultural, and political development. (Cross-listed with HIUS 158.)

#### 131. Social and Economic History of the Southwest II (4)

This course examines the history of the American Southwest from the U.S.-Mexican War in 1846-48 to the present, focusing on immigration, racial and ethnic conflict, and the growth of Chicano national identity. (Cross-listed with HIUS 159.)

#### 132. Chicano Dramatic Literature (4)

Focusing on the contemporary evolution of Chicano dramatic literature, the course will analyze playwrights and theatre groups that express the Chicano experience in the United States, examining relevant acts, plays, and documentaries for their contributions to the developing Chicano theatre movement. (Cross-listed with THHS 110.)

#### 133. Hispanic-American Dramatic Literature (4)

This course examines the plays of leading Cuban-American, Puerto Rican, and Chicano playwrights in an effort to understand the experiences of these Hispanic-American groups in the United States. (Cross-listed with THHS 111.)

#### 135. Development of Chicano Literature (4)

A cross-genre survey of major works in Chicano literature from its beginning to the present with primary emphasis on contemporary works. Speaking, writing, and reading knowledge of Spanish is required. (Cross-listed with Lit/Sp 150.)

#### 136. Themes and Motifs in Chicano Literature (4)

This course is organized around some of the significant themes and ideas expressed in specific Chicano writings. The importance of these themes to particular Chicano experience is considered. Speaking, writing, and reading knowledge of Spanish is required. (Cross-listed with Lit/Sp 151.)

#### 137. Chicano Prose (4)

A study of the different genres of Chicano prose: novel, short story, poetry, autobiography. Attention is given to Chicano prose styles and the historical and cultural movement in which they develop. Speaking, writing, and reading knowledge of Spanish is required. (Cross-listed with Lit/Sp 152.)

#### 138. Chicano Poetry (4)

An analysis and discussion of major forms and modes of Chicano poetry, with primary emphasis on the developing styles of the poets and on the study of texts' and authors' historical moments. Speaking, writing, and reading knowledge of Spanish is required. (Cross-listed with Lit/Sp 153.)

#### 139. Chicano Literature in English (4)

Introduction to the literature in English by the Chicano population, the men and women of Mexican descent who live and write in the United States. The primary focus is the contemporary period. (Cross-listed with Lit/En 180.)

#### 140. Language and American Ethnicity (4)

This course examines the intersection of language and ethnicity in the United States, focusing on the social and political impact of bilingualism, ethnically based English dialects, and standard and nonstandard English.

#### 141. Language and Culture (4)

A critical review of conceptions of language and how they have been deployed in constructing images of culture, race, ethnicity, gender, sexuality, and class. Topics include cultural and linguistic relativism, structuralism, symbolic and cognitive approaches, ethnomethodology, sociolinguistics, ethnography of speaking, performance, and ethnopoetics.

#### 145. Spanish Language in the United States (4)

A sociolinguistic study of the popular dialects in the United States and their relation to other Latin American dialects. The course will cover phonological and syntactic differences between the dialects as well as the influence of English on the Southwest dialects. (Cross-listed with Lit/Sp 162.)

#### 146A. Theatrical Ensemble (4-4)

An intensive theatre practicum designed to generate theatre created by an ensemble, with particular emphasis upon the analysis of text. Students will explore and analyze scripts and authors. Ensemble segments include: black theatre, Chicano theatre, feminist theatre, commedia dell'arte theatre. (Cross-listed with THAC 120.)

#### 150. Politics of Cultural Pluralism and National Integration (4)

This course comparatively analyzes the problems posed by subnational loyalties founded on ethnic, linguistic, racial, religious, and caste identities in Asia, Africa, Europe, and the Western Hemisphere. Particular attention will be given to the processes of national integration in multicultural politics.

#### 151. Ethnic Politics in America (4)

This course will survey the political effects of immigration, ethnic mobilization, and community building in America, and the contemporary role of ethnicity in politics and intergroup relations.

#### 152. Law and Civil Rights (4)

In this course students explore the relationship between race, class, and law as it applies to civil rights both in an historical and a contemporary context. Topics include racism and the law, history of the 14th Amendment, equal protection, school desegregation, and affirmative action.

#### 160. Black Politics and Protest 1885-1941 (4)

An examination of the evolution of black thought and activism from Booker T. Washington's Atlanta Exposition Address to A. Philip Randolph's March on Washington Movement. Particular attention paid to black institutions and their relationship to the federal government.

**161. Black Politics and Protest Since 1941 (4)**

Discussion of black social, political, and intellectual experiences since the publication of Richard Wright's *Native Son*. Close examination of blacks' involvement in and relationships to Second World War, Cold War, Civil Rights Movement, Black Power Movement, Reagan Revolution, and Underclass Debate.

**162. Cultural Contact and Exchange (4)**

An examination of the comparative histories of cultural contact and exchange between indigenous peoples and "outsiders." Particular attention will be paid to the way in which social hierarchy and cultural belief systems guide the balance of power between dissimilar societies.

**163. Leisure in Urban America (4)**

Historical examination of how leisure has shaped the American urban landscape. Course will explore connections between spectator sports and the rise of "urban mentalities"; sports franchises, urban redevelopment schemes, and racial and ethnic communities; and sports mythology and civil pride.

**164. African Americans and the Mass Media (4)**

This course will examine the media representations of African Americans from slavery through the twentieth century. Attention will be paid to the emergence and transmission of enduring stereotypes, and their relationship to changing social, political, and economic frameworks in the United States. The course will also consider African Americans' responses to and interpretations of these mediated images.

**165. Sex and Gender in African American Communities (4)**

This course will investigate the changing constructions of sex, gender, and sexuality in African American communities defined by historical period, region, and class. Topics will include the sexual division of labor, myths of black sexuality, the rise of black feminism, black masculinity, and queer politics.

**166. The Black Press and Social Change (4)**

An investigation of the black press—including newspapers, periodicals, and electronic media—as agents for social change in African American history. The course will consider the changing cultural and political functions of the black press, economic forces, and the work of influential journalists, artists, and intellectuals.

**168. Comparative Ethnic Literature (4)**

A lecture-discussion course that juxtaposes the experience of two or more U.S. ethnic groups and examines their relationship with the dominant culture. Students will analyze a variety of texts representing the history of ethnicity in this country. Topics will vary.

**170. Slavery and the Atlantic World (4)**

An examination of the emergence and consolidation of slave societies in regions of the Caribbean and British North America from the seventeenth through the early nineteenth centuries. (Cross-listed with HIUS 135.)

**171. Slavery and Freedom in the Nineteenth Century (4)**

An examination of social, cultural, and political dimensions of the transition from slave to wage labor in the era of the Civil War, Reconstruction, and the Gilded Age. (Cross-listed with HIUS 136.)

**172. Afro-American Prose (4)**

Students will analyze and discuss the novel, the personal narrative, and other prose genres, with particular emphasis on the developing characters of Afro-American narrative and the cultural and social circumstances that influence their development. (Cross-listed with Lit/En 183.)

**173. Afro-American Poetry (4)**

A close reading and analysis of selected works of Afro-American poetry as they reflect styles and themes that recur in the literature. (Cross-listed with Lit/En 184.)

**174. Themes in Afro-American Literature (4)**

This course focuses on the influence of slavery upon African American writers. Our concern is not upon what slavery was but upon what it is within the works and what these texts reveal about themselves, their authors, and their audiences. (Cross-listed with Lit/En 185.)

**175. Literature of the Harlem Renaissance (4)**

The Harlem Renaissance (1917–39) focuses on the emergence of the "New Negro" and the impact of this concept on black literature, art, and music. Writers studied include Claude McKay, Zora N. Hurston, and Langston Hughes. Special emphasis on new themes and forms. (Cross-listed with Lit/En 186.)

**176. Black Music/Black Texts: Communication and Cultural Expression (4)**

This course explores the role of music as a traditional form of communication among Africans, Afro-Americans, and West Indians. Special attention given to poetry of black music, including blues and other forms of vocal music expressive of contestatory political attitudes. (Cross-listed with Lit/En 187.)

**177. African Heritage in Contemporary Drama: African, Caribbean, and African American (4)**

From Lorraine Hansberry's *Raisin in the Sun* to the latest plays of Ed Bullins, black drama has mirrored and, occasionally, forecast the mood and aspirations of black people in America. The course examines plays, playwrights, and participants in contemporary black theatre. (Cross-listed with THHS 109.)

**178. Introduction to Oral Music (4)**

An introductory study of oral music in Western and non-Western cultures, with emphasis on the impact of oral transmission of ideas and customs, and the nature of improvisation in various indigenous cultures. Music studied includes Afro-American, African, Asian, and Oceanian. (Cross-listed with Music 126.)

**179A-B. Music of African Americans (4-4)**

The first quarter of this course will investigate the vocal music of African American culture, primarily the development of the spiritual and the blues traditions, while the second quarter will critically study the history of jazz in America. (Cross-listed with Music 127A-B.)

**Colloquia**

**180. Topics in Mexican-American History (4)**

This colloquium studies the racial representation of Mexican-Americans in the United States from the nineteenth century to the present, examining critically the theories and methods of the humanities and social sciences. (Cross-listed with HIUS 167.)

**181. American Slave Communities in Comparative Perspective (4)**

A reading and discussion seminar that explores topics related to the emergence, consolidation, and destruction of plantation slave regimes in regions of the Caribbean and the United States. Topics will vary. (Cross-listed with HIUS 164.)

**182. Segregation, Freedom Movements, and the Crisis of the Twentieth Century (4)**

A reading and discussion seminar that views the origins of segregation and the social movements that challenged it between 1890 and 1970 in a comparative framework. (Cross-listed with HIUS 165.)

**183. Gender, Race, Ethnicity, and Class**

Gender is often neglected in studies of ethnic/racial politics. This seminar explores the relationship of race, ethnicity, class, and gender by examining the participation of working class women of color in community politics and how they challenge mainstream political theory.

**184. Black Intellectuals in the Twentieth Century (4)**

An analysis of black cultural and intellectual production since 1895. Course will explore how race and race-consciousness have influenced the dialogue between ideas and social experience; and how other factors—i.e., age, gender, and class—affected scholars' insights.

**185. Discourse, Power, and Inequality (4)**

While discourse analysis has transformed numerous disciplines, a gap separates perspectives that envision discourse as practices that construct inequality from approaches which treat discourse as everyday language. This course engages both perspectives critically in analyzing law, medicine, and popular culture.

**186. The Ethnic Press in the United States (4)**

Readings and research on news media institutions established in ethnic communities since the nineteenth century. The course will trace the emergence, development, and longevity of ethnic presses, their role in cultivating and maintaining ethnic identity, and their attempts to respond to and resist images in mainstream media.

**187. Black Nationalism (4)**

This course will investigate the ideologies and practices of black nationalist movements in the United States and/or across the black Diaspora, focusing on their political philosophy, political culture, and gender and class structure.

**189. Special Topics in Ethnic Studies (4)**

A reading and discussion course that explores special topics in ethnic studies. Themes will vary from quarter to quarter; therefore, course may be repeated for credit.

**Seminars and Independent Studies**

**190. Research Methods: Studying Racial and Ethnic Communities (4)**

The course offers students the basic research methods with which to study ethnic and racial communities. The various topics to be explored include human and physical geography, transportation, employment, economic structure, cultural values, housing, health, education, and intergroup relations.

**197. Fieldwork in Racial and Ethnic Communities (4)**

This course comprises supervised community fieldwork on topics of importance to racial and ethnic communities in the greater San Diego area. Regular individual meetings with faculty sponsor and written reports are required. (May be repeated for credit.)

**198. Directed Group Studies (4)**

Directed group study on a topic or in a field not included in the regular department curriculum by special arrangement with a faculty member. (May be repeated for credit.)

**199. Supervised Independent Study and Research (4)**

Individual research on a topic that leads to the writing of a major paper. (May be repeated for credit.)

**GRADUATE**

**200A. History of Ethnic Studies (4)**

This course charts the origins of ethnic studies research, the emergence of dominant paradigms, and the history of race and ethnic issues across and within disciplines.

**200B. Theories and Methods of Ethnic Studies (4)**

A critical exploration of the ways in which theories and methods of ethnic studies have constituted as well as analyzed knowledge and ethnic identity.



**200C. Controversies in Ethnic Studies (4)**

This course is structured around contemporary events and debates over theories, methods, and objects of inquiry in ethnic studies.

**210A-B. Research Seminar in Ethnic Studies (4-4)**

This course is a two-quarter research sequence in ethnic studies. The first quarter will cover selected topics of importance in the field of racial and ethnic studies, as well as introduce students to the practice of original discovery research. The second quarter is devoted to the writing of a major research paper in the field. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter.

**230. Departmental Colloquium (1)**

This course is a forum for the presentation of recent research by guests, faculty, and students. This course may be repeated three times for credit.

**240. Advanced Theories and Methods in Ethnic Studies (4)**

This course explores the nature and content of disciplinary boundaries in the social sciences and humanities, and looks at the intersections between and among fields of study.

**250. Panethnicity in the United States (4)**

This course compares and contrasts the experiences of the major panethnic groups in the United States, paying particular attention to the construction of ethnicity within contexts of power.

**251. Cultural Pluralism and National Integration (4)**

This course explores the ways in which nations and states around the world have imagined and managed the linguistic, racial, and religious differences of their citizens.

**252. Ethnic Leadership in Comparative Perspective (4)**

Readings and discussion on political and intellectual leadership in racial and ethnic communities. A critical focus will be placed on the tensions underlying leadership formation.

**253. Mass Media and Ethnic Identity (4)**

This course examines the ways that ethnic identity influences the practices of mass media, and the ways in which mass media shape and reflect ethnic identity.

**254. Race and Racism (4)**

This course examines inequality based on race with a focus on the institutions, symbols, and social practices which structure and maintain racism. Particular attention is given to laws and social policy which reinforce racial inequality.

**255. Diaspora, Migration, and Return in the Post-Fordist Age (4)**

This course studies the relationship between the transnational economy, new technologies, and mass migration in the contemporary world.

**256. Gender, Sexuality, and Ethnic Identity (4)**

This course studies the body cross-culturally as a site for the construction of gender, sex, ethnic, and racial identities.

**257A-B. Language, Inequality, Modernity (4-4)**

A critical review of the role that theories of language and discursive practices have played in the construction of modernity and the legitimization of social inequality. First quarter covers the seventeenth century through 1970. The second quarter covers 1970 through the present.

**258. Ethnic Conflict and Cooperation (4)**

This course critically examines theories and research on racial and ethnic relations. In particular, it will address how such relations are linked to, and emerge from, everyday activities and structural factors.

**259. Comparative Conquests, Colonization, and Resistance in the Americas (4)**

This course will offer a comparative survey of the impact of European interactions with Native nations and populations in the New World, from Peru to Canada. Readings will emphasize modes of initial interaction, patterns of European colonization, and Native adaptation and resistance, and broader changes in Native culture and cosmology as a result of conquest and colonization.

**289. Topics in Ethnic Studies Research (4)**

This course is a research seminar on themes of contemporary and historic importance in ethnic studies. Themes will be determined by instructor. Course may be repeated three times for credit.

**290A-B. Master's Thesis Preparation (4-4)**

All graduate students are required to write a master's thesis as part of the requirements for the master of arts in ethnic studies. Students should enroll in the thesis preparation courses in the winter and spring quarters of the second year of graduate studies.

**295A-B-C. Dissertation Seminar (4-4-4)**

For students advanced to doctoral candidacy. It will include discussion, criticism, and revision of dissertation drafts, and of work to be submitted for publication.

**298. Directed Reading (1-12)**

This is an independent research or individual guided tutorial in an area not covered by present course offerings. This course may be repeated for an indefinite number of times due to the independent nature of the content of the course.

**299. Thesis Research (1-12)**

Open to graduate students conducting doctoral thesis research. This course may be repeated for an indefinite number of times due to the independent nature of thesis research and writing.

**500. Apprentice Teaching in Ethnic Studies (4)**

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty: handling of discussions, preparation and grading of examinations and other written exercises, and student relations.

implications and ramifications of health care issues, policies, and delivery systems. Students gain an understanding of how the economy, culture, technology, sociological and psychological processes influence modern health care. Although it is administered by Warren College, it is available to all UCSD students with a general interest in health care as well as to students considering health care careers. This minor offers UCSD students the opportunity to examine health care-related issues from the perspectives of a wide range of disciplines, including anthropology, contemporary issues, economics, philosophy, psychology, sociology, urban studies, and science and technology. By bringing together course work from these academic departments, this interdisciplinary curriculum offers a breadth of intellectual experience that enhances students' undergraduate education and their preparation for professional and postgraduate education in health care professions.

Students should consult an academic adviser in their college provost's office to determine how the health care-social issues minor can best meet their college's graduation requirements. Declarations (forms officially designating health care-social issues a minor and listing the specific course work selected by the student) and petitions (forms requesting changes in or exceptions to course requirements) for the health care-social issues minor must first be reviewed and approved by the coordinator of Interdisciplinary Programs and then by the student's college academic advising office.

Students are strongly urged to supplement the health care-social issues minor with a health-related internship. The Academic Internship Program offers internship placements in clinical settings and with medical research teams that provide valuable experience, career clarification, and an opportunity to apply theories learned in course work. Juniors and seniors with at least a 2.5 overall grade-point average (some placements require a 3.0 G.P.A.) are eligible and can earn from four to sixteen units of academic credit for the internship experience.

Further information on related programs and activities is available at the Interdisciplinary Programs Office, Literature Building, Second Floor, Room 3238, Warren College, or call (619) 534-1704.

## Greek Literature

See Literature.

## Health Care— Social Issues

OFFICE: Interdisciplinary Programs, Literature Building, Second Floor, Room 3238, Warren College

Health care-social issues is an interdisciplinary minor designed to enhance students' competence in analyzing complex social and ethical

### Health Care—Social Issues Minor Requirements

The minor consists of seven courses (three required and four electives). At least five courses must be taken at the upper-division level. Students who entered UCSD prior to January 1, 1998 are required to take six courses (three required, three electives, and four must be upper-division). Upper-division courses must not overlap with courses in the student's major and must be distributed in two or more disciplines. A lower-division elective course that is not health-related but is a prerequisite to an upper-division course, must be followed by the health-related upper-division course in the same department. For full descriptions of the following courses, please see departmental listings.

The health care—social issues minor is applicable as a Warren College program of concentration in the social sciences.

#### Required Courses

- Sociology/L 40—Sociology of Health Care Issues
- Philosophy 163—Bio-Medical Ethics

One course in Urban Studies and Planning chosen from the following:

- 143—The U.S. Health Care System
- 144—Environmental and Preventive Health Issues
- 145—Aging: Social and Health Policy Issues
- 147—Case Studies in Health Care Programs: The Poor and Underserved

(Additional Urban Studies and Planning courses may be taken to fulfill elective requirements in the minor.)

#### Elective Course Options

Four courses (three before January 1, 1998) to be chosen from the following list. At least three (two before January 1, 1998) must be upper-division and must not overlap with courses in the student's major.

#### Anthropology

##### Lower-Division

- 1—Introduction to Culture
- 2—Human Origins

#### General

- 128—The Anthropology of Medicine
- 191—Seminar in Medical Anthropology

#### Contemporary Issues

- 22—Human Sexuality
- 40—The AIDS Epidemic
- 136—The Anthropology of Medicine
- 181—Seminar in Medical Anthropology

#### Economics

- 1A-B—Elements of Economics
- 138A-B—Economics of Health

#### Philosophy

- 147—Philosophy of Biology
- 148—Philosophy and the Environment
- 151—Philosophy of Neuroscience
- 162—Contemporary Moral Issues
- 164—Technology and Human Values
- 165—Professional Ethics
- 190—Special Topics  
(prior approval of topic required)

#### Psychology

- 1—Psychology
- 2—General Psychology: Biological Foundations
- 60—Introduction to Statistics
- 104—Introduction to Social Psychology
- 124—Introduction to Clinical Psychology
- 153—Clinical Psychology
- 154—Behavior Modification
- 155—Social Psychology and Medicine
- 163—Abnormal Psychology
- 168—Psychological Disorders of Childhood
- 169—Brain Damage and Mental Function
- 179—Drug Addiction and Mental Disorders
- 181—Drugs and Behavior

#### Science, Technology, and Public Affairs

- 181—Elements of International Medicine

#### Sociology

##### Lower-Division

- 1A, 1B—The Study of Society

##### Cluster B

- 120S—Special Topics in Culture, Language, and Social Interaction (prior approval of topic required)
- 143—Suicide

#### Cluster C

- 135—Medical Sociology
- 136A—Sociology of Mental Illness: Historical Approach
- 136B—Sociology of Mental Illness in Contemporary Society
- 159—Special Topics in Social Organizations and Institutions (prior approval of topic required)

#### Urban Studies and Planning

- 143—The U.S. Health Care System
- 144—Environmental and Preventive Health Issues
- 145—Aging: Social and Health Policy Issues
- 147—Case Studies in Health Care Programs: The Poor and Underserved

#### Recommended Internship Experience

Health care-related internship (AIP 197): to be arranged at least one quarter in advance through the Academic Internship Program, Literature Building, Second Floor, Warren College. Clinical and research placements are available. For each four units of credit, ten hours per week for one quarter plus a ten-page research paper are required.

## Hebrew Literature

See Literature.

## History

OFFICE: Room 5016, Humanities and Social Sciences Bldg., Muir College

#### Professors

Robert S. Edelman, Ph.D.  
Joseph W. Esherick, Ph.D., *Hsiu Professor of Chinese Studies*  
David Noel Freedman, Ph.D., *Endowed Chair, Biblical Studies*  
David M. Goodblatt, Ph.D., *Endowed Chair, Judaic Studies*

Steven Hahn, Ph.D., *Academic Senate Distinguished Teaching Award*

Judith M. Hughes, Ph.D.  
David S. Luft, Ph.D.  
Michael P. Monteón, Ph.D.  
Alden A. Mosshammer, Ph.D.  
Michael E. Parrish, Ph.D.  
Paul G. Pickowicz, Ph.D.  
Edward Reynolds, Ph.D.  
David R. Ringrose, Ph.D.  
Eric Van Young, Ph.D.  
Robert S. Westman, Ph.D.

### Associate Professors

Michael A. Bernstein, Ph.D., *Chair*  
Dain E. Borges, Ph.D.  
Takashi Fujitani, Ph.D.  
David G. Gutiérrez, Ph.D., *Academic Senate Distinguished Teaching Award*  
Christine Hünefeldt, Ph.D.  
Hasan Kayali, Ph.D.  
Rachel Klein, Ph.D.  
John A. Marino, Ph.D.  
Stephanie McCurry, Ph.D.  
Michael Meranze, Ph.D.  
William H. Propp, Ph.D.  
Pamela B. Radcliff, Ph.D., *Vice Chair*  
Stefan A. Tanaka, Ph.D.  
Cynthia M. Truant, Ph.D.

### Assistant Professors

Nancy Caciola, Ph.D.  
Marta Hanson, Ph.D.  
Becky M. Nicolaidis, Ph.D.  
Stephanie E. Smallwood, Ph.D. (*Acting*)

### Lecturer with Security of Employment

Ping C. Hu

### Adjunct Faculty

Michal Belknap, Ph.D., *Professor, Cal. Western School of Law*  
Amy Bridges, Ph.D., *Professor, Political Science*  
Suzanne Cahill, Ph.D., *Associate Adjunct Professor*  
William F. Deverell, Ph.D., *Associate Adjunct Professor, California Institute of Technology*  
Paul Drake, Ph.D., *Professor, Political Science and Institute of the Americas Chair for Inter-American Affairs*  
Steve Erie, Ph.D., *Associate Professor, Political Science*

Ramón Gutierrez, Ph.D., *Professor, Ethnic Studies and Chancellor's Associates Endowed Chair*

Peter H. Smith, Ph.D., *Professor, Political Science and Simón Bolívar Chair in Latin American Studies*

### Emeriti Professors

Guillermo Cespedes, Ph.D.  
Stanley Chodorow, Ph.D.  
John S. Galbraith, Ph.D.  
H. Stuart Hughes, Ph.D.  
Gabriel Jackson, Ph.D.  
Thomas A. Metzger, Ph.D.  
Allan Mitchell, Ph.D.  
Earl Pomeroy, Ph.D.  
Martin J. S. Rudwick, Ph.D.  
Ramón Eduardo Ruiz, Ph.D.

### The Undergraduate Program

"Whereas other subjects may make us smarter for next time," said the great historian of the Renaissance, Jakob Burckhardt, "the study of history makes us wiser forever." This major is, moreover, an excellent preparation for a number of rewarding careers in university and college teaching and research, law, government, diplomacy, international business, education, and even medicine. At the crossroads of the humanities, the arts, and the social sciences, history is the study of human experience as it has unfolded over the ages. As an academic discipline it presents a unique gateway both to the richness of our cultural heritage and to the immense variety of world civilizations.

Students wishing to declare a major in history should first consult with the Director of Undergraduate Studies. After determining the student's likely field of emphasis, the student should then select an appropriate faculty adviser. In consultation with this academic adviser, the student should formulate a coherent program of history courses that will lead to completion of the major. All undergraduate majors are strongly encouraged to consult with the academic adviser at least once each quarter. Any difficulties in the advising procedure or in registration formalities should be reported to the Director of Undergraduate Studies.

Department fields are as follows: Africa (HIAF), East Asia (HIEA), Europe (HIEU), Near

East (HINE), Latin America (HILA), History of Science (HISC), and U.S. History (HIUS). In carrying on its work, the department also administers the following special research and instructional units: the Committee on Area and Ethnic Studies and Research (CAESAR), which includes African Studies, Chinese Studies, Classical Studies, German Studies, Italian Studies, Japanese Studies, Judaic Studies, Middle East Studies, Religious Studies, Russian Soviet Studies, Science Studies; the Project on the History and Culture of the American Southwest; and the Project in Southern (U.S.) History.

The department is fortunate in having the research and professional activities of its faculty supported by the Laura and John Galbraith Faculty Development Fund.

Basic requirements for the major are as follows:

1. A three-quarter lower-division sequence.
2. Twelve four-unit upper-division courses, which must include the following distribution of courses:
  - a) Seven courses in a field of emphasis. (In certain cases, with approval of the academic adviser, two of these courses may be in a neighboring discipline.)
  - b) Five courses in other fields within the department, selected to complement the student's concentration.
  - c) Three of the twelve courses must be chronologically situated before 1800. These courses are indicated by the symbol (+).
  - d) At least one of the twelve courses must be a colloquium in which students would be required to write a substantial term paper. Colloquia are those courses with numbers between 160 and 190, or others approved by the undergraduate adviser. **Note:** The colloquium does not have to be in the major field of emphasis.

\*Requirement 2d applies only to students entering UCSD after September 1, 1998.

In special cases, upon approval of the academic adviser, students may devise a field of emphasis (e.g., economic, legal, or social history) other than those designated above. Special independent study courses, such as HITO 197, HITO 198, and HITO 199, are available for students. These courses are especially recom-

mended for those students interested in the Honors Program and in Graduate study.

With the exception of 199 courses, all work in the major must be taken for a letter grade. Of the twelve upper-division courses required in the major, no more than two may be History 199 credits. (Exceptions to these rules may be allowed upon petition to the director of Undergraduate Studies.)

Lower-division sequences may be selected from the following:

- HILD 2 A-B-C United States History
- HILD 7 A-B-C Race and Ethnicity in the U.S.A.
- HILD 10-11-12 East Asia

Students may also satisfy the lower-division requirement for the major by completing the Revelle College Humanities Sequence or the Fifth College Sequence, "Making of the Modern World." Students entering with AP credit in history may waive part of the lower-division requirement. Transfer students, after consulting with their academic adviser, may petition to substitute a two-semester or three-quarter survey from another school for the department's lower-division requirement.

Established in 1983, the Armin Rappaport Memorial Fund endows an annual prize for the outstanding graduating student in the major. The recipient of the award is announced at every June Commencement.

### The Honors Program

The department offers a special program for outstanding students. The Honors Program is especially recommended for those students interested in pursuing graduate study in history or allied fields. It is also a particularly effective preparation for professional careers. Candidates for history honors are chosen during the spring quarter from among juniors in history who have taken at least four upper-division courses in the department. Juniors with a 3.5 GPA in history (3.0 overall) are eligible to apply. Admission to the program is based on the student's academic work. Interested candidates should complete the application form (available in the Department of History office) prior to May 14.

In addition to regular course work in the department, the honors program consists of a

colloquium in historiography offered in the fall quarter of the senior year and a program of independent study leading to the completion of an honors essay on a topic of the student's choice. During the fall quarter of the senior year, candidates select a topic and begin preliminary work on the honors essay in consultation with a major field adviser (HITO 194). During the winter quarter the student pursues a course of independent study devoted to the completion of the honors essay (HITO 195). The award of history honors is based on satisfactory completion of the colloquium in history and the honors essay. Students are expected to maintain an average of 3.5 or better in all work taken within the department. Honors candidates must include at least three colloquia in their regular course work.

Candidates for history honors should organize their work as follows:

1. Six quarter-courses in one of the major fields offered by the department, of which two or three must be colloquia;
2. Three quarter-courses in a field other than the primary one, of which one course should be a colloquium unless the requirement of three colloquia has been satisfied in the major field;
3. HITO 196. Colloquium in History;
4. HITO 194 and 195. History Honors—Honors Essay.

### Minors in History

Effective fall quarter, 1997, the minor consists of at least seven courses, five of which must be upper-division. Although there is no specific distribution requirement, the courses should be selected to constitute a coherent curriculum. Prospective minors in history should consult with a departmental adviser for approval of their program.

### Education Abroad Program

Students are encouraged to participate in the UC Education Abroad Program (EAP) of UCSD's Opportunities Abroad Program (OAP), while still making progress toward completing their major. Students considering this option should discuss their plans with the Director of Undergraduate Studies before going abroad,

and courses taken abroad must be approved by the department. More information on EAP is detailed in the Education Abroad Program of the *UCSD General Catalog*. Interested students should contact the Programs Abroad Office in the International Center.

### The Graduate Program

### The Master's Program

The Department of History offers master's degrees in the fields of Chinese studies, modern European history (1500 to the present), history of science, Latin American history, and United States history. The department also provides the opportunity for students to design special M.A. programs in areas such as African history, medieval European history, and Judaic studies. In consultation with an appropriate faculty member, students may petition the department for approval for a special M.A.

Applicants must submit their academic records, three letters of recommendation, Graduate Record Examination scores (aptitude only), TOEFL scores for foreign applicants, and samples of their written work. Ordinarily, those admitted have at least a 3.0 grade-point average, with a higher average in history and related subjects. Proficiency in a foreign language is not a requirement for admission (except in Latin America, where a reading knowledge of Spanish is required), but the department urges prospective applicants to begin study of at least one foreign language relevant to the proposed area of concentration as early as possible in their academic careers.

With very few exceptions, students are expected to begin their programs in the fall quarter. The deadline for application is January 15. Normally, master's students do not receive financial aid from the department or the university, except in circumstances where funds are not utilized for support of Ph.D. candidates.

### General Requirements

Candidates for the master's degree are expected to finish the program in one academic year of full-time study or two years of part-time work. The program requires completion of thirty-six units, of which at least twenty units must be in colloquia, conjoined courses, di-

rected readings, and seminars. In addition to course requirements, students must pass a comprehensive oral examination. Students in European or Latin American history and in certain special areas must demonstrate reading knowledge of at least one foreign language relevant to their course work.

### ***Area of Concentration: Chinese Studies***

Chinese studies is an interdisciplinary program that allows the graduate student interested in China to take advantage of the university's offerings in various departments to build a coordinated graduate program leading to an M.A. degree in history. Although the program is offered under the auspices of the Department of History, the student selects courses in the Departments of Anthropology, Linguistics, Literature, Political Science, and Sociology, as well as History.

### ***Area of Concentration: Europe***

Candidates for the M.A. degree in European history pursue a program concentrating on the history of modern Europe. The program provides background in earlier European history in order to place modern Europe in perspective. Some training in a discipline other than history is also recommended. The requirement of nine courses (thirty-six units) is normally distributed as follows:

1. A two-quarter research seminar, to be selected from HIGR 230, 231, or 232.
2. Three one-quarter courses concerning the historical literature about central problems in European history: HIGR 200, 220, 221, and 222 are the preferred options. If any of them are not scheduled for the year, other graduate-level colloquia may be substituted with approval of the student's graduate adviser.
3. Two courses in preindustrial Europe, 1450-1750: HIGR 200, 220, and 221 may be counted for this requirement.
4. Two courses in industrial Europe since 1750: HIGR 221 and 222 may be counted for this requirement, as well as appropriate graduate level colloquia.

**Note:** HIGR 221 may NOT be used for both (3) and (4).

5. One course in a discipline other than history, if relevant to the student's program.

### ***Area of Concentration: History of Science***

The master's program in history of science provides a broad background in preparation for a variety of careers related to science and technology, business, journalism, education, government, or for more advanced degree work. The nine courses (thirty-six units) required are normally distributed as follows:

1. Two courses in science in early modern Europe.
2. Two courses in science since 1750.
3. A graduate research seminar.
4. The remaining courses are chosen in consultation with the faculty in history of science. For students whose previous training has been mainly scientific, these will include courses in historical fields other than the history of science. For students who already have historical training, they may include one or more courses related to the sciences.

### ***Area of Concentration: Latin America***

This program offers the student a general preparation in the history of Latin America. Students will have the opportunity to specialize in national or colonial periods and can emphasize work in one country. Advanced work in another discipline related to Latin America may also be included in the program. Thirty-six units normally should be distributed as follows:

1. HIGR 245A-B-C.
2. Three graduate courses in Latin American history.
3. Three other courses related to Latin America in history or in other disciplines.

### ***Area of Concentration: United States***

This area of concentration offers the M.A. candidate a broad grounding in the literature of American history from the colonial period to the present. In addition to a shared core of courses, students specialize in a topical field of their own choosing. Training in a related discipline outside of history is encouraged. The re-

quirement of nine courses (thirty-six units) is ordinarily distributed as follows:

1. HIGR 265A-B-C. The Literature of American History. These colloquia are required of all entering graduate students in American history.
2. Two courses in a single topical field chosen from African-American history, history of the borderlands and Southwest, Chicano history, economic history, legal and constitutional history, political history, social and cultural history, history of the South, history of the West, or history of women and gender.
3. Four additional courses chosen in consultation with the student's adviser. Two of these may be in a related field outside the department.
4. At least six of the nine courses must be colloquia or graduate-level courses. Students may take conjoined courses, directed readings, research seminars, or the 265 series to meet this requirement.

### **Ph.D. Program**

#### ***Admission***

The Department of History offers the doctor of philosophy degree in the fields of ancient history, East Asian history, European history, history of science, Latin American history, and United States history.

Applicants for admission to these programs must submit their academic records, three letters of recommendation, Graduate Record Examination scores (aptitude only), TOEFL scores for foreign applicants, and samples of their written work. The minimum grade-point average for admission is 3.0, with a higher average in history and related subjects. In most areas of concentration, knowledge of at least one foreign language will be required during a student's academic career. In most areas of concentration, knowledge of at least one foreign language will be required during a student's academic career. In general, applicants are expected to have a reading knowledge of the language most appropriate to their major field at the time of admission. Thus, students in ancient history, East Asian history, European history, history of science, and Latin American history should have a working knowl-

edge of one foreign language at the time of admission. With very few exceptions, students are expected to begin their programs in the fall quarter. The deadline for application is January 15.

### Fields of Study

During the first year of residence each student, after consulting with a graduate adviser in the area of concentration, selects one major field of study and two minor fields. Within a major field the student should indicate a special interest from which the dissertation may develop. The first minor is ordinarily a supplementary field within the student's area of concentration, while the second minor is a complementary field outside the area of concentration. The basic programs of study are as follows:

#### I. ANCIENT HISTORY

Students in ancient history will be expected to demonstrate a broad mastery of the entire field, with special concentration as follows:

##### A. Major Fields

1. The ancient Near East, with emphasis on the civilization of the northwest Semitic peoples during the Bronze and early Iron Ages.
2. The history of Israel in the biblical period.
3. The history of the Jewish people in antiquity.

##### B. First Minor

1. One of the fields listed above not chosen as the major field.
2. Greek and Roman history.
3. The Middle East before Islam (western Asia and northeastern Africa from the sixth century b.c.e. to the seventh century c.e.)

##### C. Second Minor

1. A field of history outside of ancient history.
2. A related discipline, offered through another department.

##### D. Language Requirements

1. All students will be expected to demonstrate a reading knowledge of two modern foreign languages, usually French and German. This requirement may be satisfied by any of the means recognized by the department.

2. All students will be expected to demonstrate a reading knowledge of at least one and usually two of the three following ancient languages: Greek, Hebrew, and Latin. The languages will be chosen as appropriate to the student's particular interests and the requirement will be satisfied by departmental examination.
3. The second and sometimes third language not elected under (2) may be required if necessary for the student's research. Additional languages, such as Akkadian, Aramaic, Egyptian, Ugaritic, Phoenician, and middle and modern Hebrew, may be required as necessary for the student's research. The required level of competence will be set as appropriate to the student's needs and the requirement will be satisfied by departmental examination.

#### II. EAST ASIAN HISTORY

Students in East Asian history will be expected to demonstrate a broad competence in the entire field, with special concentration as follows:

##### A. Major Fields

1. Modern China
2. Modern Japan

##### B. Minor Fields

For students majoring in Chinese history, students will be expected to pass three minor fields in order to broaden each student's perspective on East Asian history:

1. Premodern Chinese history.
2. Modern Japanese history.
3. A history field outside of East Asia, or a related discipline studied with particular attention to East Asia.

For students majoring in Japanese history:

1. A field in history.
2. A related field offered through another department.

**Note:** One of the minor fields must not focus exclusively on East Asia.

##### C. Language Requirements

For students majoring in Chinese history: students must demonstrate a reading and speaking knowledge of Chinese and a read-

ing knowledge of a second foreign language related to the student's research interests.

For students majoring in Japanese history: students must demonstrate a reading and speaking knowledge of Japanese. Depending on specialization, reading knowledge of a second foreign language might be necessary.

#### III. EUROPEAN HISTORY

The graduate program in European history is designed to achieve a dual objective: to encourage a broad mastery of historical methods and literature in various fields, as well as to develop a special focus of research within a single area or epoch. The distribution of offerings is as follows:

##### A. Major Fields

1. Modern Europe, with a specialty in Britain, France, Germany, Italy, Spain, diplomatic history, economic history, intellectual history, or social history.
2. Early modern Europe, with a specialty in the social and economic history of one region.
3. Medieval Europe, with a specialty in political theory, canon law, or the political history of the eleventh through thirteenth centuries.

##### B. First Minor

Any of the following fields may be selected provided that the study concentrates on a chronological period outside the major.

1. Classical Greece and Rome
2. Medieval Europe
3. Early modern Europe
4. Modern Europe
5. A national history

##### C. Second Minor

1. The history of a geographic area outside of Western Europe
2. History of science
3. Women's history
4. A related discipline, offered through another department.

##### D. Language Requirements

The department requires Ph.D. candidates in European history to demonstrate competency



in two languages in addition to English before advancement to candidacy.

#### IV. HISTORY OF SCIENCE

**Note:** Students should indicate whether they are also applicants for admission to the interdepartmental program in Science Studies (history, philosophy, and sociology of science).

##### A. Major Fields

1. Science in early modern Europe.
2. Science in the eighteenth and nineteenth centuries.
3. Science in the twentieth century.
4. Another field of comparable breadth, defined in consultation with the major field adviser.

##### B. First and Second Minor Fields (Any two of the following may be selected, in consultation with the major field adviser.)

1. Science Studies (mandatory for students in the Science Studies program).
2. Any of the other fields offered by the department, provided that it offers general historical understanding of the same period as the major field.
3. A field of history of science not chosen as the major field.
4. A second field of history, provided that it concentrates on a period or region other than that chosen for the first minor field.
5. A related discipline, offered through another department. **Note:** this field may be in the physical or life sciences.

##### C. Language Requirements

Competency in one or two languages in addition to English before advancement to candidacy is required. The requirement will vary depending on chosen major field.

#### V. LATIN AMERICAN HISTORY

Doctoral candidates in Latin American history are expected to gain a broad chronological and geographical mastery of the field as a whole. The oral examination in the major field, while concentrating on the student's special area of interest, will be a comprehensive examination covering the whole field of Latin American history.

##### A. Major Fields

1. The national period of Latin America, with a specialty in the Andean Republics, Cuba, Mexico, or the Southern Cone countries.
2. Colonial Latin America, with an emphasis on one major region.

##### B. First Minor

The student should select either the national period or the colonial period as a chronological supplement to the major.

##### C. Second Minor

1. The history of another geographic area outside Latin America and the Caribbean.
2. An area of discipline, offered through another department, related to the student's dissertation or preparation for university teaching.

##### D. Language Requirement

Competency in two languages in addition to English before advancement to candidacy is required. Normally the first of these will be Spanish. The second may be Portuguese or another European or non-European language, including an indigenous language of the Americas.

#### VI. UNITED STATES HISTORY

##### A. Major Fields

1. Colonial and National period to 1877.
2. Modern America, 1877 to the present.

##### B. First Minor

1. One of the above fields not chosen as the major field.

2. One of the following topical fields:

African-American history, history of the borderlands and Southwest, Chicano history, economic history, legal and constitutional history, political history, social and cultural history, history of the South, history of the West, or history of women and gender.

##### C. Second Minor

1. A geographic area outside the United States in either the premodern or modern period.
2. A related discipline offered through another department.

##### D. Language Requirement

Competency in one language in addition to English before advancement to candidacy is required.

#### VII. OTHER FIELDS

Students may be admitted to graduate study leading to the Ph.D. in fields other than those listed above upon the recommendation of an appropriate faculty member. In such cases, a special program of study appropriate to the field will be devised by the major field adviser, subject to the approval of the department's graduate committee.

**Note:** The department also offers graduate work in African history. When appropriate, students may select a minor field in this area.

#### Course Work

A normal full-time program consists of twelve units per quarter. Ph.D. students are expected to complete at least one of the following minimum formal courses of study prior to their examinations: (a) two two-quarter research seminars and eight other courses (which may be a combination of colloquia, conjoined courses, or directed readings); or (b) three two-quarter research seminars (not necessarily in the same field) and six other courses (which may be a combination of colloquia, conjoined courses, or directed readings). Students are encouraged to take at least one colloquium or research seminar in their major field during the initial year of graduate study. A maximum of four units per quarter may be taken in teaching assistantships.

#### Part-time Study

Students who enroll in fewer than twelve graduate or upper-division units per quarter are considered part-time students. Part-time study may be pursued in several master's programs and a few Ph.D. programs at UCSD. Approval for individual students to enroll on a part-time basis may be given for reasons of occupation, family responsibilities, or health. Individuals who are interested in part-time study and meet the above qualifications should see the department's graduate coordinator.

Part-time students must satisfy the same admission requirements as full-time students and are eligible, at the discretion of the depart-

ment, for 25 percent time teaching or research assistantships. Students who are approved by the dean of Graduate Studies and Research for enrollment in a program of half-time study or less (maximum of six units) may be eligible for a reduction in fees. All other students pay the same fees as full-time students.

### ***Ph.D. and M.A. Language Requirements***

Ph.D. candidates in Chinese, European, and Latin American history must demonstrate competency in two foreign languages. Ph.D. candidates in history of science, Japanese, and United States history, as well as M.A. candidates in European and Latin American history, must demonstrate competency in one foreign language. Ph.D. candidates in ancient history require two modern foreign languages as well as the relevant ancient languages. Additional languages appropriate to the special field of study as well as language requirements for a candidate in a field other than those already mentioned may be required by the Graduate Committee in consultation with the student's major field adviser. Students may satisfy the foreign language requirement in one of the following ways:

- A. By completing, with a grade of B- or better in each term, a two-year language sequence from the student's undergraduate institution. Such a sequence must have been completed within two years of the time the request is made to the Graduate Committee for certification of competency.
- B. By completing, with a satisfactory (S) grade in each term, a two-year, lower-division sequence in the language approved by the Graduate Committee.
- C. By completing, with a satisfactory (S) grade in each term, a one-year, upper-division sequence in the language approved by the Graduate Committee.
- D. By passing a translation examination administered by a departmental faculty member who is proficient in the language. (This is the only option available for Chinese and Japanese.)

Students are urged to complete at least one foreign language examination by the end of the first year of study and must do so by the

beginning of their third year. *Failure to meet this requirement is grounds for denial of financial support.* No student may take the oral qualifying examination before completing all language requirements.

### ***Ph.D. Examinations***

#### **A. Minor Fields**

Ph.D. candidates are strongly encouraged to take at least one minor field examination by the end of fall quarter of their second year and to complete all examinations by the end of their third year. Generally, the department recognizes two types of minor fields. The most common minor field is a teaching field. That is, passing a minor field in an area certifies, on a student's record and resume, that the student has mastered the literature and the major issues in a field sufficient to qualify the student to teach in that area. (An example would be a minor field in modern Japanese history for an East Asian history student specializing in modern China; or medieval history for a Europeanist.) A second type of minor field is designed to familiarize a student with a range of theoretical and comparative issues which will be useful in the formulation of a dissertation topic and future research in the student's major field. (An example might be Latin American history for a student working in United States ethnic history; or sociology for a student in any field.) For a minor field taken outside the department, the minor field adviser (not the student or major field adviser) determines the level of expertise sufficient to warrant certification in that field.

Reading lists are negotiated between students and their minor field adviser, but, as a guideline, they should include about 50 titles with 40-70 titles representing a reasonable range. The reading list is agreed upon, at least three months in advance, by the student and faculty member administering the minor field examination. The list is intended to establish what will be expected of the student and to prevent confusion over the material to be covered. Minor field examinations are written; these may be in the form of a three-hour departmental exam or a twenty-four hour take-home exam at the administering professor's discretion. (Minor

field examinations in East Asian history will be oral; those in history of science may be either written or oral.) The professor composes and grades the written examination.

Students who fail a minor field examination may petition the Graduate Committee for permission to sit for the examination again at any time during the following two quarters, as long as pre candidacy time limits are not exceeded. A second failure results automatically in dismissal from the program.

#### **B. Oral Qualifying Examination and Candidacy**

Students are strongly encouraged to take their qualifying examination no later than the spring of their third year of study (except as otherwise specified by the individual fields), and required to do so in four years. Students must fulfill all course work, minor field, and language requirements before taking their qualifying examination. The qualifying examination is an oral test in the student's major field of study, conducted by at least five examiners. At least three of the examiners must be members of the Department of History. At least one examiner must be a tenured faculty member from a discipline outside the Department of History. Students should consult with their adviser about the composition of the examining committee well before their examination. The examination committee also serves as the dissertation committee. The membership of the committee must be approved by the Department Chair and ultimately the Dean of graduate studies. The date of the examination is determined by consultation between the candidate and the examining committee. In addition to the major field book list, it is required that students also submit a dissertation prospectus to the committee before the oral examination. The examination, which will include a discussion of the student's prospectus, lasts approximately two to three hours.

Should a candidate fail the examination, the examining committee will consult with the student to clarify weaknesses in preparation for taking the examination a second time. If a second oral examination is warranted, the department requires that it should be taken no later than one quarter after the first examination. If the candidate fails the oral

examination a second time, his or her candidacy will be terminated.

An M.A. degree may also be awarded to continuing Ph.D. students upon successfully passing the oral qualifying examination. The M.A. is not automatically awarded; students must apply in advance to receive the degree.

**Note:** Students who wish to receive an M.A. degree as part of the Ph.D. program must apply for master's degree candidacy during the first two weeks of the quarter in which they expect to receive the degree. Please see the graduate coordinator regarding this application.

The various requirements noted above apply to students who have done no previous graduate work in history. If a candidate has completed some graduate work before entering UCSD, there may be appropriate adjustments in course work, as approved by general petition to the Graduate Committee. Nevertheless, all candidates are required to meet language requirements, pass field examinations, as well as complete and defend a dissertation.

### *Dissertation*

After completing all relevant examinations and language requirements, the student is expected to write a dissertation under the supervision of his or her faculty adviser and the doctoral committee. The Department of History has established the following guidelines for dissertation work. The dissertation should:

- represent an original and significant contribution to knowledge.
- be based upon primary research.
- clearly demonstrate the capacity of the student to pursue independent historical research.
- be written in clear and coherent prose.

Decisions concerning the scope of the dissertation and its length will depend upon the nature of the problem and the documentation. The department assumes that most students will have completed their research and writing by the end of their sixth year of study. The scope and length of the dissertation should therefore be such that a complete project can be executed in no more than three years. Whatever the scope or length of the dissertation it should be capable of further develop-

ment for publication as a series of articles in scholarly journals, or as a book.

### *Departmental Ph.D. Time Limit Policies*

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

### *Opportunities for Teaching*

Undergraduate teaching, for which graduate teaching assistants earn regular academic credit, is an integral part of the graduate program at UCSD. To prepare for an academic career, the Ph.D. candidate is encouraged to assist in courses offered by the department ordinarily as a course reader (grader) or teaching assistant. A maximum of four units may be taken in undergraduate teaching. When such an opportunity is not available, a student may teach in various programs outside the department.

The department considers experience in teaching an important part of a graduate student's professional training. Based upon financial aid forms that graduate students complete during the previous winter quarter, the Graduate Committee assigns History Department teaching assistantships and recommends teaching assistantships outside of the department for the upcoming academic year.

Students must maintain a minimum grade point average of 3.0 in order to receive academic employment on campus.

### *Financial Support*

Upon recommendation of the department, several types of financial aid are available to graduate students: full or partial remission of fees and tuition, fellowships, research assistantships, teaching assistantships, and readerships. Graduate students are eligible for one or a combination of the five forms of financial support.

The department seeks to provide financial support to all continuing students in good standing in the Ph.D. program, to the limit of available resources. Fellowships and research assistantships are granted by OGSR upon the recommendation of the department. Teaching assistants are appointed by the department

upon the recommendation of the graduate committee. Readers are appointed by the department upon the recommendation of the professor whose course requires such assistance. At the discretion of the department, half-time graduate students are eligible for 25 percent TAs or GSAs. Departmental policy has been to seek seven years of support for students in the program. To the extent that resources are insufficient to meet the need, the department, on the advice of the graduate committee, will rank students using a combined criterion of academic performance and financial need.

**Graduate students must maintain a minimum grade-point average of 3.0 to be considered for any type of financial aid. Financial support is not renewed automatically but is approved by the department on a yearly basis.**

The Office of Graduate Studies and Research grants partial remission of fees for nine quarters after advancement to candidacy ("normative time") if the student is advanced to candidacy by the end of the third year. (If the student delays advancement, the amount of normative time is reduced accordingly.) Upon expiration of normative time the student must complete the dissertation or resume full payment of fees.

## **COURSES**

### **LOWER-DIVISION**

#### **HILD 2A-B-C. United States**

A year-long lower-division course that will provide students with a background in United States history from colonial times to the present, concentrating on social, economic, and political developments. (Satisfies Muir College humanities requirement and American History and Institutions requirement.) Staff

#### **HILD 7A-B-C. Race and Ethnicity in the United States**

Lectures and discussions surveying the topics of race, slavery, demographic patterns, ethnic variety, rural and urban life in the U.S.A., with special focus on European, Asian, and Mexican immigration.

#### **HILD 7A. Race and Ethnicity in the United States (4)**

A lecture-discussion course on the comparative ethnic history of the United States. Of central concern will be slavery, race, oppression, mass migrations, ethnicity, city life in industrial America, and power and protest in modern America.

#### **HILD 7B. Race and Ethnicity in the United States (4)**

A lecture-discussion course on the comparative ethnic history of the United States. Of central concern will be the Asian-American and white ethnic groups, race, oppression, mass migra-

tions, ethnicity, city life in industrial America, and power and protest in modern America. McCurry

#### **HILD 7C. Race and Ethnicity in the United States (4)**

A lecture-discussion course on the comparative ethnic history of the United States. Of central concern will be the Mexican-American, race, oppression, mass migrations, ethnicity, city life in industrial America, and power and protest in modern America. Gutiérrez

#### **HILD 10-11-12. East Asia**

A lower-division survey that compares and contrasts the development of China and Japan from ancient times to the present. Themes include the nature of traditional East Asian society and culture, East Asian responses to political and economic challenges posed by an industrialized West, and war, revolution and modernization in the twentieth century.

#### **HILD 10. East Asia: The Great Tradition (4)**

Examines the evolving characteristics of East Asian culture and civilization before 1600. Contrasts the rise of imperial Confucian governance in China to the development of feudal society in Japan. Pickowicz, Esherrick.

#### **HILD 11. East Asia and the West (4)**

Compares Chinese and Japanese responses to Western imperialism after 1600, focusing on popular protest and dynastic decline in China and the rise of the modernizing nation state in Japan. Pickowicz, Esherrick.

#### **HILD 12. Twentieth-Century East Asia (4)**

Deals with the rise of East Asia in the Pacific Century. This course stresses the emergence of a regionally dominant Japan before and after World War II and examines the process of revolution and state-building in China during the Nationalist and Communist eras. Pickowicz, Esherrick.

## UPPER-DIVISION

Please note: The following upper-division courses are offered on a regular basis, although not every class is available every year. Check with the department to see what is available each quarter.

## AFRICA

### Lecture Courses

#### **HIAF 110. History of Africa to 1880 (4)**

(Cross-listed as Third World Studies 175A.) A survey of pre-colonial Africa, concentrating on ancient Africa, Islam, state formation, the slave trade and abolition, and European penetration of the interior. *Prerequisite: upper-division standing.* Reynolds. +

#### **HIAF 111. Modern Africa Since 1880 (4)**

(Cross-listed as Third World Studies 175B.) A survey of African history dealing with the European scramble for territory, primary resistance movements, the rise of nationalism and the response of metropolitan powers, the transfer of power, self-rule and military coups, and the quest for identity and unity. *Prerequisite: upper-division standing.* Reynolds

#### **HIAF 120. History of South Africa (4)**

(Cross-listed as Third World Studies 176.) The origins and the interaction between the peoples of South Africa. Special attention will be devoted to industrial development, urbanization, African and Afrikaner nationalism, and the origin and

development of apartheid and its consequences. *Prerequisite: upper-division standing.* Reynolds

#### **HIAF 130. African Society and the Slave Trade (4)**

(Cross-listed as Ethnic Studies 169.) Topics include trans-Saharan trade, slavery with African societies, Atlantic slave trade, East African slave trade, problems of numbers exported and profitability, impact of slave trade on African society, and the abolition of the slave trade. *Prerequisite: upper-division standing.* Reynolds

#### **HIAF 140. Economic History of Africa (4)**

(Cross-listed as Third World Studies 178.) Lecture-discussion course on the economic development of sub-Saharan Africa from earliest times to the present. Topics will include: pre-European trade, the Atlantic slave trade, the era of legitimate trade, economic imperialism and the colonial economy, and post-independence economic development. *Prerequisite: upper-division standing.* Reynolds +

## Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

#### **HIAF 160/260. Special Topics in the Economic History of Africa (4)**

This course will examine selected topics in African economic history. Topics will include the precolonial economy, economics of colonialism, economics of underdevelopment, and postcolonial economic development. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students may be expected to submit a more substantial piece of work. *Prerequisites: completion of several upper-division history courses or consent of instructor. Department stamp required.* Reynolds

#### **HIAF 161/261. Special Topics in African History (4)**

This colloquium is intended for students with sufficient background in African history. Topics, which vary from year to year, will include traditional political, economic, and religious systems, and theory and practice of indirect rule, decolonization, African socialism, and pan-Africanism. *Department stamp required.* Reynolds

#### **HIAF 199. Independent Study in African History (4)**

Directed readings for undergraduates. *Prerequisite: consent of instructor and academic adviser required.*

## EAST ASIA

### Lecture Courses

#### **HIEA 110. Japan: Through the Twelfth Century (4)**

Topics include relations with continental Asia, emergence of the Yamato state, archaic notions of territoriality, the monarchy, relations between the central state and provincial elites, landholding, mythology and religion, and culture of the Heian aristocracy. Fujitani +

#### **HIEA 111. Japan: Twelfth to Mid-Nineteenth Centuries (4)**

Covers important political issues—such as the medieval decentralization of state power, unification in the sixteenth and seventeenth centuries, the Tokugawa system of rule, and con-

licts between rulers and ruled—while examining long-term changes in economy, society, and culture. Fujitani +

#### **HIEA 112. Japan: From the Mid-Nineteenth Century through the U.S. Occupation (4)**

Topics include the Meiji Restoration, nationalism, industrialization, imperialism, Taishō Democracy, and the Occupation. Special attention will be given to the costs as well as benefits of "modernization" and the relations between dominant and subordinated cultures and groups within Japan. Fujitani

#### **HIEA 113. The Fifteen-Year War in Asia and the Pacific (4)**

Lecture-discussion course approaching the 1931-1945 war through various "local," rather than simply national, experiences. Perspectives examined include those of marginalized groups within Japan, Japanese Americans, Pacific Islanders, and other elites and nonelites in Asian and Pacific settings. Fujitani

#### **HIEA 114. Postwar Japan (4)**

Examines social, cultural, political, and economic transformations and continuities in Japan since World War II. Emphases will differ by instructor. *Prerequisite: upper-division standing.* Fujitani and Tanaka

#### **HIEA 115. Social and Cultural History of Twentieth-Century Japan (4)**

Japanese culture and society changed dramatically during the twentieth century. This course will focus on the transformation of cultural codes into what we know as "Japanese", the politics of culture, and the interaction between individuals and society. Tanaka

#### **HIEA 116. Japan-U.S. Relations (4)**

Survey of relations between Japan and the United States in the nineteenth and twentieth centuries. Although the focus will be on these nation-states, the course will be framed within the global transformation of societies. Topics include cultural frameworks, political and economic changes, colonialism and imperialism, and migration. Tanaka

#### **HIEA 120. Classical Chinese Philosophy and Culture (4)**

Course covers the period from the second millennium B.C. to second century A.D. This is a formative period in Chinese history, witnessing the flowering of philosophical schools—Confucianism, Taoism, and Realism. It was also during this period that the foundations of Chinese political and social structures were laid down. +

#### **HIEA 121. Medieval Chinese Culture and Society (4)**

This course covers the period from the sixth century to thirteenth century, the time of the glorious T'ang and Sung dynasties. We focus on the "medieval revolution" that changed the political, economic, and social life of the empire. As much as possible we study these changes from the eyes of the people who lived through them—aristocrats, peasants, soldiers, merchants, women. *Prerequisite: HIEA 120 recommended but not required.* +

#### **HIEA 122. Late Imperial Chinese Culture and Society (4)**

This course surveys Chinese culture and society from the fifteenth century to the eighteenth century. We will explore the experiences of a range of political actors—emperors, scholar-officials, merchants, peasants, and women from all classes. *Prerequisites: HIEA 120 and EA 121 recommended but not required.* +

#### **HIEA 123. Food in Chinese History (4)**

This course examines the production, distribution, preparation, and consumption of food in Chinese history to illuminate such themes as state agricultural policies, regional transportation

and trade networks, dynamics of social interactions and gendered divisions of labor. *Prerequisite: upper-division standing.*

**HIEA 130. History of the Modern Chinese Revolution: 1800–1911 (4)**

This course stresses the major social, political, and intellectual problems of China in the period from the Opium War to the Revolution of 1911. Special emphasis is placed on the nature of traditional Chinese society and values, the impact of Western imperialism and popular rebellion on the traditional order, reform movements, and the origins of the early revolutionary movement. Pickowicz

**HIEA 131. History of the Modern Chinese Revolution: 1911–1949 (4)**

This course deals with the formative period of the twentieth-century Chinese revolution. Considerable stress is placed on the iconoclastic New Culture period, the rise of the student movement, Chinese communism, the labor movement, revolutionary nationalism, and the emergence of the peasant movement. Pickowicz

**HIEA 132. History of the People's Republic of China (4)**

This course analyzes the history of the PRC from 1949 to the present. Special emphasis is placed on the problem of postrevolutionary institutionalization, the role of ideology, the tension between city and countryside, Maoism, the Great Leap Forward, the Cultural Revolution. Pickowicz

**HIEA 137. Women and Family in Chinese History (4)**

We explore how the Confucian philosophy influenced the way the Chinese look at the family and the role of women in it, as well as the domestic lives that men and women actually led from the classical times to the present day. *Prerequisite: upper-division standing.* +

## Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

**HIEA 160/260. Colloquium on Modern Japanese History (4)**

This colloquium examines controversial domestic and international issues in Japanese history from 1850 to recent times. Topics will vary from year to year.

**HIEA 161/261. Representing Japan (4)**

Analyzes Anglo-American representations of Japan and "Japaneseness" from mid-nineteenth century to present. Primary focus on literary, visual, and theatrical works that have had a significant and direct impact upon popular (or public) culture and perceptions. *Prerequisite: department stamp or consent of instructor.* Fujitani

**HIEA 164/264. Seminar in Late Imperial Chinese History (4)**

Special topics in late Imperial Chinese history. Topics will vary from year to year. Requirements will vary for M.A. and Ph.D. students. Graduate students may be expected to submit a more substantial piece of work. *Prerequisite: upper-division standing or consent of instructor.*

**HIEA 167/267. Special Topics in Modern Chinese History (4)**

This seminar examines controversial, domestic, and international issues in Chinese history from 1800 to recent times. Esherick

**HIEA 199. Independent Study in East Asian History (4)**

Directed reading for undergraduates under the supervision of various faculty members. *Prerequisite: consent of instructor and academic adviser required.* Staff

## EUROPE

### Lecture Courses

**HIEU 100. Early Greece (4)**

The social, political, and cultural history of the ancient Greek world from the Bronze Age to the Persian Wars (2000–480 B.C.). Mosshammer +

**HIEU 101. Greece in the Classical Age (4)**

The social, political, and cultural history of the ancient Greek world from the Persian Wars to the death of Alexander the Great (480–323 B.C.). Mosshammer +

**HIEU 102. The Roman Republic (4)**

The political, economic, and intellectual history of the Roman world from the foundation of Rome to the time of Julius Caesar. Mosshammer +

**HIEU 103. The Roman Empire (4)**

The political, economic, and intellectual history of the Roman world from the time of Julius Caesar to the death of Justinian (A.D. 565). Mosshammer +

**HIEU 105. The Early Christian Church (4)**

A study of the origin and development of early Christian thought, literature, and institutions from the New Testament period to the Council of Chalcedon (451). Mosshammer +

**HIEU 110. The Rise of Europe (4)**

The development of European society and culture from the decline of the Roman Empire to 1050. *Prerequisite: Humanities sequence or its equivalent.* Staff +

**HIEU 111. Europe in the Middle Ages (4)**

The development of European society and culture from 1050 to 1400. *Prerequisite: Humanities sequence or its equivalent.* Staff +

**HIEU 113. Rule, Conflict, and Dissent in the Middle Ages (4)**

This course explores the question of religious and political dissent in Europe from the twelfth through the fifteenth centuries. We will explore the tensions between ideal models of religious and cultural unity, and the realities of community conflict, heretical controversies, and popular uprisings. Caciola +

**HIEU 114. Preindustrial Light and Magic (4)**

This course examines the social history of ideas about the supernatural from the fifth through the fifteenth centuries. Emphasis upon the dynamic, reciprocal cultural influences of various communities and sub-cultures. Topics include the syncretism of Christianity with folk beliefs; the cult of the saints; visions of the afterlife. Caciola +

**HIEU 121. Late Italian Renaissance: From Machiavelli to Galileo (4)**

The political analysis of Machiavelli and Guicciardini establishes the lines of inquiry to examine society and culture in Italy from the High Renaissance to the seventeenth century. Marino +

**HIEU 122. Politics Italian Renaissance Style (4)**

Modern political and historical thought find their roots in the realistic examination of fifteenth- and sixteenth-century Italian political experience. Contemporary Renaissance humanists and thinkers—Machiavelli, Guicciardini, Castiglione, Botero, and Campanella—tested classical, Christian, and legal models against practical necessities. Marino +

**HIEU 123. Renaissance Europe (4)**

This course explores the age of the Renaissance from approximately the middle of the fourteenth century to the middle of the sixteenth (1350–1550) as a period of great change and diversity, a dynamic moment of discovery, exploration, and expansion, not only in geography but also in politics, economics, religion, art, and science. Marino +

**HIEU 124. The City in Italy (4)**

Each of the great Italian cities has a style and heritage all its own. This course considers the social, political, economic, and religious aspects of civic life which gave rise to the unique characteristics of such cities as Florence, Siena, Venice, or Rome. Emphasis will be placed on the function and content of civic art, the architecture of public buildings, and the design of the urban environment. The specific content of the course, the city or cities and periods under consideration, will vary. Marino +

**HIEU 125. Reformation Europe (4)**

The intellectual and social history of the Reformation and Counter-Reformation from the French invasions to the Edict of Nantes. Emphasis is upon reform from below and above, the transformation of grass-roots spirituality into institutional control. *Prerequisite: upper-division standing or consent of instructor.* Marino +

**HIEU 126. Age of Expansion: Europe and the World, 1400–1600 (4)**

Course will begin with a survey of the major empires of the fifteenth century, concentrating on the links between them. It will then examine the entrance of Europeans on the global scene in the sixteenth century. This part of the course will examine European/non-European encounters, focusing on perceptions, economic interaction, and institutional adaptation and will emphasize the Hispanic American, Ottoman, and Indian Ocean cases. Ringrose and Marino +

**HIEU 129. Paris, Past and Present (4)**

This course surveys the historical and cultural significance of Paris from about 1500 to the present. The focus is on interactions between political, architectural, and urban evolutions, and the changing populations of Paris in times of war, revolutions, and peace. Truant +

**HIEU 130. Europe in the Eighteenth Century (4)**

A lecture-discussion course focusing on Europe from 1688–1789. Emphasis is on the social, cultural, and intellectual history of France, Germany, and England. Topics considered will include family life, urban and rural production and unrest, the poor, absolutism, and the Enlightenment from Voltaire to Rousseau. *Prerequisite: upper-division standing.* Truant +

**HIEU 131. The French Revolution: 1789–1814 (4)**

This course examines the Revolution in France and its impact in Europe and the Caribbean. Special emphasis will be given to the origins of the Revolution, the development of political and popular radicalism and symbolism from 1789 to 1794, the role of political participants (e.g., women, *sans-culottes*, Robespierre), and the legacy of revolutionary wars and the Napoleonic system on Europe. *Prerequisite: upper-division standing.* Truant +

**HIEU 132. German Politics and Culture: 1648–1848 (4)**

A lecture-discussion course on the political and cultural history of Germany in the early modern period. Luft +

**HIEU 134. Russia: Ninth Century to 1855 (4)**

The roots of Russian backwardness. The long-range historical impact of dominant personalities (Ivan the Terrible, Peter the Great, Catherine the Great) will be assessed. *Prerequisite: upper-division standing or consent of instructor.* Edelman +

**HIEU 135. European Economy and Society: 1000–1750**

Underlying structures of rural economy and society, geography, population, resources, technology. Evolution of commerce.

cial cities, unification of the European market systems, mercantilism, emergence of bureaucracies. Economic and social background of the industrial revolution. *Prerequisite: upper-division standing or consent of instructor.* Ringrose +

**HIEU 136A. European Society and Social Thought, 1688–1870 (4)**

A lecture and discussion course on European political and cultural development and social theory from 1688–1870. Important writings will be considered both as responses to and as provocations for political and cultural change. Truant +

**HIEU 136B. European Society and Social Thought, 1870–1989 (4)**

A lecture and discussion course on European political and cultural development and theory from 1870–1989. Important writings will be considered both as responses to and as provocations for political and cultural change. J. M. Hughes

**HIEU 138. Imperial Spain, 1476–1808 (4)**

The rise and decline of Spain's European empire from Ferdinand and Isabella to 1700. The revival of Spain and her return to European affairs in the eighteenth century. *Prerequisite: upper-division standing or graduate standing.* Ringrose +

**HIEU 141. European Diplomatic History, 1870–1945 (4)**

The European alliance to the outbreak of the First World War. The postwar settlement and its breakdown. The advent of Hitler and the disarray of the Western democracies. The Second World War and the emergence of the super powers. J.M. Hughes

**HIEU 142. European Intellectual History, 1780–1870 (4)**

European thought from the late Enlightenment and the French Revolution to Marx and Baudelaire, emphasizing the origins of romanticism, idealism, and positivism in England, Germany, and France. *Prerequisite: upper-division standing or consent of instructor.* Luft

**HIEU 143. European Intellectual History, 1870–1945 (4)**

A lecture-discussion course on the crisis of bourgeois culture, the redefinition of Marxist ideology, and the transformation of modern social theory. Readings will include Nietzsche, Sorel, Weber, Freud, and Musil. (This course satisfies the minor in the Humanities Program.) *Prerequisite: upper-division standing.* Luft

**HIEU 145. European Jewry: 1750–1880 (4)**

The era of the emancipation of European Jews with an emphasis on social history and history of ideas. *Prerequisite: upper-division standing or consent of instructor.* Staff

**HIEU 146. Fascism, Communism, and the Crisis of Liberal Democracy: Europe 1919–1945 (4)**

A consideration of the political, social, and cultural crisis that faced Western liberal democracies in the interwar period, with emphasis on the mass movements that opposed bourgeois liberalism from both the left and the right. Radcliff

**HIEU 147. The History of Women in Europe: Middle Ages to the Early Modern Era (4)**

This course explores shifts in the roles and representations of women from the early middle ages, through the Renaissance and Reformation, and up to the seventeenth century. Topics will be examined across the European social order and include gender and sexuality, holy women, religious movements, and production and reproduction. *Prerequisite: upper-division standing.* Truant +

**HIEU 148. The History of Women in Europe: From the Early Enlightenment to the Victorian Era (4)**

This course explores shifts in the roles and representations of women from the late seventeenth century to about 1870. Topics are examined across the European social order and include: gender and sexuality, women writers and print culture, women's participation in the French and industrial revolutions, and the

emergence of feminist movements. *Prerequisite: upper-division standing or consent of instructor.* Truant +

**HIEU 149. History of Women in Europe: 1870 to the Present (4)**

This course explores the history of women across classes from 1870 to the present, with an emphasis on the variety of women's experience and the efforts towards and obstacles to empowerment. Topics include: women and the state, science and gender, feminist movements and the evolution of women's work. *Prerequisite: upper-division standing.* Radcliff

**HIEU 150. Modern British History (4)**

Emphasis on changes in social structure and corresponding shifts in political power. The expansion and the end of empire. Two World Wars and the erosion of economic leadership. *Prerequisite: upper-division standing or consent of instructor.* J.M. Hughes

**HIEU 151. Spain since 1808 (4)**

Social, political, cultural history of Spain since Napoleon. Features second Spanish Republic, the Civil War, Franco era, and transition to democracy. *Prerequisite: upper-division standing.* Ringrose

**HIEU 153A. Nineteenth-Century France (4)**

A study of the social, intellectual, and political currents in French history from the Revolution of 1789 to the eve of the First World War. Lectures, slides, films, readings, and discussions. Mitchell

**HIEU 153B. Twentieth-Century France (4)**

A study of the social, intellectual, and political currents in French history from the First World War to the present. Lectures, slides, films, readings, and discussions. Mitchell

**HIEU 154. Modern German History (4)**

A lecture-discussion course on the political and social history of Germany during the nineteenth and twentieth centuries. *Prerequisite: upper-division standing or consent of instructor.* Mitchell

**HIEU 156. Russia: 1855 to the Present (4)**

The long-term causes of the Revolution and its ultimate consequences. Course will consider the roles of Herzen, Lenin, Stalin, and Nicholas and Alexandra. HIEU 134 is not a prerequisite for HIEU 156. *Prerequisite: upper-division standing or consent of instructor.* Edelman

## Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

**HIEU 160/260. Topics in the History of Greece (4)**

A seminar focusing on selected topics in Greek history from the Bronze Age to the Roman Conquest. *Prerequisite: department stamp or permission of instructor.* Mosshammer

**HIEU 161/261. Topics in Roman History (4)**

A seminar focusing on selected topics in Roman history and culture from the period of the Kings to the later Roman Empire. *Prerequisite: upper-division or graduate standing or consent of instructor.* Mosshammer

**HIEU 163/263. Special Topics in Medieval History (4)**

Intensive study of special problems or periods in the history of medieval Europe. Topics vary from year to year, and students

may therefore repeat the course for credit. *Prerequisite: background in European history.* Chodorow +

**HIEU 165/265. Special Topics in Early Modern Spain (4)**

Readings and discussion of recent studies on Spain in the early modern period: the Hapsburg Empire to 1700, social and economic conditions of Spain in the Enlightenment of the eighteenth century, and the breakup of the Old Regime after 1790. *Prerequisite: background in European history.* Ringrose +

**HIEU 167/267. Special Topics in the Social History of Early Modern Europe (4)**

Topic varies from year to year. May be repeated for credit. Truant +

**HIEU 168/268. Special Topics in European Economic History (4)**

Analysis of the economic and social interactions between cities and their surrounding regions, comparing the impact of political, commercial, and industrial urbanization in the historical development of regions and countries. Each student will study one such city and present his or her finding to the seminar. Ringrose +

**HIEU 171/271. Special Topics in Twentieth-Century Europe (4)**

This course alternates with HIEU 170. Topics will vary from year to year. *Prerequisite: background in European history.* Mitchell

**HIEU 172/272. War in the Twentieth Century (4)**

Reckonings by novelists, essayists, and biographers with the phenomenon of contemporary warfare as an unprecedented experience and an abiding threat. J.M. Hughes

**HIEU 175/275. Selected Topics in the History of Nineteenth- and Twentieth-Century Spain (4)**

Topics may include economic development, modernization, political change, intellectual history, and the transition to democracy. Ringrose

**HIEU 177/277. Special Topics in Modern German Thought (4)**

Topics will vary from year to year. (Satisfies the Humanities Program minor.) *Prerequisite: background in European history.* Luft

**HIEU 178/278. Special Topics in Modern Russian History (4)**

Topics will vary from year to year. May be repeated for credit. Edelman

**HIEU 180/280. Topics in European Women's History (4)**

The specific content of the course will vary from year to year, but will always analyze in depth a limited number of issues in European women's history. Radcliff, Truant

**HIEU 199. Independent Study in European History (4)**

Directed readings for undergraduates under the supervision of various faculty members. *Prerequisite: consent of instructor and faculty adviser required.* Staff

## HISTORY OF SCIENCE

### Lecture Courses

**HISC 100. The Discovery of Deep Time (4)**

The discovery of the vast scale of the past history of the natural world, and the consequent dwarfing of human history, from the chronologies of the seventeenth century, through the emergence of the science of geology, to the planetary histories of the twentieth century. Rudwick



**HISC 101A. Science in the Greek and Roman World (4)**

A survey of the principal features of ancient science: the origins of Greek naturalism, the criticism of magic, notions of quantification. Topics may include astronomy, astrology, geography, geometry, optics, mechanics and physical theory, classification of living beings, and human cognition. Emphasis on primary sources, such as the presocratic natural philosophers: Plato, Aristotle, Euclid, Archimedes, Ptolemy, Pliny Galen, and Proclus. Westman and Giard

**HISC 101B. Medieval Science in the Latin West, ca. 500–1500 (4)**

Styles of the medieval scientific imagination. Reception and assimilation of the learning of the ancient world, especially Aristotle, Plato, Euclid, Galen, and Ptolemy. Struggles to reconcile Greek, Arabic, and Christian ideals of knowledge. Rise of universities. Natural philosophy, logic, geometry, optics, astronomy, astrology, mechanics, geography, and classification of living beings. Westman and Giard

**HISC 101C. Early Modern Science (4)**

Early forms of modern science, mid-15th to 17th centuries. The revolution in printing. Sites of knowledge-making: university and court cultures, museums, academies. Astrology, astronomy, literature of the heavens, prophecy and apocalyptic expectation. Natural history, medicine, alchemy, magic and the physico-mathematical sciences. Westman and Giard

**HISC 102. The Physical Sciences in the Twentieth Century (4)**

Major conceptual changes in physical science, and their historical contexts. Quantum and relativity theories, atomic and nuclear physics 'invades' new territories: the rise of astrophysics, geophysics and chemical physics. The changing nature of the physical science enterprise. *Prerequisite: at least one year of science courses.* Staff

**HISC 103. Gender and Science in Historical Perspective (4)**

This course will examine the history of women's struggles and strategies for access and equality in professional science. Questions related to gender bias in science—as a social institution and as an epistemological enterprise—will be addressed in light of the historical and biographical readings. Staff

**HISC 104. History of Popular Science (4)**

Historical aspects of the popularization of science. The changing relation between expert science and popular understanding. The reciprocal impact of scientific discoveries and theories, and popular conceptions of the natural world. *Prerequisite: upper-division standing.* Rudwick, Staff

**HISC 105. History of Environmentalism (4)**

History of human effects on the natural environment, and with environmentalist interpretations of the history of science. Staff

**HISC 106. The Scientific Revolution (4)**

A cultural history of the formation of early modern science in the sixteenth and seventeenth centuries: the social forms of scientific life; the construction and meaning of the new cosmologies from Copernicus to Newton; the science of politics and the politics of science; the origins of experimental practice; how Sir Isaac Newton restored law and order to the West. Westman +

**HISC 107. The Emergence of Modern Science**

The development of the modern conception of the sciences, and of the modern social and institutional structure of scientific activity, chiefly in Europe, during the eighteenth and nineteenth centuries. *Prerequisite: upper-division standing.* Rudwick

**HISC 108. Science and Technology in the Twentieth Century (4)**

The origins and development of the modern scientific-technological enterprise, with science in industry, government, and

war. Cultural, social, and economic implications of major scientific advances. The changing social role of the scientist. *Prerequisite: upper-division standing.* Staff

**HISC 109. History of Evolutionary Theories (4)**

History of theories to account for the diversity of organisms. Darwin's theory of evolution by natural selection and its modern versions. Implications of evolutionary theories for understanding human beings in relation to the rest of the natural world. *Prerequisite: upper-division standing.* Rudwick, Staff

**Colloquia**

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

**HISC 160/260. Historical Approaches to the Study of Science (4)**

Major recent publications in the history of science will be discussed and analyzed; the topics will range in period from the seventeenth century to the twentieth, and will deal with all major branches of natural science. Special topics. Topics will vary from year to year. Staff

**HISC 162/262. Problems in the History of Science and Religion (4)**

Intensive study of specific problems in the relation between science and religion. The problems may range in period from the Renaissance to the twentieth century. Topics vary from year to year, and students may therefore repeat the course for credit. Staff

**HISC 163/263. Topics in the History of the Life and Earth Sciences (4)**

Intensive study of specific problems in the life sciences and earth sciences, ranging in period from the Renaissance to the twentieth century. Topics vary from year to year, and students may therefore repeat the course for credit. Rudwick

**HISC 164/264. Topics in the History of the Physical Sciences**

Intensive study of specific problems in the physical (including chemical and mathematical) sciences, ranging in period from the Renaissance to the twentieth century. Topics vary from year to year, and students may therefore repeat the course for credit. R.M. Friedman

**HISC 167/267. Topics in History of Medicine (4)**

Intensive study of specific problems in the history of medicine. Topics will vary from year to year, and students may therefore repeat the course for credit. *Prerequisite: department stamp required.* Staff

**HISC 199. Independent Study in the History of Science (4)**

Directed readings for undergraduates under the supervision of various faculty members. *Prerequisite: consent of instructor and academic adviser required.* Staff

**LATIN AMERICA****Lecture Courses****HILA 100. Latin America—Colonial Transformations (4)**

Lecture-discussion survey of Latin America from the pre-Columbian era to 1825. It addresses such issues as the nature of indigenous cultures, the implanting of colonial institutions,

native resistance and adaptations, late colonial growth and the onset of independence. Van Young +

**HILA 101. Latin America: The Construction of Independence 1810–1898 (4)**

Lecture-discussion survey of Latin America in the nineteenth century. It addresses such issues as the collapse of colonial practices in the society and economy as well as the creation of national governments, political instability, disparities among regions within particular countries, and of economies oriented toward the export of goods to Europe and the United States. Van Young

**HILA 102. Latin America in the Twentieth Century (4)**

This course surveys the history of the region by focusing on two interrelated phenomena: the absence of democracy in most nations and the region's economic dependence on more advanced countries, especially the United States. Among the topics discussed will be the Mexican Revolution, the military in politics, labor movements, the wars in Central America, liberation theology, and the current debt crisis. *Prerequisite: upper-division standing or consent of instructor.* Monteón

**HILA 105. South America: Labor, Coercion, and Society in the Nineteenth Century (4)**

Course examines how and why forms of forced labor, particularly slavery, persisted and changed in South America after independence and how they shaped the possibilities of economic development. An emphasis is placed on the diversity of contexts in which laborers survived. Hünefeldt

**HILA 107. State and Society in Nineteenth- and Twentieth-Century Latin America (4)**

This course seeks to outline the main trends of thought concerning state theory and to evaluate how and when such trends have either been applied or originated in Latin American history. Special consideration will be given to the ways in which peasants and Indians participated in the molding of modern states in Latin America and created their "own" ways of political participation. The final issue we want to address is the question about the "political projects" that can be identified through a reading of nineteenth- and twentieth-century history. Hünefeldt

**HILA 112. Economic and Social History of the Andean Region (4)**

Study of the economic and social problems of the Andean region from the colonial period until the crisis of 1912, with special attention to theoretical models to explain the processes of change. Staff

**HILA 113. Lord and Peasant in Latin America (4)**

Examination of the historical roots of population problems, social conflict, and revolution in Latin America, with emphasis on man/land relationships. Special emphasis on modern reform efforts and on Mexico, Cuba, Brazil, and Argentina. Lecture, discussion, reading, and films. *Prerequisite: upper-division standing or consent of instructor.* Van Young

**HILA 114. Social History of Colonial Latin America (4)**

The course will examine the evolution of multiracial societies in Brazil and Spanish America, with some attention to the Anglo-American colonies by way of comparison. Particular emphasis on the relationship of race to class and on topics such as race mixture, agrarian structures, slavery, urban life, and crime and social protest. *Prerequisite: upper-division standing.* Van Young +

**HILA 115. The Latin American City, a History (4)**

A survey of the development of urban forms of Latin America and of the role that cities played in the region as administrative and economic centers. After a brief survey of pre-Columbian centers, the lectures will trace the development of cities as

outposts of the Iberian empires and as "city-states" that formed the nuclei of new nations after 1810. The course concentrates primarily on the cities of South America, but some references will be made to Mexico City. It ends with a discussion of modern social ills and Third World urbanization. Lima, Santiago de Chile, Buenos Aires, Rio de Janeiro, and Sao Paulo are its principal examples. *Prerequisite: upper-division standing.* Monteón

**HILA 116. Encounter of Two Worlds: Early Colonial Latin America (4)**

A lecture course concentrating on the first century or so of the colonial period, from Columbus to about 1600. Topics will include changing European cosmography, the New World indigenous civilizations, mutual perceptions of the two cultural traditions during the conquest and early colonial eras, and evolving colonial society, all with an emphasis on cultural history. Van Young +

**HILA 117. Indians, Blacks, and Whites: Family Relations in Latin America (4)**

The development of family structures and relations among different ethnic groups. State and economy define and are defined by family relations. Thus this family approach also provides an understanding of broader socio-economic processes and cultural issues. Hünefeldt

**HILA 120. History of Argentina (4)**

A survey from the colonial period to the present, with an emphasis on the nineteenth and twentieth centuries. Among the topics covered: the expansion of the frontier, the creation of a cosmopolitan, predominately European culture, and the failure of industrialization to provide an economic basis for democracy. *Prerequisite: upper-division standing.* Monteón

**HILA 121. History of Brazil (4)**

From colonial times to the present, with an emphasis on the nineteenth and twentieth centuries. Among the topics covered: the evolution of a slave-based economy, the key differences among regions, the military in politics, and the creation of the most populous and industrialized country in Latin America. *Prerequisite: upper-division standing.* Monteón

**HILA 122. Cuba: From Colony to Socialist Republic (4)**

A lecture-discussion course on the historical roots of revolutionary Cuba, with special emphasis on the impact of the United States on the island's development and society. *Prerequisite: upper-division standing.*

**HILA 123. The Incas and Their Ancestors (4)**

The Incas called their realm Tahuantinsuyu (Land of the Four Quarters). But the Incas were only one of the many ethnic groups in the Andean region. Many different other groups became a part of the Tahuantinsuyu in the wake of Inca expansion. Over the past decade new and fascinating information on these processes have been published, and allows for a re-reading of Inca history between 900 and 1535. Hünefeldt +

**HILA 131. A History of Mexico (4)**

A century of Mexican history, 1821-1924: the quest for political unity and economic solvency, the forging of a nationality, the Gilded Age and aftermath, the ambivalent Revolution of Zapata and his enemies. *Prerequisite: upper-division standing or consent of instructor.* +

**HILA 132. A History of Contemporary Mexico (4)**

The paradox of a conservative state as heir to a legendary social upheaval, with special emphasis on the mural art renaissance, the school crusade, the economic dilemma, and the failure to eradicate poverty and inequality. Lectures and discussion. *Prerequisite: upper-division standing or consent of instructor.*

## Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

**HILA 160/260. Topics in Latin American Colonial History, 1500-1820 (4)**

Topics will deal with the social, economic, and political history of the Spanish and Portuguese experience in the new world and the presence of the black and the indian. *Prerequisites: department stamp required and background in Latin American history.* Van Young

**HILA 161/261. History of Women in Latin America (4)**

A broad historical overview of Hispanic-American women's history focusing on issues of gender, sexuality, and the family as they relate to women, as well as the historiographical issues in Latin American and Chicana women's history. Gutiérrez

**HILA 162/262. Special Topics in Latin American History (4)**

Topics will vary from year to year or quarter to quarter. May be repeated for an infinite number of times due to the nature of the content of the course always changing. *Prerequisite: department stamp or consent of instructor.* Hünefeldt

**HILA 166/266. Cuba: From Colony to Socialist Republic (4)**

A colloquium on the historical roots of revolutionary Cuba, with special emphasis on the impact of the United States on the island's development and society. Staff

**HILA 170/270. Topics in Latin American History, 1820-1910 (4)**

Topic will vary from year to year. May be repeated for credit. Staff

**HILA 171/271. Special Topics in Latin American History since 1910 (4)**

Topic will vary from year to year. May be repeated for credit. Staff

**HILA 172/272. Machismo and Matriarchy: The Latin American Social Structure (4)**

The course will examine the social history of Latin America as the product of family structure and sexual mores. In addition to looking at the different settings in which the Latin American family evolved, the course will discuss the importance of miscegenation, the role of women, and the current social crisis of the region. Gutiérrez

**HILA 199. Independent Study in Latin American History (4)**

Directed readings for undergraduates under the supervision of various faculty members. *Prerequisite: consent of instructor and academic adviser required.* Staff

## NEAR EAST

### Lecture Courses

**HINE 100. The Ancient Near East and Israel (4)**

The history of Israel is studied in the context of ancient Near Eastern civilization as a whole. Topics include the birth of civilization in Southern Mesopotamia, the Assyrian and Babylonian empires, and the rise of Persia as well as Israel in the biblical

period. *Prerequisite: upper-division standing or consent of instructor.* Staff +

**HINE 102. The Jews in Their Homeland in Antiquity (4)**

The Jews in Israel from the sixth century B.C.E. to the seventh century C.E. Statehood, nationalism, and autonomy within the framework of the Persian empire, the Hellenistic kingdoms, and the Roman-Byzantine empire. Cultural and religious developments. *Prerequisite: upper-division standing.* Goodblatt +

**HINE 103. The Jewish Diaspora in Antiquity (4)**

The Jews outside their homeland in pre-Islamic times, concentrating on the Greco-Roman West and the Parthian-Sasanian East. Topics include assimilation and survival; antisemitism and missionizing; patterns of organization and autonomy; cultural and religious developments. *Prerequisite: upper-division standing.* Goodblatt +

**HINE 104. The Bible and the Near East: The Primary History (4)**

This course covers the first nine books of the Hebrew Bible, including the Torah and Former Prophets. D.N. Freedman +

**HINE 105. The Bible and the Near East: The Prophets (4)**

This course covers the four books of the Latter Prophets, including the three major prophets, Isaiah, Ezekiel, and Jeremiah, and the twelve minor prophets. D.N. Freedman +

**HINE 106. The Bible and the Near East: The Writings (4)**

This course covers the books of the Hebrew Bible not covered in HINE 104 and HINE 105. It will include Psalms, Proverbs, Job, the Megillot, Daniel, and the Chronicler's Work. D.N. Freedman +

**HINE 108. The Middle East before Islam (4)**

The peoples, politics, and cultures of Southwest Asia and Egypt from the sixth century B.C.E. to the seventh century C.E. The Achaemenid Empire, the Ptolemaic and Seleucid kingdoms, the Roman Orient, the Parthian and Sasanian states. *Prerequisite: upper-division standing.* Goodblatt +

**HINE 114. History of the Islamic Middle East**

A survey of the Middle East from the rise of Islam to the region's economic, political, and cultural integration into the West (mid-nineteenth century). Emphasis on socioeconomic and political change in the early Arab empires and the Ottoman state. Kayali +

**HINE 116. The Middle East in the Age of European Empires (1798-1914) (4)**

Examines the contacts of the late Ottoman Empire and Qajar Iran with Europe from the Napoleonic invasion of Egypt to World War I, the diverse facets of the relationship with the West, and the reshaping of the institutions of the Islamic states and societies. Kayali

**HINE 118. The Middle East in the Twentieth Century (4)**

An introduction to the history of the Middle East since 1914. Themes such as nationalism, imperialism, the oil revolution, and religious revivalism will be treated within a broad chronological and comparative framework drawing on the experience of selected countries. Kayali

## Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

**HINE 160/260. Special Topics in the Bible and Ancient Near East (4)**

The study of a single book, period, or issue in the Bible, in the context of the ancient Near Eastern world. *Prerequisite: department stamp required or consent of instructor.* D.N. Freedman +

**HINE 166/266. Nationalism in the Middle East (4)**

Growth of nationalism in relation to imperialism, religion, and revolution in the nineteenth- and twentieth-century Middle East. Emergence of cultural and political ethnic consciousness in the Ottoman state. Comparative study of Arab, Iranian, and Turkish nationalism as well as Zionism. *Prerequisite: department stamp or consent of instructor.* Kayali

**HINE 170/270. Special Topics in Jewish History (4)**

This course studies a period or theme in Jewish history. Topics will vary from year to year. *Prerequisite: department stamp required.* Goodblatt

**HINE 180/280. Cultures of the Ancient Near East (4)**

Introduction to language and history of various ancient Near Eastern cultures, including Mesopotamia, Aram, and Canaan. *Prerequisite: upper-division or graduate standing.* Propp

**HINE 181/281. Problems in the Study of Hebrew Manuscripts (4)**

Detailed study of a portion of biblical text. Focus on text-critical and source-critical problems. *Prerequisite: upper-division or graduate standing.* Propp

**HINE 186/286. Special Topics in Middle Eastern History (4)**

Focused study of historical roots of contemporary problems in the Middle East: Islamic modernism and Islamist movements; contacts with the West; ethnic and religious minorities; role of the military; economic resources and development. *Department stamp and permission of instructor.* Kayali

**HINE 199. Independent Study in Near Eastern History (4)**

Directed readings for undergraduates under the supervision of various faculty members. *Prerequisite: consent of instructor and academic adviser required.* Staff

**UNITED STATES****Lecture Courses****HIUS 100. Colonial Period to 1763 (4)**

Political and social history of the thirteen colonies: European background, settlement and expansion, beginnings of culture, and the imperial context. *Prerequisite: upper-division standing.* Staff +

**HIUS 101. The American Revolution (4)**

Causes and consequences of the revolution: intellectual and social change, the problems of the new nation, the Constitution, and the origins of political parties. *Prerequisite: upper-division standing.* Staff +

**HIUS 102. The Age of Encounters, 1492–1630 (4)**

Europeans, Native Americans, and Africans in North America from Columbus' first voyage to early English colonization. Emphasis on cultural, political, and ecological consequences of contact. Topics include the Spanish Conquest, the origins of the African slave trade, Iroquois-French commerce, and the early history of California. +

**HIUS 105. Thomas Jefferson and Early American History (4)**

This course will study Thomas Jefferson, both as an influential American in his own right and as a window onto the age of

the American Revolution, the Enlightenment, and the early American Republic. Students will read both biographical materials and original documents to address various aspects of Jefferson's life and times. *Prerequisite: upper-division standing.* Staff +

**HIUS 107. The Early Republic (4)**

This course will examine the transformation of American society and politics between the American Revolution and the Jacksonian period. Topics to be considered include the emergence of domesticity, the development of political parties, the expansion of capitalist relations, the debate over slavery, the early labor movement, and the origins and motivations of middle-class reform. Meranze +

**HIUS 110. The Rise and Fall of the Old South (4)**

This course examines the history of the American South from first settlement to the Civil War. Special attention will be devoted to the emergence of slavery and the plantation system, the role of the South in the Revolution and Constitution, the relations between planters and yeomen, the development of slave communities, and the growing sectional conflict. *Prerequisite: upper-division standing or consent of instructor.* Hahn

**HIUS 111. The Making of the New South (4)**

This course will focus on the American South between the Civil War and the civil rights movement. Topics include emancipation and Reconstruction, the new plantation system, agrarian radicalism, segregation and disfranchisement, the onset of industrialization, Southern culture black and white, and the recent struggles for civil and political rights. Hahn

**HIUS 112. The Era of Civil War and Reconstruction (4)**

This course is chiefly a social and political history of the United States between 1848 and 1877. It explores the developing sectional conflict, disunion and civil war, and the process of reconstructing the nation; and it places the American experience in an international and comparative context. *Prerequisite: upper-division standing or consent of instructor.* Hahn

**HIUS 114. California History (4)**

(Cross-listed as USP 161.) This course examines California history from 1800 onward, with an emphasis on social, economic, and political change. The course will explore the effect of national and international events as well as the ways in which California—the ideal and the real—shapes the American experience. Staff

**HIUS 117. History of Los Angeles (4)**

This course examines the history of Los Angeles from the early nineteenth century to the present. Particular issues to be addressed include urbanization, ethnicity, politics, technological change, and cultural diversification. Staff

**HIUS 120. American Politics and Society, 1900–1942 (4)**

A lecture-discussion course on American politics and society from the era of Theodore Roosevelt to Pearl Harbor. Among the topics covered: the progressive movement, the impact of the Great War, the economic boom and collapse of the 1920s, and the New Deal. *Prerequisite: upper-division standing.* Parrish

**HIUS 121. American Politics and Society, 1942–Present (4)**

A lecture-discussion course on American politics and society, Pearl Harbor to the present. Among the topics covered: the origins of the cold war, the Red scare, the civil rights movement, the counterculture of the 1960s, and the neoconservatism of the Nixon-Reagan era. *Prerequisite: upper-division standing.* Parrish

**HIUS 130. Cultural History from 1607 to the Civil War (4)**

This course will explore connections between American culture and the transformation of class relations, gender ideol-

ogy, and political thought. Topics will include the transformation of religious perspectives and practices, republican art and architecture, artisan and working-class culture, the changing place of art and artists in American society, antebellum reform movements, antislavery and proslavery thought. *Prerequisite: upper-division standing or consent of instructor.* Klein +

**HIUS 131. Cultural History from the Civil War to the Present (4)**

This course will focus on the transformation of work and leisure and the development of consumer culture. Students will consider connections between culture, class relations, gender ideology, and politics. Topics will include labor radicalism, Taylorism, the development of organized sports, the rise of department stores, the transformation of middle-class sexual morality, the growth of commercial entertainment, and the culture of the cold war. *Prerequisite: upper-division standing or consent of instructor.* Klein

**HIUS 135. Slavery and the Atlantic World (4)**

(Cross-listed with Ethnic Studies 170.) An examination of the emergence and consolidation of slave societies in regions of the Caribbean and British North America from the seventeenth century through the early nineteenth century. Staff +

**HIUS 136. Slavery and Freedom in Nineteenth-Century U.S.: Images and Realities (4)**

(Cross-listed with Ethnic Studies 171.) An examination of social, cultural, and political dimensions of the transition from slave to wage labor in the era of the Civil War, Reconstruction, and the Gilded Age. Staff

**HIUS 140/Econ 158A. Economic History of the United States I (4)**

The United States as a raw materials producer, as an agrarian society, and as an industrial nation. Emphasis on the logic of the growth process, the social and political tensions accompanying expansion, and nineteenth- and early twentieth-century transformations of American capitalism. Bernstein

**HIUS 141/Econ 158B. Economic History of the United States II (4)**

The United States as modern industrial nation. Emphasis on the logic of the growth process, the social and political tensions accompanying expansion, and twentieth-century transformations of American capitalism. Bernstein

**HIUS 146. Early American Labor History, 1600–1850 (4)**

A history of labor systems and activity in early America. The course will address work relations affecting Indians, slaves, artisans, indentured servants, laborers, yeomen, and tenant farmers as well as work culture, political consciousness, labor organization, and working-class protest. *Prerequisite: upper-division standing.* Staff +

**HIUS 147. History of the American Suburb (4)**

(Cross listed as USP 165.) This seminar explores the development of suburbs in America, from the early nineteenth century to the contemporary era. Topics include suburban formation, class, ethnic and racial dimensions, government influences, social life, and cultural responses to suburbia. The class will explore competing theories of suburbanization as it surveys the major literature. *Prerequisite: upper-division standing.* Nicolaidis

**HIUS 148. The American City in the Twentieth Century (4)**

(Cross-listed as USP 103.) This course focuses on the phenomenon of modern American urbanization. Case studies of individual cities will help illustrate the social, political, and environmental consequences of rapid urban expansion, as well as the ways in which urban problems have been dealt with historically. Staff

**HIUS 149. The United States in the 1960s (4)**

An overview of the social and political developments that polarized American society in the tumultuous decade of the 1960s. Themes include the social impact of the post-war "baby boom," the domestic and foreign policy implications of the Cold War; the evolution of the civil rights and women's movements; and the transformation of American popular culture. D. Gutiérrez

**HIUS 150. American Legal History to 1865 (4)**

The history of American law and legal institutions. This quarter focuses on crime and punishment in the colonial era, the emergence of theories of popular sovereignty, the forging of the Constitution and American federalism, the relationship between law and economic change, and the crisis of slavery and Union. *Prerequisite: upper-division standing.* Parrish +

**HIUS 151. American Legal History since 1865 (4)**

The history of American law and legal institutions. This course examines race relations and law, the rise of big business, the origins of the modern welfare state during the Great Depression, the crisis of civil liberties produced by two world wars and McCarthyism, and the Constitutional revolution wrought by the Warren Court. HIUS 150 is not a prerequisite for HIUS 151. *Prerequisite: upper-division standing.* Parrish

**HIUS 152. The Trials of America (4)**

An in-depth look at the civil and criminal trials that have shaped the legal and constitutional history of the United States from the colonial period to the present. The relationship between law and society will be explored through a series of cases that examine freedom of the press, insanity and the law, impeachment, treason and sedition, and tort liability. *Prerequisite: upper-division standing or consent of instructor.* Parrish

**HIUS 153. American Political Trials (4)**

Survey of politicized criminal trials and impeachments from Colonial times to the 1880s. Examines politically-motivated prosecutions and trials that became subjects of political controversy, were exploited by defendants for political purposes, or had their outcomes determined by political considerations. Parrish +

**HIUS 154. Western Environmental History (4)**

(Cross-listed as USP 160.) This course examines human interaction with the western American environment and explores the distinction between the objective environmental understanding of science and the subjective views of history and historians. The course will also analyze the most compelling environmental issues in the contemporary West. Staff

**HIUS 156. American Women, American Womanhood (4)**

This course explores the emergence of a dominant ideology of womanhood in America in the early nineteenth century and contrasts the ideal with the historically diverse experience of women of different races and classes, from settlement to 1870. Topics include witchcraft, evangelicalism, cult of domesticity, sexuality, rise of industrial capitalism and the transformation of women's work, Civil War, and the first feminist movement. *Prerequisite: upper-division standing.* McCurry +

**HIUS 157. American Women, American Womanhood 1870 to Present**

This course explores the making of the ideology of womanhood in modern America and the diversity of American women's experience from 1870 to the present. Topics include the suffrage movement, the struggle for reproductive rights and the ERA; immigrant and working-class women, women's work, and labor organization; education, the modern feminist movement and the contemporary politics of reproduction, including abortion and surrogate motherhood. *Prerequisite: upper-division standing.* McCurry

**HIUS 158. Social and Economic History of the Southwest I (4)**

(Cross-listed as Ethnic Studies 130.) This course examines the history of the Spanish and Mexican borderlands (what became the U.S. Southwest) from roughly 1400 to the end of the U.S.-Mexico War in 1848, focusing specifically on the area's social, cultural, and political development. Gutiérrez, R. +

**HIUS 159. Social and Economic History of the Southwest II (4)**

(Cross-listed as Ethnic Studies 131.) This course examines the history of the American Southwest from the U.S.-Mexico War in 1846-48 to the present, focusing on immigration, racial and ethnic conflict, and the growth of Chicano national identity. Gutiérrez, R.

**Colloquia**

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

**HIUS 160/260. Industrialization and Early American Society (4)**

A course examining the initial stages of industrialization in the late eighteenth and early nineteenth centuries. Special attention to how various communities and trades responded to the intervention of large-scale capital, machine technology, and the rise of factory methods of production.

**HIUS 161/261. Popular Politics and Political Culture in America, 1750-1900 (4)**

This course will examine the transformation of political life in America from the mid-eighteenth century to the turn of the twentieth century. We shall focus on three moments during these years: the revolutionary and constitutional period, the Jacksonian period, and the Gilded Age. And we shall look at the nature of popular political participation before the franchise, at the advent of mass politics and partisan mobilization, at the gendered aspects of politics and political culture, and at the rise of popular radicalism. Hahn

**HIUS 162/262. The American West (4)**

This seminar will trace major themes in the history of the American West. Topics will include ethnicity, the environment, urbanization, demographics, and shifting concepts surrounding the significance of the West. Graduate students will be required to submit additional written work in order to receive graduate credit for the course. Deverell

**HIUS 164/264/Ethn 181. American Slave Communities in Comparative Perspective (4)**

Slavery was both a thread of continuity in the history of the Americas and a distinctive institution in specific social settings. The purpose of this course is to examine and discuss readings that explore topics in the emergence, consolidation, and destruction of New World slave regimes in regions of the Caribbean and the United States. Because topics will vary, the seminar may be taken more than once for credit, with consent of the instructor. *Prerequisite: department stamp required.*

**HIUS 165. Segregation, Freedom Movements, and the Crisis of the Twentieth Century (4)**

A reading and discussion seminar that views the origins of segregation and the social movements that challenged it between 1890 and 1970 in comparative framework.

**HIUS 166/266. Topics in Southern History (4)**

Specific topics will vary from year to year, including slavery, Civil War and Reconstruction, the Afro-American experience, race relations. Hahn

**HIUS 167/267. Topics in Mexican-American History (4)**

(Cross-listed as Ethnic Studies 180.) This colloquium studies the racial representation of Mexican Americans in the United States from the nineteenth century to the present, examining critically the theories and methods of the humanities and social sciences. Gutiérrez, R.

**HIUS 169/269. Topics in American Legal and Constitutional History (4)**

A reading and discussion course on topics that vary from year to year, including American federalism, the history of civil liberties, and the Supreme Court. Parrish

**HIUS 170/270. Topics in Colonial History (4)**

Colloquium on selected topics in late colonial history, with special attention to issues often neglected. Topics will vary from year to year, and the course may therefore be repeated for credit. *Prerequisite: department stamp required.* Meranze

**HIUS 171/271. Topics in the American Revolution (4)**

Colloquium dealing with selected topics on the American Revolution and formation of the United States. Themes will vary from year to year. *Prerequisite: department stamp required.* Meranze

**HIUS 172/272. Feminist Traditions in America (4)**

In this course original documents are used to explore competing definitions of feminism and the diversity of feminist traditions in the United States from the eighteenth century to the present day. Three arenas of feminist activity are considered—women's social and political activism, the female intellectual tradition, and feminist theory. Documents and topics change annually, so course may be repeated for credit. McCurry

**HIUS 173/273. Topics in American Women's History (4)**

The specific content of the course will vary from year to year but will always analyze in depth a limited number of issues in American women's history. Special topics. McCurry

**HIUS 174/274. American Society in the Cold War (4)**

An inquiry into the social, political, economic, and constitutional impact of the cold war upon American society between 1945 and the present. Parrish

**HIUS 180/280. Immigration and Ethnicity in Modern American Society (4)**

Comparative study of immigration and ethnic-group formation in the United States from 1880 to the present. Topics include immigrant adaptation, competing theories about the experiences of different ethnic groups, and the persistence of ethnic attachments in modern American society. *Prerequisite: department stamp required.* Gutiérrez

**HIUS 181/281. Topics in Twentieth Century United States History (4)**

A colloquium dealing with special topics in U.S. history from 1900 to the present. Themes will vary from year to year. Parrish.

**HIUS 182/282. Special Topics in Intellectual History: Politics and Culture in the United States, 1776-1860 (4)**

An examination of the cultural and political construction of the American nation. Topics include: how citizenship and national community were imagined and contested; the importance of class, gender, and race in the nation's public sphere; and debates over slavery, expansion, and democracy in defining national purpose. Meranze

**HIUS 184. Special Topics in American Urban History (4)**

This colloquium explores various topics in the history of urban America, including the process of city development, social patterning in urban areas, city life and cultural styles, suburbanization, and the urban west. Topics will vary from year to year. Nicolaides

**HIUS 199. Independent Study in United States History (4)**

Directed readings for undergraduates under the supervision of various faculty members. *Prerequisite: consent of instructor and academic adviser required.* Staff

**TOPICS****Courses****HITO 100. Religious Traditions: Ancient Near Eastern Religions (4)**

A comprehensive study of the ancient religious traditions of the world. The course will cover tribal religions, classical polytheism, and the religion of the ancient Hebrews. *Prerequisite: upper-division standing.* Staff +

**HITO 101. Religious Traditions: Judaism, Christianity, Islam (4)**

A comprehensive study of the Western religious traditions. The course will cover Judaism, Christianity, and Islam. *Prerequisite: upper-division standing.* Staff +

**HITO 102. Religious Traditions: East Asian Religious Traditions (4)**

The course is intended to introduce students to the major religious traditions of Asia: Hinduism, Buddhism, Taoism, Shinto, and Confucianism. The course will focus on one religion each year. Since special topics will vary from year to year the course may be repeated for credit three times. Cahill +

**HITO 104. The Jews and Judaism in the Ancient and Medieval Worlds (4)**

The political and cultural history of the Jews through the early modern period. Life under ancient empires, Christianity and Islam. The post-biblical development of the Jewish religion and its eventual crystallization into the classical, rabbinic model. Goodblatt

**HITO 105. The Jews and Judaism in the Modern World (4)**

Topics include the political emancipation of the Jews of Europe; the emergence of Reform, Conservative, and Modern Orthodox Judaism; hasidism; modern anti-semitism; Jewish socialism; zionism; the Holocaust; the American Jewish community; the State of Israel. Goodblatt

**HITO 110/210. The History of Economic Thought (4)**

A survey and examination of the development of economic theory from its classical antecedents through the Keynesian revolution. Emphasis on three major traditions in economic thought: classical political economy, neoclassical economic theory, and Keynesian economics. These traditions will be evaluated in terms of both their chronological development and theoretical maturation. *Prerequisite: introductory economics or consent of instructor.* Bernstein

**HITO 111/211. Marxian Economic Theory (4)**

A survey and examination of the principal writings of Marx concerning economic theory and analysis. Emphasis on the theory of value, production, technical change, reproduction and accumulation. Some consideration will also be made of certain neo-Marxist contributions and critiques. *Prerequisite: introductory economics or consent of instructor.* Bernstein

**HITO 112. The History of Psychoanalysis (4)**

A lecture-discussion course tracing the development of psychoanalysis. The late nineteenth-century intellectual context.

Freud's major contributions. Psychoanalysis in practice. Post-Freudian transformations. *Prerequisite: upper-division standing or consent of instructor.* J.M. Hughes

**Colloquia**

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

**HITO 162/262. Economic Development in Historical Perspective (4)**

An inquiry into economic growth and development as a process of historical transformation. Topics will vary from year to year, but some examples are: the transition from feudalism to capitalism in Europe and North America; the social and political tensions accompanying the rise of capitalism; the role of the state and the juridical environment in economic development; and the sources and organization of the managerial and financial control of enterprise. Bernstein

**HITO 164/264. Gender Differences in Historical Perspective (4)**

An inquiry into how over the past century a number of disciplines (principally psychoanalysis, psychology, and anthropology) have treated gender differences. *Prerequisite: department stamp or consent of instructor.* J. M. Hughes.

**HITO 167/267. Cultural History of the Early Modern Europe and Early America (4)**

A comparative examination of the cultural history of early modern Europe and early America (1500–1800), with special emphasis on questions of religion and magic, ritual, print culture, and cross-cultural encounters. +

**HITO 173/273. Time, Space, and the Politics of Development (4)**

This course will focus on the idea and practice of development as a way to examine the transformation of spatial and temporal categories in modern society. Topics will range from the conceptual—notions of temporality—to the practical—modernization in the non-West. Topics vary from year to year. Tanaka

**HITO 194. History Honors (4)**

A program of independent study providing candidates for history honors an opportunity to develop, in consultation with an adviser, a preliminary proposal for the honors essay. An IP grade will be awarded at the end of this quarter. A final grade will be given for both quarters at the end of HITO 195. *Prerequisite: consent of instructor.* Department stamp required. Staff

**HITO 195. The Honors Essay (4)**

Independent study under the supervision of a faculty member leading to the preparation of an honors essay. A letter grade for both HITO 194 and 195 will be given at the completion of this quarter. *Prerequisite: consent of instructor.* Department stamp required. Staff

**HITO 196. Colloquium in History (4)**

The nature and uses of history are explored through the study of the historian's craft based on critical analysis of historical literature relating to selected topics of concern to all historians. Required of all candidates for history honors and open to other interested students with the instructor's consent. Department stamp required. Staff

**HITO 198. Directed Group Study (4)**

Directed group study on a topic not generally included in the regular curriculum. Students must make arrangements with

individual faculty members. (P/NP grades only.) *Prerequisite: consent of instructor.* Staff

**HITO 199. Independent Study for Undergraduates (4)**

Independent study on a topic not generally included in the regular curriculum. Students must make arrangements with individual faculty members. (P/NP grades only.) *Prerequisites: upper-division standing and consent of instructor.* Staff

**GRADUATE**

Graduate standing is a prerequisite for all graduate-level courses.

**HIGR 200. History and Social Theory (4)**

A weekly reading/writing seminar. Themes include historical sociology and large-scale history, interdisciplinary approaches to history (anthropological, psychoanalytic, etc.), and historical method. Students from all fields welcome, though emphasis primarily on early modern period (1500–1800).

**HIGR 201. Theory and Method in Historical Research (4)**

A weekly reading/writing seminar that seeks to introduce students to major theoretical and analytical trends in writing of history. Themes will vary but will include interdisciplinary approaches to historical research and method. Students from all fields welcome, although the emphasis in the course will be on the modern era (1789–present). Bernstein and departmental faculty

**HIGR 202. An Inquiry Concerning Historical Understanding (4)**

This seminar will concern the difficulty of understanding past beliefs which are no longer ours, and the ways in which this recurrent misunderstanding marked the encounter of the other. Our attention will be focused on two historical moments: the Greco-Roman Antiquity (Pagans v. Christians) and the conquest of the New World (Western Europe v. Indians). We will study in parallel primary and secondary sources. Giard

**HIGR 203. History of Visual Perception, Cognition and Representation (4)**

Visual perception and pictorial representation will be analyzed in the ways they were practiced, considered and conceptualized in diverse historical and cultural contexts. Sources may include narratives, treatises on vision, cognition optics and perspective, maps, illustrations, paintings. Topics will vary from year to year and students may therefore repeat the course for credit. Giard

**HIGR 205. Feminist Historical Studies (4)**

An introduction to feminist historical studies, this course is designed for interested graduate students from all history field groups. Graduate students from other disciplines are also encouraged to participate. The course will provide students a rigorous training in women's history, in the feminist theories that undergird that scholarship, and in the emergent field of gender analysis. The particular content of the course will change from year to year, but each course will include theoretical texts, historical case studies, and primary sources. Readings will be drawn from different times and places. This course is strongly recommended for those preparing minor fields in women's history. The course can be repeated twice for credit.

**HIGR 210. Literature of Modern Chinese History (4)**

This course will introduce students to the monographic literature and the main historiographic controversies of modern Chinese history. *Prerequisite: graduate standing or permission of instructor.*

**HIGR 211. Literature of Modern Japanese History (4)**

This course will introduce students to the monographic literature and the main historiographic controversies of mod-



ern Japanese history. *Prerequisite: graduate standing or permission of instructor.*

**HIGR 212. Literature of Modern East Asian History (4)**

This course will introduce students to the monographic literature and the main historiographic controversies of modern East Asian history. *Prerequisite: graduate standing or permission of instructor.*

**HIGR 213. Sources on Modern Chinese History (4)**

An introduction to Chinese documentary sources and collections on Qing and Republican History. This course will introduce students to the language of Qing documents, and to the contents and uses of imperial documents and archives, documentary collections, periodicals, gazetteers, etc. *Prerequisite: graduate standing or permission of instructor.*

**HIGR 215A-B. Modern Chinese History (4-4)**

A two-quarter research seminar in Chinese history. A paper, based on original research, will be due in the second quarter. Seminar topics will vary. Reading knowledge of Chinese is expected. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. *Prerequisite: 215A is a prerequisite for 215B.*

**HIGR 216A-B. Modern Japanese History (4-4)**

A two-quarter research seminar in Japanese history. A paper, based on original research, will be due in the second quarter. Seminar topics will vary. Reading knowledge of Japanese is expected. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. *Prerequisite: 216A is a prerequisite for 216B.*

**HIGR 220. Problems in European History, 1500–1715 (4)**

Introduction to the historiography of Renaissance, Reformation, and early modern Europe: an overview of methodologies with emphasis on sources and critical approaches. Required for all beginning European history graduate students. *Prerequisite: graduate standing or permission of instructor.*

**HIGR 221. Problems in European History, 1715–1850 (4)**

Selected topics in European history from the early modern to the modern era. Readings and discussions focus on issues of methodology and interpretation. Required for all beginning European history graduate students. *Prerequisite: graduate standing or permission of instructor.*

**HIGR 222. Problems in European History, since 1850 (4)**

Critical evaluation of selected topics in the period of modern Europe from the mid-nineteenth century to the present. Required for all beginning European history graduate students. *Prerequisite: graduate standing or permission of instructor.*

**HIGR 225. Readings in Modern Russian History (4)**

Students will read major works on Revolutionary Russia and Soviet history. Attention will be paid to both classic and revisionist works. Edelman

**HIGR 227A-B. Seminar in Spanish History (4-4)**

Readings and critical analysis of selected topics and important works in the history of Spain. May be repeated as content changes. Proficiency in Spanish required to repeat course, but not for the first time taken. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. *Prerequisites: fluent reading knowledge of Spanish desired. Graduate standing. German or French also desirable. Ringrose (Not offered in 1998–99.)*

**HIGR 230A-B. Research Seminar in Early Modern Europe (4-4)**

Selected topics in the period from the sixteenth century through the early nineteenth, with an emphasis on the theory and prac-

tice of socio-economic history. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. *Prerequisite: 230A is a prerequisite for 230B.*

**HIGR 231A-B. Research Seminar on Modern European Intellectual and Cultural History (4-4)**

Selected topics in the period of the nineteenth and twentieth centuries. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. *Prerequisite: 231A is a prerequisite for 231B.*

**HIGR 232A-B. Research Seminar on Modern European Social and Political History (4-4)**

Selected topics in the period of the nineteenth and twentieth centuries. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. *Prerequisite: 232A is a prerequisite for 232B.*

**HIGR 233. The Philosophical Foundations of Modern Western Historiography (4)**

From Plato to Foucault, a selection of major philosophical texts studied in context and considered in relationship with key historical issues. Giard

**HIGR 236A-B. Seminar in History of Science (4-4)**

A two-quarter research seminar comprising intensive study of a specific topic in the history of science. The first quarter will be devoted to readings and discussions; the second chiefly to the writing of individual research papers. Topics vary from year to year, and students may therefore repeat the course for credit. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter.

**HIGR 237. Topics in the History of Ocean Sciences (4)**

(Cross-listed with SIO 201.) Intensive study of specific problems in the history of the ocean sciences, and of related earth and atmospheric sciences, in the modern period. Topics vary from year to year, and students may therefore repeat the course for credit. Rudwick/Friedman

**HIGR 238. Introduction to Science Studies (4)**

(Cross-listed as Sociology 255A and Philosophy 209A.) Study and discussion of classic work in history of science, sociology of science and philosophy of science, and of work that attempts to develop a unified science studies approach. Required for all students in the Science Studies Program. *Prerequisite: enrollment in Science Studies Program.*

**HIGR 239. Seminar in Science Studies (4)**

(Cross-listed as Sociology 255B and Philosophy 209B.) Study and discussion of selected topics in the science studies field. Required for all students in the Science Studies Program. May be repeated as course content changes annually. *Prerequisite: enrollment in Science Studies Program.*

**HIGR 240. Colloquium in Science Studies (4)**

(Cross-listed as Sociology 255C and Philosophy 209C.) A forum for the presentation and discussion of research in progress in science studies, by graduate students, faculty, and visitors. Required for all students in the Science Studies Program. May be repeated as course content changes annually. *Prerequisite: enrollment in the Science Studies Program.*

**HIGR 245A-B-C. Seminar in the Literature of Latin American History (4-4-4)**

Introduction to the literature of Latin American history. A three-quarter sequence of readings and discussions taught each quarter by members of the staff. Required for all beginning students for a graduate degree specializing in Latin American history; open and strongly recommended to other students using Latin American history as a secondary field for a graduate degree. HIGR 245A covers the colonial period, from conquest to independence to today; HIGR 245B

covers South America from independence to today; HIGR 245C covers Mexico, Cuba, and Central America from independence to today. The three quarters need not be taken in sequence. Reading knowledge of Spanish is required.

**HIGR 246A-B. History of Mexico (4-4)**

A research and study seminar of two quarters, with primary emphasis on social change in Mexico. The first quarter deals with primary sources, bibliography, and the selection of a research project; in the second quarter, the student will complete the project and submit the study to the scrutiny of the seminar. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. *Prerequisite: 246A is a prerequisite for 246B.*

**HIGR 247A-B. Readings and Seminar on Colonial Latin America (4-4)**

A two-quarter course involving readings and research on sixteenth- through eighteenth-century Latin America. Students are expected to compose a paper based on original research that is due in the second quarter. Reading knowledge of Spanish required. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter.

**HIGR 248A-B. Readings and Seminar on Latin America, National Period (4-4)**

A two-quarter course involving readings and research; the first quarter is devoted to the nineteenth and the second quarter to the twentieth century. Students are expected to compose a paper based on original research that is due in the second quarter. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. Reading knowledge of Spanish and/or Portuguese is helpful but not required.

**HIGR 249. Topics in Colonial Latin America (4)**

One or two topics in colonial history will be analyzed in depth; reading knowledge of Spanish is expected.

**HIGR 250. Topics in the National Period of Latin America (4)**

One or two topics in the national period or the national history of one country will be analyzed in depth; a reading knowledge of Spanish is expected.

**HIGR 251. Topics in the History of Mexico (4)**

One or two topics in the history of Mexico will be examined in depth. A reading knowledge of Spanish is expected. Topics vary from year to year, and students may therefore repeat the course for credit.

**HIGR 252. History, Social Evolution, and Intellectuals in the Andes: Mariátegui, Haya de la Torre, and Arguedas (4)**

The course will study three major twentieth-century interpreters of Andean history and society. Mariátegui is Latin America's most original socialist intellectual; Haya de la Torre is the founder of Peru's most important party; and Arguedas was the most profound interpreter of the role of Indian peasants in the Andean nations. *Prerequisite: graduate standing or consent of instructor.*

**HIGR 260A-B-C. Seminar in Judaic Studies (4-4-4)**

Weekly graduate seminar. Faculty and students present results of research. Student research may be towards course work on thesis.

**HIGR 261. Seminar in the Hebrew Bible (4)**

Examination of texts from the Hebrew Bible with the aim of identifying their authors and the historical circumstances surrounding their composition. Methodological preparation in textual criticism, redaction criticism, and analysis of the relationship between history and literature.



**HIGR 264. Topics in Pre-Islamic Jewish History (4)**

An examination in depth of selected topics in the history of the Jewish people and Jewish civilization in pre-Islamic times. Goodblatt

**HIGR 265A-B-C. The Literature of American History (4-4-4)**

A three-quarter sequence of readings and discussions on the bibliographical and monographic literature of American history from the colonial period to the present. Taught by different members of the staff each quarter, the course is required of all beginning graduate students in American history.

**HIGR 267A-B. Research Seminar in United States History (4-4)**

Readings and discussion in selected areas of American history for advanced graduate students. An IP (in progress) grade will be awarded the first quarter. The second quarter will be devoted to the presentation, discussion, and evaluation of work in progress. A final grade will be awarded at the end of the second quarter. *Prerequisite: 267A is a prerequisite for 267B.*

**HIGR 272. Seminar in Southern History (4)**

Analysis of major works on the history of the southern United States, focusing on social groups, class and race relations, economic development, culture, and politics. An intercampus course taught jointly by participating faculty from UCSD, UCI, and UCR. May be repeated for credit due to the content changing from quarter to quarter. Special topics.

**HIGR 273. The Culture of Consumption (4)**

(Cross-listed with COGR 240.) This course will explore the development and cultural manifestations of consumerism in the nineteenth and twentieth centuries. Topics will include the rise of museums, the development of mass-market journalism and literature, advertising, and the growth of commercial amusements. Readings focus primarily on the United States. Students will be encouraged to think historically and comparatively. Klein

**HIGR 274. Topics in Western American History (4)**

This course is a one-quarter colloquium devoted to the examination of major issues in the history of the American West. Topics addressed will include, but not be limited to, the region's social, cultural, environmental, and political history. Historiographical debates will be analyzed, as well as crucial problems related to the definition of the field and region. Students will be expected to participate fully in class discussions and write several essays pertaining to the course themes and readings. Department of History graduate students are encouraged to enroll in research seminar HIGR 275A-B instead of taking this colloquium. *Prerequisite: graduate standing in the Department of History and related disciplines.*

**HIGR 275A-B. Seminar in Western American History (4-4)**

This course is a two-quarter research sequence in Western American history. The first quarter will cover selected topics of the nineteenth and twentieth centuries of the American West, with an emphasis on the region's social, cultural, environmental, and political history. The second quarter is devoted to the writing of a major research paper in the field. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. *Prerequisite: 275A is a prerequisite for 275B.*

**HIGR 290. Library Research Methods (2)**

Introduction to library research methods for historians, including strategies, current and retrospective bibliography, computer-based resources, and special skills and knowledge for contemporary scholarly research. Includes bibliography project that may be undertaken with concurrent research seminar.

**HIGR 295. Thesis Seminar (4)**

For students advanced to candidacy to the doctorate. Discussion, criticism, and revision of drafts of chapters of theses and of work to be submitted for publication.

**HIGR 296. M.A. Thesis Direction (8)**

Independent work by graduate students engaged in research and writing of thesis.

**HIGR 298. Directed Reading (1-12)**

Guided and supervised reading in the literature of the several fields of history. This course may be repeated for an indefinite number of times due to the independent nature of the content of the course. (S/U grades permitted.)

**HIGR 299. Ph.D. Thesis Direction (1-12)**

Independent work by graduate students engaged in research and writing of doctoral theses. This course may be repeated for an indefinite number of times due to the independent nature of thesis writing and research. (S/U grades only.)

**HIGR 500. Apprentice Teaching in History (1-4)**

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty: handling of discussions, preparation and grading of examinations and other written exercises, and student relations. (S/U grades only.)

## Human Development Program

ADMINISTRATIVE OFFICE: 3575 McGill Hall Annex, Muir College

**Professors**

Mark Appelbaum, Ph.D., *Psychology*  
 Elizabeth Bates, Ph.D., *Cognitive Science*  
 Ursula Bellugi, Ph.D., *Salk Institute*  
 Charles Briggs, Ph.D., *Ethnic Studies*  
 Sandra Brown, Ph.D., *Psychology*  
 Aaron V. Cicourel, Ph.D., *Emeritus, Cognitive Science/Sociology/Pediatrics*  
 Michael Cole, Ph.D., *Communication/ Psychology*  
 Eric Courchesne, Ph.D., *Neuroscience*  
 Jean M. Mandler, Ph.D., *Cognitive Science*  
 Hugh B. Mehan, Ph.D., *Sociology*  
 Laura Schreibman, Ph.D., *Psychology*  
 Joan Stiles, Ph.D., *Director, Cognitive Science*

**Associate Professors**

Farrell Ackerman, Ph.D., *Linguistics*  
 Jim Moore, Ph.D., *Anthropology*  
 Carol Padden, Ph.D., *Assistant Director, Communication*

**Assistant Professors**

Karen Dobkins, Ph.D., *Psychology*  
 Shirley McGuire, Ph.D., *Psychology*  
 Olga A. Vasquez, Ph.D., *Communication*

**Lecturers**

Margie Gallego, Ph.D., *Human Development*  
 Paula Levin, Ph.D., *Teacher Education Program*  
 Stephen Potts, Ph.D., *Literature*

### The Human Development Major

The scientific study of human development focuses on issues of growth, development, and behavioral change across the lifespan. The Human Development Program is interdisciplinary, incorporating courses from the Departments of Anthropology, Biology, Cognitive Science, Communication, Ethnic Studies, History, Linguistics, Literature, Psychology, Sociology, the Teacher Education Program and Urban Studies and Planning. The curriculum is designed to emphasize the idea of development as an essential perspective from which to understand human behavior. The courses cover a broad spectrum of issues in human development—from brain and perceptual development, to reasoning and problem solving, to social interaction and the evolution of cultural systems. The Human Development Program unifies and coordinates the excellent research and teaching resources currently available on campus in this area, and profiles the factors which influence the ways in which humans develop and change.

Human development is a very large field, but there is a set of basic questions which serve to define and integrate it: What underlies the development of human knowledge? To what extent is the capacity to know, indeed the concepts themselves, encoded in the genes? How is the role of learning and environmental influences accounted for? How do we learn? What are the ways in which children become competent participants in their social groups? What is the origin and nature of social interaction and organization?

The study of human development has become increasingly central to a wide range of important issues affecting infants, young children and adolescents, as well as the changing structure of the American family, and public policy on children and education. An understanding of the processes which underlie human development is crucial to our evaluation of these issues and to our ability to offer avenues for remediation of the attendant problems.

The three major areas of study within the Human Development Program are: *Biological Development*, *Psychological Development*, and *Socio-Cultural Development*. These areas consider issues which pertain to development of specific neural and cognitive processes and development within a larger social and cultural context.

### Career Guidance

A degree in human development offers training of special interest to those considering admission to graduate or professional schools and careers in medicine, law, education, counseling, clinical psychology, public health, public policy, public administration, or social work. Students who are interested in these areas are advised to see the student affairs coordinator for assistance in selecting elective and major courses. A major in human development is designed to impart fundamental skills in critical thinking, comparative analysis, research analysis, and written expression.

A human development major can offer preparation for teaching in elementary schools. However, if you are interested in earning a California teaching credential from UCSD, contact the Teacher Education Program for information about the prerequisite and professional preparation requirements. It is recommended you contact TEP as early as possible in your academic career.

### Education Abroad

Students are often able to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP) while still making progress towards their major. Students interested in studying abroad should see the student affairs coordinator to discuss curriculum plans and appropriate courses. Information on EAP/OAP is detailed in the Education Abroad Program section of the *UCSD General Catalog*. Interested students should contact the Programs Abroad Office in the International Center.

### Prerequisites for Human Development Majors

A bachelor of arts degree in human development will be given to students who satisfactorily complete the general-education and graduation requirements of Marshall, Muir, Revelle, Roosevelt, or Warren College in addition to the Human Development Program requirements described below.

### Grade Requirements for the Major

A minimum grade-point average of 2.0 is required in the major. Students must receive a grade of C- or better in any course counted toward fulfillment of the major requirements.

**All courses taken to satisfy the program's lower- and upper-division requirements must be taken for a letter grade.**

### Lower-Division Requirements

The lower-division requirements for the major in human development are:

1. **Introductory course in human development** (HDP 1). This course must be taken at UCSD.
2. **One quarter of statistics** (Psychology 60, Cognitive Science 14, or see the student affairs coordinator for the equivalent).
3. **Two natural science courses.** This requirement should be fulfilled by taking general introductory courses in the physical sciences (i.e., biology, chemistry, and physics). The following is a list of acceptable natural science courses offered at UCSD:  
Biology: 1,2, 3, 10, 12  
Chemistry: 4, 6A, 6B, 6C, 11, 12, 13  
Cognitive Science: 17  
Earth Science: 10, 12  
Physics: any of the 1 and 2 series, 10, 11
4. **One introductory computer course** (AMES 5, Cognitive Science 3, CSE 1, CSE 2, or see the student affairs coordinator for the equivalent).
5. **Two formal skills courses.** The courses may consist of any combination of courses in college level mathematics or logic. One quarter of calculus is strongly recommended. Acceptable logic courses include Philosophy 10 and 12.

*Lower-division requirement 1. and 2. should be taken prior to enrolling in upper-division course work. It is recommended that all other lower-division requirements be completed by the end of the sophomore year.*

### Upper-Division Requirements

The upper-division requirements for a major in human development are:

1. **one laboratory** course
2. **four foundation** courses
3. **seven upper-division developmental** courses.
4. **one advanced-level human development** course
5. **one quarter of field research**

### LABORATORY COURSES (ONE COURSE)

Each student is required to complete **one** laboratory course from the list of approved courses. The laboratory course is intended to introduce students to the methodologies used in the study of human development. Students are to choose **one** of:

- Biology, BICD 131: Embryology Laboratory
- Biology, BIEB 165: Sociobiology Laboratory
- Cognitive Science 130: Everyday Cognition
- HDP 130/COHI 108: The Development of Communication in Children
- HDP 135/COMT 116/PSYC 128: Practicum in Child Development
- Psychology 117: Laboratory in Developmental Psychology
- TEP 135: Fifth Dimension for Elementary Schools

### FOUNDATION COURSES (FOUR UPPER-DIVISION COURSES):

The study of development provides an essential perspective of how human beings come to know and interact with the world. However, this perspective must be grounded in a knowledge of the larger fields of study. It is crucial that students of human development are well-versed in the major theoretical and empirical issues of the related parent disciplines. The foundation course list is divided into the three major areas of study, **Biological Development**, **Psychological Development**, and

**Socio-Cultural Development.** Within each area a number of foundation courses are indicated. Students are required to take at least **four** foundation courses. **Students must take at least one course in each of the three major areas and may distribute the remaining course in any area they wish.**

**BIOLOGICAL DEVELOPMENT**

- Biology, BICD 100: Genetics
- Biology, BIEB 164: Behavioral Ecology
- Biology, BIMM 100: Molecular Biology
- Cognitive Science 107A-B-C: Cognitive Neuroscience
- Psychology 102: Introduction to Sensation and Perception
- Psychology 106: Introduction to Physiological Psychology
- Psychology 145: Psychology of Language
- Psychology 176: Functional Neuroanatomy

**PSYCHOLOGICAL DEVELOPMENT**

- Anthropology, ANPR 107: Psychological Anthropology
- Anthropology, ANGN 118: Cognitive Anthropology
- Cognitive Science, 101A-B-C: Cognitive Theory and Phenomena
- Cognitive Science, 151: Analogy and Conceptual Systems
- Communication, COHI 100: Introduction to Communication & the Individual
- Linguistics 101: Introduction to the Study of Language
- Psychology 103: Introduction to Principles of Behavior
- Psychology 105: Introduction to Cognitive Psychology
- Psychology 131: Personality Theory and Research

**SOCIO-CULTURAL DEVELOPMENT**

- Anthropology, ANPR 105: Social Anthropology
- Anthropology, ANPR 106: Cultural Anthropology
- Communication, COCU 100: Introduction to Communication and Culture

- Psychology 104: Introduction to Social Psychology **or** Sociology, SOCB 112: Social Psychology (Students may not receive credit for both Psychology 104 and SOCB 112.)
- Sociology, SOCB 115: Language and Society
- Sociology, SOCB 127: Language, Identity and Community.

**DEVELOPMENTAL COURSES (SEVEN UPPER-DIVISION COURSES):**

Each student is required to complete **seven** developmental courses from the approved list. The developmental course list is divided into the three major areas of study, **Biological Development, Psychological Development, and Socio-Cultural Development.** Within the seven developmental courses, a distribution requirement must be met by 1) taking **one** course from each of the **three** major areas of study and 2) by taking **three** courses from those denoted by the asterisk \* (which may or may not be completed within the first distribution requirement). (Please note some courses appear in more than one area of study such as Psychology 101 and 180, and may not be counted towards more than one area of study.) The distribution requirement is intended to provide students with breadth within the area of human development. In addition to the distribution requirements, each student is required to complete the remaining courses chosen from the approved developmental course list. The program allows considerable flexibility in selection of developmental courses. Students may focus on a particular area, or they may define their course of study more broadly by selecting courses across the range of areas offered.

**BIOLOGICAL DEVELOPMENT**

- Anthropology, ANBI 140: The Evolution of the Human Brain
- Biology, BILD 20: Human Genetics in Modern Society (see the HDP student affairs coordinator prior to enrollment).
- Biology, BILD 24: Biology of Human Reproduction **or** Biology, BICD 134: Human Reproduction and Development (Requires a strong Biology background. Students may not receive credit for both BILD 24 and BICD 134. See the HDP student affairs coordinator prior to enrollment).

- Biology, BICD 130\*: Embryology
- Biology, BIEB 156\*: Population Genetics
- Biology, BIPN 144: Developmental Neurobiology
- Cognitive Science 115\*: Neurological Development and Cognitive Change
- Cognitive Science 184: Modeling the Evolution of Cognition
- Psychology 101\*: Intro to Developmental Psychology
- Psychology 133\*: Brain and Cognitive Development
- Psychology 168\*: Psychological Disorders of Childhood
- Psychology 177: Introduction to Behavioral Genetics
- Psychology 180\*: Adolescence

**PSYCHOLOGICAL DEVELOPMENT**

- Cognitive Science 113/PSYC 136\*: Cognitive Development
- Cognitive Science 156/PSYC 126\*: Language Development
- Communication, COHI 121\*: Literacy, Social Organization and the Individual
- Linguistics 170: Psycholinguistics
- Linguistics 171\*: Child Language Acquisition
- Linguistics 177: Multilingualism
- Literature, LTGN 171: Children's Literature
- Literature, LTGN 172: Adolescent Literature
- Psychology 101\*: Intro to Developmental Psychology
- Psychology 156: Cognitive Development in Infancy
- Psychology 167\*: Social and Emotional Development
- Psychology 168\*: Psychological Disorders of Childhood
- Psychology 174: Communication Disorders in Children & Adults
- Psychology 180\*: Adolescence
- TEP 115: Child Development and Education

**SOCIO-CULTURAL DEVELOPMENT**

- Anthropology, ANGN 177: Adolescence
- Anthropology, ANLD 57: Children and Culture (see the HDP student affairs coordinator prior to enrollment).

- Communication, COHI 121\*: Literacy, Social Organization and the Individual
- Communication, COHI 123\*: Children and Media
- Communication, COCU 139: Reproductive Discourse and Gender
- Ethnic Studies 141: Language and Culture
- History, HILA 117: Indians, Blacks and Whites: Family Relations in Latin America
- Literature, LTGN 171: Children's Literature
- Literature, LTGN 172: Adolescent Literature
- Psychology 101\*: Intro to Developmental Psychology
- Psychology 167\*: Social and Emotional Development
- Psychology 180\*: Adolescence
- Sociology, SOCB 118: Sociology of Sex and Gender Roles
- Sociology, SOCB 131: Sociology of Youth
- Sociology, SOCC 129: The Family
- Sociology, SOCC 152/USP 133: Social Inequality and Public Policy
- TEP 115: Child Development and Education
- TEP/SOCB 117\*: Language, Culture, and Education
- TEP/SOCC 126: Social Organization of Education
- USP 145: Aging—Social and Health Policy Issues

### Advanced Human Development Requirement HDP 150

The course is designed for human development seniors. Its purpose is to provide students with an integrative overview of the field at an advanced level in a way that helps them integrate the widely different individual curricula they have followed along one of the many branching paths of our program. The course will focus on subfields of human development including biology, society, culture, and the individual experience to human development, continuity and discontinuity in development, and theory and practice. This course must be taken at UCSD. *Prerequisites: senior standing or consent of instructor.*

### Field Research Requirement HDP 191

This course provides students with the opportunity to participate jointly in a research project in conjunction with a mentor/collaborator from a local service site. This applied research experience allows students to design and conduct research projects in a variety of settings ranging from laboratory research settings to service oriented placements. In addition to literature research, and a final paper at the end of the quarter, students will participate at an off-campus site for a minimum of four hours per week. Research sites are pre-arranged one quarter in advance (see the student affairs coordinator for enrollment information). Students interests and future career plans are considered for site placement. Various research orientations and methodologies are reviewed in class. This course must be taken at UCSD. *Prerequisites: HDP 1 and department approval one quarter prior to enrollment.*

### Honors in Human Development HDP 194A-B-C

The Human Development Program offers an honors option for those students who have demonstrated excellence in the human development major. Human development honors allows eligible undergraduates to explore advanced issues in the field through an honors thesis, on a topic of their choice, and under faculty supervision. In order to be admitted to the honors program, students must have 1) junior standing, 2) maintain a minimum cumulative grade point average of 3.2, and a 3.5 GPA for courses taken in the Human Development major. Interested students need to apply for departmental honors spring quarter of their junior year. Students in the honors program are expected to complete the following courses in addition to those required for the major:

1. An advanced course in statistics or methods design (see the student affairs coordinator for more information).
2. HDP 194A-B-C, a year-long independent research project, which results in an Honors Thesis.

### The Minor Program

A total of **seven** courses are required to complete a minor in human development.

These include **Introduction to Human Development** (HDP 1), three developmental courses denoted by the asterisk \*, and **three** additional developmental courses, one from each major area of study from the developmental course list.

### FINISH-IN-FOUR PLAN

This plan is provided to help students fit the human development major into a four-year schedule. Students interested in a particular career field should see the student affairs coordinator for more specific Finish-in-Four Plans for their particular college.

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
Natural Science Formal Skills	Natural Science Formal Skills	Computer
<b>SOPHOMORE YEAR</b>		
Statistics Foundation	HDP 1 Foundation	HDP Lab Foundation
<b>JUNIOR YEAR</b>		
Foundation Development Advanced Statistics**	Development Development	Development Field Research
<b>SENIOR YEAR</b>		
Development Honor's Thesis**	HDP 150 Development Honor's Thesis**	Development Honor's Thesis**

\*\* Only required for students participating in the HDP Honor's Program.

## COURSES

### LOWER-DIVISION

**HDP 1. Introduction to Human Development (4)**  
This course introduces students to the central issues in the basic areas in human development. The course will explain relationships between biological, cognitive, social and cultural aspects of development.

### UPPER-DIVISION

**HDP 130. Development of Communication in Children (4)**  
(Same as COHI 108.) The course serves as an introduction to research methods in the study of child development. The special focus of the course will be on how children acquire competence in symbolic communication, including language, drawing, writing, and number systems. Observation of children in their interactions with each other and adults will be required. *Prerequisite: HDP 1 or COHI 100.*

**HDP 135. Practicum in Child Development (6)**  
(Same as COMT 116/PSYC 128.) A combined lecture and laboratory course for students in psychology, communications and human development. Student backgrounds should include a

background in general psychology or communication. Students will be expected to spend four hours a week in a supervised practical after school setting at one of the community field sites involving children. Additional time will be devoted to readings and class prep, as well as, six hours a week transcribing field notes and writing a paper on some aspect of the field work experience as it relates to class lectures and readings. *Prerequisite: HDP 1 or COHI 100 or PSYC 101.*

**HDP 150. Advanced Human Development (4)**

This course provides human development seniors with an integrative overview of the field at an advanced level. The course will focus on subfields of human development including biology, society, culture, and the individual experience to human development, continuity and discontinuity in development, and theory and practice. *Prerequisites: senior standing and consent of instructor.*

**HDP 191. Field Research in Human Development (4)**

This course provides students the opportunity to participate jointly in a research project in conjunction with a mentor/collaborator from a local service site. Students will participate at an off-campus site for a minimum of four hours per week for a ten week quarter. Research sites are arranged by the instructor prior to the ten week quarter. Students choose among research sites according to their interests and future career plans. This applied research experience allows students to participate in different aspects of research projects in a variety of settings. Students employ various research methods reviewed in class that are suited to the particular research settings. *Prerequisites: HDP 1 and department approval one quarter prior to enrollment.*

**HDP 194A-B-C. Honors Thesis (4-4-4)**

Students will take part in a weekly research seminar. In addition, they will plan and carry out a three-quarter research project under the guidance of a faculty member. The project will form the basis for their senior honors thesis. *Prerequisites: overall GPA of 3.2, and a 3.5 GPA for courses taken in the human development major; an advanced course in statistics or experimental design, and consent of instructor.*

## Humanities

OFFICE: Revelle Commons T100, Room 101,  
Revelle College

The Humanities Program offers interdisciplinary courses in history, philosophy, and literature, with a focus on major aspects of the Western humanistic tradition. In these courses, students examine the development of a wide variety of ideas and forms of expression that exert a major influence on modern America. Through lectures and class discussions, and through the writing of essays, students learn to interpret literary, historical, and philosophical texts and to conduct independent critical assessments of documents and ideas.

The sequence of courses, Humanities 1 through 5, meets the humanities and writing requirement of Revelle College. Instruction in

university-level writing is part of all five courses, but students in Humanities 1 and 2 (six units each) receive intensive writing instruction.

Students must have satisfied the university's Subject A requirement before registering for any part of the humanities sequence. Humanities 1 and 2 must be taken before Humanities 3-4-5.

For detailed description of the Revelle College humanities requirement, see "Revelle College, General-Education Requirements, Humanities."

## COURSES

### LOWER-DIVISION

**1. The Foundations of Western Civilization: Israel and Greece (6)**

Texts from the Hebrew Bible and from Greek epic, history, drama, and philosophy in their cultural context. Revelle students must take course for letter grade. *Prerequisite: satisfaction of the Subject A requirement. (W)*

**2. Rome, Christianity, and the Middle Ages (6)**

The Roman Empire, the Christian transformation of the classical world in late antiquity, and the rise of a European culture during the Middle Ages. Representative texts from Latin authors, early Christian literature, the Germanic tradition, and the high Middle Ages. Revelle students must take course for letter grade. *Prerequisite: satisfaction of the Subject A requirement. (S)*

**3. Renaissance, Reformation, and Early Modern Europe (4)**

The revival of classical culture and values and the reaction against medieval ideas concerning the place of human beings in the world. The Protestant Reformation and its intellectual and political consequences. The philosophical background to the scientific revolution. Revelle students must take course for letter grade. *Prerequisite: satisfaction of the Subject A requirement. (F)*

**4. Enlightenment, Romanticism, Revolution (1660-1848) (4)**

The enlightenment's revisions of traditional thought; the rise of classical liberalism; the era of the first modern political revolutions; romantic ideas of nature and human life. Revelle students must take course for letter grade. *Prerequisite: satisfaction of the Subject A requirement. (W)*

**5. Modern Culture (1848-present) (4)**

Challenges to liberalism posed by such movements as socialism, imperialism, and nationalism; the growth of new forms of self-expression and new conceptions of individual psychology. Revelle students must take course for letter grade. *Prerequisite: Satisfaction of the Subject A requirement. (S)*

**199. Special Studies (2-4)**

Individually guided readings or projects in area of humanities not normally covered in standard curriculum. *Prerequisite: upper-division standing or consent of instructor.*

**200. Seminar in the Humanities (4)**

Selected topics in the history, literature, and thought of Mediterranean antiquity and its successor-cultures. Emphasis on

identifying both common themes and cultural distinctiveness. Discussion of pedagogical approaches to this material. Required of all graduate instructional assistants in the humanities sequence. *Prerequisite: graduate standing. (F)*

### The Humanities Minor

The present humanities minor consists of six courses chosen from the listings of the Departments of History, Philosophy, Literature, Visual Arts, Music, and Theatre. All six courses may be selected from the upper-division offerings, but at least three upper-division courses *must* be included. Effective winter 1995, students for whom Humanities 1-5 fulfill general education requirements may use three of these courses on the humanities minor.

Effective for students entering UCSD after January 1, 1998, the required number of courses will increase. The minor will consist of seven courses, at least five of which must be upper-division.

Courses selected for the minor must be selected from the offerings of more than one department. They must concern themselves with more than one historical, national, or ethnic culture; and they must offer broad treatment of centrally important topics in the humanities. Thus, a course on the history of the United States since the Civil War would be appropriate for the humanities minor, while a course in the history of California would not.

Here are some examples of study lists appropriate for the present humanities minor:

**Example 1:**

History: HILD 2AB: United States  
History: HILD 11: East Asia and the West  
Literature: LTGN 140B: Modern Chinese Literature in Translation  
Philosophy 160: Ethical Theory  
Philosophy 153: Philosophy of History

**Example 2:**

History: HILA 102: Latin America in the Twentieth Century  
History: HIAF 111: Modern Africa since 1880  
Literature: LTGN 136: Latin American Literature in Translation  
Literature: LTEN 184: African-American Poetry  
Music 113: Music of the Baroque, Classic, and Romantic Periods  
Visual Arts 126DN: African and African-American Art

### Example 3:

Literature: LTEN 145: The English Novel  
in The Twentieth Century

Literature: LTEN 146: Women and English/  
American Literature

Literature: LTGN 148: The Bible and Western  
Literature

Philosophy 175: Aesthetics

Philosophy 177: Philosophy and Literature

Theatre: TH/HS 1: History of Theatre I: Classical  
to Renaissance

Students should review their plans for the minor with the humanities adviser as well as with the advisers in their college. Before undertaking the minor, students must submit a study list for approval to the humanities office, 1512 Galbraith Hall.

### Humanities Majors

Normally, students interested in majoring in humanities must choose a specific major in the humanities departments, i.e., history, literature, or philosophy. But students from Revelle and Muir Colleges may request to graduate with an approved individual/special project major in the humanities.

## International Relations and Pacific Studies Graduate School (IR/PS)

OFFICE: Building 4, Level 1, Robinson  
Building Complex

### Professors

Peter Cowhey, Ph.D.  
Richard Feinberg, Ph.D.  
Peter Gourevitch, Ph.D.  
Stephan Haggard, Ph.D.  
Chalmers Johnson, Ph.D., *Emeritus*  
Miles Kahler, Ph.D., *Interim Dean*  
Alex Kane, Ph.D.  
Lawrence Krause, Ph.D., *Emeritus*  
Ellis Krauss, Ph.D.

Bruce Lehmann, Ph.D.  
Gordon MacDonald, Ph.D.  
R. John McMillan, Ph.D.  
Susan Shirk, Ph.D.

### Associate Professors

Roger Bohn, Ph.D.  
Takeo Hoshi, Ph.D.  
Andrew MacIntyre, Ph.D., *Associate Dean*  
Barry Naughton, Ph.D.  
Matthew Shugart, Ph.D.  
Yasu-Hiko Tohsaku, Ph.D.

### Assistant Professors

Euysung Kim, Ph.D.  
Mikhail Klimenko, Ph.D.  
Ulrike Schaede, Ph.D.  
Barbara Walter, Ph.D.  
Christopher Woodruff, Ph.D.

### Adjunct

Wayne Cornelius, Ph.D.  
Paul W. Drake, Ph.D.  
Theodore Groves, Ph.D.  
J. Luis Guasch, Ph.D.  
Germaine Hoston, Ph.D.  
David Lake, Ph.D.  
David Mares, Ph.D.  
Michael May, Ph.D.  
Akimasa Mitsuta, Ph.D.  
Paul Papayouanou, Ph.D.  
James Rauch, Ph.D.  
Albert Rubenstein, Ph.D.  
Peter H. Smith, Ph.D.  
Dale Squires, Ph.D.  
Christena Turner, Ph.D.

### The Master of Pacific International Affairs (MPIA)

### Requirements for Admission

Students interested in pursuing the MPIA degree program at UCSD's Graduate School of International Relations and Pacific Studies (IR/PS) must have earned a B.A., or its equivalent, with training comparable to that provided by the University of California. A minimum scholastic average of 3.0 or better is required for course work completed in upper-division or prior graduate study. Undergraduate preparation that includes one or more of the following is strongly encouraged: the social sciences (specifically economics and political science) and

history; computer science and quantitative methods (such as calculus and statistics); foreign language, and related area studies courses. Students with an undergraduate background in the sciences, engineering, or the arts are also encouraged to explore this degree program. The admissions committee looks for students with previous professional employment, a history of meaningful international experience, and demonstrated leadership ability.

Applicants must submit three letters of recommendation from individuals who can attest to their academic or professional competence and to the depth of their interest in pursuing graduate training in international affairs.

Applicants are required to submit the Graduate Record Exam (GRE) scores (verbal, quantitative, and analytical). (Indicate code #R4836 for UCSD, IR/PS department code #1901.) Scores from the Graduate Management Admission Test (GMAT) may be substituted. (Indicate code #4927 for UCSD, Pacific International Affairs.) A minimum score of 550 on the Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. Students who score below 600 on the TOEFL examination are strongly encouraged to enroll in an English as a second language program before beginning graduate work. (UCSD Extension offers an excellent English language program during the summer as well as the academic year. For further information, call 619-534-3400).

Interviews are not required for admission to the MPIA program. Orientation tours are available for all applicants who would like further information about the degree programs. Tours assist applicants in becoming better acquainted with IR/PS's graduate programs and in understanding how these programs might relate to their long-term career goals. Applicants are advised to visit well in advance of the January 15 application deadline. To receive a tour schedule, applicants should contact the IR/PS Office of Admissions at 619-534-5914.

The MPIA is a two-year, full-time program. Those students who enter, however, with no previous language training in Mandarin Chinese, Japanese, Korean, Spanish, or Vietnam-



ese will need to spend more time in the program. Part-time study is feasible within the MPIA curriculum. The maximum course load for half-time study is 6 units.

### **The MPIA Curriculum\*** (ninety-six units)

#### **Core Curriculum**

The Core Curriculum is designed to integrate the diverse subject areas of international management, international relations, applied economics, technology management, and comparative public policy, as well as regional studies and foreign language. All components of the Core Curriculum are required of MPIA students. Core courses list as follows:

- Economics (Managerial and International)
- Management (Accounting and Finance)
- International Relations (International Politics and Security and the Politics of International Economic Relations)
- Policy-Making Processes
- Regional Specialization: Students are required to specialize in one particular country or region in the Pacific. To fulfill this requirement, students must take three courses in one of five areas: China, Japan, Korea, Southeast Asia, or Latin America.
- Foreign Language: A minimum level of language proficiency must be met through examination prior to award of the MPIA degree. Students' designated foreign language must correspond to the geographical area selected for regional specialization.
- Quantitative Methods (two-quarter sequence)
- Capstone Sequence:
  - Management and Policy
  - International Business Simulation Laboratory

#### **TWO-YEAR MASTER'S PROGRAM**

##### **First Year**

*Fall*  
 Policy-Making Processes (4)  
 Managerial Economics (4)  
 International Politics and Security (4)

Quantitative Methods (2)  
 Elective (4)/Language (4)

*Winter*

International Economics (4)  
 Accounting (4)  
 Quantitative Methods (2)  
 Elective (4)/Language (4)

*Spring*

The Politics of International Economic Relations (4)  
 Finance (4)  
 Elective (4)  
 Elective (4)/Language (4)

#### **Second Year**

*Fall*

Management and Policy (4)  
 Elective (4) or  
 Regional Specialization\* (4)  
 Elective (4)/Language (4)  
 Elective (4)

*Winter*

International Business Simulation Laboratory (4)  
 Elective (4) or  
 Regional Specialization\* (4)  
 Elective (4)/Language (4)  
 Elective (4)

*Spring*

Elective (4)  
 Elective (4) or  
 Regional Specialization\* (4)  
 Elective (4)/Language (4)

\*Three regional specialization courses are required.

*This program summary represents a sequence of courses that most MPIA students are likely to take.*

#### **Concentrations and Electives**

The MPIA program's elective course work allows for flexibility in response to the wide diversity of marketplace employment options as well as in students' backgrounds, interests, and needs. Students have the opportunity to declare a career concentration. Although concentration in a career is not mandatory, it enables individuals to work closely with other students and faculty who share similar interests. In addition, concentration in a particular career area may serve to enhance career entry opportunities and improve initial on-the-job performance.

#### **Career Concentrations**

A career concentration requires that the student take six elective courses in one of five career concentration areas. IR/PS offers career concentrations in the following areas:

*Applied Economics:* Course work in this concentration is intended for students interested in economic or policy analysis. Through courses such as Fiscal and Monetary Policy, Strategic Analysis, and Analysis and Forecasting, tools used in reading, understanding and analyzing economic data are developed with applications to both public and private sector situations.

*International Management:* An international management concentration includes intermediate and advanced courses in such areas as corporate finance, accounting, and international marketing—similar to those offered in M.B.A. programs—as well as courses focusing on international business activities such as multinational corporations, project analysis and planning, trade, and risk analysis.

*International Relations:* This concentration includes course work with an emphasis on political economic factors operating in the global environment, as well as on the traditional areas of international strategy and security. Particular attention is given to the Pacific region as an international subsystem.

*Comparative Public Policy:* In this concentration, courses are provided which compare policies in Pacific region countries in such areas as industry, development, labor, technology, natural resources, health, and social security. The focus is on public sector policies as well as public and private sector interrelations in policy formation and implementation.

*International Technology/Management:* The International Technology/Management concentration is designed for students with technical or scientific undergraduate training. The course work emphasizes technology management and technology policy, allowing students to apply their backgrounds to issues which will be important in the twenty-first century. Courses are chosen by students from a selected curriculum which includes: operations management, technology management, policymaking, corporate finance, international marketing, and environmental policy. The concentration prepares graduates for careers in business (technology management) and government (technology policy).

**Note:** Specific course requirements for fulfilling a concentration may be obtained at the IR/PS Student Affairs Office.

### *Capstone Sequence*

#### **Management and Policy**

Management and Policy is an integrative course which asks students to solve realistic managerial problems, using concepts and tools from throughout the IR/PS curriculum. Harvard-style case studies provide a first-person perspective, with incomplete information and conflicting objectives. Specific topics include negotiation, organizational behavior, business strategy, and others. Many of the cases emphasize the need to combine quantitative and qualitative analysis to make effective decisions.

#### **International Business Simulation Laboratory**

Assuming roles of government officers, corporate executives, mutual-fund portfolio managers, and newspaper reporters, students manage the affairs of the international organizations in a simulation exercise which is run through the Web and includes participants from other schools.

### *Foreign Language*

IR/PS considers foreign language competency an indispensable skill for international relations professionals. All students are expected to acquire the language skills necessary to work in the Pacific region. The foreign language proficiency requirement is designed to ensure that students achieve a level of competency sufficient for professional interaction. Students are placed in foreign language courses based on prior preparation and on the results of a placement test administered during the week of orientation. Students who miss the placement exam should contact the IR/PS Language Program office (RBC 1308) for instructions.

At the present time, students can fulfill the foreign language requirement in Mandarin Chinese, Vietnamese, Japanese, Korean, Brazilian Portuguese, or Spanish. Students may also fulfill their language proficiency requirement in other languages, such as Thai, Tagalog, Bahasa Indonesia, Bahasa Malay, and other Chinese dialects; but, due to resource constraints, IR/PS cannot provide instructional support at this

time. Please contact the IR/PS Language Program or the Office of Student Affairs for additional information. The language selected for the requirement must coincide with the student's regional specialization. As languages differ greatly in their relative degree of difficulty, the level of required competency varies among these languages. The minimum required level of proficiency for Spanish is equivalent to 2+ on the Foreign Service Institute Scales (FSI), 2 for Portuguese, and 2- for Mandarin Chinese, Vietnamese, Japanese, Korean, and other Asian languages. Students must pass the proficiency examination in speaking and reading administered by the IR/PS Language Program or other approved testing service before receiving their degree. The writing proficiency examination is optional.

A variety of language courses are offered by UCSD. IR/PS is currently offering four-unit language courses for professional proficiency in the six languages at intermediate to advanced levels. Students with a lower level of language proficiency are encouraged to take beginning and intermediate language courses offered by the Chinese Studies Program, the Japanese Studies Program, and the Departments of Linguistics or Literature. These courses serve as prerequisites for the language proficiency courses offered at IR/PS, which in turn prepare students for the proficiency examination.

Students may prepare for the proficiency examination in a variety of ways, depending on their language background, aptitude for learning languages, and actual time and effort invested in language study at IR/PS. In general, students fall into one of four categories with respect to language study: 1) those who enter at a superior level of proficiency may be waived out of the language courses; 2) those who enter with a rough equivalence of three years of Chinese, Japanese, or Korean or two-plus years of Spanish should be able to achieve the requisite level in two years without any intensive language training during the first summer; 3) those who enter with a rough equivalence of two years of Mandarin Chinese, Japanese, or Korean language or one-plus years of Spanish will usually be able to achieve the requisite level in two years by a combination of intensive language study in the summer and the six language courses for professional proficiency in the two-year program; 4) those who enter with

less training in these foreign languages will need to spend at least two and one-half to three years in the program. Intensive sessions for two or three summers and language courses during the academic year should enable students to achieve the required proficiency.

The proficiency examination will be given throughout the academic year. Most students take the proficiency examination during the spring quarter of their final year. To take the examination, students must complete the language skills self-assessment, which is designed to assess student's readiness to pass the language proficiency requirement. Students have two opportunities to take the proficiency examination given at IR/PS free of charge. An administrative fee will be charged for each subsequent examination.

### *Internships*

Students are encouraged to participate in various internship programs that are available in business and industry, in federal and state government, and through various foundations and institutions. The school has established links to a number of programs with available internships.

### *Education Abroad Program*

Students are encouraged to participate in the Education Abroad Programs (EAP) in their second year of study. Though this will necessitate a third year of study to meet MPIA requirements, the opportunity provides unparalleled experience in the selected regional study area and language. By petition, certain credits earned through EAP may be applied to the MPIA degree requirements.

### *Career Development and Opportunities*

The IR/PS Career Services Office provides students with assistance in professional career development. This assistance begins in the student's first quarter and continues through the interviewing process in the final quarter.

Career services include individual advising appointments, workshops, speaker forums, special events, and a library containing international resources and employment opportunity listings. Specialized workshops explore resume

writing, cover letters, salary and benefits negotiation, job-offer evaluation, interviewing skills (including videotaped mock interviews), career goals, labor market trends, and effective job search strategies.

### ***The Master of International Technology Management (MITM) Final Approval Pending, Fall 1998***

#### **Requirements for Admission**

Students who seek admission to the program must have a B.A. or the equivalent in engineering or science from an institution of comparable standing to the University of California. A minimum scholastic average of 3.0 or better is required for course work completed in upper-division or prior graduate study. Work experience of three to five years following conferral of the undergraduate degree is also required.

Applicants must submit a letter of corporate sponsorship from their employer indicating they have or will be assuming a position of managerial responsibility beyond purely technical responsibilities.

The MITM degree is a terminal professional degree based solely on advanced course work. The MITM degree requirements focus on specific issues of technology management, rather than management in general. The program offers core courses that address the specific management and policy needs of scientists and engineers. In cooperation with the UCSD School of Engineering, courses in engineering and science will also be offered.

#### **THE MITM CURRICULUM (SEVENTY-TWO UNITS)**

##### **Program of Study**

Designed as a three-year, part-time program, the MITM curriculum consists of a total of seventy-two units typically attained by enrollment in two four-unit courses (or their equivalent) in each of nine quarters. Beyond the required core, elective courses are offered in each of three fields: technology; management; and policy, international relations, and area studies. The core consists of eleven required four-unit courses. An additional seven courses will be chosen from the three elective fields.

#### **Sample Program**

##### **The Core:**

##### *General Management and Policy Courses:*

- Policy Making Processes
- Managerial Economics
- Accounting
- Finance
- Organization
- Politics of International Economic Relations
- Entrepreneurship and Intrapreneurship

##### *Technology Courses:*

- Production and Operations Management
- Marketing for Technology Firms
- Team Management
- Product Design and Process Development
- Strategy in Technology Management

##### **Electives Chosen from the Following Three Fields:**

- Policy, International Relations, and Area Studies*
- Technology*
- Management*

#### **Foreign Language**

There is no foreign language requirement for the Master of International Technology Management degree. Students may, however, apply up to three language courses towards the MITM requirements.

#### **Career Development and Opportunities**

A growing interest in graduates with skills provided by the MITM exists among employers. Since graduates will already be employed, the Master of International Technology Management will gain a competitive edge for career advancement. Recruiters from the public and private sectors show a preference for candidates who have pursued executive management programs. Experience indicates employers seek the engineering/science-plus-management profile.

Program participants may avail themselves of the IR/PS Career Services, which includes individual advising appointments, workshops, speaker forums, special events, and a library containing international resources and employment opportunity listings. Specialized workshops explore resume writing, cover letters, salary and benefits negotiation, job-offer evaluation, interviewing skills (including videotaped

mock interviews), career goals, labor market trends, and effective job search strategies.

### ***The Joint Ph.D. in Economics and International Affairs Final Approval Pending, Spring 1998***

#### **Requirements for Admission**

Students who seek admission to the program must have a B.A. or the equivalent from an institution of comparable standing to the University of California. Preference will be given to students with prior academic records of distinction and to those who have a background in one of the fields of emphasis and/or geographical areas covered by the program. GRE scores (verbal, quantitative, and analytical) are required of all applicants. (Indicate code #R4836 for UCSD, IR/PS department code #1901.)

A minimum score of 550 on the Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. Students who score below 600 on the TOEFL examination are strongly encouraged to enroll in an English-as-a-second-language program before beginning doctoral work. (UCSD Extension offers an excellent English language program during summer as well as the academic year. For further information, call (619) 534-3400.)

#### ***The Ph.D. Curriculum***

##### **Program of Study**

The Ph.D. in economics and international affairs prepares students for research careers in economics, with an emphasis on international affairs and the Pacific region. The program combines the analytical skills of economics with political economy, institutional analysis, and region/empirical knowledge.

##### **Program Advisory Committee**

Each student is assigned a Program Advisory Committee of four economics and IR/PS faculty, at least one must be from economics, one from IR/PS and one outside member from another UCSD department. With this committee, the

student works out a plan of study which the committee must approve. The student must make satisfactory progress in a coherent program of course work and reading courses which meet the approval of the Program Advisory Committee.

### **Course Requirements**

The Ph.D. curriculum in economics and international affairs is designed to provide students with basic training in the techniques of modern economics as well as empirical and institutional knowledge of the Pacific region. The first year will consist of the three sequences of microeconomics, macroeconomics, and econometrics, taught in the Department of Economics. The second year will consist of continuation of the three series plus seven electives. Two of these electives will be an IR/PS sequence in political economy. In subsequent years, courses will consist of the regional sequence, an empirical project, and two third-year papers.

### **Regional Requirement**

Students must take at least three courses one of which may be a reading course on policy processes and issues in the Pacific region. These courses may consider the Pacific region as a whole, as a sub-region, or examine individual countries. The courses may be in both IR/PS and, with prior permission, related departments. Some students may choose to take more than the minimum three courses to deepen their knowledge of a particular country or area. Comprehensive examination on regional areas is not required.

### **Language Requirement**

Students are expected to achieve a level appropriate to the student's dissertation topic of reading proficiency in at least one foreign language. Proficiency may be verified by examination or by certification by thesis supervisor.

### **Comprehensive Examinations**

Students must pass written comprehensive exams in microeconomics, macroeconomics, and econometrics, which will be administered and graded by the economics department.

### **Dissertation**

Candidates must present a dissertation prospectus no later than March of their third year

in the doctoral program. They will be examined on their prospectus by their dissertation committee, and must complete a dissertation which makes a substantial and original contribution to knowledge commensurate with the standards of the University of California in order to receive the Ph.D. degree.

### **Oral Defense**

Students will defend their dissertation at a final oral examination which will be open to the public.

### **Ph.D. Time Limit Policies**

Students must be advanced to candidacy by the end of five years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

### ***The Joint Ph.D. in Political Science and International Affairs Final Approval Pending, Academic Year 1997-1998***

### **Requirements for Admission**

Students who seek admission to the program must have a B.A. or the equivalent from an institution of comparable standing to the University of California. Preference will be given to students with prior academic records of distinction and to those who have a background in one of the fields of emphasis and/or geographical areas covered by the program. GRE scores (verbal, quantitative, and analytical) are required of all applicants. (Indicate code #R4836 UCSD, IR/PS department code #1901.)

A minimum score of 550 on the Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. Students who score below 600 on the TOEFL examination are strongly encouraged to enroll in an English-as-a-second-language program before beginning doctoral work. (UCSD Extension offers an excellent English language program during summer as well as the academic year. For further information, call (619) 534-3400.)

## ***The Ph.D. Curriculum***

### **Program of Study**

The Ph.D. in, political science and international affairs prepares students for research careers in political science, with a emphasis in either international policy analysis or comparative policy analysis. The program combines the analytical skills of political science with political economy, institutional analysis, policy analysis (especially economic policy) and regional training, with special attention to East Asia and/or Latin America

### **Course Requirements**

The Ph.D. curriculum in political science and international affairs is designed to provide students with basic training in the techniques of modern political science as well as applications to specific policy areas and countries or regions.

Seventeen courses are required prior to advancement to candidacy. There is a common core sequence, consisting of comparative public policy, two courses in comparative politics, two courses in international relations and research design. Each student must declare a primary field of either international policy analysis (IPA) or comparative policy analysis (CPA), consisting of three specialized courses. There is also a regional focus of five courses. Three additional courses must be taken from a set of electives.

### **Regional Requirement**

The regional focus consists of international relations of Asia Pacific or international relations of the Americas (depending on which region is the student's primary region), three additional courses in the student's primary region, and one course in another region offered by either IR/PS or the Department of Political Science are required. By petition, students may count a region other than one of the IR/PS offerings (currently China, East Asia, Japan, Latin America, or Southeast Asia) as their primary region.

### **Language Requirement**

All students in the program are required to meet a high standard of proficiency in a foreign language before being advanced to candidacy. The language must be linked to the student's region.

### **Seminar Papers**

Each student must submit two seminar papers, one in each field. The penultimate draft of each seminar paper must be completed prior to taking the appropriate field exam, and the final draft must be completed by the end of the quarter in which the exam is taken. Both papers must demonstrate knowledge of the student's regional focus, as well as knowledge of relevant theory in the field. At least one of the papers must also demonstrate knowledge of a substantive policy area, related to the student's primary focus field.

### **Comprehensive Examinations**

Each student must pass two comprehensive examinations, one in international relations and one in comparative politics. Each exam will be graded by a joint committee consisting of three permanent faculty members, with at least one from political science and at least one from IR/PS.

The primary field exam contains a focus field, which may be either a substantive field of policy analysis (e.g. trade, environment, international finance) or the student's chosen primary region. Regardless of focus field, that part of the exam shall test the student's knowledge of theoretical literature and ability to apply it to a policy issue of relevance to the region.

### **Dissertation**

Candidates must present a dissertation prospectus to be examined by their dissertation committee, and must complete a dissertation which makes a substantial and original contribution to knowledge commensurate with the standards of the University of California in order to receive the Ph.D. degree. The dissertation committee shall consist of four faculty members chosen from the Department of Political Science and IR/PS, with at least one from each unit. A fifth member must be from outside the department and IR/PS.

### **Oral Defense**

Students will defend their dissertation at a final oral examination which will be open to the public.

### **Ph.D. Time Limit Policies**

Students must be advanced to candidacy by the end of the fourth year. Total university sup-

port cannot exceed eight years. Total registered time at UCSD cannot exceed seven years.

### **The Ph.D. in International Affairs**

Pending final approval of the joint Ph.D. degree programs in economics and international affairs, and political science and international affairs, no future admissions will be made to the Ph.D. in International Affairs Program.

### **International Career Associates Program**

The International Career Associates Program is designed for working professionals seeking additional exposure to the various areas of international management, international relations, and comparative public policy.

Participants in the program spend an academic year at IR/PS usually beginning in mid-September and ending in mid-June. Under the auspices of the program, professionals have an opportunity to further internationalize their knowledge and experience as well as enhance their professional development in such areas as finance, management, marketing, accounting, quantitative methods, econometrics, long-range strategic planning, international affairs, and comparative decision making. The program of study is tailored to individual interests under the guidance of the program's director and faculty advisers.

#### **IR/PS offers:**

- An individualized one-year program leading to a Certificate of Study
- An optional summer program preceding the academic year
- An academic tutorial program
- Opportunities to interact with world-renowned Pacific Rim scholars and policymakers
- Special seminars and lectures by academics and professionals
- IR/PS-sponsored cultural events and field trips to local, state, and national organizations and government offices

For further information, contact the International Career Associates Program office at (619) 534-7420.

### **The Korea-Pacific Program**

The Korea-Pacific Program was formed in September 1989 in recognition of the growing importance of Korea in the world, of Korean-U.S. relationships, and of the Korean model of social and economic development.

Directed by Professor Emeritus Lawrence Krause, the program promotes the understanding of Korea in an international context and encourages the study of Korea in a university setting by offering courses in the country's society, economics, language, and policymaking. Research is supported on contemporary Korean society and policy issues. Outreach to the community is offered through seminars, lectures, courses, and cultural events, including performances and exhibits in the Korean arts.

In comparison with other Korean studies programs in the United States, the IR/PS Korea-Pacific Program is distinctive in several respects: it concentrates on contemporary Korea, focuses on policy questions, stresses the foundations of Korean economic growth, explores Korea's international relations, and seeks to understand Korea in a broad regional context.

The Korea-Pacific Program is supported by a strong Korean language component, encourages a broad understanding of Korean culture and history, and has a strong community base in and around its university setting.

### **The ASEAN-Pacific Project**

The ASEAN-Pacific Project is one of several major regional and theme-based nodes of activity within the Graduate School of International Relations and Pacific Studies. Its mandate is to support students and to serve as a catalyst for the development of Southeast Asia-related teaching and research activities within the school. The director of the project is Associate Professor Andrew MacIntyre.

The ASEAN-Pacific Project extends the success of the school's original Vietnam-Pacific Project. While a strong Vietnam focus has been retained in the expanded ASEAN-Pacific Project, the scope has been broadened to embrace the other countries of Southeast Asia.

The project is built upon private donations to the school, with this resource being supplemented by resources obtained from external grant agencies and the university. One of the primary goals of the project's private benefac-

tors has been to support students at the school interested in Southeast Asia. To this end fellowships (covering tuition and/or a stipend) have been offered on a competitive basis to students from the United States and Southeast Asia enrolled in both the MPA and Ph.D. programs. Additionally, travel fellowships have been offered to support students wanting to travel to Southeast Asia during the summer or to pursue internship opportunities that are Southeast Asia-related.

The project also serves as a catalyst and facilitator for research projects within the school relating to Southeast Asia. Examples of this include a study of the development of small and medium enterprises in Vietnam, the relocation of the global magnetic disk drive industry to Southeast Asia, and the dynamics of off-budget government spending in Indonesia. The project also supports visiting speakers for seminars on topics relating to Southeast Asia.

The third major leg of the ASEAN-Pacific Project has been to support the development of teaching resources. To date the focus of activity in this area has been on the development of Vietnamese language instruction at the school. It is hoped that it will be possible to expand this initiative to include Indonesian language instruction.

## COURSES

### MPIA CORE CURRICULUM

#### IP/Core 400. Policy-Making Processes (4)

A course designed to teach students how to "read" a country's political and economic system. The course will examine how the evolution of different institutional frameworks in the countries of the Pacific region influences the way in which political choices are made.

#### IP/Core 401. Managerial Economics (4)

Survey of basic tools in economics. Examination of how commodity demand is determined, what affects supply of the commodity, how price is determined, when optimal market allocation of resources and failure occurs, and basic topics concerning the aggregate economy.

#### IP/Core 403. International Economics (4)

The theory and mechanics of international economics. Included will be such topics as real trade theory, international movements of capital, the effects of trade and capital flows on domestic economies, and policies toward trade and foreign investment.

#### IP/Core 410. International Politics and Security (4)

Development of analytic tools for understanding international relations with applications to contemporary problems such as the environment, nuclear proliferation, human rights, humani-

tarian interventions, and the roots of conflict and cooperation among countries.

#### IP/Core 411. The Politics of International Economic Relations (4)

The course presents explanations for the political organization of international economic relations in different issue-areas. Additional topics include international economic inequality, efforts by states to manipulate economic relations for strategic gain, and the prospects for regional and global organizations.

#### IP/Core 420. Accounting (4)

An introduction to financial accounting designed to prepare students to understand their own organizations' international operations and interpret information from outside organizations. The emphasis will be on understanding the potential uses and limitations of accounting information for various management purposes, and the procedural aspects of accounting will be introduced only to the extent necessary to explicate the basic concepts.

#### IP/Core 421. Finance (4)

This course surveys the financial problems facing managers and analyzes financial institutions, financial instruments, and capital markets. Tools acquired will prepare students to analyze international financial topics such as exchange rate behavior, the management of international risk, and international financing. *Prerequisites: IP/Core 420, 453, and 454.*

#### IP/Core 453. Quantitative Methods: Decision Making and Scenario Analysis (2)

This course is designed to provide proficiency in quantitative methods that are used for optimization and decision making. It first develops graphic and analytical solutions to resource allocation and efficient production. Next, scenario analysis and elements of decision making under uncertainty are introduced. Finally, the use of spreadsheets is applied to data analysis and problem solving.

#### IP/Core 454. Quantitative Methods: Decision Making under Uncertainty (2)

This course covers elements from statistics that are central to business decision making under uncertainty. In particular, regression analysis and estimation will be applied to problems of forecasting and optimization.

#### IP/Core 460. Management and Policy (4)

A case-based class that aims to synthesize the material learned in the first year and apply it to solve real-world problems in business and public policy, strategy, and management. *Prerequisites: IP/Core 400, 401, 403, 410, 411, 420, 421, 453 and 454, or consent of instructor.*

#### IP/Core 461. International Business and Policy Simulation (4)

To simulate a complete international economic system, students participate in a corporate, government, investment management, or newspaper team. They make weekly decisions and discuss results in class. *Prerequisites: IP/Core 400, 401, 403, 410, 411, 420, 421, 453, 454 and 460 or consent of instructor.*

### GENERAL COURSES

#### IP/Gen 400. International Relations of the Pacific (4)

International relations and developing international political economies of nations bordering the Pacific. Topics include: the "Pacific Basin" concept; the U.S. and "hegemonic-stability" theory; legacies of Korean War and Sino-Soviet dispute; immigration patterns and their consequences; and Japan's foreign policy.

#### IP/Gen 402. International Political Economy: Money and Finance (4)

Examination of effects of national policies and international collaboration of public and private international financial institutions, in particular management of international debt crises, economic policy coordination, and the role of international lender of last resort. *Prerequisite: IP/Core 411 or consent of instructor.* Conjoined with Political Science 144D and 262.

#### IP/Gen 403. International Political Economy: Trade (4)

This course examines the evolution of the international trading system, emphasizing issues of politics and policy. Topics include developments in the GATT, the emergence of regional trading blocs, protectionism, industrial policy, and the relationship between trade and direct investment. Students choose a particular sector to develop expertise. *Prerequisite: IP/CORE 411 or consent of instructor.*

#### IP/Gen 404. Chinese Politics (4)

This course will analyze post-1949 Chinese politics, including political institutions, the policy making process, and citizen political behavior. Special attention will be paid to the prospects for political reform in China.

#### IP/Gen 406. The Politics of Democratization (4)

This course will examine the following questions: Why do some countries fail and others succeed in establishing democracies? How do leaders "institutionalize uncertainty"? Should economic or political liberalization come first? Why are there periodic "waves" of democratic breakthrough and breakdown?

#### IP/Gen 407. Bureaucracy and Public Policy (4)

What determines the degree of influence bureaucrats exert over public policy outcomes, versus the influence of politicians? Overview of themes such as developmental state, state autonomy, legislative oversight, clientelism, corruption. Applications to Japan, East Asia, United States, and Latin America. *Prerequisite: IP/Core 400 or permission of instructor.*

#### IP/Gen 408. Internal Conflict after the Cold War (4)

Will examine the causes of civil wars and the problems with resolution and state reconstruction. Theoretical approaches discussed will then be applied to three recent case studies: Cambodia, Rwanda, and Bosnia. Policy implications for the international community will be discussed. *Prerequisite: IP/Core 410.*

#### IP/Gen 409. Economic Policy in Latin America (4)

This course seeks to enhance the students' understanding of the main policy alternatives open to the largest Latin American countries. Development and stabilization policies are analyzed, emphasizing current debate between conventional and heterodox policy packages and their impact on decisionmaking. *Prerequisites: IP/Core 401, IP/Core 403.*

#### IP/Gen 410. Politics and Policy in Latin America (4)

Overview of the contemporary politics in Latin America: democracy, authoritarianism, and revolutionary change. Readings will be mostly comparative, either dealing with groups of countries within Latin America or comparisons between Latin America and other regions of the world.

#### IP/Gen 411. Business and Management in Japan (4)

This course introduces the main aspects of Japanese business and industrial organization (keiretsu), Japanese management practices, and the representation and influence of business interests in the Japanese political economy.

#### IP/Gen 412. The Politics of International Competitiveness (4)

Examination of policy debates concerning international economic relations: what policies promote or encourage effective participation in the international economy, and what political factors support or oppose such policies? Examples are drawn from the



experiences of the U.S., Japan, Europe, Latin America, and East Asia.

**IP/Gen 413. The Political Economy of Regulated International Markets (4)**

This course examines the politics and economics of world markets that are subject to extensive government regulation. Cases include examples from the services, manufacturing, and commodities markets. The course investigates why there are different types of regulation for each market, how global regulations interact with national regulations, and how firms respond to regulations.

**IP/Gen 414. U.S. Strategic Policy Issues in a Changing World (4)**

Strategic issues facing the U.S. in the nineties will be described and analyzed. Issues taken up will include nuclear weapons policy, space policy, European and Northeast Asia security policies. Political, military and technical aspects of these issues will be analyzed. *Prerequisite: graduate status or consent of instructor. Some background in political science and in quantitative analysis of issues desirable.*

**IP/Gen 416. Post War Politics in Japan (4)**

Overview of postwar politics in Japan, including American Occupation reforms, political institutions, major political factors, mass and elite, and political behavior. Special attention will be paid to the issue of Japan's changing democracy.

**IP/Gen 417. Models of International Change (4)**

The seminar will explore models that account for international change by linking international (systemic or structural) and domestic variables. Particular attention will be given to evolutionary and learning models as they have been employed in a number of disciplines. *Prerequisite: IP/Core 410.*

**IP/Gen 418. Trade and Economic Growth: Lessons from Pacific Basin Economies (4)**

The purpose of this course is to survey economic relations among Pacific Basin economies, exploring relevant economic and public policy issues. Major topics include: productivity; trade; technology spill-over/transfer; foreign direct investment; factor and human capital accumulation; income distribution; and regional institutional arrangements. *Prerequisites: IP/Core 401 and 403.*

**IP/Gen 419. Derivative Asset Markets (4)**

This course provides an introduction to derivative assets such as options, futures, and swap contracts. The main emphasis is on their valuation, use in hedging, and role as components of liabilities that mitigate risk and agency problems in business firms. *Prerequisite: IP/Core 421.*

**IP/Gen 420. Principles of Marketing (4)**

This course develops the micro-economic foundations of market exchange by explicitly examining the marketing details of transactions: demand and product differentiation, incomplete and incorrect information, search costs and promotion costs. It is argued that within this theoretical framework (i.e., model) most observed marketing behavior can be reconciled. The primary objective of this course is to learn to deduce firm and consumer motives from observed behavior. *Prerequisites: IP/Core 401 and 403, or consent of instructor.*

**IP/Gen 421. International Marketing (4)**

This course focuses on decision making in international marketing. The impact of cultural, social, political, economic, and other environmental variables on international marketing systems and the decision making process of multilateral marketing operations will be addressed. *Prerequisites: IP/Core 453 and 454, and IP/Gen 420 or consent of instructor.*

**IP/Gen 422. Investments (4)**

An analysis of the risk/return characteristics of different assets as perceived by different investors and their implications for

security price behavior, emphasizing real world capital market behavior. International aspects include the role of exchange rate risk and international diversification. *Prerequisites: IP/Core 421, 453, and 454, or consent of instructor.*

**IP/Gen 424. Corporate Finance (4)**

The topics covered are dividend policy and capital structure, options, debt financing, and short- and long-term financial planning. Course format will consist mostly lectures, with occasional cases. Some international aspects of corporate finance will also be discussed. *Prerequisites: IP/Core 401, 403, 420, 421, 453, and 454, or consent of instructor.*

**IP/Gen 427. Competition and Regulation in the Global Communications Market (4)**

This course explores the global market for telecommunications, internet, and information services. It analyzes how regulation and international trade rules influence market structure. It examines the politics underlying government rules, and it probes the strategies of corporation in the global market.

**IP/Gen 433. International Finance (4)**

The international financial system will be addressed including the perspectives of individual investors, borrowers, and financial intermediaries. Public policy issues including the exchange rate mechanism, financial linkages among countries, optimum currency areas and macro-policy coordination will be discussed. *Prerequisites: IP/Core 403, 421, or consent of instructor.*

**IP/Gen 434. Strategic Analysis (4)**

This course analyzes competitive interactions, surveying the modern economic analysis of relationships between and within organizations. The foundations of the course are game theory and the economics of information. Topics include bargaining and contracting, principal-agent models, and bidding models.

**IP/Gen 435. Topics in International Trade (4)**

Objective is to develop analytic tools and explore their relevance for trade policy issues. Focuses on a revolving set of issues, including the political economy of trade policy, strategic trade and industrial policy; trade and financial liberalization; the debate on trade, jobs and wages; and trade and international technology transfer. *Prerequisites: IP/Core 401 and 403, or consent of instructor.*

**IP/Gen 437. Strategy and Planning in Production and Operations Management (4)**

This course examines manufacturing, distribution, and service activities that are relevant to the strategic management of operations. It explores the everyday control of operations, the design of the production system, and the interface between operations and other aspects of the firm's overall strategy. *Prerequisite: IP/Gen 438 or consent of instructor.*

**IP/Gen 438. Production and Operations Management: Analysis and Control (4)**

This course provides a comprehensive introduction to the fundamental decisions and trade-offs associated with the control of a firm's operations function. It analyzes production processes, quality control, inventory and materials planning, kanban and just-in-time principles. *Prerequisites: IP/Core 453 and 454, or consent of instructor.*

**IP/Gen 439. International Manufacturing Strategy: Selected Topics (4)**

This course covers selected issues emerging from the recent trends in globalization of a firm's manufacturing activities. Topics include globalization of manufacturing base, international comparison of manufacturing management, the role of manufacturing in the global competition. *Prerequisite: IP/Gen 438 or consent of instructor.*

**IP/Gen 440. Managerial Accounting and Control (4)**

Focus on planning, managing, controlling and evaluating costs for competitive advantage in global markets. Key topics will

include cost structure, cost-based managerial decision making, strategic cost management, JIT/TQC cost management, and accounting control systems. *Prerequisite: IP/Core 420 or consent of instructor.*

**IP/Gen 441. Seminar in Advanced Topics in Production and Operations Management (4)**

Studies of advanced analytical techniques in operations management. Emphasis is on the application of various analytical methods to operational problems. Students are encouraged to carry out a research project for the actual application of these techniques. *Prerequisite: IP/Gen 438 or consent of instructor.*

**IP/Gen 442. Economic Analysis of Manufacturing Systems (4)**

How to evaluate manufacturing process economics. Cost accounting, project evaluation, net present value and other financial measures, making tradeoffs among alternatives, cost of quality losses, assessing intangibles. Impacts of design and operating policies. Fitting manufacturing processes to market and strategy.

**IP/Gen 443. Economics of Telecommunications (4)**

This course will focus on the underlying economics of the telecommunications and public policy rationale of regulations applied to this industry. Both theoretical models and case studies will be used to provide better understanding of the telecommunications marketplace and the nature of competition between service providers in the industry. *Prerequisite: IP/Core 401 or consent of instructor.*

**IP/Gen 444. Product Design and Process Development (4)**

Engineering management, emphasizing creation and improvement of products and processes. Cases, lectures, and team exercises set in various industries, including software. *Prerequisites: IP/Gen 438 or consent of instructor plus experience in manufacturing, engineering, or software.*

**IP/Gen 445. Entrepreneurship and Intrapreneurship (4)**

Student teams (3-5) are admitted to the course on the basis of a proforma business plan. While teams perfect their plans, class discussions cover aspects of creating and planning new businesses, culminating in presentations of their final plans. *Prerequisites: IP/Core 400, 401, 403, 410, 411, 420, 421, 453, and 454, and consent of instructor.*

**IP/Gen 446. Applied Data Analysis and Statistical Decision Making (4)**

The goal of the course is to teach how to evaluate quantitative information in business and economics contexts, and to make sound managerial decisions in complex situations. Much of the problems and the course work will involve statistical software and spreadsheet analysis of data. The course covers various applied multivariate statistical methods beyond basics. *Prerequisites: IP/Core 453 and 454, or consent of instructor.*

**IP/Gen 447. Organizations (4)**

A seminar course based on the modern economics of organization. Covers an eclectic set of readings on a diverse range of organizations, looking at how incentives for collective action are structured. *Prerequisites: IP/Core 401 and 403.*

**IP/Gen 448. Politics and Political Institutions in Southeast Asia (4)**

This course examines key aspects of political life in one or two selected southeast Asia countries focusing on the interrelationship between political problems in these rapidly changing societies and their political institutions. The countries considered may vary from year to year. *Prerequisite: IP/Gen 463 or consent of instructor.*

**IP/Gen 449. Making US Foreign Policy (4)**

Analysis of the interests, structure and procedures of the main executive branch agencies involved in the formulation of for-

eign policy, and of the roles of Congress, the media, public opinion, and non-governmental actors. Case studies and "daily briefings" to prepare students to perform professionally in the foreign policy arena. *Prerequisite: IP/Core 410 or consent of instructor.*

**IP/Gen 451. Economic Development (4)**

This course examines comparative patterns of industrialization and agricultural modernization with a focus on certain common features of the modernization process and widely varying endowments, policies, and experiences of different countries. *Prerequisites: IP/Core 401 and 403, or consent of instructor.*

**IP/Gen 453. Sustainable Development (4)**

This course will cover the concept of sustainable development, ways in which sustainable development can be measured, evaluation of environmental damages and benefits, and the role of discounting, and will analyze cases demonstrating failure of the market.

**IP/Gen 456. Program Design and Evaluation (4)**

Introduction to elements of program design and evaluation. Examines principles and guidelines used in creating a program and evaluating its success or failure. International case studies are explored. Students have the opportunity to develop their own program and evaluation projects.

**IP/Gen 457. Policy Analysis and the Environment (4)**

Examination of public policy analysis, such as cost-benefit analysis and project evaluation, for use in policy formation. Sustainable development will receive particular attention. Case studies emphasizing the environment, agriculture and food, and economic development will be included.

**IP/Gen 458. International Environmental Policy (4)**

Review of environmental issues, including transboundary air and water pollution, acid rain, ozone depletion, species eradication, whaling, and climate change. Economic, political, and social consequences of international environmental disputes. Current approaches to environmental policy analysis.

**IP/Gen 459. Conflict Resolution of Environmental Issues (4)**

Use of bilateral negotiations (U.S.-Canada), regional organization (ECE and acid rain in Europe), and United Nations specialized agencies (UNEP and WMO on ozone depletion and climate change) to mediate environmental disputes. Consideration of nontraditional approaches resolving international environmental problems.

**IP/Gen 460. The Politics of US-Japan Economic Relations (4)**

This course will analyze how the domestic politics of each country, their international negotiations, and their interaction concerning economic issues have affected the U.S.-Japan relationship. Both the politics of cooperation and integration, and trade friction and conflict will be addressed in part through study of specific cases.

**IP/Gen 461. Doing Business in China (4)**

This course describes the Chinese commercial, organizational, and cultural environment. Case studies of foreign businesses in China are examined, and the opportunities and pitfalls of operation in China are considered. Negotiation with Chinese counterparts is covered through a negotiation exercise. The focus is on mainland China, but some attention is given to business in Hong Kong and Taiwan as well. Students are required to prepare business plans for proposed Chinese ventures.

**IP/Gen 462. Problems in the International Political Economy of the Asia-Pacific Region (4)**

This course examines a range of major applied international political economy issues confronting the Asia-Pacific region.

The central themes in the course are: the sources of rapid economic growth, the significance of international institutions designed to promote economic and regional integration, and the dynamics of major areas of economic and political tension within the region. *Prerequisite: IP/Core 411 or consent of instructor.*

**IP/Gen 463. Political Economy of Southeast Asia (4)**

This course provides an introduction to five Southeast Asian countries: Indonesia, Thailand, Malaysia, the Philippines, and Vietnam. The focus will be on national-level political and economic issues in these countries. In addition, a number of region-wide issues will also be examined such as: Chinese business groups and networks; clientelism and corruption; regional trade and investment linkages; democratization; and the implications of political change for future economic development.

**IP/Gen 467. Policymaking and Political Economy in Japan (4)**

The policymaking process in Japan and the interaction and role of state and non-state actors in shaping Japan's economic development. Analysis and comparison, through case studies of industrial policies (toward high-tech and declining industries), and non-industrial policies and their consequences.

**IP/Gen 468. Government and Business in Japan (4)**

This course aims to identify and analyze the basic features of the Japanese political economy and government-business relationships in postwar Japan. Following an introduction to the constituents of Japanese political and industrial organization, specific aspects of financial and industrial policy (MOF/MITI) as well as regulation and corporate governance are discussed.

**IP/Gen 469. The Japanese Financial System (4)**

This course studies the financial system in Japan and analyzes its role in the development of the Japanese economy. Topics will include *keiretsu* and the main bank system, internationalization and deregulation of finance, the Bank of Japan and monetary policy. *Prerequisites: IP/Core 401 and 403.*

**IP/Gen 470. International Business Strategy (4)**

This course analyzes corporate strategies and management issues in their international dimensions. Based on numerous case studies, the class examines the strategic opportunities and problems that emerge when companies transfer corporate skills and competence to other countries. *Recommended: IP/Core 456A.*

**IP/Gen 471. Japanese Economy (4)**

A broad survey of the Japanese economy, together with in-depth examination of some distinctively Japanese phenomena such as savings behavior, financial structure, industrial organization, and labor markets. *Prerequisites: IP/Core 401 and 403, or consent of instructor.*

**IP/Gen 472. Japanese Corporate Culture (4)**

This course examines Japanese cultural values and social relations in the context of business organizations. The central focus will be on the integration of individuals into their organizations and on the human relations characteristic of their work environments.

**IP/Gen 474. Latin American Societies: Social Classes and State Policies in a Comparative Perspective (4)**

Focuses on class structures, political mobilization, and government policies (economic and social policies in particular) in selected South American countries. Special attention will be given to the interaction between domestic and external economic and political processes.

**IP/Gen 476. Doing Business in Latin America (4)**

This course will explore the realities of conducting business in Latin America. The focus will be on discussing a variety of cases, mainly in four countries—Mexico, Brazil, Argentina and Chile—covering strategic, operational, organizational, and cross-cul-

tural issues. Course format will consist of case studies and will include the development and presentation of a business plan.

**IP/Gen 477. Latin American Politics (4)**

Introductory reading seminar on Latin American politics to acquaint students with leading schools of thought, provide critical perspective on premises and methodology, and identify themes for further inquiry. Themes include authoritarianism, revolution, democratization, regional conflict, and emergence of middle-level powers.

**IP/Gen 478. Mexican Economic Policy (4)**

This course offers an overview of economic policy in Mexico. It covers the shift from "stabilizing growth" in the 1950s and 1960s to crisis in the 1970s and 1980s and current reforms. International interactions and current developments are stressed. *Prerequisites: IP/Core 401 and 403.*

**IP/Gen 482. East Asian NICS (4)**

Forces explaining the success of four economies in East Asia (South Korea, Taiwan, Hong Kong, Singapore), and two natural resource-rich states (Malaysia, Thailand) will be addressed. Theoretical models, implementation of development policies/strategies, and sociopolitical causes and consequences of development will be discussed. *Prerequisites: IP/Core 401 and 403, or IP/Core 410 and 411, or consent of instructor.*

**IP/Gen 484. Korean Politics and Society (4)**

This course will examine characteristics and distinctive aspects of contemporary Korean society and politics. Emphasis will be placed on continuity and change in social values, political culture and leadership, economic growth and its impact, and democratization and its future prospects.

**IP/Gen 485. The Political Economy of South Korea (4)**

Analytical review of South Korea's economic performance. Examination of major policy changes (e.g., shifts toward export promotion, heavy and chemical industrial promotion); Korea's industrial structure including the role of large enterprises (*chaebol*); role of government; links between Korea and other countries.

**IP/Gen 486. Economic and Social Development of China (4)**

This course examines China's development experience from a generally economic standpoint. Contents include: patterns of traditional Chinese society and economy; geography and resource constraints; impact of the West and Japan; development since 1949; and contemporary problems and options.

**IP/Gen 490. Special Topics in Pacific International Affairs (4)**

A seminar course at an advanced level on a special topic in Pacific international affairs. May be repeated for credit.

**IP/Gen 497. Internship (4-12)**

Field research in an area relevant to career and/or regional specialization. May be repeated for credit.

**IP/Gen 498. Directed Group Study (2-12)**

Directed reading in a selected area. The content of each course is to be decided by the professor directing the course with the approval of the student's faculty adviser. May be repeated for credit.

**IP/Gen 499. Independent Research (2-12)**

Independent research under the guidance of a faculty member in IR/PS. May be repeated for credit.

**LANGUAGE COURSES**

**IP/Lang 1A-B-C. First-Year Korean: Korean Conversation (2-2-2)**

Tutorial meetings to practice Korean conversation. Must be taken with IP/Lang 1AX, BX, CX.

**IP/Lang 1AX-BX-CX. First-Year Korean: Analysis of Korean (3-3-3)**

Introduction to the phonology, orthography, morphology, and syntax of the Korean language. Lectures and practice. *Prerequisite: must be taken with IP/Lang 1A, B, C.*

**IP/Lang 3A-B-C. First-Year Vietnamese: Vietnamese Conversation (2-2-2)**

Tutorial meetings to practice Vietnamese conversation. *Prerequisite: must be taken with IP/Lang 3AX, BX, CX.*

**IP/Lang 3AX-BX-CX. First-Year Vietnamese: Analysis of Vietnamese (3-3-3)**

Introduction to the phonology, orthography, morphology, and syntax of the Vietnamese language. Lectures and practice. *Prerequisite: must be taken with IP/Lang 3A, B, C or consent of instructor.*

**IP/Lang 11A-B-C. Second-Year Korean: Korean Conversation (2-2-2)**

Tutorial meetings to practice Korean conversation. Must be taken with IP/Lang 11AX-BX-CX. *Prerequisites: IP/Lang 1C and 1CX or equivalent.*

**IP/Lang 11AX-BX-CX. Second-Year Korean: Analysis of Korean (3-3-3)**

A continuation of IP/Lang 1A, B, C. Through lectures and practice, students will review the basic structure of Korean and will be introduced to an intermediate-level analysis of Korean structure. Must be taken with IP/Lang 11A-B-C. *Prerequisites: IP/Lang 1C and 1CX or equivalent.*

**IP/Lang 33A-B-C. Second-Year Vietnamese: Vietnamese Conversation (2-2-2)**

Tutorial meetings to practice Vietnamese conversation. *Prerequisites: must be taken with IP/Lang 33AX, BX, CX. Completion of IP/Lang 3A, 3B, 3C and 3AX, 3BX, 3CX or consent of instructor.*

**IP/Lang 33AX-BX-CX. Second-Year Vietnamese: Analysis of Vietnamese (3-3-3)**

A continuation of first-year Vietnamese. Through lectures and practice students will review the basic structure of Vietnamese and will be introduced to an intermediate level analysis of Vietnamese structure. *Prerequisites: IP/Lang 3A, 3B, 3C, 3AX, 3BX, 3CX and must be taken with 33A, B, C or consent of instructor.*

**IP/Lang 400ABC. Chinese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at a *low-intermediate* level of proficiency to maintain and improve their Chinese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 401ABC. Chinese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *intermediate* level of proficiency to maintain and improve their Chinese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 402ABC. Chinese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *advanced-intermediate* level of proficiency to maintain and improve their Chinese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 403ABC. Chinese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *advanced* level of proficiency to maintain and improve their Chinese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 404ABC. Chinese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at a *superior* level of proficiency to maintain and improve their Chinese language skills through individual training with an instructor. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 406ABC. Technical Chinese Language (4)**

A course designed to prepare IR/PS technical management track students to meet the language competency requirement in Chinese. Acquisition of technical language skills through classes, language, language laboratory, exercises, and other activities. *Prerequisite: IR/PS technical concentration admission status or by consent of instructor.*

**IP/Lang 410ABC. Japanese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at a *low-intermediate* level of proficiency to maintain and improve their Japanese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only or by consent of instructor.*

**IP/Lang 411ABC. Japanese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *intermediate* level of proficiency to maintain and improve their Japanese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 412ABC. Japanese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *advanced-intermediate* level of proficiency to maintain and improve their Japanese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 413ABC. Japanese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *advanced* level of proficiency to maintain and improve their Japanese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 414ABC. Japanese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at a *superior* level of proficiency to maintain and improve their Japanese language skills through individual training with an instructor. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 416ABC. Technical Japanese Language (4)**

A course designed to prepare IR/PS technical management track students to meet the language competency requirement in Japanese. Acquisition of technical language skills through classes, language, language laboratory, exercises, and other activities. *Prerequisite: IR/PS technical concentration admission status or by consent of instructor.*

**IP/Lang 420ABC. Korean Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at a *low-intermediate* level of proficiency to maintain and improve their Korean

language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only or by consent of instructor.*

**IP/Lang 421ABC. Korean Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *intermediate* level of proficiency to maintain and improve their Korean language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 430ABC. Portuguese Language for Spanish Speakers (4-4-4)**

This course is designed to enable Spanish-speaking students to acquire proficiency in the Portuguese language through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only or by consent of instructor.*

**IP/Lang 431ABC. Second Year Portuguese Language for Spanish Speakers (4-4-4)**

A continuation of first-year Portuguese for Spanish speakers. This course is designed to enable Spanish-speaking students to be introduced to an *intermediate* level of Portuguese language through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only or by consent of instructor.*

**IP/Lang 440ABC. Spanish Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at a *low-intermediate* level of proficiency to maintain and improve their Spanish language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only or by consent of instructor.*

**IP/Lang 441ABC. Spanish Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *intermediate* level of proficiency to maintain and improve their Spanish language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 442ABC. Spanish Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *advanced-intermediate* level of proficiency to maintain and improve their Spanish language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lane 443ABC. Spanish Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *advanced* level of proficiency to maintain and improve their Spanish language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 444ABC. Spanish Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at a *superior* level of proficiency to maintain and improve their Spanish language skills through individual training with an instructor. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 446ABC. Technical Spanish Language (4)**

A course designed to prepare IR/PS technical management track students to meet the language competency requirement in Spanish. Acquisition of technical language skills through classes, language, language laboratory, exercises, and other activities. *Prerequisite: IR/PS technical concentration admission status or by consent of instructor.*

**IP/Lang 450ABC. Vietnamese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at a *low-intermediate* level of proficiency to maintain and improve their Vietnamese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only or by consent of instructor.*

**IP/Lang 451ABC. Vietnamese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *intermediate* level of proficiency to maintain and improve their Vietnamese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 452ABC. Vietnamese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at an *advanced-intermediate* level of proficiency to maintain and improve their Vietnamese language skills through a combination of classes, language laboratories, exercises, and other language experiences. *Prerequisite: IR/PS majors only, or by consent of instructor.*

**IP/Lang 490. Special Topics in Language (2-12)**

A seminar course at an advanced level on core linguistic functions and topics related to international management and policy work in the Pacific Rim area. *Prerequisite: proficiency examination must be passed.*

**IP/Lang 500. Apprentice Teaching of Language (1-4)**

This course, designed for graduate students serving as teaching assistants, includes discussion of teaching theories, techniques, and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. *Prerequisite: graduate standing.*

**PH.D. LEVEL COURSES**

**IP/Gen 202. International Political Economy: Money and Finance (4)**

Examination of effects of national policies and international collaboration of public and private international financial institutions, in particular management of international debt crises, economic policy coordination, and the role of international lender of last resort. Conjoined with Political Science 262. *Prerequisite: IP/Gen 211 or consent of instructor.*

**IP/Gen 203. The International Political Economy: Trade (4)**

This course examines the evolution of the international trading system, emphasizing issues of politics and policy. Topics include developments in the GATT, the emergence of regional trading blocs, protectionism, industrial policy, and the relationship between trade and direct investment. Students choose a particular sector to develop expertise. *Prerequisite: IP/Gen 211 or consent of instructor.*

**IP/Gen 204. International Relations of the Pacific (4)**

International relations and developing international political economies of nations bordering the Pacific. Topics include: the "Pacific Basin" concept; the U.S. and "hegemonic-stability" theory; legacies of the Korean War and Sino-Soviet dispute; immigration patterns and their consequences; and Japan's foreign policy.

**IP/Gen 206. The Politics of Democratization (4)**

This course will examine the following questions: Why do some countries fail and others succeed in establishing democracies? How do leaders "institutionalize uncertainty"? Should economic or political liberalization come first? Why are there periodic "waves" of democratic breakthrough and breakdown? Conjoined with Political Science 224.

**IP/Gen 207. Bureaucracy and Public Policy (4)**

What determines the degree of influence bureaucrats exert over public policy outcomes, versus the influence of politicians? Overview of themes such as developmental state, state autonomy, legislative oversight, clientelism, corruption. Applications to Japan, East Asia, United States, and Latin America. Conjoined with Political Science 228.

**IP/Gen 208. Internal Conflict after the Cold War (4)**

Will examine the causes of civil wars and the problems with resolution and state reconstruction. Theoretical approaches discussed will then be applied to three recent case studies: Cambodia, Rwanda, and Bosnia. Policy implications for the international community will be discussed. *Prerequisites: IP/Core 210.*

**IP/Gen 209. Principles of Marketing (4)**

This course develops the microeconomics foundations of market exchange by explicitly examining the marketing details of transactions: demand and product differentiation, incomplete and incorrect information, search costs and promotion costs. It is argued that within this theoretical framework (i.e., model) most observed marketing behavior can be reconciled. The primary objective of this course is to learn to deduce firm and consumer motives from observed behavior. *Prerequisites: IP/Gen 221 and 243, or consent of instructor.*

**IP/Gen 210. International Politics and Security (4)**

Development of analytic tools for understanding international relations with applications to contemporary problems such as the environment, nuclear proliferation, human rights, humanitarian interventions, and the roots of conflict and cooperation among countries.

**IP/Gen 211. The Politics of International Economic Relations (4)**

The course presents explanations for the political organization of international economic relations in different issue-areas. Additional topics include international economic inequality, efforts by states to manipulate economic relations for strategic gain, and the prospects for regional and global organizations.

**IP/Gen 212. The Politics of International Competitiveness (4)**

Examination of policy debates concerning international economic relations: what policies promote or encourage effective participation in the international economy, and what political factors support or oppose such policies? Examples drawn from the experiences of the U.S., Japan, Europe, Latin America, and East Asia.

**IP/Gen 214. U.S. Strategic Policy Issues in a Changing World (4)**

Strategic issues facing the U.S. in the nineties will be described and analyzed. Issues taken up will include nuclear weapons policy, space policy, European and Northeast Asia security policies. Political, military, and technical aspects of these issues will be analyzed. *Some background in political science and in quantitative analysis of issues desirable.*

**IP/Gen 215. Competition and Regulation in the Global Communications Market (4)**

This course explores the global market for telecommunications, internet, and information services. It analyzes how regulation and international trade rules influence market structure. It examines the politics underlying government rules, and it probes the strategies of corporation in the global market.

**IP/Gen 216. Post War Politics in Japan (4)**

Overview of postwar politics in Japan, including American Occupation reforms, political institutions, major political actors, mass and elite, and political behavior. Special attention will be paid to the issue of Japan's changing democracy.

**IP/Gen 217. Models of International Change (4)**

The seminar will explore models that account for international change by linking international (systemic or structural) and domestic variables. Particular attention will be given to evolutionary and learning models as they have been employed in a number of disciplines.

**IP/Gen 219A-B-C. Workshop in International Relations (4)**

Examination of recent research in international politics; development and presentation of research projects by graduate students; presentation of research projects by faculty. Second year students present seminar paper; third year students present dissertation prospectus; candidates make yearly presentation of dissertation research. *Prerequisite: Political Science 202 or consent of instructor.* Conjoined with Political Science 283A-B-C.

**IP/Gen 221. Managerial Economics (4)**

Survey of basic tools in economics. Examination of how commodity demand is determined, what affects supply of the commodity, how price is determined, when optimal market allocation of resources and failures occur, and basic topics concerning the aggregate economy.

**IP/Gen 222. Investments (4)**

An analysis of the risk/return characteristics of different assets as perceived by different investors and their implications for security price behavior, emphasizing real world capital market behavior. International aspects include the role of exchange rate risk and international diversification.

**IP/Gen 224. Corporate Finance (4)**

The topics covered are dividend policy and capital structure, options, debt financing, and short- and long-term financial planning. Course format will be mostly lectures with occasional cases. Some international aspects of corporate finance will also be discussed.

**IP/Gen 227. Organizations (4)**

A seminar course based on the modern economics of organization. Covers an eclectic set of readings on a diverse range of organizations, looking at how incentives for collective action are structured. *Prerequisites: IP/Gen 221 and 243.*

**IP/Gen 228. Government and Business in Japan (4)**

This course aims to identify and analyze the basic features of the Japanese political economy and government-business relationships in postwar Japan. Following an introduction to the constituents of Japanese political and industrial organization, specific aspects of financial and industrial policy (MOF/MITI) as well as regulation and corporate governance are discussed. Additional paper and/or examination will be required at the doctoral level.

**IP/Gen 229. Business and Management in Japan (4)**

This course introduces the main aspects of Japanese business and industrial organization (keiretsu), Japanese management practices, and the representation and influence of business interests in the Japanese political economy.

**IP/Gen 230. Trade and Economic Growth: Lessons from Pacific Basin Economies (4)**

The purpose of this course is to survey economic relations among Pacific Basin Economies, exploring relevant economic and public policy issues. Major topics include: productivity; trade; technology spill-over/transfer; foreign direct investment; factor and human capital accumulation; income distribution; and regional institutional arrangements. *Prerequisites: IP/Gen 221 and IP/Gen 243.*

**IP/Gen 231. Fiscal and Monetary Policy (4)**

Effects of fiscal and monetary policies on aggregate variables such as output, nominal and real interest rates, price level, and employment. Additional topics include the inflation/unemployment trade-off, budget deficit, and economic growth.

**IP/Gen 233. International Finance (4)**

The international financial system will be addressed including the perspectives of individual investors, borrowers, and financial intermediaries. Public policy issues including the exchange rate mechanism, financial linkages among countries, optimum currency areas, and macro-policy coordination will be discussed.

**IP/Gen 234. Strategic Analysis (4)**

This course analyzes competitive interactions, surveying the modern economic analysis of relationships between and within organizations. The foundations of the course are game theory and the economics of information. Topics include bargaining and contracting; principal-agent models; and bidding models.

**IP/Gen 235. Topics in International Trade (4)**

Objective is to develop analytic tools and explore their relevance for trade policy issues. Focuses on a revolving set of issues, including the political economy of trade policy, strategic trade and industrial policy; trade and financial liberalization; the debate on trade, jobs, and wages; and trade and international technology transfer.

**IP/Gen 237. Strategy and Planning in Production and Operations Management (4)**

This course examines manufacturing, distribution, and service activities that are relevant to the strategic management of operations. It explores the everyday control of operations, the design of the production system, and the interface between operations and other aspects of the firm's overall strategy. *Prerequisite: IP/Gen 238 or consent of instructor.*

**IP/Gen 238. Production and Operations Management: Analysis and Control (4)**

This course provides a comprehensive introduction to the fundamental decisions and trade-offs associated with the control of a firm's operations function. It analyzes production processes, quality control, inventory and materials planning, kanban, and just-in-time principles.

**IP/Gen 239. International Manufacturing Strategy: Selected Topics (4)**

This course covers selected issues emerging from the recent trends in globalization of firms' manufacturing activities. Topics include globalization of the manufacturing base, international comparison of manufacturing management, and the role of manufacturing in the global competition. *Prerequisite: IP/Gen 238 or consent of instructor.*

**IP/Gen 240. Applied Data Analysis and Statistical Decision Making (4)**

The goal of the course is to teach how to evaluate quantitative information in business and economics contexts and to make sound managerial decisions in complex situations. Much of the problems and the course work will involve statistical software and spreadsheet analysis of data. The course covers various applied multivariate statistical methods beyond basics.

**IP/Gen 241. Seminar in Advanced Topics in Production and Operations Management (4)**

Studies of advanced analytical techniques in operations management. Emphasis is on the application of various analytical methods to operational problems. Students are encouraged to carry out a research project for the actual application of these techniques. *Prerequisite: IP/Gen 238 or consent of instructor.*

**IP/Gen 242. Economics of Telecommunications (4)**

This course will focus on the underlying economics of the telecommunications and public rationale of regulations applied to this industry. Both theoretical models and case studies will be used to provide better understanding of the telecommunications marketplace and the nature of competition between service providers in the industry. *Prerequisite: IP/Gen 221 or consent of instructor.*

**IP/Gen 243. International Economics (4)**

The theory and mechanics of international economics. Included will be such topics as real trade theory, international movements of capital, the effects of trade and capital flows on domestic economies, and policies toward trade and foreign investment.

**IP/Gen 244. Product Design and Process Development (4)**

Engineering management, emphasizing creation and improvement of products and processes. Cases, lectures, and team exercises set in various industries, including software. *Prerequisites: IP/Gen 238 or consent of instructor plus experience in manufacturing, engineering, or software.*

**IP/Gen 245. Entrepreneurship (4)**

Student teams (3-5) are admitted to the course on the basis of a pro forma business plan. While teams perfect their plans, class discussions cover aspects of creating and planning new businesses, culminating in presentations of their final plans. *Prerequisite: consent of instructor.*

**IP/Gen 246. Seminar in International Economics (4)**

Presentations by the Departments of IR/PS and Economics faculty and Ph.D. students, as well as visiting speakers. Various research topics in international economics, development economics, etc. will be covered. Attendance is required of IR/PS Ph.D. students in the economics concentration (or the joint Economic / IR/PS Ph.D. degree program-pending approval).

**IP/Gen 247. Seminar in Political Economy (4)**

Presentations by IR/PS faculty and Ph.D. students, as well as visiting speakers. Theme varies from quarter to quarter: e.g., corruption, the political economy of growth, etc. Attendance is required of IR/PS Ph.D. students in the international relations and comparative public policy concentrations.

**IP/Gen 248. Politics and Political Institutions in Southeast Asia (4)**

This course examines key aspects of political life in one or two selected southeast Asia countries, focusing on the interrelationship between political problems in these rapidly changing societies and their political institutions. The countries considered may vary from year to year. *Prerequisite: IP/Gen 263 or consent of instructor.*

**IP/Gen 249. Making US Foreign Policy (4)**

Analysis of the interests, structure, and procedures of the main executive branch agencies involved in the formulation of foreign policy, and of the roles of Congress, the media, public opinion, and non-governmental actors. Case studies and "daily briefings" to prepare students to perform professionally in the foreign policy arena. *Prerequisite: IP/Gen 210 or consent of instructor.*

**IP/Gen 250. The Politics of U.S.-Japan Economic Relations (4)**

This course will analyze how the domestic politics of each country, their international negotiations, and their interaction concerning economic issues have affected the U.S.-Japan relationship. Both the politics of cooperation and integration, and trade friction and conflict will be addressed in part through study of specific cases.

**IP/Gen 251. Economic Development (4)**

This course examines comparative patterns of industrialization and agricultural modernization with a focus on certain common features of the modernization process and widely varying endowments, policies, and experiences of different countries.

**IP/Gen 253. Sustainable Development (4)**

The course will cover the concept of sustainable development, ways in which sustainable development can be measured,

evaluation of environmental damages and benefits, and the role of discounting, and will analyze cases demonstrating failure of the market.

**IP/Gen 254. International Relations Theory (4)**

A survey of the principal theories and approaches to the study of international relations. *Conjoined with Political Science 240.*

**IP/Gen 256. Program Design and Evaluation (4)**

Introduction to elements of program design and evaluation. Examines principles and guidelines used in creating a program and evaluating its success or failure. International case studies are explored. Students have the opportunity to develop their own program and evaluation projects.

**IP/Gen 257. Policy Analysis and the Environment (4)**

Examination of public policy analysis, such as cost-benefit analysis and project evaluation, for use in policy formation. Sustainable development will receive particular attention. Case studies emphasizing the environment, agriculture and food, and economic development will be included.

**IP/Gen 258. International Environmental Policy (4)**

Review of environmental issues, including transboundary air and water pollution, acid rain, ozone depletion, species eradication, whaling, and climate change. Economic, political, and social consequences of international environmental disputes. Current approaches to environmental policy analysis.

**IP/Gen 259. Conflict Resolution of Environmental Issues (4)**

Use of bilateral negotiations (U.S.-Canada), regional organization (ECE and acid rain in Europe), and United Nations specialized agencies (UNEP and WMO on ozone depletion and climate change) to mediate environmental disputes. Consideration of nontraditional approaches resolving international environmental problems.

**IP/Gen 260. Economic and Social Development of China (4)**

This course examines China's development experience from a generally economic standpoint. Contents include: patterns of traditional Chinese society and economy; geography and resource constraints; impact of the West and Japan; development since 1949; and contemporary problems and options.

**IP/Gen 261. Chinese Politics (4)**

This course will analyze post-1949 Chinese politics, including political institutions, the policymaking process, and citizen political behavior. Special attention will be given to the prospects for political reform in China.

**IP/Gen 262. Theories of the Politics and Process of Making Public Policy (4)**

Introduction to research methods in comparative policy analysis and to the design of research proposals. Survey of major competing approaches in the field, with analysis of methods used. Special attention to needs of Ph.D. students formulating dissertation proposals.

**IP/Gen 263. Political Economy of Southeast Asia (4)**

This course provides an introduction to five Southeast Asian countries: Indonesia, Thailand, Malaysia, the Philippines, and Vietnam. The focus will be on national level political and economic issues in these countries. In addition, a number of region-wide issues will also be examined such as: Chinese business groups and networks; clientelism and corruption; regional trade and investment linkages; democratization; and the implications of political change for future economic development.

**IP/Gen 267. Policymaking and Political Economy in Japan (4)**

Examines the policymaking process in Japan, the interaction and role of state and non-state actors in shaping Japan's



economy. Analysis and comparison, through case studies of industrial policies (toward high-tech and declining industries), and non-industrial policies and their consequences.

**IP/Gen 269. The Japanese Financial System (4)**

This course studies the financial system in Japan and analyzes its role in the development of the Japanese economy. Topics will include *keiretsu* and the main bank system, internationalization and deregulation of finance, the Bank of Japan and monetary policy. *Prerequisites: IP/Gen 221 and 243.*

**IP/Gen 270. International Business Strategy (4)**

This course analyzes corporate strategies and management issues in their international dimensions. Based on numerous case studies, the class examines the strategic opportunities and problems that emerge when companies transfer corporate skills and competence to other countries.

**IP/Gen 271. Japanese Economy (4)**

A broad survey of the Japanese economy, together with in-depth examination of some distinctively Japanese phenomena such as savings behavior, financial structure, industrial organization, and labor markets.

**IP/Gen 272. Japanese Corporate Culture (4)**

This course examines Japanese cultural values and social relations in the context of business organizations. The central focus will be on the integration of individuals into their organizations and on the human relations characteristic of their work environments.

**IP/Gen 274. Economic Policy in Latin America (4)**

This course seeks to enhance the students' understanding of the main policy alternatives open to the largest Latin American countries. Development and stabilization policies are analyzed, emphasizing current debate between conventional and heterodox policy packages and their impact on decision making.

**IP/Gen 275. Politics and Policy in Latin America (4)**

An overview of the contemporary politics in Latin America: democracy, authoritarianism, and revolutionary change. Readings will be mostly comparative, either dealing with groups of countries within Latin America or comparisons between Latin America and other regions of the world.

**IP/Gen 277. Latin American Politics (4)**

Introductory reading seminar on Latin American politics to acquaint students with leading schools of thought, provide critical perspective on premises and methodology, and identify themes for further inquiry. Themes include authoritarianism, revolution, democratization, regional conflict, and emergence of middle-level powers. Conjoined with Political Science 235A.

**IP/Gen 278. Mexican Economic Policy (4)**

This course offers an overview of economic policy in Mexico. It covers the shift from "stabilizing growth" in the 1950s and 1960s to crisis in the 1970s and 1980s and current reforms. International interactions and current developments are stressed.

**IP/Gen 279. Doing Business in Latin America (4)**

This course will explore the realities of conducting business in Latin America. The focus will be on discussing a variety of cases, mainly in four countries—Mexico, Brazil, Argentina and Chile—covering strategic, operational, organizational, and cross-cultural issues. Course format will consist of case studies and will include the development and presentation of a business plan.

**IP/Gen 280A-B-C. Graduate Policy Seminar: Comparative Analysis of Political Decision Making (4-4-4)**

Three quarter sequence requirement for all doctoral candidates. This course aims to develop theoretical approaches to the study of policymaking in the countries of the Pacific region, including China, Japan, Korea, Taiwan, Hong Kong, Singapore, Latin

America, and Canada. The focus is on political institutions and how they structure collective choice and incentives for individual behavior. Participants will research case studies of policymaking and present their findings to the class. As a group, they will also contribute to the process of generating theories about the consequences of different institutional arrangements for policy outcomes.

**IP/Gen 282. East Asian NICS (4)**

Forces explaining the success of four economies in East Asia (South Korea, Taiwan, Hong Kong, Singapore), and two natural resource-rich states (Malaysia, Thailand) will be addressed. Theoretical models, implementation of development policies/strategies, and sociopolitical causes and consequences of development will be discussed.

**IP/Gen 284. Korean Politics and Society (4)**

This course will examine characteristics and distinctive aspects of contemporary Korean society and politics. Emphasis will be placed on continuity and change in social values, political culture and leadership, economic growth and its impact, and democratization and its future prospects.

**IP/Gen 285. The Political Economy of South Korea (4)**

Analytical review of South Korea's economic performance. Examination of major policy changes (e.g., shifts toward export promotion, heavy and chemical industrial promotion); Korea's industrial structure including the role of large enterprise (*chaebol*); role of government; links between Korea and other countries.

**IP/Gen 290. Special Topics in Pacific International Affairs (4)**

A seminar course at an advanced level on a special topic in Pacific international affairs. May be repeated for credit.

**IP/Gen 298. Directed Group Study (2-12)**

Directed reading in a selected area. The content of each course is to be decided by the professor directing the course, with the approval of the student's faculty adviser. May be repeated for credit.

**IP/Gen 299. Independent Research (2-12)**

Independent research under the guidance of a faculty member in IR/PS. May be repeated for credit.

Pasquale Verdicchio, Ph.D., *Italian and Comparative Literature*

Italian studies is an interdisciplinary program in the language, literature, history, and art of Italy. Italian studies coordinates the resources of the Departments of History, Literature and Visual Arts, and offers students the opportunity to design a major, leading to a B.A., around the course offerings of these three departments. Students in Italian studies are encouraged to participate in the University of California Education Abroad Program (EAP), which is affiliated with the Universities of Padua, Venice, and Bologna: this provides the possibility of a junior year abroad, including both language courses and courses dealing with various aspects of Italian studies. EAP credits may be transferred back to UCSD to coordinate with on-campus offerings.

**The Major Program**

A major in Italian studies consists of a choice of twelve upper-division courses in literature, history, and visual arts approved for the program and listed below. Each of the three areas (literature, history, and visual arts) must be represented in the student's program of study, with at least two courses from each field. The particular courses making up each student's major will be selected in consultation with the program adviser. Literature 115 (Medieval Studies) is a required course for all Italian studies majors. In the senior year, each student is required to take a directed readings tutorial (199) and write an essay under the supervision of the chosen instructor.

**The Minor Program**

A minor in Italian studies consists of seven upper-division courses from among those listed below (at least two each from literature, history, and visual arts). Credit from the EAP program may be applied toward the minor.

Additional courses counting toward a major in Italian studies are offered on a year-to-year basis. As these often cannot be listed in the catalog in advance, interested students should consult the program faculty for an up-to-date list.

## Italian Studies

OFFICE: 3024 Humanities and Social Sciences Building, Muir College (CAESAR Office)  
Web site: <http://orpheus.ucsd.edu/history/ItalianStud.html>

**Professor**

Robert Westman, Ph.D., *History*

**Associate Professors**

Jack Greenstein, Ph.D., *Visual Arts*

John Marino, Ph.D., *History*

Stephanie Jed, Ph.D., *Italian and*

*Comparative Literature*

Pamela Radcliff, Ph.D., *History*



## Upper-Division/Italian Studies Courses

For description of courses listed below, see appropriate departmental listing.

### Literature

- LT/IT 100. Introduction to Italian Literature  
 LT/IT 110. Selected Topics in Italian Literature  
 (may be repeated for credit as topics vary)  
 LT/IT 115. Medieval Studies  
 LT/IT 118. Italian Romanticism  
 LT/IT 122. Studies in Modern Italian Culture  
 LT/IT 136. Studies in Modern Italian Poetry  
 LT/IT 137. Studies in Modern Italian Prose  
 LT/IT 138. Contemporary Italian Thought  
 LT/IT 139. Italy and the Question of  
 Subaltern Cultures  
 LT/IT 140. Women in Italy  
 LT/IT 143. Major Italian Authors  
 LT/IT 150. Italian North American Culture  
 LT/IT 161. Advanced Stylistics and  
 Conversation  
 LT/IT 163. Translation  
 LT/IT 190. Seminar  
 LT/IT 196. Honors Thesis  
 LT/IT 198. Directed Group Study  
 LT/IT 199. Special Studies

N.B.: Students must complete the following prerequisites for all upper-division work in Italian literature:

1. Linguistics/Italian 1A-B-C, or  
 LT/IT 12A-B-C
2. Literature/Italia 2A-B, 50

### Visual Arts

- 123A. Italian Art of the Early Renaissance  
 123B. High Renaissance Art  
 123C. Michelangelo  
 123D. The City in Italy  
 128C. Topics in Medieval, Renaissance, and  
 Baroque Art (when on an Italian topic)  
 129C. Special Problems in Medieval,  
 Renaissance, and Baroque Art (when on  
 an Italian topic)

### History

120. Early Renaissance Italy: Dante to the  
 Medici (1300-1494)

121. Late Italian Renaissance: Age of  
 Michelangelo (1494-1564)  
 122. Politics, Italian Renaissance Style  
 152. Italy Since 1860  
 199. Independent Study for Undergraduates

## Japanese Studies

OFFICE: 3024 Humanities and Social Sciences  
 Building, Muir College  
 Web site: [http://orpheus.ucsd.edu/history/  
 JapaneseStud.html](http://orpheus.ucsd.edu/history/JapaneseStud.html)

### Faculty

Takashi Fujitani, *Associate Professor, History*  
 Takeo Hoshi, *Associate Professor, International  
 Relations and Pacific Studies*  
 Germain A. Hoston, *Professor, Political Science*  
 Hifumi Ito, *Lecturer, Japanese Language*  
 Noriko Kikuchi, *Lecturer, Japanese Language*  
 Ellis Krauss, *Professor, International Relations  
 and Pacific Studies*  
 Sige-Yuki Kuroda, *Professor Emeritus,  
 Linguistics*  
 Masao Miyoshi, *Hajime Mori Professor of  
 Japanese, English, and Comparative Literature*  
 Mayumi Mochizuki, *Lecturer, Japanese  
 Language*  
 Masato Nishimura, *Lecturer, Japanese  
 Language*  
 Ulrike Schaede, *Assistant Professor,  
 International Relations and Pacific Studies*  
 Stefan Tanaka, *Associate Professor, History*  
 Yasu-Hiko Tohsaku, *Associate Professor,  
 International Relations and Pacific Studies*  
 Christena Turner, *Associate Professor, Sociology*  
 Lisa Yoneyama, *Assistant Professor, Literature*  
 Joji Yuasa, *Professor Emeritus, Music*

The Program in Japanese Studies coordinates a variety of campus offerings dealing with the language, history, culture, and political economy of Japan. The program is especially strong in the area of modern and contemporary Japan. In addition to courses available in the Departments of Anthropology, Economics, History, Linguistics, Literature, Music, Political Science and Sociology, qualified undergraduates also may enroll in Japan-related courses in the Graduate School of International Relations and Pacific Studies with consent of instructors.

## The Major

### A. LOWER-DIVISION REQUIREMENT

1. Japanese language: two years lower-division or the transferred equivalent:  
 Japanese Studies 10A-B-C  
 Japanese Studies 20A-B-C
2. Japanese Studies 91 (this course is an introduction to Japanese studies and an opportunity for students to learn in some depth about a few selected topics. The format is speaker/seminar rotated among the Japanese studies faculty).
3. The remaining two courses may be chosen from among the following:
  - a. East Asian History: HILD 10-11-12
  - b. Eleanor Roosevelt College students may petition to use MMW Courses 2 and 5.
  - c. Thurgood Marshall College students may petition to use DOC course 1.
4. The language requirement may be waived by demonstrating the equivalent proficiency through exam.

### B. UPPER-DIVISION REQUIREMENT (12 COURSES)

1. Japanese Language: six upper-division language courses or the transferred equivalent from:  
 Japanese Studies 100A-B-C  
 Japanese Studies 130A-B-C  
 Japanese Studies 140A-B-C  
 Japanese Studies 150A-B-C
2. The remaining six courses must be taken from two or more different disciplines.
  - a. Students may petition to include two non-language upper-division courses taken abroad under EAP or OAP.
  - b. Students may include one 199.
  - c. Students may include one course on China or Korea.
3. All upper-division courses must be taken for a letter grade.
4. The language requirement can be waived by demonstrating the equivalent proficiency through exam. The required number of courses must be fulfilled by taking other non-language upper-division courses.

### C. HONORS PROGRAM

1. Junior Standing.
2. A GPA of 3.5 or better in the major.
3. Overall GPA of 3.2 or better.
4. Completion of at least four upper-division non-language courses approved by the Program in Japanese Studies.

5. Recommendation of a faculty sponsor familiar with the student's work. Students who qualify for honors take a two-quarter sequence Japanese Studies 196A-B (fall and winter quarters preferred) of directed study during which they define a research project, carry out the research, and complete an honors thesis.

The completed honors thesis will be evaluated by a committee consisting of the student's thesis adviser and one other faculty member appointed by the Japanese studies program director.

#### The Minor

A minor in Japanese studies consists of at least 15 units of Japanese language (lower or upper-division) and at least 16 units of upper-division non-language coursework taken from two or more departments. Students may use one non-language course taken abroad. All courses to be used for the minor must be approved by the Program in Japanese Studies and must be taken for a letter grade. Students who are already beyond first- and second-year language levels will be placed in one of our upper-division Japanese language course, Written Japanese (100ABC), Third-Year Japanese (130ABC), Fourth-Year Japanese (140ABC), or Advanced Japanese (150ABC), and will be required to take four upper-division language courses and three upper-division non-language courses.

### COURSES

All graduate-level courses require permission of the instructor for undergraduate students. Course titles may vary from year to year.

### HISTORY

- HIEA 110. Japan: Through the Twelfth Century  
 HIEA 111. Japan: Twelfth through Mid-Nineteenth Century  
 HIEA 112. Japan: from Mid-Nineteenth Century through U.S. Occupation  
 HIEA 113. The Fifteen-Year War in Asia and the Pacific  
 HIEA 114. Postwar Japan  
 HIEA 160. Colloquium on Modern Japanese History  
 HIEA 161. Representing Japan

### JAPANESE STUDIES

- JAPN 91. Contemporary Issues in Japanese Studies

### LANGUAGE

(Students who have prior preparation of Japanese language are placed in language courses based on the results of a placement exam or an oral interview with an instructor. Students who have lived in Japan, or use Japanese at home are required to take a placement exam administered prior to the beginning of the fall quarter. Contact the Japanese Studies office for more information.)

**10A-B-C. First-Year Japanese**  
 (No prior study of Japanese language is required for 10A.)  
*Prerequisites for 'B' and 'C': previous course or consent of instructor.*

**20A-B-C. Second-Year Japanese**  
*Prerequisites: previous course or consent of instructor.*

**100A-B-C. Written Japanese**  
 (These courses are for those students who have a high level of speaking proficiency in Japanese but no or little reading and writing abilities.) *Prerequisite for 'A': consent of instructor. Prerequisites for 'B' and 'C': previous course or consent of instructor.*

**130A-B-C. Third-Year Japanese**  
*Prerequisites: previous course or consent of instructor.*

**140A-B-C. Fourth-Year Japanese**  
*Prerequisites: previous course or consent of instructor.*

**150A-B-C. Advanced Japanese**  
*Prerequisites: previous course or consent of instructor.*

### LINGUISTICS

146. Structure of Japanese

### LITERATURE

**Lit/Gen 142. Earlier Japanese Literature in Translation**  
 (Quarter offerings will vary among A. General Literature; B. Poetry; C. Prose Fiction; D. Drama; and E. Essays, travelogues, diaries, etc.)

**Lit/Gen 143. Later Japanese Literature in Translation**  
 (Quarter offerings will vary among A. General Literature; B. Poetry; C. Prose Fiction; D. Drama and Film; and E. Essays, criticism, etc.)

- Lit/Gen 144. A Single Japanese Author (in translation)  
 Lit/Gen 145. Special Topics in Japanese Literature  
 Lit/Gen 146. Japanese Literary Works/Writers in Japanese (When on Japan)  
 LTGN 189. Gender Studies  
 LTCS 120. Historical Perspectives on Culture  
 LTCS 130. Gender, Race, Ethnicity/Class, and Culture  
 LTCS 150. Topics in Cultural Studies  
 Lit/Th 240. Forms and Genres

### MUSIC

(Check with program office as to whether these courses may be used toward a Japanese studies minor.)

111. World Music  
 211. Seminar in World Music

### POLITICAL SCIENCE

- 132B. Modernity and Identity in East Asia  
 133A. Introduction to Japanese Politics  
 133D. Japanese Foreign Policy  
 133E. Public Policy in Japan  
 233. Politics and Political Economy in Contemporary Japan

### SOCIOLOGY

- SOC/D 158J. Religion and Ethics in China and Japan  
 188G. Japanese Organizational Culture

### GRADUATE SCHOOL OF INTERNATIONAL RELATIONS AND PACIFIC STUDIES

- IP/Gen 400. International Relations of the Pacific  
 IP/Gen 469. The Japanese Financial System  
 IP/Gen 471/271. Japanese Economy  
 IP/Gen 472/272. Cultures of Japanese Business Organizations  
 IP/Core 434A-B/270A-B. Modern Japanese Political Economy  
 IP/Gen 473/273. Japan's Foreign and Defense Policies  
 IP/Core 473A-D, 474A-D, 475A-D. Japanese Language Maintenance for Professional Proficiency

## Judaic Studies

OFFICE: 4008 Humanities and Social Sciences Building, Muir College

### Faculty

David Noel Freedman, Ph.D., *History;*  
*Endowed Chair, Hebrew Biblical Studies*

Richard Elliott Friedman, Th.D., *Hebrew and Comparative Literature; Katzin Chair in Jewish Civilization*

David M. Goodblatt, Ph.D., *History; Endowed Chair in Judaic Studies*

Thomas E. Levy, Ph.D., *Anthropology; Director, Judaic Studies*

William H.C. Propp, Ph.D., *History*

### Associate Faculty

Steven Cassedy, Ph.D., *Literature*

Jonathan Saville, Ph.D., *Theatre, Emeritus*

Gershon Shafir, Ph.D., *Sociology*

Melford E. Spiro, Ph.D., *Anthropology, Professor Emeritus*

The Judaic Studies Program is an interdisciplinary program offering courses, majors, minors, and concentrations in Judaic studies which draw upon a variety of perspectives. Courses are offered in the Departments of Anthropology, History, Literature, Political Science, Philosophy, and Sociology.

### Major

Requirements for the major in Judaic studies are:

1. Judaic Studies 100A-B-C.
2. Twelve upper-division courses in Judaic studies, to be selected in consultation with a faculty adviser.
3. Upper-division competence in Hebrew, normally to be fulfilled by completion of first- and second-year Hebrew language courses, or equivalent.

Students also have the option within the general literature major in the Department of Literature of concentrating on Judaic literature or on a combined program of Judaic and classical literature.

In addition, Revelle and Muir Colleges have noncontiguous minors in Judaic studies and in Hebrew language and literature; Warren College has Judaic studies and Hebrew literature concentrations; and various general requirements in all colleges can be met by courses in the Judaic area. For details students should inquire at their provost's office or at the Judaic Studies Program office.

Students are encouraged to participate in the UC Education Abroad Program (EAP) in

Jerusalem or Beersheva, and to investigate other options through the Opportunities Abroad Program (OAP). By petition, credits earned through EAP/OAP can fulfill UCSD degree, major and minor requirements. Scholarships are available through EAP and Judaic Studies. Interested students should contact the Programs Abroad Office in the International Center for more information.

In addition, the UCSD Department of Anthropology and Judaic Studies Program offer hands-on experience in Near Eastern archaeology at their archaeological field school which takes place in Israel or Jordan. Eight units of academic credit may be earned through the UCSD Summer Session Program. Some scholarships are available through Judaic Studies. For more information call the UCSD Summer Session Office.

### Minors

A. Requirements for the minor in Judaic studies:

1. Judaic Studies 100A, HITO 104, HITO 105.
2. Four upper-division courses in Judaic studies, to be selected in consideration with a faculty adviser.

B. Requirements for the minor in Hebrew language and literature:

Six quarter courses in Hebrew, ordinarily Judaic Studies 1, 2, 3, 101, 102, and 103.

### COURSES

Following are course offerings in this area.

For descriptions of the courses listed below, refer to the appropriate department's section of the catalog.

#### Judaic Studies 1. Beginning Hebrew (4)

Acquisition of basic vocabulary, fundamentals of Hebrew grammar, conversation, and reading.

#### Judaic Studies 2. Intermediate Hebrew (4)

Continued study of vocabulary and grammar, emphasis on fluency in conversation, and reading.

#### Judaic Studies 3. Intermediate Hebrew, Continued (4)

Vocabulary, grammar, conversation, introduction to literary and nonliterary texts.

#### Judaic Studies 100A-B-C. Introduction to Judaic Studies (4-4-4)

An introductory survey of the history of the Jewish people and Jewish civilization from the Bible to the present day. The approach is multi-disciplinary and addresses social, political, religious, and artistic aspects of Judaic culture.

#### Judaic Studies 101. Introduction to Hebrew Texts (4)

Reading and analysis of texts from Biblical through modern authors, study of advanced vocabulary and grammar. Course taught in Hebrew and in English.

#### Judaic Studies 102. Intermediate Hebrew Texts (4)

Further reading and analysis of Hebrew literature from a range of periods. Advanced grammar and vocabulary. Course taught in Hebrew and in English.

#### Judaic Studies 103. Advanced Hebrew Texts (4)

Synthesis of fluency, reading, and grammatical skills. Reading of texts from a range of periods.

#### ANGN 105. Ethnoarchaeology (4)

#### ANGN 141. Religion and Society (4)

#### ANRG 116. Archaeology of Society in Syro-Palestine (4)

#### ANRG 189. Zionism (4)

#### HIEU 145. European Jewry: 1750-1880 (4)

#### HINE 100. The Ancient Near East and Israel (4)

#### HINE 101. Hebrew Prophetic Literature (4)

#### HINE 102. The Jews in Their Homeland in Antiquity (4)

#### HINE 103. The Jewish Diaspora in Antiquity (4)

#### HINE 104. The Bible and the Ancient Near East (4)

#### HINE 108. The Middle East before Islam (4)

#### HINE 160/260. Special Topics in the Bible and Ancient Near East (4)

#### HINE 166/266. Nationalism in the Middle East (4)

#### HINE 170/270. Special Topics in Jewish History (4)

#### HINE 180. Cultures in Ancient Near East (4)

#### HINE 181. Problems in Hebrew Manuscripts (4)

#### HINE 199. Independent Study in Near Eastern History (4)

#### HITO 100. Religious Traditions: Ancient Near Eastern Religions (4)

#### HITO 101. Religious Traditions: Judaism, Christianity, Islam (4)

#### HIGR 260. Seminar in the Hebrew Bible.

#### HIGR 261A-B-C. Seminar in Judaic Studies (4-4-4)

#### HIGR 298. Directed Reading (1-12)

#### HIGR 299. Thesis Direction (1-12)

#### HIGR 500. Apprentice Teaching (1-40)

#### Lit/He (Lit/Gen) 148. The Bible and Western Literature (4)

#### Lit/Gen 149. The Jewish Experience in Literature (4)

#### Lit/Gen 150. Jewish Mysticism (4)

#### Lit/Gen 159. A Cultural History of American Jewry (4)

#### Lit/He (Lit/Gen) 151. Bible: The Prophetic Books (4)

#### Lit/He (Lit/Gen) 152. Bible: The Narrative Books (4)

#### Lit/He (Lit/Gen) 153. Bible: The Poetic Books (4)

#### Lit/He (Lit/Gen) 154. Medieval Hebrew Literature (4)

#### Lit/He (Lit/Gen) 155. Hebrew Literature: The Modern Period (4)

Lit/He (Lit/Gen) 156. Topics in the Prophets (4)

Lit/He (Lit/Gen) 157. Topics in Biblical Narrative (4)

Lit/He (Lit/Gen) 158. Topics in Biblical Poetry (4)

Lit/Gen 120. Yiddish Literature in Translation (4)

Lit/He 190. Seminars (4)

Lit/Gen 195. Apprentice Teaching (0 and 4)

Courses cross-listed as Lit/He and Lit/Gen may be taken as Hebrew literature by students proficient in the language or as general literature by students without knowledge of Hebrew.

Lit/He 197. Field Study: Archaeology and the Bible (4)  
(Offered in Summer Session)

Lit/He 198. Directed Group Study (4)

Lit/He 199. Special Studies (4)

Lit/Co 297. Directed Studies (4)

Lit/Co 298. Special Projects (4)

Philosophy 160. Philosophy of Religion (4-4)

Philosophy 161. Religious Existentialism (4)

Political Science 121A and 121B. Governments and Politics of the Middle East (4-4)

Political Science 121C and 121D. The Arab-Israeli Conflict (4-4)

Sociology/C 156. Sociology of Religion (4)

Sociology/C 157. Religion in Contemporary Society (4)

Sociology/D 188F. Modern Jewish Societies and Israeli Society (4)

## Language

See particular languages under linguistics (beginning and intermediate) or literature (advanced).

## Language and Communicative Disorders

OFFICE: Cognitive Science Building 261,  
Mail code: 0526  
(619) 534-2536

### Professors

Elizabeth Bates, Ph.D., *Cognitive Science, Psychology*

Ursula Bellugi, Ed.D., *Adjunct/Psychology*

Jeff Elman, Ph.D., *Cognitive Science*

Marta Kutas, Ph.D., *Cognitive Science*

David Swinney, Ph.D., *Psychology*

### Associate Professor

Mark Kritchevsky, M.D., *Neurosciences*

Carol Padden, Ph.D., *Communications*

### Assistant Professors

Adele Goldberg, Ph.D., *Linguistics*

Javier Movellan, Ph.D., *Cognitive Science*

### The Joint Doctoral Program

San Diego State University (SDSU) and the University of California, San Diego (UCSD), offer jointly a doctoral program in Language and Communicative Disorders. The program's focus is the interdisciplinary study of language and communicative disorders. A major emphasis of the program is to apply techniques developed in cognitive science and neuroscience to the study of language and language disorders. The program involves study and research in normal language (including sign languages of the deaf and language impairments), and in the neural bases of language use and language loss. Participating faculty have research interests in a wide range of issues in processes of language development, language and aging, multilingualism, language disorders, assessment, and intervention. Graduates of the program will be qualified to serve as faculty in university programs in a variety of disciplines, and to provide leadership in research and health services. The doctoral program faculty at UCSD are an interdisciplinary group from the Departments of Cognitive Science, Communication, Linguistics, Neurosciences, and Psychology. The doctoral program faculty at SDSU are members of the Departments of Communicative Disorders, Linguistics, and Psychology. The program is coordinated by the doctoral program coordinators at each campus, in conjunction with an Executive Committee comprising three faculty from each campus appointed by the Graduate Deans from each campus.

The program is innovative in that many of the requirements are designed to function as a model of professional preparation specifically incorporating activities in which a successful teacher and researcher must engage after obtaining the Ph.D: students will be required to participate in interdisciplinary research throughout the program, learn about the nature and ethics of research, prepare grant proposals,

write manuscripts, and will gain experience in oral presentations and teaching. Graduates from the program will be well prepared for the rigors of an academic/research career. The doctoral program in Language and Communicative Disorders, being interdisciplinary, draws from a variety of undergraduate disciplines including communicative disorders, psychology, cognitive science, linguistics, engineering, and other related sciences. Students should have adequate preparation in mathematics, statistics, and biological sciences. Backgrounds in neurosciences and/or language sciences, or language disorders is helpful, but not required for admission.

By the end of the first year, all students will select a major field of emphasis by choosing one of three concentrations. The *Adult Language* concentration is intended to provide intensive education in communicative disorders in adults. Students in this concentration will also develop expertise in the study of language processing in normal adults. The *Child Language* concentration is intended to provide specialized education in childhood (birth to adolescence) communicative disorders. Students in this concentration will also achieve competence in developmental psycholinguistics emphasizing language acquisition in normally developing children. The *Multilingualism* concentration is intended to provide education in cross-linguistic, ethnographic, and other comparative studies of communicative disorders in children and/or adults, including those associated with bilingualism and second-language acquisition (including acquisition of sign language in deaf individuals). All students will be required to take some courses in each of the three concentrations. In addition, each student will elect a *methods minor*, applying one of the new technologies of cognitive neuroscience to research on language and communicative disorders. These may include computer-controlled studies of language processing in real-time functional brain imaging (including event-related brain potentials and/or functional magnetic resonance imaging), or neural-network simulations of communicative disorders.

The program is designed as a five-year curriculum, based on a twelve-month academic year. Students will be admitted to the doctoral program only in the fall semester/quarter. Information regarding admission is found in the current edition of the *Bulletin of the Graduate*

Division of San Diego State University. To receive an application for admission, contact: SDSU/UCSD Joint Doctoral Program in Language and Communicative Disorders, San Diego State University, 5500 Campanile Drive, San Diego, California 92182-1518, (619) 594-6775.

Required courses include the *Tools* requirement (two courses in statistics/research design, a course in neuroanatomy and physiology, a course in language structure and theory and a professional survival skills course), the *Foundations* requirement (three courses on normal language and three courses on disorders of language) and the *Electives* requirement (at least five courses, with a minimum of three courses related to the chosen concentration, chosen from a broad list of approved options from Anthropology, Cognitive Science, Communicative Disorders, Computer Science, Linguistics, Neurosciences, and Psychology). Consult with adviser for approved list of elective courses. The five required electives must be approved by the student's adviser and the Doctoral Program Coordinators. In addition to their course requirements, students are required to complete three laboratory rotations in different research methodologies (each lasting a minimum of one quarter), two research projects (first year and second year), a qualifying examination for advancement to candidacy, and a dissertation proposal in the form of grant proposal to one of the public agencies that funds research in communicative disorders.

### Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

## COURSES

(See individual departments for details; for courses available at SDSU, see *SDSU Graduate Catalogue*.)

### Tools Requirement:

Quantitative Methods  
Psychology 201A-B

Ethics and Survival Skills in Academe  
Cognitive Science 241

Neuroanatomy and Neurophysiology  
Cognitive Science 201A or  
(Neurosciences 253 and 262)

Language: Basic Structures and Concepts  
Cognitive Science 201D or  
(Linguistics 221A and 211A)

### Foundations Requirement:

Normal Language and Cognition in Adults  
Psychology 244

Language Disorders in Adults  
Cognitive Science 251 or Psychology 245

Development of Normal Language and  
Cognition in Children  
Psychology 215

### Electives:

Cognitive Science  
201F: Foundations: Neural Networks  
201G: Cognitive Neuroscience  
204A-B: Research Methods in Cognitive  
Science  
213: Issues in Cognitive Development  
260: Parallel Distributed Processing and  
Natural Language Processing  
272: Topics in Theoretical Biology  
273: Biological Basis of Attention  
279: Electrophysiology of Cognition

Communication  
200A: Communication as Social Force  
200B: Communication and Culture  
200C: Communication and the Individual  
201B: Ethnographic Methods for  
Communication Research  
201C: Discourse Analysis  
222: Modern Childhood

Linguistics  
211A: Introductory Phonology<sup>1</sup>  
214: Topics in Phonetics  
221: Introductory Syntax<sup>1</sup>  
225: Topics in Syntax  
249: Topics in Sign Languages of the Deaf  
272: Language and the Brain

Psychology  
202: Sensory Mechanisms  
203: Physiological Psychology  
218AB: Cognitive Psychology  
222: Brain Functions  
225: The Development of Speech Perception  
227: Cognitive Development  
230: Brain, Cognition & Development

235: Cognitive Psychophysiology  
236: Neural Plasticity and Regeneration  
242A-B-C: Research Topics in Developmental  
Psychology  
244: Special Topics in Psycholinguistics  
252: Seminar on Cognitive Neuroscience

Computer Science and Engineering  
278AB: Advanced Artificial Intelligence  
281P: Connectionist Models and Cognitive  
Processes  
281W: Natural Language Processing

Neurosciences:  
243: Physiological Basis of Human  
Information  
246: Advanced Neuroanatomy<sup>1</sup>  
252: Information Processing in Man  
253: Clinical Neuroanatomy  
258 Molecular and Cellular Neurobiology  
262: Neurophysiology  
263: Developmental Neurobiology  
274: Neurobiology of Cognitive  
Developmental Disorders  
277: Clinical Neurosciences

<sup>1</sup>Students who use this course to fulfill the Tools requirement may not use this as an elective.

## Latin American Studies

Office:  
1 Gildred Latin American Studies Building  
Institute of the Americas Complex

### Professors

Carlos Blanco-Aguinaga, Ph.D., *Literature, Emeritus*  
Rae Blumberg, Ph.D., *Sociology, Emeritus*  
Charles Briggs, Ph.D., *Ethnic Studies*  
Jaime Concha, Ph.D., *Literature*  
Wayne A. Cornelius, Ph.D., *Political Science*  
Peter Cowhey, Ph.D., *International Relations and Pacific Studies*  
Paul W. Drake, Ph.D., *Political Science*  
Richard Feinberg, Ph.D., *International Relations and Pacific Studies*  
Ramón Gutiérrez, Ph.D., *Ethnic Studies*  
Stephan Haggard, Ph.D., *International Relations and Pacific Studies*  
Dee Dee Halleck, Ph.D., *Communication*

Daniel Hallin, Ph.D., *Communication*  
 Jorge Huerta, Ph.D., *Theatre and Dance*  
 David Mares, Ph.D., *Political Science*  
 Rosaura Sánchez, Ph.D., *Literature*  
 Peter H. Smith, Ph.D., *Political Science, Program Director*  
 Eric Van Young, Ph.D., *History*  
 Carlos Waisman, Ph.D., *Sociology*

### Associate Professors

Dain Borges, Ph.D., *History*  
 Ann Craig, Ph.D., *Political Science*  
 J. Luis Guasch, Ph.D., *Economics*  
 David Gutiérrez, Ph.D., *History*  
 James Holston, Ph.D., *Anthropology*  
 Christine Hunefeldt, Ph.D., *History*  
 George Mariscal, Ph.D., *Literature*  
 Michael Monteón, Ph.D., *History*  
 James Rauch, Ph.D., *Economics*  
 Marta Sánchez, Ph.D., *Literature*  
 Matthew Shugart, Ph.D., *International Relations and Pacific Studies*  
 León Zamosc, Ph.D., *Sociology*

### Assistant Professors

Lisa Catanzarite, Ph.D., *Sociology*  
 Paule Cruz-Takash, Ph.D., *Ethnic Studies*  
 Milos Kokotovic, Ph.D., *Literature*  
 John Moore, Ph.D., *Linguistics*  
 Elizabeth Newsome, Ph.D., *Visual Arts*  
 Max Parra, Ph.D., *Literature*  
 Ricardo Stanton-Sálazar, Ph.D., *Sociology*  
 Olga Vásquez, Ph.D., *Communication*  
 Christopher Woodruff, Ph.D., *International Relations and Pacific Studies*

### Lecturers

Claudio Fenner-Lopez, M.A., *Visual Arts, Emeritus*  
 Karen Lindvall-Larson, M.L.S., *Geisel Library*  
 Keith Pezzoli, Ph.D., *Urban Studies*  
 Beatrice Pita, Ph.D., *Literature*

UCSD's program in Latin American Studies has attained national and international distinction for its excellence in teaching, research, and public service. Each year its faculty offers approximately 100 Latin America-related courses in fourteen academic departments, and the Latin American Studies Program now offers three interdisciplinary degrees:

- bachelor of arts in Latin American Studies,
- minor in Latin American Studies, and a
- master of arts in Latin American Studies.

By special petition, students may also pursue a joint master's degree in Pacific International Affairs and Latin American Studies.

Latin American Studies at UCSD offers distinct advantages:

- At the undergraduate level, students may take elective courses on Latin American topics or pursue a minor or a B.A. degree in Latin American Studies. At the graduate level, they can work on Latin America through interdisciplinary master's programs or through doctoral programs in academic departments.
- Latin American Studies integrates teaching, research, and policy analysis, encouraging students to develop interdisciplinary perspectives and to work actively with faculty on research projects and conferences.
- Students participate in the activities of an outstanding array of research and teaching organizations, including the Center for Iberian and Latin American Studies, the Center for U.S.-Mexican Studies, the Graduate School of International Relations and Pacific Studies, and the Institute of the Americas.
- Students are encouraged to interact with visiting Latin American scholars and to participate in Latin America-related internships, seminars, clubs, foreign exchange programs, and other extracurricular activities.
- Students at UCSD have access to one of the largest and fastest-growing library collections on Latin America in the United States.

### The Curricular Programs

Degree programs in Latin American Studies are supervised by an interdisciplinary faculty group under the chairmanship of the director of Latin American Studies. Students in Latin American Studies are encouraged to participate in the Education Abroad Program (EAP) in Brazil, Chile, Costa Rica, or Mexico; by petition, credits earned through EAP can fulfill UCSD's degree requirements.

### Undergraduate Major in Latin American Studies

The bachelor of arts in Latin American Studies blends coverage of methodological and theoretical approaches to the study of Latin

America with a broad foundation in the humanities and social sciences. Students receiving this degree will be prepared for private employment or for graduate training; the major also provides a valuable supplement for those who subsequently pursue professional degrees in business, law, engineering, medicine, or other fields.

To satisfactorily complete the B.A. degree, students must take a broad range of courses from at least three of UCSD's humanities and social science departments. All students entering the major must enroll in LATI 50 "Introduction to Latin America," an interdisciplinary course that prepares majors to build a coherent curriculum on Latin America from UCSD's interdisciplinary offerings (see list of approved courses below). They must also demonstrate proficiency in Spanish.

During the senior year, all B.A. candidates are required to successfully complete LATI 190, a writing seminar. This course will culminate in the preparation of an interpretive paper based on the secondary analysis of existing scholarly research (approximately twenty to forty pages in length).

As part of the overall requirements, students are strongly encouraged to enroll in four credits of Individual Study (LATI 199) with a member of the Latin Americanist faculty, who will serve as the student's principal adviser.

Study abroad can significantly enhance understanding of Latin America. Students are encouraged to study abroad through the Education Abroad Program before their senior year and may use a maximum of six upper-division courses to satisfy major requirements. These must be approved by the department (based on syllabi and course work) after they have been entered on the student's official record at UCSD.

Students majoring in Latin American studies are also urged to minor in a core discipline such as anthropology, economics, history, literature, political science, or sociology. In summary, the requirements for the bachelor of arts in Latin American Studies are:

### LOWER-DIVISION REQUIREMENTS

1. The equivalent of at least two years of college-level language instruction in Spanish, comparable to satisfactory completion of Literature/Spanish 2C; students who satisfy



this requirement by examination are strongly encouraged to study Portuguese.

2. Latin American Studies 50.

**UPPER-DIVISION REQUIREMENTS**

1. Eleven upper-division courses selected, with the approval of the director of Latin American Studies, from a designated list of Latin American studies courses offered in the humanities or social sciences. Students must take course work in at least three departments; and they must take at least three courses, but no more than five, from one department. At least two of the eleven courses must concentrate exclusively on periods earlier than the twentieth century. The collection of courses should be structured so as to provide both depth in a special area of study and breadth across the broader field.
2. Enrollment in the four-credit Senior Seminar (LATI 190), usually to be taken in the winter quarter of the senior year; satisfactory completion of a substantial paper is required of all graduating majors.
3. With the sole exception of LATI 199, all courses must be taken for a letter grade.

**Honors in Latin American Studies**

Individuals who wish to pursue Honors in Latin American Studies, as distinct from the regular major, must complete nine upper-division courses from at least three departments, with no more than five courses from any single department and with at least two courses on material prior to the twentieth century. Honors students also take a three-quarter sequence during the senior year that will culminate in the presentation and defense of an original thesis based on primary research (usually between 50 and 100 pages in length), and they must maintain a minimum GPA in the major of 3.5.

In summary, to receive Honors, students must:

1. satisfy all lower-division requirements of the major program;
2. complete nine upper-division courses;
3. complete a three-course sequence consisting of Individual Study, the Senior Seminar, and the Honors Seminar (LATI 199, 190, and 191, respectively);

4. produce an original thesis based on primary research under the direction of a mentor selected from the Latin Americanist faculty, and defend this thesis during the spring quarter before an interdisciplinary faculty committee; and
5. maintain a minimum GPA of 3.5 in the major.

**Undergraduate Minor in Latin American Studies**

The Latin American Studies minor allows students to explore interdisciplinary approaches to a significant world region while pursuing a major in an academic discipline. To complete the program, students take at least six Latin America-related courses in the humanities and social sciences all taken for a letter grade; five of these courses must be at the upper-division level. Students must also complete the equivalent of two years of college-level Spanish or Portuguese.

**Master of Arts in Latin American Studies**

The master of arts in Latin American Studies is designed for students who seek to integrate a broad range of disciplinary approaches to a world region of growing international significance. Upon graduation, most students pursue additional advanced degrees in academic or professional fields; others proceed to careers in the private sector or in government.

To qualify for admission, students must have a B.A. with a grade-point average of at least 3.5 on a 4.0 scale for the final two years of undergraduate study plus satisfactory scores on the Graduate Record Examination. To receive the master of arts in Latin American Studies, a student must:

1. demonstrate foreign language competence in Spanish or Portuguese;
2. complete forty units of course work (ten courses) in at least three fields, with no more than sixteen units in any one department; four of those units must be taken in the Latin American Studies Core Seminar (LATI 200); and two must be taken in the seminar on Latin American Library Resources (LATI 210). Students are encouraged to include four units of Independent Research (LATI 299) for work on the master's thesis.

3. successfully complete either a comprehensive exam or master's thesis.

**COURSES**

**LATI 50. Introduction to Latin America (4)**

Interdisciplinary overview of society and culture in Latin America—including Mexico, the Caribbean, and South America: legacies of conquest, patterns of economic development, changing roles of women, expressions of popular culture, cycles of political change, and U.S.-Latin American relations.

**LATI 120/220. Special Topics in Latin American Studies (1-4)**

A course designed to cover various aspects and various disciplines of Latin American Studies.

**LATI 190. Senior Seminar (4)**

Research seminar on selected topics in the study of Latin America; all students will be required to prepare and present independent research papers. (Honors students will present drafts of senior research theses, of no less than fifty pages in length; non-honors students will present final versions of analytical papers of approximately twenty-five to forty pages in length.) *Prerequisites: satisfactory completion of LATI 50 and a working knowledge of Spanish.*

**LATI 191. Honors Seminar (4)**

Independent reading and research under direction of a member of the faculty group in Latin American Studies; goal is to provide honors students with an opportunity to complete senior research thesis (to be defended before three-person interdisciplinary faculty committee). *Prerequisites: successful completion of LATI 50, working knowledge of Spanish; minimum GPA of 3.5 in the major.*

**LATI 199. Individual Study (4)**

Guided and supervised reading of the literature on Latin America in the interdisciplinary areas of anthropology, communications, economics, history, literature, political science, and sociology. For students majoring in Latin American Studies, reading will focus around potential topics for senior papers; for honors students in Latin American Studies, reading will culminate in formulation of a prospectus for the research thesis. *Prerequisites: LATI 50 and working knowledge of Spanish.*

**LATI 200. Core Seminar on Interdisciplinary Research and Methodology in Latin American Studies (4)**

A team-taught course wherein members of the faculty group in Latin American Studies present diverse disciplinary and thematic approaches to the region. Topics vary from year to year. Grades are based on discussions and on a series of analytical papers. *Prerequisite: enrollment in the master's degree program in Latin American Studies or permission of instructor.*

**LATI 210. Latin American Library Resources (2)**

The major research methods and resources for the study of Latin America will be studied. Both conventional library materials (books, journals, documents, microfilm, special collections) and those available electronically (CD ROMs, Infopath, Melvyl) will be explored. Skills will transfer to any major research library. *Prerequisite: graduate standing or consent of instructor.*

**LATI 298. Directed Reading (1-12)**

Guided and supervised reading of the literature of the several areas included in the interdisciplinary fields of anthropology, communications, economics, history, literature, political science, and sociology. *Prerequisite: graduate standing in Latin American Studies.*

**LATI 299. Independent Research (1-12)**

Independent work by graduate students engaged in thesis research and writing under the direct supervision of a faculty adviser.

**LATI 500. Teaching Apprenticeship (1-4)**

The course is designed for teaching assistants to learn effective teaching methods through supervision and mentorship by the faculty. Student will learn handling of discussions; preparation and grading of examinations and other written exercises; and student relations.

**COURSES THAT SATISFY UNDERGRADUATE/GRADUATE DEGREE REQUIREMENTS IN LATIN AMERICAN STUDIES**

**Approved Interdisciplinary Courses:** The following is a list of courses available in UCSD departments that are approved to satisfy the requirements of the major, minor and master's in Latin American Studies. Please note that these courses may not be offered every quarter or year and new courses may be added. Check the current schedule of classes or the Latin American Studies Web site (<http://www.orpheus.ucsd.edu/las>) for updated information.

The Departments of Linguistics and Literature and the Graduate School of International Relations and Pacific Studies offer language courses in Spanish and Portuguese. **Language courses do not count toward the course requirements** for Latin American Studies degrees.

**Anthropology**

- ANRG 90 Undergraduate Seminar: Latin American Topics
- ANRG 121 The Archaeology of South America
- ANRG 126 Rise of New World Civilizations: Mesoamerica and the Andes
- ANRG 134 The Cultures of Mexico

**Communication**

- COCU 110 Cinema in Latin America: Visions of a Continent in Transition
- COHI 114 Bilingual Communication
- COSF 140C Comparative Media Systems: Latin America and the Caribbean

**Economics**

- ECON 161 Latin American Economic Development

**Ethnic Studies**

- ETHN 130 Social and Economic History of the Southwest I
- ETHN 131 Social and Economic History of the Southwest II

- ETHN 132 Chicano Dramatic Literature
- ETHN 135 Development of Chicano Literature
- ETHN 136 Themes and Motifs in Chicano Literature
- ETHN 137 Chicano Prose
- ETHN 138 Chicano Poetry
- ETHN 139 Chicano Literature in English
- ETHN 180 Special Topics in Mexican-American History

**History**

- HILA 100 Latin American Colonial Transformation
- HILA 101 Latin American Independence 1810-1898
- HILA 102 Latin America in the Twentieth Century
- HILA 105 South America: Labor, Coercion, and Society/Nineteenth Century.
- HILA 107 State and Society in Nineteenth and Twentieth Century Latin America
- HILA 112 Economic and Social History of the Andean Region
- HILA 113 Lord and Peasant in Latin America
- HILA 114 Social History of Colonial Latin America
- HILA 115 Latin American City, A History
- HILA 116 Encounter of Two Worlds/Colonial Latin America
- HILA 117 Indians, Blacks, Whites: Family Relations in Latin America
- HILA 120 History of Argentina
- HILA 121 History of Brazil
- HILA 122 Cuba: From Colony to Socialist Republic
- HILA 131 History of Mexico in the Nineteenth Century
- HILA 132 History of Contemporary Mexico
- HILA 160/260 Topics in Latin American Colonial History 1500-1820
- HILA 161/261 History of Women in Latin America
- HILA 162/262 Special Topics in Latin American History
- HILA 166/266 Cuba: From Colony to Socialist Republic
- HILA 170/270 Topics in Latin American History, 1820-1910
- HILA 171/271 Special Topics in Latin American History since 1910
- HILA 172/272 Machismo and Matriarchy: The Latin American Social Structure
- HIGR 245ABC Seminar in the Literature of Latin American History
- HIGR 246ABC History of Mexico
- HIGR 247AB Readings and Seminar on Colonial Latin America
- HIGR 248AB Readings and Seminar on Latin America, National Period
- HIGR 249 Topics in Colonial Latin America
- HIGR 250 Topics in the National Period of Latin America
- HIGR 251 Topics in the History of Mexico

- HIGR 252 History, Social Evolution, and Intellectuals in the Andes

**International Relations and Pacific Studies**

- IRGN 409 Economic Policy in Latin America
- IRGN 410 Politics and Policy in Latin America
- IRGN 474 Latin American Societies: Social Classes and State Policies
- IRGN 476 Doing Business in Latin America
- IRGN 477 Latin American Politics
- IRGN 478 Mexican Economic Policy
- IRGN 490 Special Topics (with Latin American content)

**Latin American Studies**

- LATI 50 Introduction to Latin America
- LATI 120 Special Topics in Latin America
- LATI 190 Senior Seminar
- LATI 191 Honors Thesis Seminar
- LATI 199 Independent Study
- LATI 200 Core Seminar in Latin American Studies
- LATI 210 Latin American Library Resources
- LATI 220 Special Topics in Latin America
- LATI 298 Directed Reading
- LATI 299 Independent Research
- LATI 500 Teaching Apprenticeship

**Literature**

- LTAM 110 Latin American Literature in Translation
- LTAM 120 Mexican Literature in Translation
- LTEN 19 Introduction to Chicano Literature
- LTEN 180 Chicano Literature in English
- LTEN 188 Contemporary Caribbean Literature
- LTGN 173 Contemporary Literature/Chicano Literature
- LTSP 50BC Readings in Latin American Topics
- LTSP 111 Topics in Golden Age Poetry
- LTSP 115 Topics in Golden Age Prose
- LTSP 117 Golden Age Drama
- LTSP 119ABC Cervantes
- LTSP 130B Development of Latin American Literature
- LTSP 131 Spanish American Literature: Colonial Period
- LTSP 132 Spanish American Literature: Nineteenth Century
- LTSP 133 Spanish American Literature: Twentieth Century
- LTSP 134 Argentine Literature
- LTSP 135 Mexican Literature
- LTSP 136 Peruvian Literature
- LTSP 137 Caribbean Literature

- LTSP 140 Spanish American Novel
- LTSP 141 Spanish American Poetry
- LTSP 142 Spanish American Short Story
- LTSP 143 Spanish American Essay
- LTSP 144 Spanish American Theatre
- LTSP 150 The Development of Chicano Literature
- LTSP 151 Themes and Motifs in Chicano Literature
- LTSP 152 Chicano Prose
- LTSP 153 Chicano Poetry
- LTSP 163 Spanish Language in the Americas
- LTSP 165 History of the Spanish Language
- LTSP 171 Literature and Society Studies
- LTSP 172 Indigenista Themes in Spanish American Literature
- LTSP 173 Problems in Spanish and Spanish American Literary History
- LTSP 190 Seminar
- LTSP 224 Golden Age Studies
- LTSP 226 Cervantes
- LTSP 252 Studies in Modern Hispanic Literature and Culture
- LTSP 253 Chicano Literature
- LTSP 258 Spanish American Prose
- LTSP 259 Spanish American Poetry
- LTSP 272 Literature and Society Studies

**Political Science**

- POLI 134AA,AB Comparative Politics of Latin America
- POLI 134BC Politics in Mexico
- POLI 134C Politics in Mexico: Research Seminar
- POLI 134D Selected Topics in Latin American Politics
- POLI 134G Politics in the Andes
- POLI 134I Politics in the Southern Cone of Latin America
- POLI 134N Politics in Central America
- POLI 134P Organizing Women in Latin America
- POLI 134Q Organization, Resistance, and Protest in Latin America
- POLI 134R Political Parties in Latin America
- POLI 146A US and Latin America: Political and Economic Relations
- POLI 146E US and Latin American Relations: Security Issues
- POLI 150AB Politics of Immigration
- POLI 229 Special Topics: Comparative Politics (if Latin American content)
- POLI 230AB The Mexican Political System
- POLI 235 Latin American Politics
- POLI 235B Regime Transformation in Latin America
- POLI 236 Immigration Policy and Politics
- POLI 237 Grassroots Organization and Political Change

**Sociology**

- SOCC 148M Labor Market Inequality: Los Angeles and the Border Region
- SOCC 151M Chicanos in American Society
- S OCD 188D Latin America: Society and Politics
- S OCD 189 Ethnicity in Latin America
- S OCG 248 Latin American Societies: Social Classes and State Policies
- S OCG 290 Ethnicity in Latin America

**Theatre and Dance**

- THHS 101 Gay/Lesbian Themes in Latino Theatre
- THHS 102 Master of Theatre: Luis Valdez
- THDA 132 Dances of the World: Latin American Dances
- THGR 252 Topics in Dramaturgy (Chicano Dramatic Literature)
- THGR 268 Latin American Dramatic Literature
- THGR 269 U.S.-Latino Dramatic Literature

**Third World Studies**

- TWS 22 Latin American Literature
- TWS 24 Caribbean Literature

**Visual Arts**

- VIS 126BN Art and Civilization/Ancient Maya
- VIS 128E Topics in Art Theory and Criticism (Pre-Columbian Art of Ancient Mexico and Central America)
- VIS 129E Special Problems in Art Criticism and Theory (Seminar, Pre-Columbian Art)

**Latin Literature**

See Literature.

**Law and Society**

OFFICE: Interdisciplinary Programs, Literature Building, Second Floor, Room 3238, Warren College

Law and society is an interdisciplinary minor that emphasizes the complexity and interrelationship of legal, social, and ethical issues in their historical context. Although it is administered by Warren College, it is available to all UCSD students considering law-related careers

or those with a general interest in law as a social institution. The purpose of the program is to enhance students' critical analysis of social and ethical issues related to law and of the legal implications and ramifications of policy and decision-making in their major fields of study. Students examine the role of the legal system and specific legal issues from the perspectives of the social sciences and humanities. Social forces, historical questions, and issues of values will be considered in the context of the legal system. The focus of the minor is on the process of law—how the law both reflects and defines basic social values—and its relation to the political, economic, and social conflicts within society.

The interdisciplinary content of the law and society minor offers UCSD students the opportunity to examine law-related issues from the perspectives of a broad range of disciplines including: communication, economics, environmental studies, history, linguistics, philosophy, political science, psychology, sociology, urban studies and planning, and women's studies.

Students should consult an academic adviser in their college provost's office to determine how the law and society minor can best meet their college's graduation requirements. Declarations (forms officially designating law and society a minor and listing the specific course work selected by the student) and petitions (forms requesting changes and/or exceptions from course requirements) for the law and society minor must first be reviewed and approved by the coordinator of Interdisciplinary Programs and then by the students' college academic advising office.

Students are strongly urged to supplement the law and society minor with a law-related internship. Both local and out-of-town internships are available to juniors and seniors with at least a 2.5 grade-point average (some placements require a 3.0 GPA) through the Academic Internship Program. The Academic Internship Program offers local placements with lawyers, judges, elected officials, government offices, and public interest groups. In addition, placements are available in Washington, D.C. with senators, representatives, legislative committees, and political action committees. Students may earn from four to sixteen units of academic credit for the internship experience.

A number of extracurricular events and programs are also available to students inter-

ested in law. Information on these programs and activities is available in the Interdisciplinary Programs Office, Literature Building, Second Floor, Room 3238, Warren College, or call (619) 534-1704.

### Law and Society Minor Requirements

The minor consists of seven courses (six for students who entered UCSD before January 1, 1998), five of which must be upper-division, chosen from the courses listed below. To assure an interdisciplinary learning experience, students must include at least one course from each of the following academic departments: history, philosophy, political science, and sociology. Law and Society 101, Contemporary Legal Issues, may be counted as either political science or sociology, and may be repeated for credit once, for a maximum total of eight units.

The law and society minor is applicable as a Warren College program of concentration in the social sciences.

### Required Courses

1. Political Science 40—Introduction to Law and Society
2. Law and Society 101—Contemporary Legal Issues
3. One of the following four courses:  
History US 150—American Legal History to 1865  
History US 151—American Legal History Since 1865  
Political Science 104A—The Supreme Court and the Constitution  
Political Science 104B—Civil Liberties—Fundamental Rights
4. One of the following two courses:  
Philosophy 168—Philosophy of Law  
Sociology/C-140—Sociology of Law

### TWO ELECTIVES CHOSEN FROM THE FOLLOWING:

#### Communication/SF

139A-B—Law, Communication, and Freedom of Expression

#### Dimensions of Culture

2—Justice (open to Marshall College students)

#### Economics

118A-B—Law and Economics

#### Ethnic Studies

152—Law and Civil Rights

#### Environmental Studies

110—Environmental Law

#### History U.S.

152—The Trials of America  
153—American Political Trials  
169—American Legal and Constitutional History

#### Linguistics/General

105—Law and Language  
176—The Language of Persuasion

#### Philosophy

12—Logic and Decision Making  
162—Contemporary Moral Issues  
163—Bio-Medical Ethics  
165—Professional Ethics  
167—Contemporary Political Philosophy

#### Political Science

102H—Political and Legal Foundations of the American Economy  
104C—Civil Liberties—The Rights of Criminals and Minorities  
104F—Constitutional Law Seminar  
104I—Law and Politics—Courts and Political Controversy

#### Psychology

162—Psychology and the Law

#### Sociology

120S/B—Special Topics in Culture, Language, and Social Interaction (prior approval of topic required)  
141/C—Crime and Society  
142/B—Social Deviance  
144/C—Forms of Social Control  
159/C—Special Topics in Social Organizations and Institutions (prior approval of topic required)

#### Urban Studies and Planning

124—Land Use Planning

#### Women's Studies

102—Selected Topics in Women's Studies: Gender and the Law

Students may petition to substitute courses in the minor that have substantial legal content. Petitions should be submitted to the Interdisciplinary Programs Office.

### Recommended Internship Experience

Law-related internship (AIP 197): To be arranged at least one quarter in advance through the Academic Internship Program, Literature Building, Second Floor, Warren College. For each four units of credit, ten hours a week for one quarter and a ten-page research paper are required.

## COURSES

As indicated above, most course work for the Law and Society minor is listed under the academic department providing instruction. Law and Society 101, described below, is an interdisciplinary course. It may be counted toward minor requirements as either political science or sociology. Further information on Law and Society 101 is available in the Interdisciplinary Programs Office.

### UPPER-DIVISION

#### 101. Contemporary Legal Issues (4)

This course will deal in depth each year with a different legal issue of contemporary significance, viewed from the perspectives of political science, history, sociology, and philosophy. Required for students completing the law and society minor. May be repeated for credit once, for a maximum total of eight units.

## Linguistics

OFFICE: 5237 McGill Hall, Muir College

### Professors

Matthew Y. Chen, Ph.D., *Chair*  
Ronald W. Langacker, Ph.D.  
David M. Perlmutter, Ph.D.

### Associate Professors

Farrell Ackerman, Ph.D.  
Robert Kluender, Ph.D.  
Maria Polinsky, Ph.D.

### Assistant Professors

Chris Barker, Ph.D.

Kathleen Hubbard, Ph.D.  
John Moore, Ph.D.  
Sharon Rose, Ph.D.

### Professors Emeritus

Edward S. Klima, Ph.D.  
S.-Y. Kuroda, Ph.D.  
Margaret Langdon, Ph.D.  
Leonard Newmark, Ph.D.  
Sanford A. Schane, Ph.D.

In what ways do languages differ, and in what ways are all human languages alike? These are the basic questions that the science of linguistics seeks to answer.

In formulating hypotheses about language it has been found that languages have intricate structure at a number of different levels. Phonetics studies the sounds of speech and how they are produced and perceived. Phonology studies the principles by which the sounds of a language are organized into a system and combined into syllables and larger units. Morphology studies the principles by which smaller units of meaning are combined into words. Syntax is the study of the principles by which words are combined into larger units such as phrases and sentences. Semantics studies meaning—the meanings of words and the ways the meanings of words are related to the meanings of larger units such as the phrase, the sentence, and the discourse. Linguists attempt to discover to what extent the principles at each level vary across languages, and to what extent they are universal.

Because language provides a window into the human mind, linguistics plays a central role in the study of human cognition and figures prominently in the field of cognitive science. We know, for example, that all normal children succeed in learning language relatively quickly at a time when their other cognitive abilities are still developing. The universal properties of human language that linguists discover can be used to provide models of this process, to explain why it occurs so rapidly, and to make specific predictions about the way it unfolds. The results of linguistic research can also be tested directly in experimental studies of how language is represented and processed in the mind (psycholinguistics) and brain (neurolinguistics). Language can also be studied in terms of its function as a cognitive system shared by an entire society; sociolinguistics investigates the

ways in which the language we use is affected by our social environment.

The department of Linguistics offers a series of lower-division courses designed to introduce non-majors to the scientific study of language in the broader perspective of a liberal arts education. These are Linguistics 3 (Language as a Social and Cultural Phenomenon), Linguistics 4 (Language as a Cognitive System), Linguistics 7 (Sign Language and Its Culture), and Linguistics 8 (Languages and Cultures in America). These courses may be used to satisfy the Marshall College disciplinary breadth requirement. Lower-division linguistics courses may be used to satisfy the social sciences requirement at Muir College and Revelle College, and they partially fulfill the requirements for a program of concentration in Warren College. In addition, certain linguistics courses satisfy the American Cultures requirement in Revelle College and the cultural diversity requirement in Muir College and Warren College. Students should consult their college advising offices to determine which linguistics courses satisfy these requirements.

Linguistics courses are relevant to a wide range of fields of study at UCSD, including anthropology, cognitive science, communication, computer science, human development, law and society, psychology, and sociology, as well as areas such as African studies, Chinese studies, ethnic studies, Judaic studies, Latin American studies, and others. In some cases certain linguistics courses count toward a major or minor in one of these departments or programs. Students should consult with a faculty adviser in linguistics and the other department or program when deciding on their course of study.

Students are often able to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP) while still making progress toward the major. Students considering this option should discuss their plans with the department undergraduate adviser before going abroad. Detailed information on EAP/OAP is found in this catalog under the heading "Education Abroad Program."

The Department of Linguistics oversees the Linguistics Language Program, which offers elementary instruction in ASL, French, German, Italian, and Spanish. Courses from the Lan-

guage Program satisfy general education requirements, as well as the linguistics language requirement. In addition, directed self-instruction is available for a wide variety of languages through Linguistics 19.

**Note:** Please check with department office for updates concerning programs and course offerings.

## The Major Program

### General Requirements

Every linguistics major must satisfy the undergraduate language requirement and must successfully complete a minimum of twelve upper-division courses, including six required courses and at least five upper-division linguistics electives. In addition to the general major, the department offers a set of enriched major programs in various specializations.

Except for Linguistics 198 or 199, no course taken on a Pass/Not Pass basis may be counted toward a linguistics major. No more than one quarter of Ling/Gen 198 or 199 may be counted toward a linguistics major. At least six of the required upper-division linguistics courses counted toward the major must be taken in residence at UCSD. A letter grade of C- or better is required for every course counted toward a linguistics major, including courses taken to satisfy the department's undergraduate language requirement.

### Required Linguistics Courses

Linguistics 101 is required as an introduction to the field and serves as the prerequisite to certain other courses. Students who choose a linguistics major should enroll in it as early as possible.

Every major program in linguistics must include the following required courses covering basic areas of the field:

- Ling/Gen 101: Introduction to the Study of Language
- Ling/Gen 110: Phonetics
- Ling/Gen 111: Phonology I
- Ling/Gen 120: Morphology
- Ling/Gen 121: Syntax I
- Ling/Gen 130: Semantics

Students are advised to take these required courses as early as possible, since the background they provide may be needed for other upper-division linguistics courses. Check individual course listings for prerequisite information.

### Core Linguistics Electives

Linguistics courses with course numbers between 110 and 159 are considered core area courses. The following courses are approved core electives for the linguistics major (Ling/Gen 114, 141, and 143 may be repeated for credit when topics vary, each repetition counting toward the major):

- Ling/Gen 114: Topics in Phonetics
- Ling/Gen 115: Phonology II
- Ling/Gen 123: Morphology II
- Ling/Gen 125: Syntax II
- Ling/Gen 141: Language Structures
- Ling/Gen 142: Language Typology
- Ling/Gen 143: The Structure of Spanish
- Ling/Gen 145: Pidgins and Creoles
- Ling/Gen 150: Historical Linguistics

### Other Linguistics Electives

- Ling/Gen 104: Language and Conceptualization
- Ling/Gen 105: Law and Language
- Ling/Gen 108: Languages of Africa
- Ling/Gen 160: Mathematical Analysis of Language
- Ling/Gen 163: Computers and Language
- Ling/Gen 170: Psycholinguistics
- Ling/Gen 171: Child Language Acquisition
- Ling/Gen 172: Language and the Brain
- Ling/Gen 175: Sociolinguistics
- Ling/Gen 176: The Language of Persuasion
- Ling/Gen 177: Multilingualism
- Ling/Gen 178: Second Language Teaching Methodology

### Restricted Courses

- Ling/Gen 195: Apprentice Teaching (does not count as a linguistics elective)

Ling/Gen 198: Directed Group Study in Linguistics

Ling/Gen 199: Independent Study in Linguistics

Ling/Gen 199H: Honors Independent Study in Linguistics

### Note to Revelle and Warren students.

*Revelle:* For Revelle College only, the classification of the linguistics major as humanities, natural science, or social science must be determined on the basis of each student's specific program. The classification of the major program will in turn determine what areas will be acceptable for the noncontiguous minor.

*Warren:* For Warren College only, any courses taken in departments other than linguistics may not overlap with the student's outside area(s) of concentration.

### Undergraduate Language Requirement

Linguistics majors must demonstrate proficiency in one foreign language and must in addition successfully complete the equivalent of three quarters of foreign language instruction (based on standard four- or five-unit courses).

Proficiency in a foreign language may be demonstrated in either of two ways:

1. By passing the reading proficiency examination and the oral interview administered by the Department of Linguistics in French, German, Italian, or Spanish; or
2. By successfully completing a course given at UCSD representing the fourth quarter (or beyond) of instruction in any single foreign language with a grade of C- or better.

The three additional quarters of foreign language instruction may be in a single language or some combination of languages. The language in which proficiency was demonstrated is not excluded, provided that any additional courses in that language are beyond the fourth-quarter level and are more advanced than any course taken to demonstrate proficiency.

Students are encouraged to satisfy this requirement as early as possible in order to be able to use the languages for reference in linguistics courses. Students with native language

competence in a language other than English may petition to have English count as satisfying the proficiency requirement.

### General Major (12 courses)

The general major in linguistics requires satisfaction of the undergraduate language requirement and successful completion of twelve upper-division courses:

- 6 required linguistics courses
- 3 core linguistics electives
- 2 linguistics electives (core or other)
- 1 additional linguistics electives (core or other) or upper-division courses in other departments pertaining to the study of language

### Specialized Majors (14 courses)

**Every student with a specialized major must consult the faculty adviser in the Department of Linguistics to have approved an individual curricular plan to satisfy the major requirements for the option chosen.**

Each specialized major requires satisfaction of the undergraduate language requirement and successful completion of a total of fourteen courses as specified below. Of the courses counted towards the specialized major, at least twelve must be upper-division. To recognize the additional courses required for specialized majors, specialization will be reflected in the wording of a degree, e.g., "B.A. in Linguistics (with Specialization in Language and Society)."

### Linguistics with Concentration in a Particular Language

- 6 required linguistics courses
- 1 of the following:
  - Ling/Gen 141 Language Structures or
  - Ling/Gen 143 The Structure of Spanish
- 3 upper-division courses taught in the language of concentration, selected in consultation with the faculty adviser for this specialization
- 4 linguistics electives (core or other). Courses particularly relevant to this specialization are:
  - Ling/Gen 141: Language Structures (may be repeated as topics vary)
  - Ling/Gen 143: The Structure of Spanish



Ling/Gen 150: Historical Linguistics  
 Ling/Gen 177: Multilingualism  
 Ling/Gen 178: Second Language  
 Teaching Methodology

### **Language and Mind**

- 6 required linguistics courses
- 2 core linguistics electives
- 3 courses related to language and cognition, which may include courses from other departments, selected in consultation with the faculty adviser for language and mind
- 3 linguistics electives (core or other). Courses particularly relevant to this specialization are:
  - Ling/Gen 104: Language and Conceptualization
  - Ling/Gen 170: Psycholinguistics
  - Ling/Gen 171: Child Language Acquisition
  - Ling/Gen 172: Language and the Brain
  - Ling/Gen 176: The Language of Persuasion

### **Language and Society**

- 6 required linguistics courses
- 2 core linguistics electives
- 2 appropriate upper-division courses in other departments (especially the Departments of Anthropology, Communication, Cognitive Science, or Sociology), selected in consultation with the faculty adviser for language and society
- 1 course in sociolinguistics (by approval of the faculty adviser, may be taken in another department)
- 3 linguistics electives (core or other). Courses particularly relevant to this specialization are:
  - Ling/Gen 105: Law and Language
  - Ling/Gen 175: Sociolinguistics
  - Ling/Gen 176: The Language of Persuasion
  - Ling/Gen 177: Multilingualism

### **Honors Program**

The department offers an honors program for outstanding students. Those students who have a 3.75 GPA in linguistics (3.25 overall) at the end of their junior year are eligible to par-

ticipate. Students interested in participating in the honors program should consult with their department adviser: admission to the program requires nomination by the adviser and approval of the department faculty.

The honors program requires that two graduate linguistics courses be taken as part of the twelve required courses for the major, and further requires one quarter of Ling/Gen 199H. During one of the two graduate courses, the student, in consultation with the instructor and a faculty adviser, will begin a substantial research project which will be continued during the quarter of 199H and will culminate in an honors paper. Responsibility for proposing possible projects and completing necessary paperwork rests with the student. Upon successful completion of the requirements the designation "with distinction," "with high distinction," or "with highest distinction" will appear on the student's diploma.

### **Independent Study and Directed Group Study in Linguistics for Majors**

Upon presentation of a written study proposal or project, and with the consent of the instructor and the adviser, linguistics majors with at least a 3.5 GPA in the major courses may request permission to undertake directed group study in linguistics (Ling/Gen 198) or independent study in linguistics (Ling/Gen 199). No more than one such course (to be taken Pass/Not Pass) may count toward the major.

### **The Minor Program**

The linguistics minor consists of seven courses: Ling/Gen 101, 110, 111, 120 and 121, plus two additional courses in linguistics.

For all courses counted toward the linguistics minor, the student must receive letter grades of C- or better. Courses counted toward the minor may not be taken on a Pass/Not Pass basis, except Ling/Gen 198 or 199. Only one quarter of Ling/Gen 198 or 199 may be counted toward the minor.

*Warren Program of Concentration:* Six courses in linguistics, which must include Ling/Gen 101 and at least two other upper-division courses in linguistics. The upper-division courses used for the program of

concentration may not be used for a Warren minor.

### **The Ph.D. Program**

The UCSD Ph.D. program in linguistics offers rigorous training in multiple areas of theoretical linguistics, including syntax, semantics, phonetics, phonology, and morphology. The department is particularly strong in the study of interface areas, including syntax/semantics, phonetics/phonology, and phonology/syntax. Research conducted in a variety of theoretical frameworks is integrated into the graduate curriculum. Students receive a firm foundation in both formal and cognitive/functionalist approaches to syntax and semantics. In phonology, basic training includes segmental and autosegmental phonology, constraint-based phonology, syllable theory, metrical theory, and theories of the phonology-morphology interface. The first two years of graduate study are devoted primarily to gaining a strong background in these core theoretical areas.

This theoretical strength of the department is matched by strength in both language study and experimental science. The range of languages represented in faculty research encompasses American Sign Language (ASL), Bantu, Caucasian, Chinese, Finno-Ugric, Germanic, Persian, Romance, Semitic, Slavic, and Uto-Aztecan. The departmental concern with the empirical facts of language is reflected in a field methods requirement for graduate students as well as in the graduate student language requirement (conversational ability in one language other than English and reading ability in two languages other than English). The department has a tradition of working with native speakers of a wide variety of languages. The department's language laboratory maintains a library of written and recorded materials permitting independent study of dozens of languages; it also includes a microcomputer facility for self-instruction in French, German, Italian, and Spanish. The Linguistics Language Program (LLP) provides basic foreign language instruction for the entire campus, and many linguistics graduate students are employed as TAs in the program. Aside from providing a source of funding, the LLP provides graduate students with valuable teaching experience.

The department houses laboratories devoted to experimental studies of language with emphasis on phonetics, event-related brain potentials (ERPs), and signed languages. The focus of experimental research in the department is the mutual dependence between mechanisms of language processing and theories of phonology and syntax. Linguistics graduate students may supplement their theoretical studies with experimental research; in addition to departmental laboratories, graduate students have access to experimental laboratories concerned with language issues in other departments.

The department has a strong commitment to, and is an active and integral part of, the cognitive science and neuroscience communities at UCSD. Most linguistics faculty have joint appointments in the Department of Linguistics and the Cognitive Science Interdisciplinary Ph.D. Program, and participate in the Department of Cognitive Science graduate core course in language (Cognitive Science 201D) as well as in the all-campus Interdisciplinary Program seminar (Cognitive Science 200) on a regular basis. Graduate students in the Cognitive Science Department frequently participate in Linguistics graduate courses, and Linguistics graduate students regularly attend courses in the Cognitive Science Department on neuroscience, child language acquisition, aphasia, neural networks, and semantics and cognition. Linguistics graduate students are eligible to pursue a joint degree in Cognitive Science and Linguistics within the Interdisciplinary Program. Areas of secondary specialization that are especially well represented in the cognitive science community at UCSD and related institutes include child development, connectionist modeling, distributed cognition, language disorders, neuroscience, philosophy, and psycholinguistics.

The department has access to rich informational resources; in addition to the extensive linguistics holdings in the main library, the department maintains a collection of research reports, dissertations, and unpublished papers. Access to the libraries of other universities exists through interlibrary loan.

### *Preparation*

Since linguistics is a highly technical and analytic field, linguistics students will find their undergraduate training in mathematics and the natural sciences especially valuable. Under-

graduate work in certain of the social sciences and humanities, particularly psychology, anthropology, philosophy and literature, is also good preparation for linguistics. The ideal candidate for admission will have both experience with foreign languages and some knowledge of the fundamentals of contemporary linguistic theory. Students who, upon admission, are deficient either in their formal linguistics preparation or languages will be advised by the department on how to make up the deficiency. All graduate students must demonstrate a basic proficiency in phonetics in the first year of graduate study either by passing a basic proficiency test in phonetics upon registration or by taking Ling/Gen 110. New graduate students will be admitted only in the fall of any academic year.

### *Language Requirements*

A candidate for the Ph.D. degree must demonstrate: (1) Conversational ability in one language other than English. (2) A reading knowledge of any two languages except English, subject to faculty approval.

### *Required Courses*

Candidates for the Ph.D. must pass certain graduate courses prior to taking the qualifying examination. All graduate students must take a common core of nine courses. These are:

- three courses in phonetics/phonology: 211A, 211B, and one course from among 210, 212, 213, 214, and 215
- two courses in formal grammatical theory: 221A and 221B
- two courses in cognitive and functional grammatical theory: 221C and 221D
- one course in formal semantics: 230
- one course in field methods: 240

Sometime in the third year, Ph.D. students will choose an area of specialization within linguistic theory, either phonetics/phonology or syntax/semantics.

Students who choose phonetics/phonology as an area of specialization have the following **additional** course requirements:

- any two courses from among the following, including repetitions of the same course when topics vary: 210, 212, 213, 214, and 215

- one course from among the following: 222A, 224, 231, 235, 240, or 241

Students who choose syntax/semantics as an area of specialization have the following **additional** course requirements:

- 224
- one course from among the following: 222A, 231, or 235
- one course from among the following, including repetitions of the same course when topics vary: 210, 212, 213, 214, 215, 240, or 241

All required courses must be taken for a letter grade.

### *Evaluations*

A graduate student is formally evaluated by the entire faculty at particular stages during the first three years of graduate study. The first evaluation (at the end of the third quarter of graduate study) pertains chiefly to performance in courses. The second (or comprehensive) evaluation (at the end of the fifth quarter) determines the student's fitness to continue in the Ph.D. program. It takes into account performance in course work and ability to engage in original research in one area of linguistics as demonstrated in a research paper. The third evaluation (at the end of the eighth quarter) focuses primarily on a second research paper (which must be in a different area of linguistics from the first).

### *Qualifying Examination*

Candidates for the Ph.D. degree must pass an oral qualifying examination which tests the student's knowledge in the area of specialization. Prior to taking this examination, the student must pass the comprehensive evaluation, satisfy all language requirements, successfully complete all required courses, and demonstrate—through research papers—the ability to carry out independent, dissertation-level research. Students must take the qualifying examination by the end of the fourth year of graduate work.

### *Dissertation*

The candidate for the Ph.D. will write a substantial dissertation incorporating the results of original and independent research carried out

under the supervision of the doctoral committee. The candidate will be recommended for the doctor of philosophy degree after having made a successful oral defense of the dissertation before the doctoral committee in a public meeting and after having the final typed version of the dissertation accepted by Geisel Library.

### *Apprentice Teaching*

As part of their preparation for a future academic career, graduate students in linguistics at UCSD are given special opportunities to participate in teaching programs under the supervision of a professor. Depending on qualifications, students may conduct conversation or analysis classes in lower-division language courses, or may assist a professor in the teaching of a graduate or undergraduate linguistics course.

### *Other Degrees*

Candidates for the Ph.D. may be granted the M.A. in linguistics after: 1) satisfactorily completing twelve courses taken for a letter grade. These must include the common core of nine courses; 2) passing the comprehensive evaluation at the end of the fifth quarter; and 3) demonstrating a reading knowledge of any language except English, subject to faculty approval.

Candidates for the Ph.D. may also be granted the C. Phil. upon completion of all degree requirements other than the dissertation.

### *Departmental Ph.D. Time Limit Policies*

The time a student takes to complete the Ph.D. depends on a number of factors, including previous preparation and the amount of time spent in teaching or other job commitments. Several policies set an upper limit to the length of the program. All degree requirements other than the dissertation must be completed by the end of the fourth year of graduate work. Total instructional support (TAships, etc.) cannot exceed six years; total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

## COURSES

**NOTE:** Not all courses are offered every year. It is essential that students consult the linguistics adviser when planning their degree programs.

### LINGUISTICS

#### LOWER DIVISION

**3. Language as a Social and Cultural Phenomenon (4)**  
Introduction to the study of language: language variation, change, and loss; multilingualism, pidginization, and creolization; language planning, standardization, and prescriptivism; writing systems; the role of language in thought, myth, ritual, advertising, politics, and the law.

**4. Language as a Cognitive System (4)**  
Introduction to the study of language: differences between animal communication, sign systems, and human language; origins and evolution of language; neural basis of language; language acquisition in children and adults; fundamental issues in language and cognition.

**7. Sign Language and Its Culture (4)**  
Deaf history since the eighteenth century. The structure of American Sign Language and comparison with oral languages. ASL poetry and narrative and Deaf people's system of cultural knowledge. Basic questions concerning the nature of language and its relation to culture.

**8. Languages and Cultures in America (4)**  
Language in American culture and society. Standard and non-standard English in school, media, pop-culture, politics; bilingualism and education; cultural perception of language issues over time; languages and cultures in the 'melting pot', including Native American, Hispanic, African-American, Deaf.

#### UPPER DIVISION

**101. Introduction to the Study of Language (4)**  
Language is what makes us human, but how does it work? This course focuses on speech sounds and sound patterns, how words are formed, organized into sentences, and understood, how language changes, and how it is learned.

**104. Language and Conceptualization (4)**  
How does language reflect the ways humans conceptualize the world? Issues discussed include the relation between language and thought, how languages differ in conceiving and portraying situations, and how cultural differences are reflected in language structure.

**105. Law and Language (4)**  
The interpretation of language in understanding the law: 1) the language of courtroom interaction (hearsay, jury instructions); 2) written legal language (contracts, ambiguity, legal fictions); 3) language-based issues in the law (First Amendment, libel and slander).

**108. Languages of Africa (4)**  
Africa is home to an astonishing variety of languages. This course investigates the characteristics of the major language families as well as population movements and language contact, and how governments attempt to regulate language use.

**110. Phonetics (4)**  
The study of the sounds which make up human language. How sounds are physically produced; acoustics of speech perception; practical training in translating speech signals into written form and in interpreting computerized speech signals. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**111. Phonology I (4)**  
Why does one language sound different from another? This course analyzes how languages organize sounds into different patterns, how those sounds interact, and how they fit into larger units, such as syllables. Focus on a wide variety of languages and problem-solving. *Prerequisite: Ling/Gen 110.*

**114. Topics in Phonetics (4)**  
Topics in phonetic sciences. Subjects will vary, and may include acoustic, articulatory, and perceptual studies. In addition to readings and lectures, students may use laboratory facilities to investigate specific questions. May be repeated for credit when topics vary. *Prerequisite: Ling/Gen 110 or consent of instructor.*

**115. Phonology II (4)**  
Current theoretical approaches to the sound structure of languages. *Prerequisite: Ling/Gen 111.*

**120. Morphology (4)**  
How do some languages express with one word complex meanings that English needs several words to express? Discovery of underlying principles of word formation through problem-solving and analysis of data from a wide variety of languages. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**121. Syntax I (4)**  
What universal principles determine how words combine into phrases and sentences? Introduction to research methods and results. Emphasis on how argumentation in problem-solving can be used in the development of theories of language. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**123. Morphology II (4)**  
Recent developments in morphological theory, with special reference to the interface between morphology and syntax and/or phonology. An illustrative list of issues includes: cyclic effects, non-derived environment blocking, bracket erasure, non-concatenative morphology; item-and-arrangement vs. realizational approaches to morphology. *Prerequisite: Ling/Gen 120 or consent of instructor.*

**125. Syntax II (4)**  
Topics in the syntax of English and other languages. Syntactic theory and universals. *Prerequisite: Ling/Gen 121.*

**130. Semantics (4)**  
Introduction to the formal study of meaning. The meanings of words and phrases have an intricate internal structure that is both logical and intuitive. How, precisely, do words mean what they do in isolation and in context? *Prerequisite: Ling/Gen 101 or consent of instructor.*

**141. Language Structures (4)**  
Detailed investigation of the structure of one or more languages. May be repeated for credit as topics vary. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**142. Language Typology (4)**  
The systematic ways languages differ. Cross-linguistic studies of specified topics (e.g., word order, agreement, case, switch reference, phonological systems and rule types, etc.) in an effort to develop models of language variation. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**143. The Structure of Spanish (4)**

Surveys aspects of Spanish phonetics, phonology, morphology, and syntax. Topics include dialect differences between Latin American and Peninsular Spanish (both from a historical and contemporary viewpoint), gender classes, verbal morphology, and clause structure. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**145. Pidgins and Creoles (4)**

Pidgin and creole languages provide important insights into the processes arising from natural language contact. Origins of pidgins and creoles; detailed description of salient aspects of their structure; relevance of pidgins and creoles for theories of syntax, morphology, language acquisition. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**150. Historical Linguistics (4)**

Language is constantly changing. This course investigates the nature of language change, how to determine a language's history, its relationship to other languages, and the search for common ancestors or 'proto-language'. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**160. Mathematical Analysis of Language (4)**

The techniques and major results of computational, logical, and statistical approaches to the analysis of human and computer languages.

**163. Computers and Language (4)**

Computers are just getting to the point where they can understand spoken and written language. What makes this task so hard? How do computers manage to do it at all? Hands-on study of real software systems.

**170. Psycholinguistics (4)**

The study of models of language and of language acquisition from the point of view of modern linguistics and psychology. Basic experimental method as applied to language. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**171. Child Language Acquisition (4)**

A central cognitive, developmental mystery is how children learn their first language. Overview of research in the learning of sound systems, word forms and word meanings, and word combinations. Exploration of the relation between cognitive and language development. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**172. Language and the Brain (4)**

The mind/body problem, basic neuroanatomy and neurophysiology, cerebral lateralization, origins and evolution of language, aphasia, magnetic resonance imaging (MRI), and event-related potentials (ERPs). *Prerequisite: Ling/Gen 101 or consent of instructor.*

**175. Sociolinguistics (4)**

The study of language in its social context, with emphasis on the different types of linguistic variation and the principles underlying them. Dialects; registers; sex-based linguistic differences; factors influencing linguistic choice; formal models of variation; variation and change. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**176. The Language of Persuasion (4)**

How can we explain the difference between what is literally said versus what is actually conveyed in the language of law, politics, and advertising? How people's ordinary command of language and their reasoning skills are used to manipulate them.

**177. Multilingualism (4)**

The critical period, the processing and neural representation of language in bilinguals, theories of second language acquisition and creolization, official and minority languages, lan-

guage planning, bilingual education and literacy, code switching, and language attrition. *Prerequisite: Ling/Gen 101 or consent of instructor.*

**178. Second Language Teaching Methodology (4)**

The history of second language teaching methodology, current methods, and empirical studies of methodological issues.

**195. Apprentice Teaching (0-4)**

Students lead a class section of a lower-division linguistics course. They also attend a weekly meeting on teaching methods. (This course does not count toward minor or major.) May be repeated for credit, up to a maximum of four units. (P/NP grades only.) *Prerequisites: consent of instructor, advanced standing.*

**199. Independent Study in Linguistics (2 or 4)**

The student undertakes a program of research or advanced reading in linguistics under the supervision of a faculty member of the Department of Linguistics. (P/NP grades only.) *Prerequisite: consent of instructor.* May be repeated for credit.

**199H. Honors Independent Study in Linguistics (4)**

The student undertakes a program of research and advanced reading in linguistics under the supervision of a faculty member in the Department of Linguistics. (P/NP grades only.) *Prerequisite: admission to Honors Program.*

## GRADUATE

**200. Research Forum (2)**

A forum for discussion of current issues. (S/U grades only.) May be repeated for credit.

**210. Laboratory Phonetics (4)**

Readings and laboratory work in acoustic and articulatory phonetics and speech perception. Experimental design and methodology. Phonetic explanation in phonology. Students will gain hands-on experience with laboratory equipment. *Prerequisite: Ling/Gen 110 or equivalent.*

**211A. Introductory Phonology (4)**

Introduction to the study of the sound patterns of language. Rules and representations, lexical phonology, segmental processes, autosegmental phonology.

**211B. Nonlinear Phonology (4)**

In this course students will learn the basic theoretical and empirical motivations for three major representational theories of nonlinear phonology: (a) feature geometry and underspecification, (b) syllable theory, and (c) metrical theory. In addition, the relationship between phonology and morphology will be discussed in terms of lexical phonology. *Prerequisite: Ling/Gen 211A or equivalent.*

**212. Theories in Phonology (4)**

Current theoretical approaches: one particular approach is explored in a given quarter. May be repeated for credit when topics vary.

**213. Issues in Phonology (4)**

Current theoretical issues. May be repeated for credit when topics vary.

**214. Topics in Phonetics (4)**

Advanced topics in phonetic sciences. Subjects will vary, and may include speech perception, acoustic phonetics, articulatory phonetics. May be repeated for credit when topics vary. *Prerequisite: Ling/Gen 210.*

**215. Topics in Phonology (4)**

Descriptive and theoretical problems in phonology. Discussion of work in progress and/or theoretical consequences of alternative analyses. May be repeated for credit when topics vary.

**221A. Introduction to Grammatical Theory (4)**

Foundations of syntactic theory. The notion of explicit hypotheses, argumentation, and basic results of generative grammar. Introduction to Principles and Parameters Theory through the analysis of English data, concentrating on Theta, X-bar, Government, Case, and Control Theories.

**221B. Introduction to Grammatical Theory (4)**

Continued development of Principles and Parameters Theory, concentrating on wh-movement and the Binding Theory. Focus on testing theoretical proposals and understanding the role of theoretical alternatives, underlying assumptions, and the empirical results upon which these are based.

**221C. Introduction to Grammatical Theory (4)**

Introduction to cognitive and functional theories of linguistic structure. Examination of fundamental concepts and theoretical issues. Discussion of the methodology and basic findings of functional research.

**221D. Introduction to Grammatical Theory (4)**

Cognitive approaches to semantic, lexical, and grammatical structure. Basic principles of cognitive linguistic theories. Application to the description of representative structural phenomena.

**222A-B. Theories of Grammar (4-4)**

Introduction to a particular grammatical theory. May be repeated for credit when topics vary.

**223. Issues in Syntax (4)**

Current theoretical issues. May be repeated for credit when topics vary.

**224. Lexicalist Theories of Grammar (4)**

Introduction to the role of the lexicon in the explanation of syntactic phenomena. Investigation into the nature of lexical representations and their relation to the morphology/syntax interface.

**225. Topics in Syntax (4)**

Descriptive and theoretical problems in syntactic analysis. Theoretical consequences of alternative analyses. May be repeated for credit when topics vary.

**230. Formal Semantics (4)**

Theories of semantic structure. The relation of meaning to grammar, and how it is to be accommodated in an overall model of linguistic organization. The application of formal semantics to the description of natural language.

**231. Cognitive Semantics (4)**

Introduction to conceptualist accounts of semantic structure. Survey of basic phenomena, including frames, metaphor, metonymy, construal, categorization, image schemas, and mental space organization. Examination of selected descriptive and theoretical proposals.

**235. Topics in Semantics (4)**

Advanced material in special areas of the study of meaning and its relation to formal aspects of human language. As subject matter varies, the course may be repeated for credit.

**238. Topics in Cognitive Linguistics (0-4)**

(Same as Cognitive Science 238) Basic concepts, empirical findings, and recent developments in cognitive and functional linguistics. Language viewed dynamically in relation to conceptualization, discourse, meaning construction, and cognitive processing. As topics vary, may be repeated for credit.

**239. Information Structure and Discourse (4)**

This course will examine major information-structural categories (topic, focus, etc.) and the relationships between these categories, semantic roles, and grammatical functions. The course will also examine the status of information structure

within the architecture of a linguistic theory. *Prerequisite: Ling/Gen 221A, 221B, 221C, 221D, or consent of instructor.*

**240. Field Methods (4)**

Techniques of discovering the structure of a language through elicitation of data from native speaker consultants. Phonemic, morphemic, and syntactic analysis. *Prerequisite: Ling/Gen 110 or equivalent.*

**241. Fieldwork (4)**

Fieldwork continuing the research of the previous quarter; student-directed elicitations on topics of interest. *Prerequisite: Ling/Gen 240.*

**248. Morphology (4)**

Theories of word structure are examined and confronted with data from a variety of languages. Topics may include: the distinction between derivational and inflectional morphology, the morphology/phonology interface, and the morphology/syntax interface. May be repeated for credit as topics vary.

**249. Topics in Sign Languages of the Deaf (4)**

Topics in the structure of American Sign Language and/or other natural sign languages of Deaf communities. May be repeated for credit as topics vary.

**250. Historical Linguistics (4)**

Introduction to the concepts and methodology of historical linguistics. Topics covered include the nature of language change, genetic and areal relationships, the comparative method, and internal reconstruction.

**270. Psycholinguistics (4)**

The study of models of language and of language acquisition from the point of view of modern linguistics and psychology.

**272. Topics in Neurolinguistics (4)**

Issues of language representation and neural instantiation that arise in studies of neural imaging, language disorders, multilingualism and second language acquisition, animal communication, and the origins and evolution of language. May be repeated for credit when topics vary.

**278. Research in Second Language Acquisition (4)**

Investigation of methods of teaching foreign languages and the theories of language acquisition on which they are based.

**290. Current Issues in Linguistic Theory (4)**

Discussion of selected current issues: theoretical formulations, their predictions, and how relevant data can be brought to bear on them. Since the topics will change, this course may be repeated for credit.

**292. Topics in Research in Progress (0-4)**

Presentation and discussion of research in progress. May be repeated.

**293. Research Practicum (0-4)**

Gathering and interpreting data, formulating research questions and hypotheses, making the predictions of hypotheses explicit, finding relevant evidence, and organizing research results into suitable form for presentation in abstracts, talks, and research papers. (S/U grades only.) May be repeated for credit.

**294. Professional Development (0-2)**

Skills, techniques, issues, and principles relevant to graduate education and successful transition to a professional career. (S/U grades only.) May be repeated for credit.

**295. Professional Development in Methodology of Language Teaching (0-2)**

Skills, techniques, issues, and principles relevant to the methods and pedagogy involved in the teaching and learning of a foreign language and the successful transition to a professional

career. Readings, discussions, and demonstrations of techniques. (S/U grades only.) May be repeated for credit. *Prerequisite: permission of instructor.*

**296. Directed Research (1-8)**

Individual research. May be repeated for credit.

**297. Field Research (1-8)**

Linguistic analysis of language in the field. May be repeated for credit.

**298. Directed Group Study (0-2)**

Study of topics outside the scope of regular course work, under the direction of a faculty member. (S/U grades only.) May be repeated for credit.

**299. Doctoral Research (1-12)**

Directed research on dissertation topic for students who have been admitted to candidacy for the Ph.D. degree. May be repeated for credit. *Prerequisite: admission to candidacy.*

**502. Apprentice Teaching of Linguistics (1-4)**

The course, designed for graduate students serving as teaching assistants in the department's linguistics courses, includes discussion of teaching theories, techniques, and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. The student must be serving as a teaching assistant in a Ling/Gen course to receive credit.

**503. Apprentice Teaching of American Sign Language (1-4)**

The course, designed for graduate students serving as teaching assistants in American Sign Language, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

**504. Apprentice Teaching of French (1-4)**

The course, designed for graduate students serving as teaching assistants in French, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

**505. Apprentice Teaching of German (1-4)**

The course, designed for graduate students serving as teaching assistants in German, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

**506. Apprentice Teaching of Italian (1-4)**

The course, designed for graduate students serving as teaching assistants in Italian, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

**507. Apprentice Teaching of Spanish (1-4)**

The course, designed for graduate students serving as teaching assistants in Spanish, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

**508. Apprentice Teaching of Language/Directed Study (1-4)**

The course, designed for graduate students serving as teaching assistants in language directed study, includes discussion of teaching theories, techniques and materials, directing study

of various uncommonly taught languages, sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

## COURSES

### LANGUAGE

OFFICE: Linguistics Language Program Office,  
2125 McGill Hall, Muir College

Students are placed in foreign language courses based on prior preparation and on the results of a placement test administered prior to or during orientation. Students who miss the placement exam should contact the Linguistics Language Program Office (McGill 2125) for instructions.

Conversation sections (Linguistics 1A-1B-1C-1D) consist of small tutorial meetings with a native speaker, plus reading and assigned laboratory work. Analysis sections (Linguistics 1AX-1BX-1CX-1DX) consist of presentation and practice of grammatical structures, discussion sections, assigned laboratory work, and outside reading. Each course in the 1A-1B-1C-1D series must be taken concurrently with the corresponding course in the 1AX-1BX-1CX-1DX series.

Linguistics 11 courses are self-instructional: intended for learning the language to read it for scholarly purposes. They are particularly aimed at graduate students preparing to fulfill French or German reading requirements.

Linguistics 19 courses, offered in more than sixty languages, are designed for self-instructional study at an introductory level. Depending on the availability of suitable materials, students may enroll for two or four units of credit. For some languages, the course may be repeated for credit.

### AMERICAN SIGN LANGUAGE

**Linguistics/American Sign Language (LISL) 1A. American Sign Language Conversation (2.5)**

Small tutorial meetings with a signer of American Sign Language (ASL). Conversational practice organized around common everyday communicative situations. Must be taken with LISL 1AX. *Prerequisite: no prior study of ASL.*

**Linguistics/American Sign Language (LISL) 1AX. Analysis of American Sign Language (2.5)**

Study of American Sign Language (ASL) and analysis of its syntactic, morphological, and phonological features. Readings and discussions of cultural information. Must be taken with LISL 1A. *Prerequisite: no prior study of ASL.*

**Linguistics/American Sign Language (LISL) 1B. American Sign Language Conversation (2.5)**

Small tutorial meetings with a signer of American Sign Language (ASL). Conversational practice organized around common everyday communicative situations. Must be taken with LISL 1BX. *Prerequisites: LISL 1A with a grade of C- or better, or equivalent and LISL 1AX with a grade of D or better, or equivalent.*

**Linguistics/American Sign Language (LISL) 1BX. Analysis of American Sign Language (2.5)**

Study of American Sign Language (ASL) and analysis of its syntactic, morphological, and phonological features. Readings and discussions of cultural information. Must be taken with LISL 1B. *Prerequisites: LISL 1A with a grade of C- or better, or equivalent and LISL 1AX with a grade of D or better, or equivalent.*

**Linguistics/American Sign Language (LISL) 1C. American Sign Language Conversation (2.5)**

Small tutorial meetings with a signer of American Sign Language (ASL). Conversational practice organized around common everyday communicative situations. Must be taken with LISL 1CX. *Prerequisites: LISL 1B with a grade of C- or better, or equivalent and LISL 1BX with a grade of D or better, or equivalent.*

**Linguistics/American Sign Language (LISL) 1CX. Analysis of American Sign Language (2.5)**

Study of American Sign Language (ASL) and analysis of its syntactic, morphological, and phonological features. Readings and discussions of cultural information. Must be taken with LISL 1C. *Prerequisites: LISL 1B with a grade of C- or better, or equivalent and LISL 1BX with a grade of D or better, or equivalent.*

**Linguistics/American Sign Language (LISL) 1D. American Sign Language Conversation (2.5)**

Small conversation sections taught entirely in American Sign Language. Emphasis on speaking, reading, writing, and culture. Practice of the language functions needed for successful communication. Must be taken in conjunction with LISL 1DX. **Successful completion of LISL 1D and LISL 1DX satisfies the requirement for language proficiency in Revelle College.** *Prerequisites: LISL 1C with a grade of C- or better, or equivalent and LISL 1CX with a grade of D or better, or equivalent.*

**Linguistics/American Sign Language (LISL) 1DX. Analysis of American Sign Language (2.5)**

Practice of the grammatical functions indispensable for comprehensible communication in the language. The course is taught entirely in American Sign Language. Must be taken in conjunction with LISL 1D. **Successful completion of LISL 1D and LISL 1DX satisfies the requirement for language proficiency in Revelle College.** *Prerequisites: LISL 1C with a grade of C- or better, or equivalent and LISL 1CX with a grade of D or better, or equivalent.*

**CHINESE**

See: **Chinese Studies**

See also: **Linguistics Directed Study**

**FRENCH**

**Linguistics/French (LIFR) 1A. French Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIFR 1AX. *Prerequisite: no prior study of French.*

**Linguistics/French (LIFR) 1AX. Analysis of French (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in French. Must be taken in conjunction with LIFR 1A. *Prerequisite: no prior study of French.*

**Linguistics/French (LIFR) 1B. French Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIFR 1BX. *Prerequisites: LIFR 1A with a grade of C- or better, or equivalent and LIFR 1AX with a grade of D or better, or equivalent.*

**Linguistics/French (LIFR) 1BX. Analysis of French (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in French. Must be taken in conjunction with LIFR 1B. *Prerequisites: LIFR 1A with a grade of C- or better, or equivalent and LIFR 1AX with a grade of D or better, or equivalent.*

**Linguistics/French (LIFR) 1C. French Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIFR 1CX. *Prerequisites: LIFR 1B with a grade of C- or better, or equivalent and LIFR 1BX with a grade of D or better, or equivalent.*

**Linguistics/French (LIFR) 1CX. Analysis of French (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in French. Must be taken in conjunction with LIFR 1C. *Prerequisites: LIFR 1B with a grade of C- or better, or equivalent and LIFR 1BX with a grade of D or better, or equivalent.*

**Linguistics/French (LIFR) 1D. French Conversation (2.5)**

Small conversation sections taught entirely in French. Emphasis on speaking, reading, writing, and culture. Practice of the language functions needed for successful communication. Must be taken in conjunction with LIFR 1DX. **Successful completion of LIFR 1D and LIFR 1DX satisfies the requirement for language proficiency in Revelle College.** *Prerequisites: LIFR 1C with a grade of C- or better, or equivalent and LIFR 1CX with a grade of D or better, or equivalent.*

**Linguistics/French (LIFR) 1DX. Analysis of French (2.5)**

Practice of the grammatical functions indispensable for comprehensible communication in the language. The course is taught entirely in French. Must be taken in conjunction with LIFR 1D. **Successful completion of LIFR 1D and LIFR 1DX satisfies the requirement for language proficiency in Revelle College.** *Prerequisites: LIFR 1C with a grade of C- or better, or equivalent and LIFR 1CX with a grade of D or better, or equivalent.*

**Linguistics/French (LIFR) 11. Elementary French Reading (2-4)**

A self-instructional program designed to prepare graduate students to meet reading requirements in French. After a one-week introduction to French orthography/sound correspondence, students work with a self-instructional textbook. Mid-term and final examinations. (F,W,S)

**Linguistics/French (LIFR) 15, 16, and 17. Intermediate French for the Social Sciences (2)**

Conducted entirely in French. Course aims to improve oral language skills through discussions of social science topics, with emphasis on political events and current affairs. Course materials encompass televised news broadcasts, newspapers and periodicals. LIFR 15 is offered fall quarter only, LIFR 16 is offered winter quarter only and LIFR 17 is offered spring quarter only. Each course may be taken one time and need not be

taken in sequence. *Prerequisite: LIFR 1D/DX or at least three semesters/four quarters of college French or by permission of the instructor.*

**Linguistics/French (LIFR) 25. French on the World Wide Web (2)**

Conducted entirely in French. Course aims to improve language skills through reading and discussion of contemporary cultural issues: press, politics, arts, and cultural events. Students will access course materials directly from France through the Internet. It is particularly recommended for students preparing for EAP or QAP. *Prerequisite: LIFR 1D/DX or at least three semesters/four quarters of college French or by permission of the instructor.*

See also: **Department of Literature**

**GERMAN**

**Linguistics/German (LIGM) 1A. German Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIGM 1AX. *Prerequisite: no prior study of German.*

**Linguistics/German (LIGM) 1AX. Analysis of German (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in German. Must be taken with LIGM 1A. *Prerequisite: no prior study of German.*

**Linguistics/German (LIGM) 1B. German Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIGM 1BX. *Prerequisites: LIGM 1A with a grade of C- or better, or equivalent and LIGM 1AX with a grade of D or better, or equivalent.*

**Linguistics/German (LIGM) 1BX. Analysis of German (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in German. Must be taken with LIGM 1B. *Prerequisites: LIGM 1A with a grade of C- or better, or equivalent and LIGM 1AX with a grade of D or better, or equivalent.*

**Linguistics/German (LIGM) 1C. German Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIGM 1CX. *Prerequisites: LIGM 1B with a grade of C- or better, or equivalent and LIGM 1BX with a grade of D or better, or equivalent.*

**Linguistics/German (LIGM) 1CX. Analysis of German (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in German. Must be taken with LIGM 1C. *Prerequisites: LIGM 1B with a grade of C- or better, or equivalent and LIGM 1BX with a grade of D or better, or equivalent.*

**Linguistics/German (LIGM) 1D. German Conversation (2.5)**

Small conversation sections taught entirely in German. Emphasis on speaking, reading, writing, and culture. Practice of the language functions needed for successful communication. Must be taken in conjunction with LIGM 1DX. **Successful completion of LIGM 1D and LIGM 1DX satisfies the**



**requirement for language proficiency in Revelle College.** *Prerequisites:* LIGM 1C with a grade of C- or better, or equivalent and LIGM 1CX with a grade of D or better, or equivalent.

**Linguistics/German (LIGM) 1DX. Analysis of German (2.5)** Practice of the grammatical functions indispensable for comprehensible communication in the language. The course is taught entirely in German. Must be taken in conjunction with LIGM 1D. **Successful completion of LIGM 1D and LIGM 1DX satisfies the requirement for language proficiency in Revelle College.** *Prerequisites:* LIGM 1C with a grade of C- or better, or equivalent and LIGM 1CX with a grade of D or better, or equivalent.

#### **Linguistics/German (LIGM) 11. Elementary German Reading (2-4)**

A self-instructional program designed to prepare graduate students to meet reading requirements in German. After a one-week introduction to German orthography/sound correspondences, students work with a self-instructional textbook. Mid-term and final examinations. (F,W,S)

#### **Linguistics/German (LIGM) 15, 16, and 17. Intermediate German for the Social Sciences (2)**

Conducted entirely in German. Course aims to improve oral language skills through discussions of social science topics, with emphasis on political events and current affairs. Course materials encompass televised news broadcasts, newspapers and periodicals. LIGM 15 is offered fall quarter only, LIGM 16 is offered winter quarter only and LIGM 17 is offered spring quarter only. Each course may be taken one time and need not be taken in sequence. *Prerequisites:* LIGM 1D/DX or at least three semesters/four quarters of college German or by permission of the instructor.

#### **Linguistics/German (LIGM) 25. German on the World Wide Web (2)**

Conducted entirely in German. Course aims to improve language skills through reading and discussion of contemporary cultural issues: press, politics, arts, and cultural events. Students will access course materials directly from Germany through the Internet. It is particularly recommended for students preparing for EAP or OAP. *Prerequisite:* LIGM 1D/DX or at least three semesters/four quarters of college German or by permission of the instructor.

See also: **Department of Literature**

### **GREEK**

See: **Department of Literature**

See also: **Linguistics Directed Study**

### **HEBREW**

See: **Judaic Studies**

See also: **Linguistics Directed Study**

### **ITALIAN**

#### **Linguistics/Italian (LIIT) 1A. Italian Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIIT 1AX. *Prerequisite:* no prior study of Italian.

#### **Linguistics/Italian (LIIT) 1AX. Analysis of Italian (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Italian. Must be taken with LIIT 1A. *Prerequisite:* no prior study of Italian.

#### **Linguistics/Italian (LIIT) 1B. Italian Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIIT 1BX. *Prerequisites:* LIIT 1A with a grade of C- or better, or equivalent and LIIT 1AX with a grade of D or better, or equivalent.

#### **Linguistics/Italian (LIIT) 1BX. Analysis of Italian (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Italian. Must be taken with LIIT 1B. *Prerequisites:* LIIT 1A with a grade of C- or better, or equivalent and LIIT 1AX with a grade of D or better, or equivalent.

#### **Linguistics/Italian (LIIT) 1C. Italian Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIIT 1CX. *Prerequisites:* LIIT 1B with a grade of C- or better, or equivalent and LIIT 1BX with a grade of D or better, or equivalent.

#### **Linguistics/Italian (LIIT) 1CX. Analysis of Italian (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Italian. Must be taken with LIIT 1C. *Prerequisites:* LIIT 1B with a grade of C- or better, or equivalent and LIIT 1BX with a grade of D or better, or equivalent.

See also: **Department of Literature**

### **JAPANESE**

See: **Japanese Studies**

See also: **Linguistics Directed Study**

### **LATIN**

See: **Department of Literature**

### **RUSSIAN**

See: **Department of Literature**

See also: **Linguistics Directed Study**

### **SPANISH**

#### **Linguistics/Spanish (LISP) 1A. Spanish Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LISP 1AX. *Prerequisite:* no prior study of Spanish.

#### **Linguistics/Spanish (LISP) 1AX. Analysis of Spanish (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Spanish. Must be taken with LISP 1A. *Prerequisite:* no prior study of Spanish.

#### **Linguistics/Spanish (LISP) 1B. Spanish Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LISP 1BX. *Prerequisites:* LISP 1A with a grade of C- or better, or equivalent and LISP 1AX with a grade of D or better, or equivalent.

#### **Linguistics/Spanish (LISP) 1BX. Analysis of Spanish (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading.

The course is taught entirely in Spanish. Must be taken with LISP 1B. *Prerequisites:* LISP 1A with a grade of C- or better, or equivalent and LISP 1AX with a grade of D or better, or equivalent.

#### **Linguistics/Spanish (LISP) 1C. Spanish Conversation (2.5)**

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LISP 1CX. *Prerequisites:* LISP 1B with a grade of C- or better, or equivalent and LISP 1BX with a grade of D or better, or equivalent.

#### **Linguistics/Spanish (LISP) 1CX. Analysis of Spanish (2.5)**

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Spanish. Must be taken with LISP 1C. *Prerequisites:* LISP 1B with a grade of C- or better, or equivalent and LISP 1BX with a grade of D or better, or equivalent.

#### **Linguistics/Spanish (LISP) 1D. Spanish Conversation (2.5)**

Small conversation sections taught entirely in Spanish. Emphasis on speaking, reading, writing, and culture. Practice of the language functions needed for successful communication. Must be taken in conjunction with LISP 1DX. **Successful completion of LISP 1D and LISP 1DX satisfies the requirement for language proficiency in Revelle College.** *Prerequisites:* LISP 1C with a grade of C- or better, or equivalent and LISP 1CX with a grade of D or better, or equivalent.

#### **Linguistics/Spanish (LISP) 1DX. Analysis of Spanish (2.5)**

Practice of the grammatical functions indispensable for comprehensible communication in the language. The course is taught entirely in Spanish. Must be taken in conjunction with LISP 1D. **Successful completion of LISP 1D and LISP 1DX satisfies the requirement for language proficiency in Revelle College.** *Prerequisites:* LISP 1C with a grade of C- or better, or equivalent and LISP 1CX with a grade of D or better, or equivalent.

#### **Linguistics/Spanish (LISP) 15, 16, 17. Intermediate Spanish for the Social Sciences (2)**

Conducted entirely in Spanish. Course aims to improve oral language skills through discussions of social science topics, with emphasis on political events and current affairs. Course materials encompass televised news broadcasts, newspapers and periodicals. LISP 15 is offered fall quarter only, LISP 16 is offered winter quarter only, and LISP 17 is offered spring quarter only. Each course may be taken one time and need not be taken in sequence. *Prerequisite:* LISP 1D/DX or at least three semesters/four quarters of college Spanish or by permission of the instructor.

#### **Linguistics/Spanish (LISP) 25. Spanish on the World Wide Web (2)**

Conducted entirely in Spanish. Course aims to improve language skills through reading and discussion of contemporary cultural issues: press, politics, arts, and cultural events. Students will access course materials directly from Spanish-speaking countries through the Internet. It is particularly recommended for students preparing for EAP or OAP. *Prerequisite:* LISP 1D/DX or at least three semesters/four quarters of college Spanish or by permission of the instructor.

See also: **Department of Literature**

### **DIRECTED STUDY**

#### **Linguistics/19. Directed Study-Language (2-4)**

Introductory-level study of a language in the language laboratory on a self-instructional basis. Depending on the availability of appropriate study materials, the course may be taken in

blocks of two or four units of credit and may be repeated up to the total number of units available for that language.

Albanian	Indonesian
American Sign Language	Italian
Amharic	Japanese
Arabic, Eastern	Kannada
Arabic, Egyptian	Kituba
Arabic, Iraqi	Korean
Arabic, Moroccan	Latvian
Arabic, Saudi	Lithuanian
Bengali	Malay
Bulgarian	Mongolian
Burmese	Navajo
Cambodian	New Guinea Pidgin
Catalan	Norwegian
Chinese, Cantonese	Persian
Chinese, Mandarin	Polish
Chinyanja	Portuguese
Cree	Romanian
Czech	Russian
Danish	Serbo-Croatian
Dutch	Slovenian
Esperanto	Spanish
Finnish	Swahili
French	Swedish
Fula	Tagalog
German	Telugu
Greek, Modern	Thai
Haitian Creole	Tibetan
Hausa	Turkish
Hawaiian	Twi
Hebrew, Modern	Vietnamese
Hindi-Urdu	Welsh
Hungarian	Yoruba
Igbo	

## Literature

### ADMINISTRATIVE OFFICE:

3124 Literature Building  
(619) 534-3214

### GRADUATE OFFICE:

3139/3140 Literature Building  
(619) 534-3217

### UNDERGRADUATE OFFICE:

3110 Literature Building  
(619) 534-3210

### Professors

Ronald S. Berman, Ph.D., *English and American Literature*  
Linda Brodkey, Ph.D., *Writing; Director, Warren College Writing Program*  
Steven Cassedy, Ph.D., *Slavic and Comparative Literature*  
Alain J.-J. Cohen, Ph.D., *Comparative Literature*  
Jaime Concha, Ph.D., *Spanish and Latin American Literature*

Stephen Cox, Ph.D., *English Literature; Director, Revelle Humanities Writing Program*  
Michael Davidson, Ph.D., *American Literature, Writing*  
Abraham J. Dijkstra, Ph.D., *American and Comparative Literature*  
Page duBois, Ph.D., *Classics and Comparative Literature*  
Ann duCille, Ph.D., *American and African American Literature*  
William Fitzgerald, Ph.D., *Classics and Comparative Literature*  
Richard Elliott Friedman, Th.D., *Hebrew and Comparative Literature; Katzin Professor of Jewish Civilization*  
Marcel Hénaff, Ph.D., *French Literature*  
Fanny Howe, *Writing*  
Susan Kirkpatrick, Ph.D., *Spanish and Comparative Literature*  
Lisa Lowe, Ph.D., *Comparative Literature*  
Masao Miyoshi, Ph.D., *English, Japanese and Comparative Literature; Hajime Mori Endowed Chair*  
Louis Adrian Montrose, Ph.D., *English and American Literature*  
Jerome Rothenberg, M.A., *American Literature, Writing*  
Rosaura A. Sánchez, Ph.D., *Spanish, Latin American, and Chicano Literature*  
William S. Tay, Ph.D., *Chinese and Comparative Literature*  
Quincy Troupe, B.A., *Writing; African American Literature*  
Donald T. Wesling, Ph.D., *English and American Literature, Writing*  
Sherley Anne Williams, M.A., *American and African American Literature, Writing*  
Wai-lim Yip, Ph.D., *Chinese and Comparative Literature*

### Associate Professors

Robert Cancel, Ph.D., *African and Comparative Literature*  
Anthony Edwards, Ph.D., *Classics and Comparative Literature*  
Judith Halberstam, Ph.D., *English and American Literature*  
Todd Kontje, Ph.D., *German and Comparative Literature*  
Stephanie H. Jed, Ph.D., *Italian and Comparative Literature*  
George Mariscal, Ph.D., *Spanish Literature*

William A. O'Brien, Ph.D., *German and Comparative Literature*  
Fred V. Randel, Ph.D., *English Literature*  
Roddey Reid, Ph.D., *French Literature*  
Marta E. Sánchez, Ph.D., *Latin American and Chicano Literature*  
Kathryn Shevelow, Ph.D., *English Literature*  
Barbara Tomlinson, Ph.D., *Writing; Director, Muir College Writing Program*  
Nicole Tonkovich, Ph.D., *American Literature; Director, Eleanor Roosevelt College Writing Program*  
Pasquale Verdicchio, Ph.D., *Italian and Comparative Literature*  
Cynthia Walk, Ph.D., *German Literature*  
Don Edward Wayne, Ph.D., *English Literature*  
Winifred Woodhull, Ph.D., *French Literature*  
Oumelbanine Zhiri, Ph.D., *French Literature*

### Assistant Professors

Rosemary George, Ph.D., *English Literature*  
Milos Kokotovic, Ph.D., *Latin American Literature*  
Michael Murashige, Ph.D., *Popular Culture and Asian American Literature*  
Max Parra, Ph.D., *Mexican and Latin American Literature*  
Shelley Streeby, Ph.D., *American Literature*  
Lisa Yoneyama, Ph.D., *Japanese Studies and Cultural Studies*

### Professors Emeriti

Jack Behar, Ph.D.  
Carlos Blanco-Aguinaga, Ph.D.  
Diego Catalan, Ph.D.  
Charles Cooper, Ph.D.  
David K. Crowne, Ph.D.  
Thomas K. Dunseath, Ph.D.  
Edwin S. Fussell, Ph.D.  
Reinhard Lettau, Ph.D.  
James K. Lyon, Ph.D.  
Roy Harvey Pearce, Ph.D.  
John L. Stewart, Ph.D.  
Andrew Wright, Ph.D., F.R.S.L.

### Lecturers

Rae Armantrout, M.A., *Writing*  
Charles Chamberlain, Ph.D., *Classical Languages and Literature, Writing*  
Fraser Cocks, Ph.D., *American Literature; Director, Dimensions of Culture*  
Robert Dorn, M.A., *Writing*

Leslie Collins Edwards, Ph.D., *Classical Languages and Literature*  
 Melvyn Freilicher, C.Phil., *Writing*  
 Elizabeth Jordan, Ph.D., *Revelle Humanities Program*  
 Christine Norris, Ph.D., *Revelle Humanities Program and Women's Studies*  
 Beatrice Pita, Ph.D., *Spanish Language and Latin American Literature*  
 Catherine Ploye, Ph.D., *French Language and Literature*  
 Stephen Potts, Ph.D., *American and Popular Literature*  
 Rebecca Wells, C.Phil., *Russian Language and Literature*  
 Eliot Wirshbo, Ph.D., *Classical Languages and Literature*

### Visiting Professor

Fredric Jameson, Ph.D.

All literature courses at UCSD are offered by a single Department of Literature. The department brings together writers, teachers, scholars, and students of several different languages and literatures. Here, they are united by the nature of the studies they pursue. This lends a comparative aspect to both undergraduate and graduate programs, which lead to the bachelor of arts, master of arts, the candidate in philosophy, and doctor of philosophy degrees. All students must show knowledge of a foreign literature by doing upper-division or graduate work in that literature in the original language. Courses are offered not only in the literatures themselves but in the theoretical aspects of literature and—often in cooperation with other departments—in the relationship of literary study to other disciplines such as philosophy, visual arts, music, sociology, history, psychology, linguistics, and communication. With special permission, undergraduates may take graduate courses for credit, and graduate students may also take undergraduate courses for credit.

The UCSD Library's Mandeville Department of Special Collections offers the undergraduate and graduate literature student an excellent range of resources, including single-author collections, rare and out-of-print books, tapes, maps, and historical archives. Of special interest are the Southworth Collection of Spanish Civil War materials, the Hill Collection of South Pacific Voyages, the Don Cameron Allen Renaissance collection, and the Archive for New

Poetry. Within the latter collection are an extensive series of single-author archives, including the papers of Paul Blackburn, Donald Allen, Lew Welch, Charles Reznikoff, Joanne Kyger, Jerome Rothenberg, and others. The Archive for New Poetry is one of the largest collections of contemporary poetry in the United States. Graduate students also have access, facilitated by travel grants, to all other University of California research collections.

### Careers for Literature Majors

The study of literature is the study of ideas, language, and society. How to do things with words lies at the very heart of the study of literature and culture; the literature major trains students to read critically and write fluently. The abilities to be articulate and discerning, to analyze and think creatively are all sought-after traits in a number of professional careers, including education, law, technical writing, communications, journalism, advertising, public relations, business, management, and international affairs. Skills developed by majors in literature are considered to be assets by medical schools. An undergraduate major in literature also prepares students for graduate study and academic careers in literature and in the humanities.

### The Undergraduate Program

#### Lower-Division Preparation

Lower-division requirements vary, depending on the literature program in which the student elects to concentrate. However, the department strongly recommends that, as part of the freshman/sophomore course work, students who have chosen or are considering a major in literature begin the appropriate lower-division language sequence in the Department of Linguistics or Literature as preparation for upper-division course work in a foreign language and literature.

#### Writing in Literature Courses

It is the departmental expectation that students in lower-division courses should write a minimum of 2,500 words per course. In upper-division courses the minimum requirement is 4,000 words per course.

### The Major in Literature

There are nine majors available to students within the Department of Literature: Literatures in English, French, German, Italian, Russian, Spanish, Literatures of the World, Writing, and the composite major in two literatures. Requirements vary from program to program as described below. Once a student has decided upon a major in literature, he or she is required to meet with an adviser in the Department of Literature. Worksheets defining major requirements are available in the literature undergraduate office to help students organize their course work.

*All students majoring in literature must study a secondary literature, that is, a literature written in a language different from that of their primary literature.* The range of secondary literatures includes Classical Greek, Hebrew, and Latin, as well as the previously mentioned French, German, Italian, Russian, Spanish, and for those concentrating in a foreign literature, English. Students will satisfy this requirement by taking three courses in the secondary literature, given substantially in the native language. At least one of these courses must be upper-division. Students should see an adviser to confirm the selection of the specific courses that will be taken to satisfy the upper-division component of the secondary literature requirement.

The lower-division component within the secondary literatures may be satisfied by: French 2B and either 2C or 50; German, two courses numbered 50 through 53; Hebrew 2 and 3 (see "Judaic Studies"); Italian 2B and 50; Greek 2 and 3; Latin 2 and 3; Russian 2B and 2C; two courses from Spanish 50A-50B-50C. For majors other than Literatures in English, two courses from English 17-18-19, 21-22-23-24, and 50 are applicable. (Literatures of the World and writing courses may not be applied toward the English secondary literature requirement.) **Note:** World Literature courses taught in English do not apply unless there is a foreign-language discussion section and materials are available in the foreign language.

Upper-division courses in the secondary literature are counted as part of the total number of upper-division courses required for the major. Students are free to choose from any of the regularly scheduled upper-division offerings in their secondary foreign literature. Special Stud-

ies courses (198s and 199s) cannot be used to satisfy the upper-division secondary literature requirement but will, where appropriate, be applied to the upper-division major elective requirements.

All regularly scheduled departmental courses taken to satisfy the requirements of the literature major, including courses in the secondary literature, must be taken for a letter grade. No grade below C- is acceptable for a course taken in the major.

At least six of the upper-division courses for the major, including a minimum of four in the primary literature and one in the secondary literature, must be taken at UCSD.

### *Dual Major in Literature*

The dual major in literature permits a student to develop a solid foundation in two literatures, while remaining within one department. Because the UCSD Literature Department houses literatures that are divided among different departments at most universities, our dual major allows students to coordinate their studies with a single, closely-knit group of faculty, and to arrange their program without repeating two different sets of major requirements. (For example, since a dual major necessarily combines literatures written in two different languages, it automatically fulfills the foreign-language requirement for the literature major.)

Students pursuing a dual major work closely with a faculty adviser to plan a program of study that meets the following requirements:

1. Students will select two literatures of concentration (Literature 1 and Literature 2)
  - a. one of the literatures must be in a language other than English;
  - b. both concentrations, however, can be in non-English literatures; thus a student can choose English and French, for example, or Russian and Spanish, French and Italian, German and Latin, Spanish and English, etc., but not Literatures of the World or Literature/Writing.
2. Students will meet all lower-division major requirements for each of the two literatures of concentration. See specific "Primary Concentration" listings above; English, Spanish, and Russian, for example, all have lower-division requirements for the major.

3. Students will take eight upper-division courses in each of the two selected literatures of concentration for a total of sixteen upper-division courses.
  - a. these must satisfy the upper-division course requirements for each of the two majors. Thus, for example, if one of the concentrations is English, the student must include courses from each of the five stipulated categories; if one of the concentrations is Spanish, upper-division courses must include LTSP 119A, B, or C, 130A, and 130B.
  - b. beyond the upper-division requirements for each literature of concentration (Literature 1 and Literature 2), students will take a sufficient number of elective courses in each of the two literatures of concentration to make a total of eight upper-division courses in each chosen concentration.

### *Honors Program*

The department offers a special program of advanced study for outstanding undergraduates majoring in literature. Admission to this program ordinarily requires an overall GPA of 3.5 and a literature major GPA of 3.7 at the beginning of the senior year. Students meeting these requirements will be sent, during fall quarter, an invitation to participate in the program. Interested students who do not meet the established criteria may petition to participate in the program by submitting a personal statement and three letters of support from members of the literature faculty by the end of the third week of the quarter. During the winter quarter of their senior year, all honors students together take an honors seminar (LTWL 191), which aims to deepen their understanding of the issues of theory and method implied in the study of literature. This seminar lays the groundwork for an honors thesis, written in spring quarter (LT 196), each under the supervision of a faculty member who specializes in the literature of the student's primary concentration. The Honors Program concludes with an oral examination of each honors candidate by a faculty committee, which is charged with recommending whether departmental honors are warranted and, if so, which degree of honors will appear on the student's transcript and di-

ploma. A student from this program will also be recommended for the Burckhardt Prize, which is awarded at graduation for outstanding achievement in the literature major. The honors seminar and thesis course may be applied toward the primary concentration in the literature major. For Literature/Writing majors, the honors seminar is considered to be equivalent to a writing workshop.

### *Special Studies*

Students with upper-division standing and a departmental GPA of at least 3.0 are eligible to take Special Studies courses (198s and 199s). Those not satisfying this requirement may, with justification supported by the proposed Special Studies instructor, petition for an exception to the regulation. 198s and 199s require at least 4,000 words of writing or an equivalent project as determined by the instructor. Information and Special Studies Enrollment forms are available in the literature undergraduate office. Enrollment requires departmental approval. These courses may not be used to satisfy upper-division secondary literature requirements for majors.

### *Study Abroad*

Study abroad can significantly enhance a student's major, particularly in ways in which it relates to international issues. Literature students are encouraged to study abroad before their senior year. Students who take Education Abroad Program or Opportunities Abroad Program (EAP/OAP) courses in a country appropriate to their major may use up to five upper-division courses to satisfy major requirements. These must be approved by the department after they have been entered on the student's official record at UCSD. The approval process is described in a hand-out on receiving transfer credit, available in the Literature Undergraduate Office.

### **Individual Program Requirements**

### *Primary Concentration in Literatures in English*

1. Four lower-division courses, two from each of the following two groups:

- a. LTEN 21, 22, 23, and TWS 21.
  - b. LTEN 17, 18, 19, and LTEN 24.
- Even if some or all of these courses are used toward meeting a college's humanities or general-education requirements, they will still count toward satisfying the requirements for the major in literatures in English.
2. Nine upper-division courses in literatures originally written in English, including courses from each of the following five categories:
    - a. British literature before 1660: at least two courses
    - b. British literature from 1660 to 1832: at least one course
    - c. British literature from 1832 to the present: at least one course
    - d. United States literature before 1860: at least one course
    - e. United States literature after 1860: at least one course
  3. One course in literature/theory.
  4. Three courses in a secondary literature, that is, a literature written and taught in a language other than English. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures taught in English translation do not apply to the secondary literature requirement.
  5. Upper-division electives chosen from Department of Literature offerings to make a total of twelve upper-division courses.

### *Primary Concentration in a Foreign Literature*

#### **Literatures in French**

1. Nine upper-division courses as follows:
  - a. LFR 115-116, Themes in French Intellectual and Literary History
  - b. Seven additional upper-division courses in French literature, including at least one course in each of the following periods: seventeenth or eighteenth century; nineteenth century; and twentieth century.
2. Three courses in a secondary literature, that is, a literature written and taught in a lan-

guage other than French. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures which are taught in French do not apply to the secondary literature requirement.

3. Upper-division electives chosen from Department of Literature offerings to make a total of twelve upper-division courses.

#### **Literatures in German**

1. Nine upper-division courses in German literature. Three of these should be in literature written before the year 1850.
2. Three courses in a secondary literature, that is, a literature written and taught in a language other than German. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures taught in German do not apply to the secondary literature requirement.
3. Upper-division electives chosen from Department of Literature offerings to make a total of twelve upper-division courses.

#### **Literatures in Italian**

1. Nine upper-division courses in Italian literature as follows:
  - a. LTIT 100, Introduction to Italian Literature
  - b. LTIT 115, Medieval Studies
  - c. LTIT 161, Advanced Stylistics and Conversation
  - d. LTCS 140, Subaltern Studies in Context or LTIT 150, Italian North American Culture
  - e. Five additional upper-division courses in Italian literature taught in Italian
2. Three courses in a secondary literature, that is, a literature written and taught in a language other than Italian. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures taught in Italian do not apply to the secondary literature requirement.
3. Upper-division electives chosen from Department of Literature offerings to make a total of twelve upper-division courses.

#### **Russian Literature**

1. Russian 1A-B-C and 2A-B-C or their equivalent
2. Twelve upper-division courses in Russian:
  - a. LTRU 101A-B-C
  - b. LTRU 110A-B-C
  - c. Six additional upper-division courses in Russian literature
3. Three courses in a secondary literature, that is, a literature written and taught in a language other than Russian. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures taught in Russian do not apply to the secondary literature requirement.

Students in the Russian literature major are encouraged to participate in the Education Abroad Program (EAP) in Moscow and to investigate other options for foreign study through the Opportunities Abroad Program (OAP). By petition, credits earned through EAP/OAP can fulfill UCSD degree and major requirements.

#### **Literatures in Spanish**

1. Two lower-division Spanish literature courses, as indicated:
  - a. LTSP 50A, Peninsular Literature
  - b. Either LTSP 50B or LTSP 50C, Latin American Literature
2. Nine upper-division courses as follows:
  - a. LTSP 130A, Development of Spanish Literature
  - b. LTSP 130B, Development of Latin American Literature
  - c. LTSP 119A, 119B, or 119C, Cervantes
  - d. Six additional upper-division courses in Spanish, Latin American and/or Chicano literature (taught in Spanish)
3. Three courses in a secondary literature, that is, a literature written and taught in a language other than Spanish. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures taught in Spanish do not apply to the secondary literature requirement.
4. Upper-division electives from Department of Literature offerings, whether in Spanish or in

another literature, to make a total of twelve upper-division courses.

Students majoring in Spanish can choose to concentrate on either Spanish or Latin American literature. All students, however, are encouraged to take courses in the various national literatures as well as in Chicano literature for a broad background in Spanish language literatures.

Students not having a solid linguistic base in Spanish are advised to take intermediate language courses from the LTSP 2 and 50 sequences for additional review of Spanish grammar, development of writing skills, and introduction to literary analysis. Only 50A and either 50B or 50C, however, can count towards the major.

It is strongly recommended that students take LTSP 130A before any other upper-division Spanish (peninsular) literature course and LTSP 130B before any other upper-division Latin American literature course.

### ***Primary Concentration in Literatures of the World***

The major in Literatures of the World allows students to expand the focus of their work beyond a single-language literature. They plan an individual program with options in regional studies (Europe, the Americas, East Asia, Africa, Near East) and topical studies (genre, period, gender, ethnic literature, literature and the visual arts, cultural studies, literature and science, writing, Third World Studies, The Western Tradition) as well as the single-language literatures.

1. Lower-division (three courses):

A three-course sequence in literature chosen from any section in literature.

**Note:** Students can combine courses in an original national language/literature with courses in translation to satisfy this requirement, such as LTFR 2A and 2B plus LTWL 4A (Fiction and Film in the 20th Century: France)

2. Upper-division (twelve courses):

- a. six courses in a regional or single-language literature, to be taken in the original language(s) or in translation
- b. four courses focused on a topic or another regional or single-language literature
- c. two courses in non-European and non-U.S. literature; if satisfied under group (a)

or group (b), any other two literature courses may be substituted.

3. Three courses in a secondary literature, that is, a literature written and taught in a language different from that of the primary literature. At least one of these courses must be upper-division. Upper-division courses taken to satisfy the secondary literature requirement may be counted as part of the twelve upper-division courses for the major and may, where appropriate, be applied to requirements in Group 2. Students should see an adviser when selecting specific courses that will be taken to satisfy this requirement. Special studies courses (198s and 199s) and courses in foreign literatures taught in translation do not apply to the secondary literature requirement.

**At least two of the required twelve upper-division courses must be in literature written before 1850. No more than four courses in Lit/Writing may be taken as part of the world literatures major, and these will generally apply to Group 2.b.**

Courses formerly listed under General Literature have been renumbered effective fall 1998 under the following subject headings:

- LTAF—African Literatures
- LTAM—Literature of the Americas
- LTEA—East Asian Literatures
- LTEU—European and Eurasian Literatures
- LTNE—Near Eastern Literatures
- LTWL—World Literatures (courses or sequences which do not belong to a single linguistic or regional grouping)

### ***The Pre-Writing Major***

Until they are admitted to the writing major, students may indicate their interest in writing by declaring a pre-writing major using the pre-writing major code (LT01). Admission to the writing major will be determined by evaluation of each student's performance in the LTWR 8A/8B/8C sequence.

Normally, students are expected to achieve a grade of B or better in each of these courses to ensure their eligibility for declaring the major.

### ***Primary Concentration in Writing***

The writing major is designed to provide directed experience in writing prose fiction and

nonfiction, media workshops, and poetry, as well as intensive work in practical criticism. An indispensable feature of the program is that it involves students with the work of their peers. Those who think of themselves as writers will find courses regularly offered in the various genres to develop their own style and breadth of experience in composing and criticism. Those students who are primarily interested in the teaching of writing will find the major a context both for writing extensively and for dealing critically with the act of written composition.

**Note** that students who entered UCSD fall 1991 and after must complete the sequence LTWR 8A/8B/8C prior to declaring a major in Writing; beginning fall 1996, entering students had the option of substituting LTWR 8D for 8C. The LTWR 8D option is discontinued as of fall 1998. The major requirements are as follows:

1. Any of the following literature sequences:

- a. LTWL 4A-B-D-E-M—any three courses in the sequence (Fiction and Film in Twentieth-Century Societies)
- b. LTWL 19A-B-C (The Graeco-Roman World)
- c. LTEN 21, 22, and one course chosen from LTEN 17, 18, 19, 23, or 24.
- d. TWS 21, 22, 23, 24, 25, 26 (Third World Literatures)

2. A minimum of twelve upper-division courses:

- a. Six upper-division courses in Lit/Writing from the writing workshop sequence (LTWR 100–135, 180). These workshops may be repeated for credit (see course listing for number of times workshops may be repeated), but the requirement should show a range of writing experience in at least two major writing types. No other courses may be substituted for this basic requirement of six upper-division workshops.

- b. One course from the group numbered Lit/Writing 140-146.
- c. Five upper-division electives chosen from Department of Literature offerings; at least four of these courses must be other than Lit/Writing workshops.

3. Three courses in a secondary literature, that is, a literature written and taught in a language other than English. At least one of these courses must be upper-division. Stu-



dents should see an adviser when selecting specific courses that will be taken to satisfy this requirement. Special studies courses (198s and 199s) and courses in foreign literatures which are taught in English translation do not apply to the secondary literature requirement.

### ***Double Major in Writing and a Subject outside Literature***

Students who wish to major both in Literature/Writing and in a department other than the Department of Literature must fulfill all requirements for the writing major as described above. Students must submit a double major petition for approval by the participating departments and the student's provost office.

### ***Double Major within the Department of Literature in Writing and Another Literature***

Students who wish to major both in writing and in literature (any section) should see the department for information regarding appropriate double major requirements.

### **The Minor in Literature**

The department offers a wide range of possibilities for noncontiguous minors. The options include courses in a single regional or national literature, courses in more than one literature, and a combination of language and literature courses. In all instances, the minors require six or seven courses depending upon a student's first quarter of attendance at UCSD. *All courses taken to complete a literature minor must be taken for a letter grade.* No grade below C- is acceptable.

Please see the department undergraduate office for specific minor requirements.

For students entering winter quarter 1998 and thereafter, a minor in literature will consist of seven courses as described below.

French, German, Greek, Italian, Latin, Russian, and Spanish Literatures: a three-course lower-division literature sequence plus four or more upper-division courses in the same literature.

Literatures in English, Literatures of the World, and Literature/Writing: seven courses, at least five of which must be upper-division.

Lower-division courses applicable toward minors:

English—LTEN 17, 18, 19, 21, 22, 23, 24, 50

French—LTFR 2A, 2B, 2C, 50

German—LTGM 2A, 2B, 2C, 50, 51, 52, 53

Greek—LTGK 1, 2, 3

Hebrew—JUDA 1, 2, 3 (see Judaic Studies)

Italian—LTIT 2A, 2B, 50

Latin—LTLA 1, 2, 3

Russian—LTRU 2A, 2B, 2C

Spanish—LTSP 2A, 2B, 2C, 2D, 50A, 50B, 50C

Writing—LTWR 8A, 8B, 8C

General Minor—For students entering Fall 1997 and earlier: six Literature courses: usually 1) a three-course lower-division sequence such as LTEN 17/18/19, LTEN 21/22/23, LTFR 2A/2B/50, LTGN 19A/9B/19C, LTLA 1/2/3, LTSP 2A/2B/2C; and 2) three or more upper-division courses, at least two of which must be in a single national literature, taught either in the original language or in translation. No more than one upper-division course in Literature/Writing may be applied toward the general literature minor. Students should see the general literature faculty adviser or the undergraduate staff when planning a minor or program of concentration in general literature.

Literatures of the World—For students entering Winter 1998 and thereafter: seven literature courses—usually 1) a two- or three-course lower-division sequence and 2) five upper-division courses with a single unifying theme.

Writing Minor—The minimum of five upper-division courses must cover at least two major writing genres, with course work chosen from writing courses numbered 100 through 180.

Please see the department for further information and specifics regarding minors in literature.

### **The Graduate Program**

### **Doctoral Degree Program**

The department now offers a single Ph.D. in literature with concentrations in any of the fields in which members of the department do research (see below). The C.Phil. (candidate in philosophy) is conferred upon all students who pass the qualifying examination and are advanced to candidacy for the Ph.D. Students in

the doctoral program may also qualify for the M.A. upon completion of their qualifying examinations.

### **Preparation**

The following are requirements for admission to graduate study in literature:

1. A baccalaureate or a master's degree with a major in one of the literatures offered by the department, or in another field approved by the departmental committee on graduate studies.
2. Satisfactory scores on the Graduate Record Examination achieved within the past three calendar years. The Subject Test is not required.
3. A complementary working knowledge of a second language.

### **Course of Study**

Formal study begins with a first-year, three-quarter introductory sequence (Literature/Theory 200A-B-C) having an interdisciplinary and theoretical emphasis. During the first three years, the course of study will include at least four seminars in one literature and two in another (students in comparative literature must take at least one seminar or upper-division undergraduate course in a third literature); at least four seminars drawn from offerings in literary theory, the second or a third literature, cultural studies, comparative literature, or composition studies; and five additional seminars open entirely to the student's choice (four for students in comparative literature). Such "open" seminars should generally be related to the intended dissertation field. Seminars in other disciplines may be substituted for any of the latter group, with the adviser's permission. Students must also fulfill a historical breadth requirement by completing two seminars dealing with texts or cultural practices prior to 1800. For students with approved M.A. degrees the initial three-year sequence can be reduced to two.

Students in comparative literature must take four of the above-described seminars in comparative literature. Comparative literature seminars taken for Literature 1, 2, or 3 must be substantially focused upon the relevant language and deal with materials in the original. Students who wish to take these courses in a

another literature, to make a total of twelve upper-division courses.

Students majoring in Spanish can choose to concentrate on either Spanish or Latin American literature. All students, however, are encouraged to take courses in the various national literatures as well as in Chicano literature for a broad background in Spanish language literatures.

Students not having a solid linguistic base in Spanish are advised to take intermediate language courses from the LTSP 2 and 50 sequences for additional review of Spanish grammar, development of writing skills, and introduction to literary analysis. Only 50A and either 50B or 50C, however, can count towards the major.

It is strongly recommended that students take LTSP 130A before any other upper-division Spanish (peninsular) literature course and LTSP 130B before any other upper-division Latin American literature course.

### *Primary Concentration in Literatures of the World*

The major in Literatures of the World allows students to expand the focus of their work beyond a single-language literature. They plan an individual program with options in regional studies (Europe, the Americas, East Asia, Africa, Near East) and topical studies (genre, period, gender, ethnic literature, literature and the visual arts, cultural studies, literature and science, writing, Third World Studies, The Western Tradition) as well as the single-language literatures.

1. Lower-division (three courses):

A three-course sequence in literature chosen from any section in literature.

**Note:** Students can combine courses in an original national language/literature with courses in translation to satisfy this requirement, such as LTFR 2A and 2B plus LTWL 4A (Fiction and Film in the 20th Century: France)

2. Upper-division (twelve courses):

- a. six courses in a regional or single-language literature, to be taken in the original language(s) or in translation
- b. four courses focused on a topic or another regional or single-language literature
- c. two courses in non-European and non-U.S. literature; if satisfied under group (a)

or group (b), any other two literature courses may be substituted.

3. Three courses in a secondary literature, that is, a literature written and taught in a language different from that of the primary literature. At least one of these courses must be upper-division. Upper-division courses taken to satisfy the secondary literature requirement may be counted as part of the twelve upper-division courses for the major and may, where appropriate, be applied to requirements in Group 2. Students should see an adviser when selecting specific courses that will be taken to satisfy this requirement. Special studies courses (198s and 199s) and courses in foreign literatures taught in translation do not apply to the secondary literature requirement.

**At least two of the required twelve upper-division courses must be in literature written before 1850. No more than four courses in Lit/Writing may be taken as part of the world literatures major, and these will generally apply to Group 2.b.**

Courses formerly listed under General Literature have been renumbered effective fall 1998 under the following subject headings:

- LTAF—African Literatures
- LTAM—Literature of the Americas
- LTEA—East Asian Literatures
- LTEU—European and Eurasian Literatures
- LTNE—Near Eastern Literatures
- LTWL—World Literatures (courses or sequences which do not belong to a single linguistic or regional grouping)

### *The Pre-Writing Major*

Until they are admitted to the writing major, students may indicate their interest in writing by declaring a pre-writing major using the pre-writing major code (LT01). Admission to the writing major will be determined by evaluation of each student's performance in the LTWR 8A/8B/8C sequence.

Normally, students are expected to achieve a grade of B or better in each of these courses to ensure their eligibility for declaring the major.

### *Primary Concentration in Writing*

The writing major is designed to provide directed experience in writing prose fiction and

nonfiction, media workshops, and poetry, as well as intensive work in practical criticism. An indispensable feature of the program is that it involves students with the work of their peers. Those who think of themselves as writers will find courses regularly offered in the various genres to develop their own style and breadth of experience in composing and criticism. Those students who are primarily interested in the teaching of writing will find the major a context both for writing extensively and for dealing critically with the act of written composition.

**Note** that students who entered UCSD fall 1991 and after must complete the sequence LTWR 8A/8B/8C prior to declaring a major in Writing; beginning fall 1996, entering students had the option of substituting LTWR 8D for 8C. The LTWR 8D option is discontinued as of fall 1998. The major requirements are as follows:

1. Any of the following literature sequences:

- a. LTWL 4A-B-D-E-M—any three courses in the sequence (Fiction and Film in Twentieth-Century Societies)
- b. LTWL 19A-B-C (The Graeco-Roman World)
- c. LTEN 21, 22, and one course chosen from LTEN 17, 18, 19, 23, or 24.
- d. TWS 21, 22, 23, 24, 25, 26 (Third World Literatures)

2. A minimum of twelve upper-division courses:

- a. Six upper-division courses in Lit/Writing from the writing workshop sequence (LTWR 100–135, 180). These workshops may be repeated for credit (see course listing for number of times workshops may be repeated), but the requirement should show a range of writing experience in at least two major writing types. No other courses may be substituted for this basic requirement of six upper-division workshops.
- b. One course from the group numbered Lit/Writing 140-146.
- c. Five upper-division electives chosen from Department of Literature offerings; at least four of these courses must be other than Lit/Writing workshops.

3. Three courses in a secondary literature, that is, a literature written and taught in a language other than English. At least one of these courses must be upper-division. Stu-

dents should see an adviser when selecting specific courses that will be taken to satisfy this requirement. Special studies courses (198s and 199s) and courses in foreign literatures which are taught in English translation do not apply to the secondary literature requirement.

### ***Double Major in Writing and a Subject outside Literature***

Students who wish to major both in Literature/Writing and in a department other than the Department of Literature must fulfill all requirements for the writing major as described above. Students must submit a double major petition for approval by the participating departments and the student's provost office.

### ***Double Major within the Department of Literature in Writing and Another Literature***

Students who wish to major both in writing and in literature (any section) should see the department for information regarding appropriate double major requirements.

### **The Minor in Literature**

The department offers a wide range of possibilities for noncontiguous minors. The options include courses in a single regional or national literature, courses in more than one literature, and a combination of language and literature courses. In all instances, the minors require six or seven courses depending upon a student's first quarter of attendance at UCSD. *All courses taken to complete a literature minor must be taken for a letter grade.* No grade below C- is acceptable.

Please see the department undergraduate office for specific minor requirements.

For students entering winter quarter 1998 and thereafter, a minor in literature will consist of seven courses as described below.

French, German, Greek, Italian, Latin, Russian, and Spanish Literatures: a three-course lower-division literature sequence plus four or more upper-division courses in the same literature.

Literatures in English, Literatures of the World, and Literature/Writing: seven courses, at least five of which must be upper-division.

Lower-division courses applicable toward minors:

English—LTEN 17, 18, 19, 21, 22, 23, 24, 50

French—LTFR 2A, 2B, 2C, 50

German—LTGM 2A, 2B, 2C, 50, 51, 52, 53

Greek—LTGK 1, 2, 3

Hebrew—JUDA 1, 2, 3 (see Judaic Studies)

Italian—LTIT 2A, 2B, 50

Latin—LTLA 1, 2, 3

Russian—LTRU 2A, 2B, 2C

Spanish—LTSP 2A, 2B, 2C, 2D, 50A, 50B, 50C

Writing—LTWR 8A, 8B, 8C

General Minor—For students entering Fall 1997 and earlier: six Literature courses: usually 1) a three-course lower-division sequence such as LTEN 17/18/19, LTEN 21/22/23, LTFR 2A/2B/50, LTGN 19A/9B/19C, LTLA 1/2/3, LTSP 2A/2B/2C; and 2) three or more upper-division courses, at least two of which must be in a single national literature, taught either in the original language or in translation. No more than one upper-division course in Literature/Writing may be applied toward the general literature minor. Students should see the general literature faculty adviser or the undergraduate staff when planning a minor or program of concentration in general literature.

Literatures of the World—For students entering Winter 1998 and thereafter: seven literature courses—usually 1) a two- or three-course lower-division sequence and 2) five upper-division courses with a single unifying theme.

Writing Minor—The minimum of five upper-division courses must cover at least two major writing genres, with course work chosen from writing courses numbered 100 through 180.

Please see the department for further information and specifics regarding minors in literature.

### **The Graduate Program**

### **Doctoral Degree Program**

The department now offers a single Ph.D. in literature with concentrations in any of the fields in which members of the department do research (see below). The C.Phil. (candidate in philosophy) is conferred upon all students who pass the qualifying examination and are advanced to candidacy for the Ph.D. Students in

the doctoral program may also qualify for the M.A. upon completion of their qualifying examinations.

### **Preparation**

The following are requirements for admission to graduate study in literature:

1. A baccalaureate or a master's degree with a major in one of the literatures offered by the department, or in another field approved by the departmental committee on graduate studies.
2. Satisfactory scores on the Graduate Record Examination achieved within the past three calendar years. The Subject Test is not required.
3. A complementary working knowledge of a second language.

### **Course of Study**

Formal study begins with a first-year, three-quarter introductory sequence (Literature/Theory 200A-B-C) having an interdisciplinary and theoretical emphasis. During the first three years, the course of study will include at least four seminars in one literature and two in another (students in comparative literature must take at least one seminar or upper-division undergraduate course in a third literature); at least four seminars drawn from offerings in literary theory, the second or a third literature, cultural studies, comparative literature, or composition studies; and five additional seminars open entirely to the student's choice (four for students in comparative literature). Such "open" seminars should generally be related to the intended dissertation field. Seminars in other disciplines may be substituted for any of the latter group, with the adviser's permission. Students must also fulfill a historical breadth requirement by completing two seminars dealing with texts or cultural practices prior to 1800. For students with approved M.A. degrees the initial three-year sequence can be reduced to two.

Students in comparative literature must take four of the above-described seminars in comparative literature. Comparative literature seminars taken for Literature 1, 2, or 3 must be substantially focused upon the relevant language and deal with materials in the original. Students who wish to take these courses in a

literature for which seminars are not regularly offered in the Department of Literature may substitute 298s or undergraduate courses enhanced by additional assignments. To do so, however, students must demonstrate through prior course work that they have already attained graduate-level competency in the literature and language in question and they must obtain approval from the comparative literature graduate adviser.

The third year—during which in place of three seminars, students may opt for three courses in independent study—is in part spent in completing preparation of the research papers required as part of the qualifying examination, which usually comes during the last quarter of the third year, but which must be completed by the end of the tenth quarter. The fourth and fifth years will be devoted to preparation of the dissertation.

Students may write dissertations in any of the fields in which members of the department do research. These fields now include English, American, French, German, biblical Hebrew, Italian, Greek, Latin, Spanish, Chinese, Japanese, Russian, Chicano, Asian-American, and African-American literature, comparative literature, literary theory, women's studies, cultural studies, early modern studies, and composition studies.

### ***Specialty in Composition Theory, Research, and Practice***

The Department of Literature offers special studies to graduate students who wish to concentrate on composition theory, research, and practice. The composition subspecialty is an interdisciplinary course of study that requires students to work with faculty in both the department and across the university. The department regularly offers graduate seminars taught by faculty in composition, along with a variety of seminars on history, theory, cultural studies, and literatures in English of special interest to students in composition. Students in special studies in composition take two research methods courses outside the department on topics such as field work, historiography, or research design in the human sciences to qualify them to conduct the research for their dissertations. Students are also encouraged to apply to teach in one of the five college undergraduate writing programs on campus, to see for themselves

how classroom and administrative practice intersect with theory and research.

### ***Language Requirements***

Graduate students in literature are required to develop the ability to read literary and secondary texts and—when appropriate—to follow seminar discussions or lectures in a second language, a language other than the one in which the literature of their intended specialization is written. To satisfy this requirement students must demonstrate language proficiency and completion of two seminars in the literature of the second language or, in exceptional cases, by completing with the grade of A two upper-division undergraduate courses given in the language. Students must pass an examination in reading, interpretation, and translation in each of the two courses taken to satisfy the second language requirement. The language requirements must be satisfied by the end of the third year of study.

Doctoral students specializing in comparative literature require knowledge in depth of two foreign languages. "Knowledge in depth" means the ability to attend graduate seminars given in the original language (or seminars where the texts are read in the original language). Students must demonstrate this ability by enrolling in such seminars or, where this is not possible, by taking guided independent study in the language in question.

The M.A. program in comparative literature requires knowledge in depth of one foreign language.

### ***Advancement to Candidacy***

No later than the first quarter of the third year, the student should choose a Ph.D. adviser, who will, in consultation with the student, form a qualifying examination committee. The student and the qualifying examination committee will jointly determine the nature of the long research paper (45–60 pages) and the two shorter research papers (20–30 pages) to be submitted for the C. Phil. degree. After satisfactory completion of the papers, a two-hour oral doctoral examination takes place. On passing the oral examination, the student is declared eligible for advancement to candidacy for the Ph.D. The C. Phil. degree is conferred on those so advanced. Thereupon, a doctoral disserta-

tion is written. This work is defended in a traditional final examination.

### ***Teaching***

The department requires that each Ph.D. student do some apprentice teaching before the completion of the degree; the minimum amount required is equivalent to the duties expected of a half-time teaching assistant for three academic quarters. This teaching involves conducting, with the guidance and support of a supervising professor, discussion sections and related activities in a variety of freshman and sophomore courses. Academic credit is granted for the training given under the apprentice teaching program.

### ***Grading***

The only grading option for literature graduate courses is Satisfactory/Unsatisfactory (S/U). Students receive written evaluations of their performance in seminars.

### **Departmental Ph.D. Time Limit Policies**

Students must be advanced to candidacy by the tenth quarter of study. Departmental normative time is five years. Total registered time at UCSD cannot exceed eight years.

### **Financial Support**

Ph.D. students entering the program with a B.A. may be supported (either by employment or fellowships) for five years. Students who have an M.A. and have been given transfer credit may be supported for four years. Such support depends upon the funds available, the number of students eligible, and the rate of progress.

### **Master's Degree Program**

The master's degree program is intended to meet the needs of several groups: (1) persons interested in possibly applying later, at UCSD or elsewhere, for admission to a Ph.D. program and wishing to strengthen their preparation for such a program; (2) persons seeking a master's degree only, for reasons of professional devel-

opment or cultural enrichment; and (3) graduate students who have been admitted to the Ph.D. program and who decide to qualify also for a master's degree. The M.A. degree is currently available in five fields: literatures in English, French, German, Spanish, and Comparative literature. It is possible to take an M.A. in Spanish with a special emphasis on bilingual discourse or an M.A. in English with a special emphasis on composition theory. **Note:** *The department does not offer financial support for M.A. candidates.* It is possible, in cases of full-time employment or other compelling reasons, to apply for permission to enroll on a part-time basis.

Completed applications and supporting materials must be received before January 9, 1998 for admission to the following fall quarter. Those planning to apply should take the Graduate Record Examination far enough in advance so that the scores will be available to the admissions committee in January.

The requirements for the M.A. degree are a total of thirty-six units. Included must be the following:

1. Twenty units of graduate seminars, including Literature/Theory 201, which is normally taken during a student's first quarter in the program.
2. Eight additional units of graduate seminars, upper-division courses, and/or guided independent study. Up to four units of supervised teaching at UCSD may be applied toward this eight-unit requirement.
3. For the M.A. in French, German, Spanish, and Literatures in English students will be required to complete a minimum of sixteen units of course work—including graduate seminars, upper-division classes, and Literature 298—in the specific literature, read in its original language, in which they will receive their degree. For the M.A. in comparative literature students will be required to complete a minimum of twelve units of course work in one literature of concentration. Comparative literature seminars are recommended when their focus is substantially upon the literature in question and they deal with materials in the original language.
4. Four units of literature in a language other than that of the student's principal concentration. For students in French, German,

Spanish and literatures in English, this course may be taken either in the original language or in translation, and it may be used toward fulfilling the requirements listed under items 1 and 2 above. An upper-division or graduate course in English or American literature may be used to fulfill this requirement by students working toward an M.A. degree in French, German, or Spanish. An upper-division course in general literature may be taken to satisfy this requirement as long as its principal readings were originally written in a language other than that of their principal concentration. For the M.A. in comparative literature students must take either eight units of seminar work in the second literature (other than the literature of concentration) or four units of seminar work in a second and four units of seminar or upper-division course in a third literature. Texts or other materials must be dealt with in the original languages. Comparative literature seminars are recommended when their focus is substantially upon the literature in question and they deal with materials in the original language.

5. For the M.A. in comparative literature students must take at least one seminar in comparative literature. This requirement can be satisfied by a course taken for item 3 or item 4 above. Students wishing to take courses for requirements 3 or 4 above in a literature for which seminars are not regularly offered in the Department of Literature may substitute 298s or upper-division undergraduate courses enhanced by additional assignments. To do so, however, students must demonstrate through prior course work that they have already attained graduate-level competency in the literature and language in question and they must obtain approval from the comparative literature graduate adviser. Such 298s and upper-division courses should not exceed a total of two courses within a student's program unless demonstrably necessary.
6. Eight units of guided research, culminating in an acceptable master's thesis or master's examination.

The only grading option for literature graduate courses is Satisfactory/Unsatisfactory (S/U). Students receive written evaluations of their performance.

## COURSES

**Note:** A list of specific course offerings (with names of instructors for the 1998–99 academic year) is available in the undergraduate office of the Department of Literature, LIT 3110. A list of graduate course offerings is available in the graduate office, LIT 3140.

Undergraduate students may enroll in graduate seminars with the consent of instructor and will receive a P/NP grade unless they petition for a letter-grade option within the first four weeks of the quarter in which the course is taken.

### CHINESE LITERATURE

#### UPPER-DIVISION

*Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.*

#### **LTCB 101. Readings in Contemporary Chinese Literature (4)**

Intended for students who have the competence to read contemporary Chinese texts, poetry, short stories, and criticism in vernacular Chinese. May be repeated for credit as topics vary.

### COMPARATIVE LITERATURE

#### GRADUATE

#### **LTCO 202A-B-C. History of European Criticism and Aesthetics (4-4-4)**

A core course for comparative literature, strongly recommended for all graduate students in the comparative literature program. A historical survey of criticism and aesthetics divided as follows: 202A, Classical Antiquity; 202B, Renaissance to Enlightenment; 202C, Romanticism to late nineteenth century.

#### **LTCO 210. Classical Studies (4)**

Analysis of significant works of the Greek and Roman traditions, with attention to their interest for later European literature. May be repeated for credit as topics vary.

#### **LTCO 212. Studies in the Hebrew Bible (4)**

Analysis of books of the Hebrew Bible from literary, historical, archaeological, theological, and psychological perspectives; text-critical and source-critical study of the Hebrew text. Repeatable for credit when topics vary.

#### **LTCO 231. Eighteenth-Century Studies (4)**

One or more major writers, texts, or trends of eighteenth-century European literature. May be repeated for credit when topics vary.

#### **LTCO 242. Nineteenth-Century Studies (4)**

Consideration of one or more major figures, texts, trends, or problems in the nineteenth century. May be repeated for credit as topics vary.

#### **LTCO 243. Symbolism (4)**

A study of the poetic imagery and of the changes in symbolic and thematic significance from the eighteenth to the twentieth century. May be repeated for credit as topics vary.

**LTCO 252. Modernism (4)**

A sample investigation into the concept of period. The course will deal also with the question of the existence of modernism, the description of the phenomenon, and the causes to which it is to be attributed. May be repeated for credit as topics vary.

**LTCO 264. Oral Literature (4)**

An introduction, through the study of recordings of actual oral performance as well as of the written record, to research in oral literature and the theoretical and methodological problems entailed.

**LTCO 270. Historical Thinking (4)**

This seminar will address the ways in which concepts of history inform interpretive projects in comparative literature. Topics will include: hermeneutics, historicism, philology, the "new" historicism, historiographic theory, "Third World" historiography, the history of books, and experimental historiography. Repeatable for credit when topics vary.

**LTCO 274. Genre Studies (4)**

A consideration of a representative selection of works relating to a theme, form, or literary genre. May be repeated for credit as topics vary.

**LTCO 281. Literature and Film (4)**

A study of literature and film in relation to one another, to critical and aesthetic theories, and to historical contexts.

**LTCO 282. Literature and Philosophy (4)**

Questions and problems from the history of philosophy or from the various fields of philosophy (e.g., epistemology, ethics, logic) in their interaction with intellectual issues and questions addressed by literary criticism and theory. Repeatable for credit when topics vary.

**LTCO 295. M.A. Thesis (1-8)**

Research for the master's thesis. Opened for repeated registration up to eight units. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: enrolled in M.A. program.*

**LTCO 296. Research Practicum (1-12)**

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

**LTCO 297. Directed Studies: Reading Course (1-12)**

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

**LTCO 298. Special Projects: Writing Course (1-12)**

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

**LTCO 299. Dissertation (1-12)**

Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

**LITERATURE/CULTURAL STUDIES****LOWER-DIVISION****LTCS 50. Introduction to Cultural Studies (4)**

An introduction to cultural studies with a focus on the following areas: literary and historical studies, popular culture,

women's studies, ethnic studies, science studies, and gay/lesbian studies. Particular emphasis on the question of "cultural practices" and their social and political conditions and effects.

**UPPER-DIVISION**

*Prerequisite: upper-division standing or consent of instructor.*

**LTCS 110. Popular Culture (4)**

A reading of recent theory on popular culture and a study of particular texts dealing with popular cultural practices, both contemporary and noncontemporary, as sites of conflict and struggle. Repeatable for credit when topics vary.

**LTCS 120. Historical Perspectives on Culture (4)**

The course will explore the relation among cultural production, institutions, history, and ideology during selected historical periods. In considering different kinds of texts, relations of power and knowledge at different historical moments will be discussed. Repeatable for credit when topics vary.

**LTCS 130. Gender, Race/Ethnicity, Class, and Culture (4)**

The course will focus on the representation of gender, ethnicity, and class in cultural production in view of various contemporary theories of race, sex, and class. Repeatable for credit when topics vary.

**LTCS 135. Interdisciplinary Approaches to Lesbian, Gay, Bisexual, and Transgender Studies (4)**

Introduction to interdisciplinary examination of human sexuality and, especially, lesbian, gay, bisexual, and transgender identities and desires. Juxtaposes perspectives from humanities, social sciences, and natural sciences. Introduces queer theory to understand sexuality in relation to phenomena such as government, family, culture, medicine, race, gender, and class.

**LTCS 140. Subaltern Studies in Context (4)**

This course will explore some basic texts related to subaltern studies and the variations in the field as related to national and historical situations. Repeatable for credit when readings and focus vary.

**LTCS 150. Topics in Cultural Studies (4)**

The course will examine one or more forms of cultural production or cultural practice from a variety of theoretical and historical perspectives. Topics may include: contemporary debates on culture, genres of popular music/fiction/film, AIDS and culture, the history of sexuality, subcultural styles, etc. Repeatable for credit when topics vary.

**LTCS 155. The Cultural Politics of Science and Technology (4)**

The course will examine interventions by the technosciences in the lives of citizens in the domains of biology, genetics, and medicine, including technologies of reproduction, drug testing, the Human Genome Project, scientific/medical responses to AIDS, etc. Repeatable for credit.

**LTCS 170. Visual Culture (4)**

The course will focus on visual practices and discourses in their intersection and overlap, from traditional media, print, and photography to film, video, TV, computers, medical scanners, and the Internet.

**LTCS 198. Directed Group Study (4)**

Directed group research, under the guidance of a member of the faculty, in an area not covered in courses currently offered by the department. (P/NP only.) *Prerequisite: permission of the department.*

**LTCS 199. Special Studies (2 or 4)**

Individual reading in an area not covered in courses currently offered by the department. (P/NP only.) *Prerequisite: permission of the department.*

**GRADUATE****LTCS 201. Theories and Methods of Analysis in Cultural Studies (4)**

Contemporary theories of cultural studies. The seminar will concentrate on major interpretive approaches drawn from several areas of cultural and political analysis, including historicism, Marxist theory, feminism, structuralism, psychoanalytic theory, semiotics, postmodernist studies, gay and lesbian studies, and others. The particular focus and approach may vary. Repeatable for credit. *Prerequisite: graduate standing or consent of instructor.*

**LTCS 202. Cultural Texts (4)**

This seminar will examine a wide-ranging variety of cultural texts and use them to explore methods of reading and interpreting culture. Cultural texts may include: popular music, popular literature, film/TV/video, comics, photography, performance art.

**LTCS 210. History and Culture (4)**

This seminar will focus on the cultural practices of a particular historical period as a means of analyzing the relation between culture/ideology and economic and political modes of production and domination. Topic, historical period, and theoretical approach may vary. Repeatable for credit. *Prerequisite: graduate standing or consent of instructor.*

**LTCS 220. Film/TV/Video Studies (4)**

The seminar will concentrate on genres or subgenres within film/TV/video studies or on a stand of film/TV/video theory. Possible topics may include: horror film, melodrama, sitcoms/soaps/talk shows, music videos, black or queer cinema, etc. Repeatable for credit.

**LTCS 222. Theory and History of Film (4)**

This course will consider various theoretical approaches to film texts (historical-materialist, feminist, psychoanalytic, semiotic) as well as the history of film, the political economy of film production and distribution, exhibition practices, and spectatorship in national and transnational contexts. Repeatable for credit.

**LTCS 225. Interdisciplinary and Historical Analysis of Cultural Texts (4)**

The seminar will focus on a particular historical period and examine a variety of cultural texts vis-a-vis related historical, economic, political, and sociological discourses. The conjunction and disjunction of approaches will be explored in relation to specific texts. Repeatable for credit.

**LTCS 250. Topics in Cultural Studies (4)**

This seminar will be organized around any of various topic areas relating to cultural studies. These might include studies in colonialism, historicism, gender, sexuality, social institutions, popular culture, subaltern practices, etc. May be repeated for credit as topics vary. *Prerequisite: graduate standing or consent of instructor.*

**LTCS 255. Cultural Studies, Colonialism, and Decolonialization (4)**

This course considers different approaches to the study of colonialism in a variety of national contexts. Educational, legal, religious, military, and cultural apparatuses of colonialism, theories of decolonialization, the "postcolonial" and feminist critiques of "modernity"/modernization will also be studied.

**LTCS 256. Cultural Studies of Technoscience (4)**

The course will explore work in cultural studies, feminist studies, and queer theory of scientific practices altering social relations, cultural identities, and conceptions of "nature." Issues may include the AIDS pandemic, genetic research, electronic communities, reproductive technologies, and other topics. Repeatable for credit.



**LTCS 260. National Cultures (4)**

Selected topics on the construction of national cultural identities. Investigation of the dynamics of canon formation and nation building in specific historical contexts. Repeatable for credit.

**LTCS 295. M.A. Thesis (1-8)**

Research for master's thesis. May be repeated for a cumulative total of up to eight units.

**LTCS 296. Research Practicum (1-12)**

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

**LTCS 297. Directed Studies: Reading Course (1-12)**

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

**LTCS 298. Special Projects: Writing Course (1-12)**

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

**LTCS 299. Dissertation (1-12)**

Research toward the dissertation. Open only to Ph.D. students who have advanced to candidacy. Repeatable for credit.

**LITERATURES IN ENGLISH****LOWER-DIVISION****LTEN 17. Introduction to African American Literature (4)**

A lecture discussion course that examines a major topic or theme in African American literature as it is developed over time and across the literary genres of fiction, poetry, and belles lettres. A particular emphasis of the course is how African American writers have adhered to or departed from conventional definitions of genre.

**LTEN 18. Introduction to Asian-American Literature (4)**

This course provides an introduction to the study of the history, communities, and cultures of different Asian-American people in the United States. Students will examine different articulations, genres, conflicts, narrative forms, and characterizations of the varied Asian experience.

**LTEN 19. Introduction to Chicano Literature (4)**

This course provides an introduction to the literary production of the population of Mexican origin in the United States. Students will examine a variety of texts dealing with the historical (social, economic, and political) experiences of this heterogeneous population.

**LTEN 21. Introduction to the Literature of the British Isles: Pre-1660 (4)**

An introduction to the literatures written in English in Britain before 1660, with a focus on the interaction of text and history.

**LTEN 22. Introduction to the Literature of the British Isles: 1660-1832 (4)**

An introduction to the literatures written in English in Britain and Ireland between 1660 and 1832, with a focus on the interaction of text and history.

**LTEN 23. Introduction to the Literature of the British Isles: 1832-Present (4)**

An introduction to the literatures written in English in Britain, Ireland, and the British Empire (and the former British Empire) from 1832 to the present, with a focus on the interaction of text and history.

**LTEN 24. Introduction to the Literature of the United States (4)**

An introduction to the literatures written in English in the United States, with a focus on the interaction of text and history.

**LTEN 50. Introduction to Shakespeare: The Theatre and the World (4)**

An introduction to Shakespeare's dramatic achievement through the study of several major plays—representative comedies, histories, and tragedies—in their literary, intellectual, and social contexts.

**UPPER-DIVISION**

*Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.*

**LTEN 106. The Medieval Period (4)**

Studies in medieval English literature. Topics such as medieval allegory in English, Chaucer's contemporaries, Middle English lyrics, and Middle English romances as well as surveys of Middle English literature will be presented.

**LTEN 107. Chaucer (4)**

A study of Chaucer's poetic development, beginning with *The Book of the Duchess* and *The Parliament of Fowls*, including *Troilus* and *Criseyde*, and concluding with substantial selections from *The Canterbury Tales*.

**LTEN 110. The Renaissance: Themes and Issues (4)**

Major literary works of the Renaissance, an exciting period of social and cultural transformation in England as elsewhere in Europe. Topics may include a central theme (e.g., humanism, reformation, revolution), a genre (e.g., pastoral), or comparison with other arts and sciences.

**LTEN 112. Shakespeare I: The Elizabethan Period (4)**

A lecture/discussion course exploring the development of Shakespeare's dramatic powers in comedy, history, and tragedy, from the early plays to the middle of his career. Dramatic forms, themes, characters, and styles will be studied in the contexts of Shakespeare's theatre and his society. Enrollment limited to upper-division students.

**LTEN 113. Shakespeare II: The Jacobean Period (4)**

A lecture/discussion course exploring the rich and varied achievements of Shakespeare's later plays, including the major tragedies and late romances. Dramatic forms, themes, characters, and styles will be studied in the contexts of Shakespeare's theatre and his society. Enrollment limited to upper-division students.

**LTEN 114. Shakespeare III: Stage, Film, and Television (4)**

A lecture/discussion/laboratory course involving the close study of six to eight plays representative of Shakespeare's artistic career with particular emphasis upon the interrelation of Elizabethan plays and the stage and the critical implications of transposing plays to film and television. (Generally offered in summer session only.)

**LTEN 115A. The Sixteenth Century: Themes and Issues (4)**

Selected topics concerned with sixteenth-century English literature as a whole.

**LTEN 115D. The Golden Age of Elizabethan Literature (4)**

An introduction to the literary achievement of Elizabethan England during the last two decades of the sixteenth century. Works by major writers in a variety of literary forms (e.g., sonnet, mythological poem, romantic epic, pastoral, satire, prose fiction, heroic and tragic drama) are studied in relation to relevant social contexts.

**LTEN 116. Elizabethan and Jacobean Drama (4)**

The study of representative plays from one of the great moments in the history of dramatic literature. Tragedies and comedies, primarily by Shakespeare's contemporaries and successors, are read in the context of the historical, social, and intellectual background of the period.

**LTEN 117A. The Seventeenth Century: Themes and Issues (4)**

Selected topics in English literature during a period when writers felt deeply the impact of social change, religious controversy, the emergence of the "New Science," and the English Civil War. Readings chosen from among the works of a diverse group of writers, including Jonson, Donne, Bacon, Milton, Marvell, and Dryden.

**LTEN 118. Milton (4)**

A critical examination of the major works, including *Paradise Lost*, by an author who was both a central figure in English political life in a revolutionary age and, in the view of most critics, the greatest non-dramatic poet in the English language. The course will study his poetic development in a variety of historical contexts.

**LTEN 119. Restoration Literature (4)**

The literature of a period following twenty years of civil war and revolution which saw the reopening of theatres and the rise of the professional writer. Topics may include Restoration comedy and tragedy; satire; neoclassical literary theory.

**LTEN 120A. The Eighteenth Century: Themes and Issues (4)**

Selected topics in English literature during an age of satiric writing, the shift from neoclassicism to romanticism, the emergence of the novel, and the expansion of the reading and writing public among the middle class and women. Writers such as Defoe, Pope, Swift, Richardson, Johnson, Burney, Wollstonecraft. May be repeated for credit when topics vary.

**LTEN 120D. William Blake and the Age of Sensibility (4)**

A study of the great visionary poet and artist, William Blake, in the context of several of his eighteenth-century contemporaries, such as Gray, Collins, Chatterton, and Cowper.

**LTEN 120E. Women in the Eighteenth Century (4)**

Selected topics concerning British women writers and readers in an age of increasing female participation in print culture. Topics include women writers; representations of women, domesticity, and the family in the novel, in drama, in satire; early feminist writing; literary constructions of gender. May be repeated for credit when topics vary.

**LTEN 125A. Romanticism: Themes and Issues (4)**

Selected topics concerned with the romantic period as a whole.

**LTEN 125B. First Generation Romantic Poets (4)**

The poets who came of age during the French Revolution and who inaugurated literary modes that continue in our own time: Wordsworth, Coleridge, Blake, and their contemporaries.

**LTEN 125C. Second Generation Romantic Poets (4)**

Byron, Keats, Shelley, and their contemporaries.

**LTEN 125F. Byron and Byronism (4)**

Lord Byron's life, works, and cultural impact, including an examination of some later authors, such as Carlyle and the Brontës, who responded to Byron through their own writings.

**LTEN 125G. Keats and His Poetical Heirs (4)**

The major poetry of John Keats considered together with selected works influenced by him, including poems by such authors as Tennyson, Christina Rossetti, Hopkins, Hardy, Yeats, and Stevens.

**LTEN 127A. The Victorian Period: Themes and Issues (4)**

Selected topics concerned with Victorian literature as a whole.

**LTEN 127B. Victorian Poetry (4)**

Tennyson, Browning, Arnold, Clough, Hopkins, and their contemporaries.

**LTEN 127G. The Nineties: Decade of Decadence (4)**

Selected topics concerning literature and culture from the 1890s. Themes and metaphors of the *fin de siècle* might include imperial decline, sexual anarchy, crises of transition, the emergence of modern sexual identity, censorship issues, boundary violations.

**LTEN 130A. Modern British Literature: Themes and Issues (4)**

Selected topics concerned with modern British literature as a whole.

**LTEN 130B. Modern British Poetry (4)**

Such poets as Thomas Hardy, D.H. Lawrence, Hugh MacDiarmid, W.H. Auden, Dylan Thomas, Philip Larkin, Ted Hughes, and Geoffrey Hill.

**LTEN 132. Modern Irish Literature (4)**

The Irish Revival and its aftermath: Yeats, Synge, O'Casey, Joyce, Beckett, and their contemporaries.

**LTEN 133. Modern Scottish Literature (4)**

This course takes Scottish writing from the Kailyard School of the late nineteenth century through the 1920s' revival of Scottish nationalism, to the 1980s' emergence of Glasgow as a literary center.

**LTEN 135. Twentieth-Century Literature from the Indian Subcontinent (4)**

An examination of the changes in a literature produced from a specific geographic location during a specific historical period—literature in English from British India (between 1900-1947) and from independent Pakistan and India (after 1947).

**LTEN 143. The English Novel in the Eighteenth Century (4)**

This course studies the writing of the novel in English during the eighteenth century. The focus of the course may be an introduction to selected major writers and texts, or a particular issue or problem in the literary and social history of the novel. May be repeated for credit when topics vary.

**LTEN 144. The English Novel in the Nineteenth Century (4)**

This course studies the writing of the novel in English during the nineteenth century. The focus of the course may be an introduction to selected major writers and texts, or a particular issue or problem in the literary and social history of the novel. May be repeated for credit when topics vary.

**LTEN 145. The English Novel in the Twentieth Century (4)**

This course studies the writing of the novel in English during the twentieth century. The focus of the course may be an introduction to selected major writers and texts, or a particular issue or problem in the literary and social history of the novel. May be repeated for credit when topics vary.

**LTEN 146. Women and English/American Literature (4)**

Selected topics concerning women and anglophone literature. Topics include women writers, the literary representation of

women, and women as readers. May be repeated for credit when topics vary.

**LTEN 147. Metamorphoses of the Symbol (4)**

An investigation of a single symbol—such as the cave or the mountain—as it functions within the literature and other expressions of widely different historical moments, with an emphasis upon English and American literature. May be repeated for credit as topics vary.

**LTEN 148. Genres in English and American Literature (4)**

An examination of one or more genres in English and/or American literature, for example, satire, utopian fiction, autobiography, landscape poetry, the familiar essay. May be repeated for credit as topics vary.

**LTEN 149. Themes in English and American Literature (4)**

A consideration of one of the themes that recur in many periods of English or American literature, for instance, love, politics, the role of women in society. May be repeated for credit as topics vary.

**LTEN 150. Gender, Text, and Culture (4)**

This course studies representations of the sexes and of their interrelationship in various forms of writing produced during different phases of English history. Emphasis will be placed upon connections of gender and of literature to other modes of social belief, experience, and practice. Repeatable for credit when topics vary.

**LTEN 152. The Origins of American Literature (4)**

Studies in American writing from the Puritans to the early national period (1620-1830), with emphasis on the thrust and continuity of American culture, social and intellectual, through the beginnings of major American writing in the first quarter of the nineteenth century.

**LTEN 153. The Revolutionary War and the Early National Period in U.S. Literature (4)**

A critical examination of how writing of various kinds—political, philosophical, and literary—functioned in the construction of the political body of the new American republic and the self-conception of its citizens.

**LTEN 154. The American Renaissance (4)**

A study of some of the chief works, and the linguistic, philosophical, and historical attitudes informing them, produced by such authors as Emerson, Hawthorne, Melville, Dickinson, and Whitman during the period 1836-1865, when the role of American writing in the national culture becomes an overriding concern.

**LTEN 155. Interactions Between American Literature and the Visual Arts (4)**

An exploration of the parallels between the work of individual writers, or movements, in American literature and the style and content of the work of certain visual artists. The writers studied are always American; the artists or art movements may represent non-American influences on these American writers. May be repeated for credit as topics vary.

**LTEN 156. American Literature from the Civil War to World War I (4)**

A critical examination of works by such authors as Mark Twain, Henry James, Kate Chopin and Edith Wharton, who were writing in an age when the frontier was conquered and American society began to experience massive industrialization and urbanization.

**LTEN 158. Modern American Literature(4)**

A critical examination of American literature in between World War I and World War II—the age of the great American modernists, among them Pound, H.D., and Eliot; Hemingway, Stein, and Faulkner; Stevens, Moore, and Williams.

**LTEN 159. Twentieth-Century American Literature and Culture (4)**

Selected topics concerning the relationship between literature and culture in twentieth-century America. Repeatable for credit.

**LTEN 160. Ideas and Photographic Images in American Culture (4)**

Relate the history of photography in America to the history of ideas in American culture. It assumes that photographers think in images and through their images participate in cultural discourse. Repeatable for credit when topics vary.

**LTEN 171. American Poetry I—through Early Whitman (4)**

Reading and interpretation of American poets from the Puritans through the emergence of Whitman. Lectures will set the appropriate context in sociocultural and literary history.

**LTEN 172. American Poetry II—Whitman through the Modernists (4)**

Reading and interpretation of American poets from Whitman through the principal modernists—Pound, H.D., Eliot, Moore, Stevens, and others. Lectures will set the appropriate context in sociocultural and literary history.

**LTEN 173. American Fiction I—through Early James (4)**

Reading and interpretation of American fiction from its early nineteenth-century origins through the emergence of Henry James. Lectures will set the appropriate context in sociocultural and literary history.

**LTEN 174. American Fiction II—Since Middle James (4)**

Reading and interpretation of American fiction from Henry James through the principal modernists—Fitzgerald, Stein, Welty, Faulkner, and others. Lectures will set the appropriate context.

**LTEN 175A. New American Fiction—Post-World War II to the Present (4)**

Reading and interpretation of American fiction from the mid-1940s to the present. Lectures will set the appropriate context in sociocultural and literary history. May be repeated for credit when topics vary.

**LTEN 175B. New American Poetry—Post-World War II to the Present (4)**

Reading and interpretation of American poets whose work has made its major impact since the last war, for instance Charles Olson, Robert Creeley, Denise Levertov, Adrienne Rich, Allen Ginsberg, Frank O'Hara, and John Ashbery. Lectures will set the appropriate context in sociocultural and literary history. May be repeated for credit as topics vary.

**LTEN 176. Major American Writers (4)**

A study in depth of the works of major American writers. May be repeated for credit as topics vary.

**LTEN 177. California Literature (4)**

Reading and interpretation of such novelists as London, Norris, Steinbeck, West, and Didion and such poets as Jeffers, Rexroth, Everson, Duncan, and Snyder. May be repeated for credit as topics vary.

**LTEN 178. Comparative Ethnic Literature (4)**

A lecture-discussion course that juxtaposes the experience of two or more U.S. ethnic groups and examines their relationship with the dominant culture. Students will analyze a variety of texts representing the history of ethnicity in this country. Topics will vary.

**LTEN 179. Italian North American Culture (4)**

This course will consider the phenomenon of Italian emigration as a product of sociopolitical trends in nineteenth-century Italy and Europe that led to Italian unification in 1861. Within that context, an analysis of the cultural products of Italian North Ameri-

cans will be used to read contemporary trends in multiculturalism and ethnic culture in North America.

**LTEN 180. Chicano Literature in English (4)**

Introduction to the literature in English by the Chicano population, the men and women of Mexican descent who live and write in the United States. Primary focus on the contemporary period.

**LTEN 181. Asian American Literature (4)**

Selected topics in the literature by men and women of Asian descent who live and write in the United States. Repeatable for credit when topics vary.

**LTEN 183. African American Prose (4)**

Analysis and discussion of the novel, the personal narrative, and other prose genres, with particular emphasis on the developing characteristics of African American narrative and the cultural and social circumstances that influence their development.

**LTEN 184. African American Poetry (4)**

Close reading and analysis of selected works of African American poetry as they reflect styles and themes that recur in the literature.

**LTEN 185. Themes in African American Literature (4)**

An intensive examination of a characteristic theme, special issue, or period in African American literature. May be repeated for credit when topics vary.

**LTEN 186. Literature of the Harlem Renaissance (4)**

The Harlem Renaissance (1917-39) focuses on the emergence of the "New Negro" and the impact of this concept on black literature, art, and music. Writers studied include Claude McKay, Zora N. Hurston, and Langston Hughes. Special emphasis on new themes and forms.

**LTEN 187. Black Music/Black Texts: Communication and Cultural Expression (4)**

Explores roles of music as a traditional form of communication among Africans, African Americans, and West Indians. Special attention given to poetry of black music, including blues, and other forms of vocal music expressive of contestatory political attitudes.

**LTEN 188. Contemporary Caribbean Literature (4)**

This course will focus on contemporary literature of the English-speaking Caribbean. The parallels and contrasts of this Third World literature with those of the Spanish- and French-speaking Caribbean will also be explored.

**LTEN 189. Twentieth-Century Postcolonial Literatures (4)**

The impact of British colonialism, national independence movements, postcolonial cultural trends, and women's movements on the global production of literary texts in English. Course is organized by topic or geographical/historical location. May be repeated for credit when topics vary.

**LTEN 190. Seminars (4)**

These seminars are devoted to a variety of special topics, including the works of single authors, genre studies, problems in literary history, relations between literature and the history of ideas, literary criticism, literature and society, and the like. The student may enroll in more than one section in a single quarter.

**LTEN 196. Honors Thesis (4)**

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTGN 191. Oral exam.

**LTEN 198. Directed Group Study (4)**

Research seminars and research, under the direction of a member of the staff. May be repeated for credit three times. (P/NP grades only.) *Prerequisite: permission of department.*

**LTEN 199. Special Studies (2 or 4)**

Tutorial; individual guided reading in an area not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisite: permission of department.*

**GRADUATE**

*Prerequisite: graduate standing or consent of instructor.*

**LTEN 214. Middle English Literature (4)**

Consideration of one or more major figures, texts, or trends in Middle English literature. May be repeated for credit as topics vary.

**LTEN 222. Elizabethan Studies (4)**

Selected topics in the study of literary, dramatic, and other Elizabethan cultural texts. Emphasis will be upon articulations among a range of discourses, practices, and institutions. May be repeated for credit when topics vary.

**LTEN 224. Seventeenth-Century English Literature (4)**

Consideration of one or more figures, texts, or trends in seventeenth-century English literature, including the metaphysical poets and Jacobean drama. May be repeated for credit as topics vary.

**LTEN 226. Shakespeare (4)**

Shakespeare's plays in relation to the Elizabethan background; selected major texts. May be repeated for credit as topics vary.

**LTEN 231. Restoration and Eighteenth-Century English Literature (4)**

Consideration of one or more figures, texts, or trends in Restoration and eighteenth-century English literature, including Dryden, Pope, Swift, the early novel, satire. May be repeated for credit as topics vary.

**LTEN 241. English Literature of the Romantic Period (4)**

A study of the major poetry and related prose of early nineteenth-century literature. May be repeated for credit as topics vary.

**LTEN 245. Nineteenth-Century American Studies (4)**

Consideration of some of the principal writers and movements in nineteenth-century American literature. May be repeated for credit as topics vary.

**LTEN 246. Victorian Literature (4)**

Consideration of one or more major figures, texts, or trends in the Victorian period. May be repeated for credit as topics vary.

**LTEN 251. Twentieth-Century English Literature (4)**

Consideration of one or more major figures, texts, or trends in twentieth-century English literature. May be repeated for credit as topics vary.

**LTEN 252. Studies in Modern American Literature and Culture (4)**

Consideration of one or more major figures, texts, or trends in American literature, in particular the relationship between literature and culture. May be repeated for credit as topics vary.

**LTEN 256. Postcolonial Discourses (4)**

A survey of selected responses to imperialism and colonialism as presented in cultural texts produced by colonized or once-colonized peoples. Related issues to be examined: gender dynamics, class, representing others, mimicry, language, cultural theory, and the politics of literary genres. May be repeated for credit when topics vary.

**LTEN 271. Genres in English (4)**

Consideration of one or more genres present in English and/or American literature, for instance, the ballad, landscape poetry,

comedy, satire, the familiar essay. May be repeated for credit as topics vary.

**LTEN 272. Cultural Traditions in English (4)**

The study of writing produced over an extended period of time by members of an identifiable cultural formation as defined, e.g., by political/social ideology, class, religion, ethnicity, or sexual preference. May be repeated for credit when topics vary.

**LTEN 279. Methodology Studies in Literatures in English (4)**

Topics that relate new developments and internal debates in the field to the practice of teaching. Multiculturalism, cultural studies in relation to traditional English studies, revision of the canon; practical teaching issues including construction of syllabi, lecturing on topics that are under contestation, sensitivity to the traditions of the field and to recent debates and the needs of students in the 1990s. Repeatable when topics vary.

**LTEN 281. Practicum in Literary Research and Criticism (4)**

This course will focus on strategies for framing, organizing, and drafting projects in literary research. Students will study and apply various forms of literary methodology and will learn about recent developments in bibliography, textual editing, and research. May be repeated twice for credit as topics vary.

**LTEN 295. M.A. Thesis (1-8)**

Research for the master's thesis. Opened for repeated registration.

**LTEN 296. Research Practicum (1-12)**

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

**LTEN 297. Directed Studies: Reading Course (1-12)**

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

**LTEN 298. Special Projects: Writing Course (1-12)**

Similar to a 297, but a paper is required. Papers are usually on subject not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

**LTEN 299. Dissertation (1-12)**

Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

**LITERATURES IN FRENCH**

**LOWER-DIVISION**

**Language and Literature Courses**

Ordinarily, students entering the French literature program elect the following sequence: LTFR 2A, 2B, and 50.

**LTFR 2A, 2B, 50. Readings and Interpretations/Advanced Readings and Interpretations (5-5-4)**

A three-quarter sequence designed to prepare students for upper-division French courses. The course is taught entirely in French and emphasizes the development of reading ability, listening comprehension, and conversational and writing skills. It also introduces the student to basic techniques of literary

analysis. It is expected that this sequence will be completed in the course of one academic year. These courses may not be repeated for credit. *Prerequisites:* LTFR 2A-LTFR 33/53, 1C/1CX or its equivalent; LTFR 2B-LTFR 2A or its equivalent, LTFR 50-LTFR 2B or its equivalent.

#### LTFR 2C. Composition, Conversation, Culture (4)

This course is designed to improve writing and conversational skills. Aims to develop written expression in terms of organization of ideas, structure, vocabulary. Includes a review of grammar. Discussions of a contemporary novel and film. May be taken in lieu of LTFR 50 as a prerequisite for upper-division LTFR courses. Department approval required.

#### LTFR 21. Debating Literature and Culture I (1)

Designed to allow students to practice and develop their oral skills by expanding the vocabulary necessary to discuss abstract ideas and by building up the confidence necessary to participate in literature classes. *Prerequisite:* LTFR 1C/1CX or 1D/1DX or LTFR 2A or LTFR 2B or LTFR 2C or LTFR 50 or consent of instructor.

#### LTFR 31. Debating Literature and Culture II (1)

A one-credit, one-class-a-week course. Designed to develop and maintain oral skills at an advanced level by discussing current cultural issues of the francophone world. Repeatable for credit when topics vary. *Prerequisite:* LTFR 2B or consent of instructor.

### UPPER-DIVISION

*Prerequisite:* upper-division standing or consent of instructor. All upper-division courses are taught in French. Additional prerequisites may be specified below.

Students are strongly encouraged to take LTFR 115 and 116 before enrolling in other upper-division French literature courses.

#### LTFR 115. Themes in Intellectual and Literary History (4)

This is the first course in a two-quarter sequence designed as an introduction to French literature and literary history. Each quarter will center on a specific theme or problem. It is recommended that majors whose primary literature is French take this sequence as early as possible. *Prerequisite:* LTFR 50.

#### LTFR 116. Themes in Intellectual and Literary History (4)

This is the second course in a two-quarter sequence designed as an introduction to French literature and literary history. Each quarter will center on a specific theme or problem. It is recommended that majors whose primary literature is French take this sequence as early as possible. *Prerequisite:* LTFR 50.

#### LTFR 121. The Middle Ages and the Renaissance (4)

Major literary works of the Middle Ages and Renaissance as seen against the historical and intellectual background of the period. Medieval texts in modern French translation. May be repeated for credit as topics vary. *Prerequisite:* LTFR 115.

#### LTFR 122. Seventeenth Century (4)

Major literary works of the seventeenth century. May be repeated for credit as topics vary. *Prerequisite:* LTFR 115.

#### LTFR 123. Eighteenth Century (4)

Major literary works and problems of the eighteenth century. May be repeated for credit as topics vary. *Prerequisite:* LTFR 115.

#### LTFR 124. Nineteenth Century (4)

Major literary works of the nineteenth century. May be repeated for credit as topics vary. *Prerequisite:* LTFR 116.

#### LTFR 125. Twentieth Century (4)

Major literary works and problems of the twentieth century. May be repeated for credit as topics vary. *Prerequisite:* LTFR 116.

#### LTFR 141. Literatures in French (4)

One or more periods or authors in French literature. Texts will be read in the original language. May be repeated for credit as topics vary.

#### LTFR 142. Literary Genres (4)

An examination of one or more major or minor genres of French literature: for example, drama, novel, poetry, satire, prose poem, essay.

#### LTFR 143. Major Authors (4)

A study in depth of the works of a major French writer. Recommended for students whose primary literature is French. May be repeated for credit as topics vary.

#### LTFR 144. Literature and Ideas (4)

This course will center on writers or movements of international literary, cultural, or ideological significance. May be repeated for credit when topics vary.

#### LTFR 145. Contemporary Thought (4)

Presentation of major currents and debates in contemporary philosophy, linguistics, psychoanalysis, anthropology, and social and feminist theory that have led to major changes in French cultural and literary studies.

#### LTFR 160. Advanced Grammar and Stylistics (4)

A course for students who wish to perfect their knowledge of evolving French grammar and to increase their sensitivity to style while improving their written and spoken French.

#### LTFR 163. Translation Workshop (4)

The course centers on issues in the theory and practice of literary translation. Students should be proficient in French and English. Their primary task will be to translate several literary texts and discuss the versions with the instructor and other course members, and they will also do selected readings in translation theory and in published translations. May be repeated for credit twice. *Prerequisite:* department stamp required.

#### LTFR 164. Cultural Topics (4)

A course on changing topics such as France during the 60s, contemporary social and cultural structures (the school system, economy, political parties), myths of America in France, etc. *Prerequisite:* LTFR 116.

#### LTFR 170. Film (4)

May include close analysis of films made in the French-speaking world from 1895 to the present; study of film theory, history, criticism; social contexts of films' emergence and changing contexts of reception; particular movement, styles, or individual directors' work.

#### LTFR 196. Honors Thesis (4)

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTGN 191. Oral exam.

#### LTFR 198. Directed Group Study (4)

Research seminars and research, under the direction of a member of the staff. (P/NP grades only.) *Prerequisites:* upper-division standing and special permission of department.

#### LTFR 199. Special Studies (2 or 4)

Tutorial; individual guided reading in areas of French literature not normally covered in courses. (P/NP grades only.) *Prerequisites:* upper-division standing and permission of department.

### GRADUATE

#### LTFR 221. Renaissance (4)

Critical study of one or more major figures, texts, or literary trends of the French Renaissance. May be repeated for credit as topics vary.

#### LTFR 224. Nineteenth-Century French Literature (4)

Consideration of one or more major figures, texts, or trends in nineteenth-century French literature. May be repeated for credit as topics vary.

#### LTFR 225. Twentieth-Century French Literature (4)

Selected topics in modern French literature and thought. May be repeated for credit as topics vary.

#### LTFR 240. Topics in French Literature (4)

An examination of one or more major topics in French literature.

#### LTFR 245. Literature and Cultural Issues (4)

Cultural issues related to literature, theory, and philosophy in the French tradition and Francophonous countries. Repeatable for credit.

#### LTFR 260. Poetic Analysis (4)

Through the examination of a group of texts that transcends the boundaries of historical periodization, this course will emphasize the methods and techniques of poetic analysis. The particular attention given to one or several approaches to the text—formal, thematic, textual, etc.—as well as the specific composition of the corpus of texts to be studied will vary with each instructor of the course. In every case, however, the focus will be on the assimilation of a method and the mastery of a specific technique of reading poetic texts rather than on their content or on the historical continuity of their themes or forms.

#### LTFR 295. M.A. Thesis (1-8)

Research for the master's thesis. Opened for repeated registration up to eight units.

#### LTFR 296. Research Practicum (1-12)

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit. *Prerequisite:* consent of the instructor.

#### LTFR 297. Directed Studies: Reading Course (1-12)

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit. *Prerequisite:* consent of the instructor.

#### LTFR 298. Special Projects: Writing Course (1-12)

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit. *Prerequisite:* consent of the instructor.

#### LTFR 299. Dissertation (1-12)

Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

### LITERATURES IN GERMAN

#### LOWER-DIVISION

#### Language and Literature Courses

#### LTGM 2A. Readings and Interpretations (5)

LTGM 2A follows the basic language sequence of the Depart-

ment of Linguistics and emphasizes the development of reading ability, listening comprehension, and conversational and writing skills. *Prerequisite: LTGM 1C/1CX or the equivalent or consent of instructor.* The course is designed to prepare students for LTGM 2B and LTGM 2C. Successful completion of LTGM 2A satisfies the requirement for language proficiency in Revelle College.

**LTGM 2B. Advanced Readings and Interpretations (5)**  
LTGM 2B is a continuation of LTGM 2A for those students who intend to practice their skills in reading, listening comprehension, and writing on a more advanced level. The literary texts are supplemented by readings from other disciplines as well as audio-visual materials. *Prerequisite: LTGM 2A or consent of instructor.*

**LTGM 2C. Composition and Conversation (4)**  
A course designed for students who wish to improve their ability to speak and write German. *Prerequisite: LTGM 2B or equivalent or consent of instructor.*

**LTGM 31. Debating German Literature and Culture (1)**  
The discussion format of this course enhances intermediate/advanced students' command of spoken German. Students will debate literary and cultural issues, exercising oral skills and practicing expression of ideas. May be taken as an adjunct to courses in German literature.

**LTGM 50-51-52-53. Readings in German Literature and Culture (4-4-4-4)**

An introduction to German literature. May be taken for three quarters, starting with any quarter. The instructor will advise students when they have achieved sufficient proficiency to proceed to upper-division courses which call for an ability to read extensive texts in German. *Prerequisite: completion of LTGM 2C, or the equivalent preparation.*

- 50. *Genres and Methods*
- 51. *Middle Ages and Renaissance*
- 52. *Classicism and Romanticism: Eighteenth and Nineteenth Centuries*
- 53. *The Twentieth Century*

**LTGM 60A. German for Reading Knowledge I (2)**  
A program for graduate and undergraduate students interested in developing reading skills only. No previous knowledge of German required. Texts are taken primarily from the humanities and social sciences, and include selections from publishers' catalogues, scholarly articles and books.

**LTGM 60B. German for Reading Knowledge II (2)**  
A continuation of the program for graduate and undergraduate students interested in developing reading skills only. No previous knowledge of German required, though recommended. Texts are taken primarily from the humanities and social sciences and include selections from publishers' catalogues, scholarly articles and books.

#### UPPER-DIVISION

*Prerequisite: upper-division standing or consent of instructor. Normally, a student will be expected to take two courses of the LTGM 50-51-52-53 sequence before being admitted to upper-division courses. Additional prerequisites may be specified below.*

**LTGM 100. German Literature (4)**  
One or more aspects of German literature, such as major authors, the contemporary novel, nineteenth-century poetry, Ger-

man expressionism. The texts studied will be read in the original language. May be repeated for credit as topics vary.

**LTGM 101. Major German Authors (4)**  
A study in depth of the works of a major German author. May be repeated for credit as topics vary.

**LTGM 123. Eighteenth-Century German Literature (4)**  
Major literary works as seen against the historical and intellectual background of the period. May be repeated for credit as topics vary.

**LTGM 124. Goethe (4)**  
Study of some major works in the context of Goethe's life and milieu. Recommended for literature majors whose primary literature is German. May be repeated for credit as topics vary.

**LTGM 125. Nineteenth-Century German Literature (4)**  
Major literary works, authors, or movements of the nineteenth century. May be repeated for credit as topics vary.

**LTGM 126. Twentieth-Century German Literature (4)**  
Major literary works, authors, or movements of the twentieth century. May be repeated for credit as topics vary.

**LTGM 130. German Literary Prose (4)**  
The development of major forms and modes of German literary prose. May be repeated for credit as topics vary.

**LTGM 131. German Dramatic Literature (4)**  
The development of the drama in Germany. May be repeated for credit as topics vary.

**LTGM 132. German Poetry (4)**  
The development of major forms and modes of German verse. May be repeated for credit as topics vary.

**LTGM 160. Composition and Stylistics (4)**  
Analysis of classical and modern German literary texts to increase the student's sensitivity to style and improve his or her ability to write and speak German. Stylistic variations and potentialities will be explored, various classical and modern texts will be analyzed to establish stylistic criteria and guiding principles. One composition per week on various subjects.

**LTGM 170. Literature and Ideas (4)**  
This course will center on German writers or movements of international literary, cultural, or ideological significance. May be repeated for credit as topics vary.

**LTGM 190. Seminars (4)**  
These seminars are devoted to a variety of special topics, including the works of single authors, genre studies, problems in literary history, relations between literature and the history of ideas, literary criticism, literature and society, and the like.

**LTGM 196. Honors Thesis (4)**  
Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTGM 191. Oral exam.

**LTGM 198. Directed Group Study (4)**  
Research seminars and research, under the direction of a member of the staff. May be repeated for credit. (P/NP grades only.) *Prerequisite: permission of department.*

**LTGM 199. Special Studies (2 or 4)**  
Tutorial; individual guided reading in areas of German literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

#### GRADUATE

**LTGM 202. Methods and Tools of Research (4)**  
A pragmatic workshop to familiarize students with basic methodological approaches, standard works of literary criticism, and indispensable tools of literary research.

**LTGM 231. Eighteenth-Century German Literature (4)**  
Consideration of one or more major figures, texts, or trends in eighteenth-century German literature. May be repeated for credit as topics vary.

**LTGM 241. German Romanticism (4)**  
Studies in the prose, poetry, and theoretical writings of German romantics. May be repeated for credit as topics vary.

**LTGM 242. Nineteenth-Century German Literature (4)**  
Consideration of one or more major figures, texts, or trends in nineteenth-century German literature. May be repeated for credit as topics vary.

**LTGM 251. The Twentieth Century (4)**  
A study of the structural, philosophical, and social aspects of twentieth-century German literature. May be repeated for credit as topics vary.

**LTGM 252. Major German Authors (4)**  
A study in depth of the work of one major German author. May be repeated for credit as topics vary.

**LTGM 272. Genres, Trends, and Forms (4)**  
Seminars on literary genres, trends, movements, schools, and on aspects of literary forms and structures in any given era or over a certain period of time. May be repeated for credit as topics vary.

**LTGM 295. M.A. Thesis (1)**  
Research for the master's thesis. Opened for repeated registration up to eight units.

**LTGM 296. Research Practicum (1-12)**  
Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

**LTGM 297. Directed Studies: Reading Course (1-12)**  
This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

**LTGM 298. Special Projects: Writing Course (1-12)**  
Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

**LTGM 299. Dissertation (1-12)**  
Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

#### GREEK LITERATURE

(See also listings under Classical Studies)

#### LOWER-DIVISION

**LTGK 1. Beginning Greek (4)**  
Study of ancient Greek, including grammar and reading.

**LTGK 2. Intermediate Greek (I) (4)**

Continuation of study of ancient Greek, including grammar and reading. *Prerequisite: LTGK 1 or equivalent.*

**LTGK 3. Intermediate Greek (II) (4)**

Continuation of study of ancient Greek, including grammar and reading of texts. *Prerequisites: LTGK 1 and 2 or equivalent.*

**LTGK 4. Intensive Elementary Greek (12)**

Equivalent of LTGK 1, 2, and 3. Given in summer session only.

**UPPER-DIVISION**

*Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.*

**LTGK 100. Introduction to Greek Literature (4)**

Reading and discussion of selections from representative authors. Review of grammar as needed. *Prerequisite: LTGK 3 or equivalent.*

**LTGK 101. Greek Composition (4)**

Greek prose composition. *Prerequisite: completion of LTGK 100. Students must be concurrently enrolled in an upper-division LTGK course numbered 110 or above.*

**LTGK 110. Archaic Period (4)**

Readings, in Greek, of texts from the archaic period. May be repeated for credit as topics vary.

**LTGK 112. Homer (4)**

Readings from the works of Homer. Repeatable for credit when texts and material vary.

**LTGK 113. Classical Period (4)**

Readings, in Greek, of texts from the fifth and fourth centuries B.C. May be repeated for credit as topics vary.

**LTGK 130. Tragedy (4)**

Readings, in Greek, of one or more of the works of the classical tragedians Aeschylus, Sophocles, and Euripides. May be repeated for credit as topics vary.

**LTGK 131. Comedy (4)**

Readings, in Greek, of one or more of the works of Aristophanes. May be repeated for credit as topics vary.

**LTGK 132. History (4)**

Readings, in Greek, in the works of the ancient historians, including Herodotus, Thucydides, Xenophon, and others. May be repeated for credit as topics vary.

**LTGK 133. Prose (4)**

Readings, in Greek, in the works of ancient prose writers. May be repeated for credit as topics vary.

**LTGK 134. Epic Poetry (4)**

Readings, in Greek, in the works of Homer, Hesiod, and/or Apollonius Rhodius. May be repeated for credit as topics vary.

**LTGK 135. Lyric Poetry (4)**

Readings, in Greek, of the works of the ancient lyric poets. May be repeated for credit as topics vary.

**LTGK 190. Seminars (4)**

These seminars are devoted to a variety of special topics, including the works of single authors, genre studies, problems in literary history, relations between literature and the history of ideas, literary criticism, literature and society, and the like. The student may enroll in more than one seminar in a single quarter. May be repeated for credit when topics vary.

**LTGK 198. Directed Group Study (4)**

Directed group study in areas of Greek literature not normally covered in courses. May be repeated for credit three times. (P/ NP grades only.) *Prerequisites: upper-division standing and permission of department.*

**LTGK 199. Special Studies (2 or 4)**

Tutorial; individual guided reading in areas of Greek literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

**GRADUATE****LTGK 297. Directed Studies (1-12)**

Guided and supervised reading in a broad area of Greek literature. Offered for repeated registration.

**LTGK 298. Special Projects (4)**

Treatment of a special topic in Greek literature. Offered for repeated registration.

**HEBREW LITERATURE**

Please see Near Eastern Literatures under Literatures of the World.

**LITERATURES IN ITALIAN****LOWER-DIVISION**

(See Department of Linguistics for course offerings in first-year Italian.)

**LTIT 2A. Advanced Italian I (5)**

A second-year course in Italian language and literature. Conversation, composition, grammar review, and an introduction to literary and nonliterary texts. *Prerequisite: LIIT 1C/1CX or equivalent or consent of instructor.*

**LTIT 2B. Advanced Italian II (5)**

Emphasis on composition discussion of literary texts in Italian. *Prerequisite: LTIT 2A or equivalent or consent of instructor.*

**LTIT 12A. The Language of the Italian Theater (4)**

An introduction to the study of the Italian language. Exercises in grammar, syntax, conversation, and writing are generated from the texts of Italian plays (Goldoni, Pirandello, Campanile, Fo). No prior study of Italian required.

**LTIT 12B. The Language of the Italian Opera (4)**

A continuation of the study of Italian language. Exercises in grammar, syntax, conversation, and writing are generated from the texts of opera libretti. *Prerequisite: LTIT 12A or consent of instructor.*

**LTIT 12C. The Language of the Italian Film and Literature (4)**

Further study of Italian language. Exercises in grammar, syntax, conversation, and writing are generated from the texts of Italian screenplays and novels. Prepares students for enrollment in LTIT 2A. *Prerequisite: LTIT 12B or consent of instructor.*

**LTIT 50. Advanced Italian (III) (4)**

This course constitutes the sixth and final quarter of the Italian language sequence. It offers an intensive study of Italian grammar, drills in conversation and composition, and readings in modern Italian literature. *Prerequisite: LTIT 2A and 2B, or consent of instructor.*

**UPPER-DIVISION**

*Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.*

**LTIT 100. Introduction to Italian Literature (4)**

Reading and discussion of selections from representative authors. Review of grammar as needed. *Prerequisite: LTIT 50 or equivalent or consent of instructor.*

**LTIT 110. Italian Literature (4)**

One or more periods of authors in Italian literature. May be repeated for credit as topics vary.

**LTIT 113. Love, War, and Conquest in the Italian Renaissance (4)**

A critical reading of Italian Renaissance texts with special attention to those themes, forms, and ideological conflicts still operative in today's culture. May be repeated for credit when topics vary.

**LTIT 115. Medieval Studies (4)**

Studies in medieval culture and thought with focus on one of the "three crowns" of Italian literature: Dante, Boccaccio, or Petrarca. May be repeated for credit when course content varies. *Prerequisite: upper-division standing or consent of instructor.*

**LTIT 116. Sixteenth-Century Prose (4)**

Reading and discussion of sixteenth-century Italian novelle, philosophy, history, and scientific texts. May be repeated for credit when topics vary. *Prerequisite: LTIT 100 or permission of instructor.*

**LTIT 118. Italian Romanticism (4)**

This course will consider the rise of romanticism in Italy and its relationship to European romanticism. Particular attention will most likely be paid to the works of Foscolo and Leopardi. Credit will not be given for both LTIT 118 and LTGN 124, Italian Romanticism in Translation.

**LTIT 122. Studies in Modern Italian Culture (4)**

Politics, literature, and cultural issues of twentieth-century Italy.

**LTIT 136. Studies in Modern Poetry**

A study of the chief modern Italian poets, including Montale, Ungaretti, and Quasimodo, with attention to long poetic form and contemporary Italian culture.

**LTIT 137. Studies in Modern Italian Prose (4)**

A study of the chief modern Italian prosatori, including D'Annunzio, Calvino, Pavese, Pasolini, etc.

**LTIT 138. Contemporary Italian Thought (4)**

Presentation of major currents and debates in contemporary philosophy, anthropology, political theory, sociology, and feminism that have had an impact on Italian cultural studies. May be repeated for credit when topics vary. *Prerequisite: LTIT 100 or permission of instructor.*

**LTIT 140. Women in Italy (4)**

A study of historical, political, and literary texts regarding women and feminism in Italian society.

**LTIT 143. Major Italian Authors (4)**

A study in depth of the works of a major Italian author. May be repeated for credit when topics vary. *Prerequisite: LTIT 100 or permission of instructor.*

**LTIT 150. Italian North American Culture (4)**

This course will consider the phenomenon of Italian emigration as a product of sociopolitical trends in 19th century Italy



and Europe that led to Italian unification in 1861. Within that context, and analysis of the cultural products of Italian North Americans will be used to read contemporary trends in multiculturalism and ethnic culture in North America.

**LTIT 161. Advanced Stylistics and Conversation (4)**

Analysis of Italian essays, journalism, literature. Intensive practice in writing and Italian conversation. *Prerequisite: LTIT 100 or consent of instructor.*

**LTIT 162. Translation (4)**

This course will concentrate on further developing writing and composition skills through translation exercise. Translation will be both from English to Italian and from Italian to English in order to give the greatest amount of practice in moving from one language to another. *Prerequisite: LTIT 161.*

**LTIT 190. Seminars (4)**

These seminars are devoted to a variety of special topics, including the works of single authors, genre studies, problems in literary history, relations between literature and the history of ideas, literary criticism, literature and society, and the like. The student may enroll in more than one seminar in a single quarter. *Prerequisites: upper-division standing, consent of instructor, and permission of department.*

**LTIT 196. Honors Thesis (4)**

Senior thesis research and writing for students who have been accepted for the literature honors program and who have completed General Literature 191. Oral examination. *Prerequisite: departmental approval.*

**LTIT 198. Directed Group Study (4)**

Directed group study in areas of Italian literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

**LTIT 199. Special Studies (2 or 4)**

Tutorial; individual guided reading in areas of Italian literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

## GRADUATE

**LTIT 297. Directed Studies (1-12)**

Guided and supervised reading in a broad area of Italian literature. Offered for repeated registration.

**LTIT 298. Special Projects (4)**

Treatment of a special topic in Italian literature. Offered for repeated registration.

The following summer session courses may be of interest:

**LTIT 7A-B-C. Introductory Intensive Italian (4-4-4)**

The equivalent of a full year of Italian language is covered. Through a total immersion approach, students will be able to develop proficiency in grammar, essential reading and writing skills, basic comprehension and production of spoken Italian and language functions. Given in summer session only.

**LTIT 40. Conversational Intermediate Italian (4)**

Students improve their verbal skills through group conversations about issues relevant to modern life in Italy and their own life in America. Italian current events and society are discussed; students contribute oral presentations on Italian topics. Given in summer session only. *Prerequisite: Linguistics/Italian 1C/1CX or consent of instructor.*

## KOREAN LITERATURE

**LTKO 1A-B-C. First-Year Korean (5-5-5)**

First-year Korean, with attention to reading, writing, and speaking. *Prerequisite: LTKO 1A is prerequisite to 1B; 1B is prerequisite to 1C.*

**LTKO 2A-B. Intermediate Korean: Second Year (5-5)**

Second-year Korean in two quarters. Students continue learning all four skills—speaking, listening, reading, and writing—and cultural understanding in beyond-survival level. Short essays; conversational exercises using more complex vocabularies, expressions, and sentence structures with good command of Korean. *Prerequisite: LTKO 1C or the equivalent or consent of instructor.*

## LATIN LITERATURE

(See also listings under Classical Studies)

### LOWER-DIVISION

**LTLA 1. Beginning Latin (4)**

Study of Latin, including grammar and reading.

**LTLA 2. Intermediate Latin (I) (4)**

Study of Latin, including grammar and reading. *Prerequisite: LTLA 1 or its equivalent.*

**LTLA 3. Intermediate Latin (II) (4)**

Study of Latin, including grammar and reading. *Prerequisite: LTLA 2 or its equivalent.*

**LTLA 4. Intensive Elementary Latin (12)**

Equivalent of LTLA 1, 2, and 3. Given in summer session only.

### UPPER-DIVISION

*Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.*

**LTLA 100. Introduction to Latin Literature (4)**

Reading and discussion of selections from representative authors of the Augustan age. Review of grammar as needed. *Prerequisite: LTLA 3 or equivalent.*

**LTLA 101. Latin Composition (4)**

Latin prose composition. *Prerequisite: completion of LTLA 100. Students must be concurrently enrolled in an upper-division LTLA course numbered 111 or above.*

**LTLA 102. Prose Composition (4)**

Designed for those who have completed more than one upper-division course. Latin prose composition is aimed at refining students' grasp of Latin and appreciation of its varying styles through graded exercises in writing and selected readings. What is gained in such a course is a knowledge of the language from the inside out, rather than the opposite, which is usual in translation courses.

**LTLA 111. Pre-Augustan (4)**

Readings, in Latin, in the works of Roman writers of the pre-Augustan period. May be repeated for credit as topics vary.

**LTLA 113. Augustan (4)**

Readings, in Latin, in the works of Roman writers of the Augustan period. May be repeated for credit as topics vary.

**LTLA 114. Vergil (4)**

Readings from the works of Vergil. Repeatable for credit when texts and material vary.

**LTLA 116. Silver Latin (4)**

Readings, in Latin, in the works of Roman writers of the Silver Age. May be repeated for credit as topics vary.

**LTLA 120. Late Latin (4)**

Readings, in Latin, in the works of Roman writers of the post-Silver Age. May be repeated for credit as topics vary.

**LTLA 126. Renaissance Latin (4)**

Readings, in Latin, in the works of the Renaissance period. May be repeated for credit as topics vary.

**LTLA 130. The Novel (4)**

Readings, in Latin, in the works of the Latin novelists. May be repeated for credit as topics vary.

**LTLA 131. Prose (4)**

Readings, in Latin, of the work of Roman prose writers. May be repeated for credit as topics vary.

**LTLA 132. Lyric and Elegiac Poetry (4)**

Readings, in Latin, in the works of lyric and elegiac poets. May be repeated for credit as topics vary.

**LTLA 133. Epic (4)**

Readings, in Latin, in the works of Roman epic poets. May be repeated for credit as topics vary.

**LTLA 134. History (4)**

Readings, in Latin, in the works of Roman historians. May be repeated for credit as topics vary.

**LTLA 135. Drama (4)**

Readings, in Latin, in the works of Roman dramatists. *Prerequisite: LTLA 3 or equivalent; LTLA 100 recommended.* Repeatable for credit when topics vary.

**LTLA 190. Seminars (4)**

These seminars are devoted to a variety of special topics, including the works of single authors, genre studies, problems in literary history, relations between literature and the history of ideas, literary criticism, literature and society, and the like. The student may enroll in more than one seminar in a single quarter. Repeatable for credit when topics vary.

**LTLA 198. Directed Group Study (4)**

Directed group study in areas of Latin literature not normally covered in courses. May be repeated three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

**LTLA 199. Special Studies (2 or 4)**

Tutorial; individual guided reading in areas of Latin literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

## GRADUATE

**LTLA 297. Directed Studies (1-12)**

Guided and supervised reading in a broad area of Latin literature. Offered for repeated registration.

**LTLA 298. Special Projects (4)**

Treatment of a special topic in Latin literature. Offered for repeated registration.

## LITERATURES IN PORTUGUESE

**LTPR 50. Brazilian Literature in Portuguese for Spanish Speakers (4)**

Introductory Portuguese language and literature course designed especially for speakers of Spanish. Will build on stu-

dents' knowledge of Spanish, enabling them to acquire competence in language structures of Portuguese and introducing them to Brazilian texts in Portuguese.

**LTPR 130. Brazilian Literature (4)**

Reading of representative works in Brazilian literature with a view to literary analysis (form, theme, meaning), the developmental processes of the literature, and the many contexts: historical, social, cultural. Texts will be read in Portuguese. Repeatable for credit when topics vary. *Prerequisites: upper-division standing, knowledge of Portuguese, or consent of instructor.*

## RUSSIAN LITERATURE

### LOWER-DIVISION

**LTRU 1A-B-C. First-Year Russian (5-5-5)**

First-year Russian, with attention to reading, writing, and speaking.

**LTRU 2A-B-C. Second-Year Russian (5-5-5)**

Second-year Russian grammar, with attention to reading, writing, and speaking. *Prerequisite: LTRU 1A-B-C or equivalent.*

### UPPER-DIVISION

*Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.*

**LTRU 101A-B-C. Advanced Russian (4-4-4)**

Third-year Russian. Advanced grammar and stylistics, introduction to analysis of Russian literary texts.

**LTRU 104A-B-C. Advanced Practicum in Russian (4-4-4)**

Development of advanced skills in reading, writing, and conversation. Course based on written and oral texts of various genres and styles. Individualized program to meet specific student needs. May be substituted for LTRU 101A-B-C as requirement for major. *Prerequisite for 104A: LTRU 2C or equivalent.*

**LTRU 110A-B-C. Survey of Russian and Soviet Literature in Translation, 1800–Present (4-4-4)**

A study of literary works from Pushkin to the present. LTRU 110A is not a prerequisite for LTRU 110B, and LTRU 110B is not a prerequisite for LTRU 110C.

110A. 1800–1860

110B. 1860–1917

110C. 1917–present

**LTRU 123. Single Author in Russian Literature (4)**

Study of the works of a single Russian author. May be repeated for credit two times. *Prerequisite: LTRU 101C, its equivalent, or permission of instructor.*

**LTRU 128. Single Author in Soviet Literature (4)**

Study of the works of a single author from the Soviet period. May be repeated for credit two times. *Prerequisite: LTRU 101C, its equivalent, or permission of instructor.*

**LTRU 129. Twentieth-Century Russian or Soviet Literature (4)**

A study of literary works from the twentieth century. May be repeated for credit as topics vary. *Prerequisite: upper-division standing or consent of instructor.*

**LTRU 130. Genres in Russian Literature (4)**

An examination of one or more genres in Russian literature—for example, the novel, the short story, autobiography, drama,

poetry. May be repeated for credit as topics vary. *Prerequisite: LTRU 101C, its equivalent, or consent of instructor.*

**LTRU 131. Russian Short Fiction (4)**

A study of short works of fiction by a selection of Russian or Soviet authors. May be repeated for credit. *Prerequisite: LTRU 101C, its equivalent, or permission of instructor.*

**LTRU 132. Russian Poetry (4)**

Survey of Russian poetry from the late eighteenth century to the Revolution. *Prerequisite: LTRU 101C, its equivalent, or permission of instructor.*

**LTRU 150. Russian Culture: The Modern Period (4)**

An introduction to Russia's past and present through the cross-disciplinary study of literature, the visual and performing arts, social and political thought, civic rituals, popular entertainments, values and practices from 1825 to the present.

**LTRU 150XL. Russian Culture: The Modern Period—Foreign Language Discussion Section (1)**

Students will exercise advanced Russian language skills to read and discuss materials in LTRU 150. This section is taught by the course professor, has no final examination, and does not affect the student's grade in the parent course. *Prerequisites: co-registration in LTRU 150; four quarters of Russian language study or the equivalent.*

**LTRU 160. Russian Stylistics and Grammar (4)**

Study of style in various textual and spoken genres of Russian. Review of grammar, geared toward individual student needs, and encouraging independent study of the language beyond this course. *Prerequisites: LTRU 101A-B-C or the equivalent.*

**LTRU 190. Seminars (4)**

These seminars are devoted to a variety of special topics, including the works of single authors, genre studies, problems in literary history, relations between literature and the history of ideas, literary criticism, literature and society, and the like. The student may enroll in more than one section in a single quarter. *Prerequisites: upper-division standing and consent of instructor.*

**LTRU 192. Research Practicum in Russian Literature (4)**

Students create research projects on topics of their own choosing. Course develops research skills in Russian. Attention given to vocabulary, grammar, bibliographical references, and understanding of the cultural context. Students at all levels of Russian are encouraged to enroll. Repeatable for credit as projects vary.

**LTRU 198. Directed Group Study (4)**

Directed group study in areas of Russian literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

**LTRU 199. Special Studies (2 or 4)**

Tutorial; individual guided reading in areas of Russian literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

## LITERATURES IN SPANISH

### LOWER-DIVISION

#### Language and Literature Courses

Students entering the Spanish language/literature program must have completed one year of college-level Spanish (Linguistics/Span-

ish 1C/1CX) or its equivalent at another institution or have the consent of the instructor. Ordinarily, students take LTSP 2A, 2B, 2C, and one or more courses from the 50 sequence. Native speakers are encouraged to take LTSP 2D.

**LTSP 2A. Readings and Composition (5)**

This course is taught entirely in Spanish and emphasizes the development of reading ability, listening comprehension, and writing skills. It includes grammar review, weekly compositions, and class discussions. *Prerequisite: completion of LISP 1C/1CX, 1D/1DX, or the equivalent. Successful completion of LTSP 2A satisfies the requirement for language proficiency in Revelle College.*

**LTSP 2B. Readings and Interpretations (5)**

This course further reviews major points of grammar and emphasizes critical reading and interpretation of Spanish texts through class discussion, vocabulary development, and written compositions. It is a continuation of LTSP 2A. *Prerequisite: LTSP 2A or consent of instructor.*

**LTSP 2C. Cultural Readings and Composition (4)**

This course is a continuation of LTSP 2B, with special emphasis on problems in writing and translation. It includes class discussion of cultural topics as well as grammar review and composition. The course will further develop the ability to read articles, essays, and longer pieces of fictional/nonfictional texts. *Prerequisite: LTSP 2B or equivalent.*

**LTSP 2D. Advanced Readings and Composition (4)**

Spanish for native speakers. Designed for bilingual students seeking to become biliterate. Reading and writing skills stressed with special emphasis on improvement of written expression and problems of grammar and orthography. Prepares native speakers with little or no formal training in Spanish for more advanced courses. *Prerequisite: native speaking ability and/or recommendation of instructor.*

**LTSP 7. Introductory Intensive Spanish (8)**

This course will offer highly intensive Spanish language instruction to beginning language students. The course will enable students to develop basic language skills, to include listening comprehension, speaking, reading and writing, through a total immersion approach, with a focus on the acquisition of language functions. (Offered in summer session only.)

**LTSP 21. Debating Literature and Cultural Issues Workshop I (1)**

Allows students with a basic grounding in Spanish to discuss a variety of topics related to literary and cultural issues. Vocabulary development, use of idiomatic expression, and advancement of oral proficiency in Spanish. May be taken as an adjunct to lower-division LTSP courses. Recommended for students planning to study abroad. *Prerequisite: LISP 1C/1CX or LTSP 1D/1DX or LTSP 2A or 2B or 2C or 2D or 50A or 50B or 50C.*

**LTSP 31. Debating Literature and Cultural Issues Workshop II (1)**

Enhances intermediate/advanced students' command of spoken Spanish through debates on literary and cultural issues and the formulation and expression of thoughts in Spanish. May be taken as an adjunct to lower- and upper-division LTSP courses. Recommended for students planning to study abroad. *Prerequisite: LISP 1C/1CX or LISP 1D/1DX or LTSP 2A or 2B or 2C or 2D or 50A or 50B or 50C.*

**LTSP 41. Conversation and Orthography Workshop (1)**

The workshop format of this course allows students to attain a stronger command of skills in matters of Spanish orthogra-

phy, spelling, punctuation, and accent rules. May be taken as an adjunct to lower- or upper-division LTSP courses. Recommended for students planning to study abroad. *Prerequisite:* LTSP 1C/1CX or LTSP 1D/1DX or LTSP 2A or 2B or 2C or 2D or 50A or 50B or 50C.

**LTSP 50A. Readings in Peninsular Literature (4)**

An introduction to Peninsular literature, this course offers a selection of major works and introduces students to literary analysis through reading extensive texts in Spanish. Two or more quarters of courses in the 50 series are suggested before students proceed to upper-division courses. *Prerequisite:* two years of college Spanish or the equivalent.

**LTSP 50B. Readings in Latin American Literature (4)**

An introduction to Latin American literature, this course offers a selection of major works and introduces students to literary analysis through reading extensive texts in Spanish. Two or more quarters of courses in the 50 series are suggested before students proceed to upper-division courses. *Prerequisite:* two years of college Spanish or the equivalent.

**LTSP 50C. Readings in Latin American Topics (4)**

An introduction to major topics in Latin American literature, this course focuses on the literature of a particular region, period, or movement. Works vary from those in 50B and introduce students to literary analysis through reading extensive texts in Spanish. *Prerequisite:* two years of college Spanish or the equivalent.

### UPPER-DIVISION

*Prerequisite:* upper-division standing or consent of instructor. Additional prerequisites may be specified below.

**Note:** As of fall 1992, students must have taken at least one (but preferably two) course(s) in the LTSP 50A-B-C sequence with a grade of C- or better before enrolling in upper-division courses. Without fulfillment of this prerequisite, students must obtain the consent of the instructor of the requested course.

**LTSP 100. Major Works of the Middle Ages (4)**

Major Spanish literary works of the Middle Ages and Renaissance as seen against the historical and intellectual background of the period. May be repeated for credit as topics vary.

**LTSP 107. Literature of the Fifteenth Century (4)**

Survey of cultural texts including courtly romances, political poetry, Columbus's letters, and the tragicomedia *La Celestina*. Issues of gender, blood purity, social estates, and colonialism will be discussed. Repeatable for credit when topics vary.

**LTSP 111. Topics in Golden Age Poetry (4)**

Overview of Castilian lyric production from early sixteenth century to late seventeenth century. Close readings of major texts and study of the relationship between poetic forms and social-cultural context. Repeatable for credit when topics vary.

**LTSP 115. Topics in Golden Age Prose (Except Cervantes) (4)**

Selected readings in the narrative production of the early modern period. Thematic focus and historical period may vary, but major forms such as the picaresque, morisca, and pastoral novel will be covered. Repeatable for credit when topics vary.

**LTSP 117. Golden Age Drama (4)**

Study of representative examples of early modern Castilian theater. Emphasis on textual analysis of individual plays and the

social-cultural meanings of spectacle, especially the comedia and auto sacramental. Repeatable for credit when topics vary.

**LTSP 119A. Cervantes: Teatro (4)**

Selected readings from Cervantes's dramatic works (entremeses and comedias), with special attention to generic innovations in structure and content. This course fulfills the requirement for Spanish literature majors. *Prerequisites:* LTSP 50A and either 50B or 50C.

**LTSP 119B. Cervantes: Novelas Ejemplares (4)**

Study of Cervantes's short narrative pieces and their relationship to the development of prose fiction in the early modern period. Special attention to structural and ideological elements. This course fulfills the requirement for Spanish literature majors. *Prerequisites:* LTSP 50A and either 50B or 50C.

**LTSP 119C. Cervantes: Don Quijote (4)**

Close reading of the 1605 and 1615 texts with special attention to the social and cultural background of the early 17th century in Spain. This course fulfills the requirement for Spanish literature majors. *Prerequisites:* LTSP 50A and either 50B or 50C.

**LTSP 122. The Romantic Movement (4)**

The course will explore the historical context of the emergence of a romantic movement in Spain, particularly the links between romanticism and liberalism. Major romantic works in several genres will be studied in depth.

**LTSP 124. The Nineteenth-Century Novel (4)**

Study of major novelists of the realist tradition. Selection of works and thematic focus may vary.

**LTSP 125. The Generation of '98 (4)**

The course will explore the significant literary tendencies that arose during the crisis of Spanish society at the end of the nineteenth century and the beginning of the twentieth.

**LTSP 127. Modern Drama (4)**

Study of significant developments in Spanish theatre of the nineteenth and twentieth century. Selection of works to be studied will vary at the discretion of the instructor.

**LTSP 128. Modern Poetry (4)**

The course will consider major trends and figures in the development of Spanish poetry throughout the last two centuries. Topics may vary significantly in selection of poets and periods to be studied; thus, course may be repeated for credit when topics vary.

**LTSP 129. Twentieth-Century Prose (4)**

The course will explore significant aspects of Spanish prose literature in this century. Specific topics will vary by genre (novel, short story, essay) and by period. May be repeated for credit when topics vary.

**LTSP 130A. Development of Spanish Literature (4)**

An introduction to the major movements and periods of Spanish literary history, centered on close reading of representative texts, but aimed at providing a sense of the scope of Spanish literature and its relation to the course of Spain's cultural and social history. This course is required of all Spanish literature majors. It is strongly recommended that this course be taken before any other upper-division Spanish (peninsular) literature course. *Prerequisites:* LTSP 50A and either 50B or 50C.

**LTSP 130B. Development of Latin American Literature (4)**

An introduction to major movements and periods in Latin American literature, centered on a study of key works from pre-Columbian to the present time. Texts will be seen within their sociohistorical context and in relation to main artistic trends of the period. This course is required of all Spanish literature majors. It is strongly recommended that this course be

taken before any other upper-division Latin American literature course. *Prerequisites:* LTSP 50A and either 50B or 50C.

**LTSP 131. Spanish American Literature: The Colonial Period (4)**

A study of the major literary works of the Latin American colonial period as seen against the historical context of that period.

**LTSP 132. Spanish American Literature: The Nineteenth Century (4)**

A study of the major literary works and problems of the nineteenth century in Latin America as seen against the historical context of that period.

**LTSP 133. Spanish American Literature: The Twentieth Century (4)**

A study of the major literary works and problems of the twentieth century in Latin America as seen against the historical context of that period.

**LTSP 134. Argentine Literature (4)**

Study of movements, traditions, key authors, or major trends in Argentine literature, such as gaucho poetry, the realist novel, modern urban narrative, the school of Jorge Louis Borges. May be repeated for credit as topics vary.

**LTSP 135. Mexican Literature (4)**

Study of popular novels, movements, traditions, key authors, or major trends in modern Mexican literature. May be repeated for credit as topics vary.

**LTSP 136. Peruvian Literature (4)**

Study of movements, traditions, key authors, or major trends in Peruvian literature, such as the romantic movement, the essay tradition, the rural narrative, the novel of national definition, postmodernist poetry authors such as Vallejo, Arquedas, Vargas Llosa. May be repeated for credit as topics vary.

**LTSP 137. Caribbean Literature (4)**

Study of movements, traditions, key authors, or major trends in Caribbean literature in Spanish, such as the romantic movement, the literature of independence, the essay tradition, Afro-Antillean literature, the historical novel. May be repeated for credit as topics vary.

**LTSP 140. Spanish American Novel (4)**

A study in depth of selected novelists of Spanish America. May be organized around a specific theme or idea which is traced in its development through the narratives. Course may be repeated for credit when topics vary.

**LTSP 141. Spanish American Poetry (4)**

A critical study of some of the major poets of Spanish America, focusing on the poet's central themes, the evolution of poetic style, and the significance of the poetry to the historical context. May be repeated as topics vary.

**LTSP 142. Spanish American Short Story (4)**

Readings and interpretation of short story form in Latin America. Focus is primarily nineteenth or twentieth century. May be repeated for credit as topics vary.

**LTSP 143. Spanish American Essay (4)**

A study of the essay in Spanish American literature from either an historical or a topical point of view. May be repeated for credit as topics vary.

**LTSP 144. Spanish American Theatre (4)**

This course studies the representative plays of the major dramatists of Latin America. Discusses and analyzes the dramatic works in light of their historical, social, and cultural background. Considers their contribution to the development of a theatrical tradition in Latin America. May be repeated for credit as topics vary.

**LTSP 150. The Development of Chicano Literature (4)**

A cross-genre survey of the major works in Chicano literature from its beginnings to the present, with primary emphasis on contemporary works. Speaking, writing, and reading knowledge of Spanish is required.

**LTSP 151. Themes and Motifs in Chicano Literature (4)**

This course is organized around some of the significant themes and ideas expressed in specific Chicano writings. The importance of these themes to particular Chicano experience is considered. Speaking, writing, and reading knowledge of Spanish is required.

**LTSP 152. Chicano Prose (4)**

Study of the different genres of Chicano prose: novel, short story, poetry, autobiography. Attention is given to Chicano prose styles and the historical and cultural movement in which they develop. Speaking, writing, and reading knowledge of Spanish is required.

**LTSP 153. Chicano Poetry (4)**

The analysis and discussion of the major forms and modes of Chicano poetry, with primary emphasis on the developing styles of the poets and on the study of the texts' and the authors' historical moment. Speaking, writing, and reading knowledge of Spanish is required.

**LTSP 162. Spanish Language in the United States (4)**

A sociolinguistic study of the popular dialects in the U.S.A. and their relation to other Latin American dialects. The course will cover phonological and syntactic differences between the dialects as well as the influence of English on the Southwest dialects.

**LTSP 163. Spanish Language in America (4)**

A study of the history, structure, and peculiarities of the Spanish language in Latin America with selected readings from Latin American authors utilizing these dialects within their works.

**LTSP 165. History of the Spanish Language (4)**

Historical description of Spanish phonology, morphology, and syntax based on readings of the different periods.

**LTSP 166. Creative Writing (4)**

A workshop designed to foster and encourage writing in Spanish of students working on short forms of fiction. The workshop will include discussion of techniques and intensive writing.

**LTSP 170. Literary Criticism (4)**

The course will discuss major contemporary critical approaches and the question of their applicability to the analysis of contemporary Latin American, Peninsular, and Chicano literature. Open to literature majors only.

**LTSP 171. Studies in Literature and Society (4)**

Focus on interaction between literary expression and the study of society, covering issues such as the sociology of literature, the historical novel, literature and social change, the writer as intellectual. May be repeated for credit as topics vary.

**LTSP 172. Indigenista Themes in Spanish American Literature (4)**

Study of the varying literary modes by which nineteenth- and twentieth-century poets and narrators have interpreted the themes of Andean survival in Latin America, primarily in Mexico and the Andean Highlands. May be repeated for credit as topics vary.

**LTSP 173. Problems in Spanish and Spanish American Literary History (4)**

Study of the issues involved in understanding the development process of literary expression; the problem of genre; the rela-

tion of literature to social institutions; the function of literary influence and tradition; the relation of popular and print cultures. May be repeated for credit as topics vary.

**LTSP 190. Seminars (4)**

These seminars are devoted to a variety of special topics, including the works of single authors, genre studies, problems of literary history, relations between literature and the history of ideas, literary criticism, literature and society, and the like. The student may enroll in more than one seminar in a single quarter.

**LTSP 196. Honors Thesis (4)**

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTGN 191. Oral Exam.

**LTSP 198. Directed Group Study in Spanish Literature (4)**

Research seminars and research, under the direction of a member of the staff. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

**LTSP 199. Special Studies (2 or 4)**

Tutorial: individual guided reading in areas of Spanish literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

## GRADUATE

**LTSP 214. Studies in Medieval Literature (4)**

Consideration of one or more major figures, texts, trends, or problems in medieval Spanish literature.

**LTSP 224. Golden Age Studies (4)**

Consideration of one or more major figures, texts, trends, or problems in Spanish Golden Age studies. May be repeated for credit as topics vary.

**LTSP 252. Studies in Modern Hispanic Literature and Culture (4)**

Major trends and figures considered in the context of late nineteenth- and twentieth-century Hispanic culture. May be repeated for credit as topics vary.

**LTSP 253. Chicano Literature (4)**

Study of the particular life experience of the Chicano and the unique expression given that experience by Chicano authors, whether in novels, short stories, poetry, or dramatic works. May be repeated for credit as topics vary.

**LTSP 254. Modern Spanish Poetry (4)**

An historical approach to modern Spanish poetry. May be repeated for credit as topics vary.

**LTSP 255. The Modern Spanish Novel (4)**

An historical approach to the modern Spanish novel. May be repeated for credit as topics vary.

**LTSP 259. Spanish American Poetry (4)**

Consideration of one or more major figures, texts, trends, or problems in Spanish American poetry. May be repeated for credit as topics vary.

**LTSP 272. Literature and Society Studies (4)**

Special topics in practical criticism involving social and economic historical perspectives. May be repeated for credit as topics vary.

**LTSP 280. Field Work (4)**

Techniques of on-the-spot linguistic and folkloric surveys, including the practice of ballad collections in the Spanish Peninsula. Offered for repeated registration.

**LTSP 295. M.A. Thesis (1-8)**

Research for the master's thesis. Open for repeated registration up to eight units. (S/U grades only.)

**LTSP 296. Research Practicum (1-12)**

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

**LTSP 297. Directed Studies: Reading Course (1-12)**

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

**LTSP 298. Special Projects: Writing Course (1-12)**

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

**LTSP 299. Dissertation (1-12)**

Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

## LITERATURE/THEORY

Courses in theory may apply to various literature majors. Please consult your adviser.

Additional theory courses are offered in the various department sections. See quarterly course descriptions in the Department of Literature office, first floor LIT building.

## UPPER-DIVISION

**LTH 100. Introduction to Critical Theory (4)**

A critical review of major contemporary theories of the nature of literature, its sociocultural function, and appropriate modes of evaluation.

**LTH 101. Issues in Feminist Theory (4)**

The study of selected issues in feminist theory, feminist approaches to literature; and the function of feminist critics in society. May be repeated for credit when topics vary.

**LTH 110. History of Criticism (4)**

A critical and interpretive review of some of the major documents in criticism from the classical period to the present time.

**LTH 120. Major Figures (4)**

Close study of major critics, as individuals or as groups, from the classical period to the present time. May be repeated for credit when topics vary.

**LTH 130. Introduction to Linguistic and Discourse Theories (4)**

An introduction to linguistic and discourse theories, analyses of linguistic structures, elements of socio-linguistics, language use, language acquisition, and bilingualism.

**LTH 198. Directed Group Study (4)**

Directed group study, under the guidance of a member of the faculty, in an area not covered in courses currently offered by the department (P/NP only)

**LTH 199. Special Studies (2 or 4)**

Individual reading in an area not covered in courses currently offered by the department. (P/NP only.)

## GRADUATE

**LTH 200A. Text/Culture/Critical Practice (4)**

An introduction to theories and practices of literary and cultural criticism. Topics may vary, but emphasis will be on terminology, methods of readings, modes of interdisciplinary analysis and argumentation, recent debates on questions of theory, history, textual scholarships, etc. *Prerequisite: registered doctoral student in literature.*

**LTH 200B. Problems in Contemporary Literary Theory (4)**

The focus is feminist literary/cultural theories and their relations with major contemporary theoretical discourses (e.g., psychoanalysis, poststructuralism, and various forms of historicism). *Prerequisite: registered doctoral student in literature.*

**LTH 200C. Cultural Perspectives and Cultural Criticism (4)**

Literary and cultural relations between the First and Third Worlds, colonialism and neo-colonialism, orality and literacy, construction of ethnicity, formation of canon, and popular culture and the market. *Prerequisite: registered doctoral student in literature.*

**LTH 201. Contemporary Theoretical Debates and Critical Discourses (4)**

An introduction to a wide range of theoretical and methodological issues, schools of thought, and interpretative styles in contemporary literary studies. Required of all M.A. students in the Department of Literature, normally in their first quarter in the program. *Prerequisites: admission to the M.A. program in the Department of Literature or consent of instructor; graduate standing.*

**LTH 210. Major Periods and Movements (4)**

Historically oriented study of past criticism and critical theory as they pertain to contemporary interests and concerns. May be repeated for credit when topics vary.

**LTH 220. Theories of Literary Criticism (4)**

Close study of any of the several bodies of literary theory currently applied to literary criticism: psychoanalytic, Marxist, historicist, semiotic, feminist, hermeneutic, reader-response, among others. May be repeated for credit when topics vary.

**LTH 230. Comparative Literary Theory (4)**

Comparison of theoretical approaches across cultures (e.g., East/West studies), across modes of discourse (e.g., oral/written), or across media (e.g., literature/art or literature/music). May be repeated for credit when topics vary.

**LTH 240. Forms and Genres (4)**

Theory as it focuses on the various literary modes—e.g., narratology, poetics, formalism. May be repeated for credit when topics vary.

**LTH 270. Psychoanalytic Approaches to Literature (4)**

A systematic study of basic psychoanalytic theory as it applies to literary criticism, with practical psychoanalytical exploration of works from various periods and literatures.

**LTH 296. Research Practicum (1-12)**

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

**LTH 297. Directed Studies: Reading Course (1-12)**

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

**LTH 298. Special Projects: Writing Course (1-12)**

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

## LITERATURES OF THE WORLD

## AFRICAN LITERATURES

**LTAF 110. African Oral Literature (4)**

Survey of various genres of African and oral literary traditions. Oral narrative genres, investigation of proverb, riddle, praise poetry, and epic. Development and use of a methodology to analyze aspects of performance, composition, and education in oral traditional systems.

**LTAF 120. Literature and Film of Modern Africa (4)**

This course traces the rise of modern literature in traditional African societies disrupted by the colonial and neocolonial experience. Contemporary films by African and Western artists will provide an additional insight into the complex social self-images of the continent.

## LITERATURES OF THE AMERICAS

**LTAM 110. Latin American Literature in Translation (4)**

Reading of representative works in Latin American literature with a view to literary analysis (form, theme, meaning), the developmental processes of the literature, and the many contexts: historical, social, cultural. Texts may be read in English. May be repeated for credit as topics vary.

**LTAM 120. Mexican Literature in Translation (4)**

Study of popular novels, movements, traditions, key authors, or major trends in modern Mexican literature. Texts may be read in English. May be repeated for credit as topics vary.

## EAST ASIAN LITERATURES

**LTEA 100A. Classical Chinese Poetry in Translation (4)**

A survey of different genres of traditional Chinese poetry from various periods.

**LTEA 100B. Modern Chinese Poetry in Translation (4)**

A survey of Chinese poetry written in the vernacular from 1918 to 1949.

**LTEA 100C. Contemporary Chinese Poetry in Translation (4)**

A survey of Chinese poetry development from 1949 to the present.

**LTEA 110A. Classical Chinese Fiction in Translation (4)**

The course will focus on a few representative masterpieces of Chinese literature in its classical age, with emphasis on the formal conventions and the social or intellectual presuppositions that are indispensable to their understanding. May be repeated for credit when topics vary.

**LTEA 110B. Modern Chinese Fiction in Translation (4)**

A survey of representative works of the modern period from 1919 to 1949. May be repeated for credit when topics vary.

**LTEA 110C. Contemporary Chinese Fiction in Translation (4)**

An introductory survey of representative texts produced after 1949, with particular emphasis on the social, cultural, and political changes. May be repeated for credit when topics vary.

**LTEA 120A. Chinese Films (4)**

A survey of representative films from different periods of Chinese cinematic development. May be repeated for credit when topics vary.

**LTEA 120B. Taiwan Films (4)**

A survey of "New Taiwan Cinema" of the eighties and nineties.

**LTEA 120C. Hong Kong Films (4)**

An examination of representative works of different film genres from Hong Kong.

**LTEA 120D. Filming Chinese Literature (4)**

An investigation of various adaptations of both traditional and modern literary texts from the three main Chinese communities (China, Taiwan, and Hong Kong).

**LTEA 130. Earlier Japanese Literature in Translation (4)**

An introduction to earlier Japanese (bungo) literature in translation. Will focus on several works, placing their forms in the historical context. No knowledge of Japanese required. Repeatable for credit when topics vary.

**LTEA 132. Later Japanese Literature in Translation (4)**

An introduction to later Japanese (kogo) literature in translation. Will focus on several "modern" works, placing their form in the historical context. No knowledge of Japanese required. Repeatable for credit when topics vary.

**LTEA 134. A Single Japanese Author (In Translation) (4)**

A good number of Japanese authors are by now well represented in English translation. The course will focus on one writer and his or her relationships to the social context. May be repeated for credit as topics vary.

**LTEA 136. Special Topics in Japanese Literature (4)**

The course will focus on important problematics of literary studies as they relate to Japan (e.g., "feminism," "modernity," "literary mode of production," "Orientalism and nativism"). No knowledge of Japanese required. May be repeated for credit as topics vary.

**LTEA 198. Directed Group Study (4)**

Research seminars and research, under the direction of a faculty member.

**LTEA 199. Special Studies (2 or 4)**

Tutorial; individual guided reading in areas not normally covered in courses. (P/NP grades only.)

## EUROPEAN AND EURASIAN LITERATURES

*Prerequisite: upper-division standing or consent of instructor.*

**LTEU 100. The Classical Tradition (4)**

Greek and Roman literature in translation. May be repeated for credit as topics vary.

**LTEU 102. Women in Antiquity (4)**

Selected topics in classical culture, including women and myth, women in Greek and Roman society, and the representation of women in classical literature. May be repeated for credit when topics vary.

**LTEU 105. Medieval Studies (4)**

Studies in medieval culture and thought with focus on one of the "three crowns" of Italian literature: Dante, Boccaccio, or Petrarca. May be repeated for credit when course content varies.

**LTEU 110. European Romanticism (4)**

Attention given to historical and cultural contexts. Topics to be considered include the concept of nature, the reaction to science, the role of the imagination. May be repeated for credit as topics vary.

**LTEU 120. Literatures in French (4)**

One or more periods or authors in French literature. Texts read in English. May be repeated for credit as topics vary.

**LTEU 130. German Literature in Translation (4)**

One or more aspects of German literature, such as major authors, the contemporary novel, nineteenth-century poetry, German expressionism. Texts may be read in English or the original language. May be repeated for credit as topics vary.

**LTEU 140. Italian Literature in Translation (4)**

One or more periods or authors in Italian literature. Texts may be read in English. May be repeated for credit as topics vary.

**LTEU 144. Italian Romanticism in Translation (4)**

This course will consider the rise of romanticism in Italy and its relationship to European romanticism. Particular attention will most likely be paid to the works of Foscolo and Leopardi. Credit will not be given for both LTEU 144 and LTIT 118, Italian Romanticism.

**LTEU 146. Studies in Modern Italian Prose (4)**

A study of the chief modern Italian *prosatori* including D'Annunzio, Calvino, Pavese, Pasolini, etc. Repeatable for credit. (Conjoined with LTIT 137.)

**LTEU 147. Women in Italy (4)**

A study of historical, political, and literary texts regarding women and feminism in Italian society.

**LTEU 150A-B-C. Survey of Russian and Soviet Literature in Translation, 1800 to the Present**

A study of literary works from Pushkin to the present.

150A. 1800-1860

150B. 1860-1917

150C. 1917-present

**LTEU 153. Twentieth-Century Russian or Soviet Literature in Translation (4)**

A study of literary work from the twentieth century. May be repeated for credit as topics vary.

**LTEU 154. Russian Culture: The Modern Period (4)**

An introduction to Russia's past and present through the cross-disciplinary study of literature, the visual and performing arts, social and political thought, civic rituals, popular entertainments, values and practices from 1825 to the present.

**LTEU 156. Genres in Russian Literature in Translation (4)**

An examination of one or more genres in Russian literature—for example, the novel, the short story, autobiography, drama, poetry. All readings will be in English. May be repeated for credit as topics vary.

**LTEU 158. Single Author in Russian Literature in Translation (4)**

A study of literary works by a single Russian author. All readings will be in English. May be repeated for credit when authors vary.

**LTEU 159. Russian and Soviet Film (4)**

An examination of pivotal films, filmmakers, and film theories from Russia and the former Soviet Union in their cultural and historical contexts. May be repeated for credit when topics vary.

**NEAR EASTERN LITERATURES****LTNE 100. The Bible and Western Literature (4)**

Biblical and related texts that influenced the great writers of the Middle Ages and the Renaissance, including selections from the Jewish and Christian scriptures.

**LTNE 102A. The Bible: The Prophetic Books (4)**

The prophetic books of the Bible in their historical contexts. The relationship between the prophetic and narrative books. Literary-critical analysis, theological issues, reference to archaeological data.

**LTNE 102B. The Bible: The Narrative Books (4)**

Examination of the Biblical accounts in their ancient Near Eastern context. Literary-critical, form-critical, and textual analysis. Attention to related literature and to archaeological data; consideration of theological issues.

**LTNE 106. Topics in Bible Narrative (4)**

Study of a single book, period, or issue in the narrative books of the Bible.

**LTNE 112. Medieval Hebrew Literature (4)**

Major literary works of the Middle Ages and Renaissance as seen against the historical and intellectual background of the period.

**LTNE 120A. Topics in Early Christian Literature: The New Testament (4)**

An introduction to the writings of the New Testament, their creation, collection, and critical study.

**LTNE 120B. Topics in Early Christian Literature: Paul and the Invention of Christianity (4)**

An evaluation of ancient and modern accounts of Christian origins set against a careful reading of early Jewish and Christian texts (canonical and non-canonical).

**LTNE 120C. Topics in Early Christian Literature: Reinventing Jesus (4)**

A survey of the "gospels" of the first three centuries for light they may (or may not) shed on the historical figure of Jesus, set within the context of religious biography in late antiquity.

**LTNE 120D. Topics in Early Christian Literature: The Fourth Gospel (4)**

A solution to the riddle of the Fourth Gospel.

**LTNE 120E. Topics in Early Christian Literature: The History of Heresy (4)**

Study of "heretical" movements within the first three centuries of Christianity's history (e.g., gnosticism).

**LTNE 120F. Topics in Early Christian Literature: Christianity and the Roman Empire (4)**

An evaluation of significant attempts (from Edward Gibbon to Peter Brown) to explain the "rise" of Christianity and the "decline and fall" of the Roman Empire.

**LTNE 120G. Topics in Early Christian Literature: Against the Christians (4)**

From Celsus to Julian the Apostate, the pagan assault on Christianity in the intellectual, political, and religious context of late antiquity.

**LTNE 150. Arabic Literature in Translation (4)**

Analysis and discussion of major modern works of fiction in translation with an emphasis on social and literary background. Study of the principal authors of the Arab world, their literary works, techniques, and themes. Authors chosen from various Arab countries.

**LITERATURES OF THE WORLD**

In both lower- and upper-division world literature courses, texts may be read in English translation when necessary, and lectures and discussions are conducted in English.

**LOWER-DIVISION****LTWL 4A-B-D-E-M. Fiction and Film in Twentieth-Century Societies (4-4-4-4-4)**

A study of modern culture and of the way it is expressed and understood in novels, stories, and films. The sequence aims at an understanding of relationships between the narrative arts and society in the twentieth century, with the individual quarters treating fiction and film of the following language groups:

4A. French

4B. German

4D. Italian

4E. Russian

4M. Multiple national literatures and film

**LTWL 19A-B-C. The Graeco-Roman World (4-4-4)**

An introductory study of the Graeco-Roman world, its literature, myth, philosophy, history, and art.

**LTWL 90. Undergraduate Seminar (1)**

Readings and discussions focused on a writer, period, or literary topic. The aim of the course is to acquaint the student with literature as a field of university-level study. Repeatable for credit.

**LTWL 100. Mythology (4)**

A study of various bodies of myth: their content, form, and meaning. May be repeated for credit as topics vary.

**LTWL 101. What Socrates Knew (4)**

Socratic perspectives on the nature of life and death, virtue and happiness, love and the gods.

**LTWL 102. Words and Their Vicissitudes (4)**

An inquiry into several aspects of words: etymology, semantic change, and the inescapability of metaphor, among others.

**LTWL 103. Words into Images (4)**

With the proliferation of comic books, photostories, films, and television, the visualization of the verbal abstractions of literature has become a central concern of the entertainment industry. This course explores the cultural implications of the transformation of words into images.

**LTWL 104. Epic Poetry (4)**

A study of major epics, in translation if their original language is not English. May be repeated for credit as topics vary.

**LTWL 105. Lyric Poetry (4)**

Studies in lyric poetry. Not confined to a single national literature. Texts may be read in English.

**LTWL 107. Prose Fiction (4)**

Aspects of prose fiction. Not confined to a single national literature. Texts may be read in English. May be repeated for credit as topics vary.

**LTWL 110A. The Forms of Folklore (4)**

A survey of the range of folkloristic phenomena as exemplified by major and minor forms—narrative, legend, myth, superstition, speech, custom, games, and music. Examples will be considered both as artistic entities and as social documents.

**LTWL 110B. Folk and Fairy Tales (4)**

A study of folk and fairy tales from various cultures, from the point of view of literary form, psychological meaning, and cultural function. May be repeated for credit as topics vary.

**LTWL 112. Travel Literature (4)**

A critical examination of accounts of travel, initial encounters, and cultural interactions, structured by date/period, location, authorship, or another unifying concept. Lectures will position



the readings in sociocultural and literary history. May be repeated for credit when topics vary.

**LTWL 114. Children's Literature (4)**

A study of literature written for children in various cultures and periods. May be repeated for credit as topics vary.

**LTWL 115. Contemporary Literature (4)**

A study of novels and authors of the present and recent times. May be repeated for credit as topics vary.

**LTWL 116. Adolescent Literature (4)**

A study of fiction written for the young adult in various cultures and periods. Consideration will be given to the young adult hero in fiction. May be repeated for credit as topics vary.

**LTWL 120. Popular Literature and Culture (4)**

A study of various popular forms—such as pop music, cult books, film, fashion, magazines, graphic arts—within a broader cultural context. Focus may be on a particular genre (e.g., best sellers) or era (e.g., the sixties). May be repeated for credit when topics vary.

**LTWL 122. Fantasy (4)**

Reading and analysis of various works that fall into several categories of the fantastic—e.g., heroic, gothic, irrealist, postmodern—with particular attention to the cultural uses of myth, folklore, and fantasy, and to the psychological and structuralist theories of same. May be repeated for credit when topics vary.

**LTWL 124. Science Fiction (4)**

An exploration of the genre—past and present, in literature and the visual media—as a cultural response to scientific and technological change, as modern mythmaking, and as an enterprise serving a substantial fan subculture. May be repeated for credit when topics vary.

**LTWL 128. Introduction to Semiotics and Applications (4)**

Semiotics, basically a theory of signification, describes the models and conceptual constructs through which meaning is grasped and produced. The course provides a background in the history of semiotics and its dominant modes. May be repeated for credit when topics vary.

**LTWL 130. Culture, Ideology, and Collective Memory (4)**

How do societies remember (and forget) the past and, through this process of collective memory, conceive their present? What stories are stored, who constructs them, and what purposes do they serve? Readings in the theory of ideology and close study of empirical cases.

**LTWL 131. Western Religious Traditions: Judaism, Christianity, Islam (4)**

What does it mean for a religion to have a Holy Book, normative for belief and practice? The aim of this course is to provide a comparative perspective on the sacred books of Western civilization, through a careful reading of some of the major texts in the Hebrew Bible, the New Testament, and the Qur'an.

**LTWL 132. The Jewish Experience in Literature (4)**

Literary works from various periods dealing with Jewish themes, with an emphasis on modern Jewish writing in America, Russia, etc. May be repeated for credit as topics vary.

**LTWL 133. Religion: Inside Out and Upside Down (4)**

A study of the nature and importance of place in Western religious imagination, through a comparative reading of the ancient Mesopotamian "Epic of Gilgamesh", the early Christian "Gospel of John", and Ridley Scott's futuristic film noir, "Blade Runner".

**LTWL 134. A Cultural History of American Jewry (4)**

A cultural history of Jewish immigrants in the United States, beginning in the seventeenth century. Emphasis will be on the

period of mass immigration, beginning in the 1880s, and on the Russian and European origins of Jewish immigrants.

**LTWL 140. Novel and History in the Third World (4)**

This course sets out to explore the relation between the novel and the "dependent" history of the Third World, contrasting and comparing the uses of history in the European novel as defined in the theoretical analysis of Lukacs with uses of history in the Third World novel. An analysis of major themes and movements common to selected ethnic literature in the United States and national literatures in the Third World.

**LTWL 144. American Indian Literature (4)**

An investigation of traditional native poetry and performance art of the Americas in relation to contemporary practices in the non-Indian world. Topics will vary and may include shamanism, ritual performance, mythopoesis, and oral narration. Repeatable for credit when topics vary.

**LTWL 146. Ethnopoetics: Living Poetry (4)**

An investigation of a series of events that originally compose the full sentient being of poetry's body. This course seeks to recreate the living tangents of the lyrical moment (chanting, modulating, miming, dancing, meditating, improvising, etc.) for direct experience and expression. May be repeated for credit when topics vary.

**LTWL 148. Yiddish Literature in Translation (4)**

Representative works of fiction, drama, poetry, parable, film, and song from Eastern European Jewish culture. Topics include Chasidism, Zionism, the life of the shtetl, relations with the biblical and rabbinic traditions, and a study of literary forms and styles. May be repeated for credit as topics vary.

**LTWL 150. Modernity and Literature (4)**

Explores the various cross-cultural historical, philosophical, and aesthetic ideas which formed the basis of most twentieth-century literature. Literature from the Americas, Europe, Asia, and Africa will be studied through lectures and the reading of texts in English translation. Repeatable for credit when topics vary.

**LTWL 152A. Modern and Postmodern Poetry I (4)**

A study of early twentieth-century poetry across a wide spectrum of languages and literatures, involving poets such as Apollinaire, Stein, Rilke, Pound, Marinetti, H.D., Khlebnikov, Lorca, Breton, Tsvetayeva, Artaud, Vallejo, and Césaire, and movements ranging from Futurism, Expressionism, and Dada to Surrealism, the "Objectivists," and Negritude.

**LTWL 152B. Modern and Postmodern Poetry II (4)**

A study of twentieth-century world poetry in the latter half of the twentieth century, involving poets such as Celan, Paz, Rukeyser, Olson, Ritsos, Holan, Ginsberg, Jabès, Rich, Mac Low, Adonis, Pasolini, Braithwaite, Waldman, Takahashi, and Baraka, and movements including Fluxus, concrete poetry, the Beats, the *Wienergruppe*, language poetry, and the Misty poets.

**LTWL 155. Gender Studies (4)**

The study of the construction of sexual differences in literature and culture. May be repeated for credit when topics vary.

**LTWL 160. Women and Literature (4)**

This course will explore the relationship between women and literature, i.e., women as producers of literature, as objects of literary discourse, and as readers. Foreign language texts will be read in translation. May be repeated for credit as topics vary.

**LTWL 170. Specialized Genres in Literature (4)**

The study of literary genres that do not fall into the ordinary categories of lyric, drama, fiction, and prose. Topics vary from year to year. May be repeated for credit as topics vary.

**LTWL 172. Special Topics in Literature (4)**

Studies in specialized literary, philosophic, and artistic movements, approaches to literature, literary ideas, historical moments, etc.

**LTWL 176. Literature and Ideas (4)**

The course will center on writers or movements of international literary, cultural, or ideological significance. The texts studied, if foreign, may be read either in the original language or in English. May be repeated for credit as topics vary.

**LTWL 180. Film Studies and Literature: Film History (4)**

The study of film history and its effects upon methods of styles in literary history. Repeatable for credit when topics vary.

**LTWL 181. Film Studies and Literature: Film Movement (4)**

Study of analogies between literary movements and film movements. Repeatable for credit when topics vary.

**LTWL 182. Film Studies and Literature: Film Genre (4)**

Methods of literary study of genre applied to the study of filmic genre. Repeatable for credit when topics vary.

**LTWL 183. Film Studies and Literature: Director's Work (4)**

Methods of criticism of author's work applied to the study and analysis of film director's style and work. Repeatable for credit when topics vary.

**LTWL 184. Film Studies and Literature: Close Analysis of Filmic Text (4)**

Methods of literary analysis applied to the study of shots, sequences, poetics, and deep structure in filmic discourse. Repeatable for credit when topics vary.

**LTWL 185. Film Studies and Literature: Interdisciplinary Issues (4)**

Inquiry into interrelated and interdisciplinary issues concerning the diverse field of film studies and literature.

**LTWL 186. The Psychology of the Filmic Text (4)**

Methods of psychology, psychoanalysis, and the cognitive sciences applied to the study of film and film grammar (Ch. Metz, et al.). The course also features studies in cultural interaction with the film medium. Repeatable for credit when topics vary.

**TWS 21-22-23-24-25-26. Third World Literatures (4-4-4-4-4-4)**

(See entry under "Third World Studies" heading.)

The courses in this sequence are equivalent to general literature courses. The sequence satisfies Marshall College general-education requirements.

**Seminars/Independent Studies**

**LTWL 191. Honors Seminar (4)**

Explorations in critical theory and method. This course, designed to prepare students to write an honors thesis, is open only to literature majors invited into the department's Honors Program.

**LTWL 195. Apprentice Teaching (0 or 4)**

Undergraduate instructional assistance. Student must (1) prepare reading materials assigned by the professor; (2) lead student discussions; (3) assist professor in grading; and (4) prepare report to professor at conclusion of quarter concerning his/her work.

**LTWL 196. Honors Thesis (4)**

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTGN 191. Oral exam. *Prerequisite:* permission of department.

**LTWL 198. Directed Group Study (4)**

Research seminars and research, under the direction of faculty member. *Prerequisite: permission of department.*

**LTWL 199. Special Studies (2 or 4)**

Tutorial; individual guided reading in areas of literature (in translation) not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.*

**GRADUATE****LTWL 500. Apprentice Teaching in Literature (2-4)**

Consideration of pedagogical methods appropriate to undergraduate teaching in literature courses under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

**LTWL 501. Apprentice Teaching in Humanities (2-4)**

Consideration of pedagogical methods appropriate to undergraduate teaching in humanities sequences under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

**LTWL 502. Apprentice Teaching in Muir College (2-4)**

Consideration of pedagogical methods appropriate to undergraduate teaching in Muir College courses under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

**LTWL 503. Apprentice Teaching in Marshall College (2-4)**

Consideration of pedagogical methods appropriate to undergraduate teaching in Marshall College courses under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

**LTWL 504. Apprentice Teaching in Warren College (2-4)**

Consideration of pedagogical methods appropriate to undergraduate teaching in Warren College courses under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

**LTWL 506. Apprentice Teaching in Roosevelt College (2-4)**

Consideration of pedagogical methods appropriate to undergraduate teaching in Eleanor Roosevelt College courses under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

**WRITING/LITERATURE****LOWER-DIVISION****LTWR 8A. Craft of Writing: Fiction (4)**

Study of fiction in terms of structure and content. Plot, description, character, theme, genre, dialogue, and revision studied through readings from throughout the history of the short story. Practical exercises accompany reading assignments. *Prerequisite: upper-division fiction workshops. Students are required to attend at least three Wednesday afternoon readings*

in the New Writing Series during the quarter. *Prerequisite: students must have completed their college writing requirements prior to enrollment in LTWR 8A.*

**LTWR 8B. Craft of Writing: Poetry (4)**

Study of poetry in terms of its formal structure and its individual and social function. Techniques of composition (prosody, narrative, personification, performance, metaphor, and image) studied through written and oral examples of this genre. Practical imitations and exercises accompany reading assignments. Students are required to attend at least three Wednesday afternoon readings in the New Writing Series during the quarter. *Prerequisite: students must have completed their college writing requirements prior to enrollment in LTWR 8B.*

**LTWR 8C. Craft of Writing: Nonfiction (4)**

Study of nonfictional prose in terms of genre and craft. Techniques of composition (journalism, essay, letters, reviews) studied through written examples of the genre. Practical imitations and exercises accompany reading assignments. *Prerequisite: upper-division nonfiction prose workshops. Prerequisite: students must have completed their college writing requirements prior to enrollment in LTWR 8C.*

**UPPER-DIVISION**

Departmental approval is required for enrollment in all upper-division Lit/Writing courses.

*Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.*

(See Department of Theatre for course offerings in dramatic writing.)

**Prose Fiction, Poetry, Media Workshops****LTWR 100. Short Fiction (4)**

A workshop for students with some experience and special interest in writing fiction. This workshop is designed to encourage regular writing in the short forms of prose fiction and to permit students to experiment with various forms. There will be discussion of student work, together with analysis and discussion of representative examples of short fiction from the present and previous ages. May be taken for credit three times. *Prerequisite: LTWR 8A.*

**LTWR 101. Beginning Poetry Workshop (4)**

A workshop for beginning students of poetry. This course has weekly writing assignments in basic poetic forms; readings from ancient through contemporary poetry. Prepares students for LTWR 102 and other more advanced poetry workshops. May be taken only once. *Prerequisite: LTWR 8B.*

**LTWR 102. Poetry (4)**

A workshop for students with some experience and special interest in writing poetry. This workshop is designed to encourage regular writing of poetry. There will be discussion of student work, together with analysis and discussion of representative examples of poetry from the present and previous ages. May be taken for credit three times. *Prerequisite: LTWR 8B.*

**LTWR 104. The Novel (4)**

A workshop designed to encourage writing of longer narrative forms. There will be discussion of student work, together with analysis and discussion of novels from the present and previous ages. May be taken for credit three times. *Prerequisite: LTWR 8A.*

**LTWR 106. Translation Workshop (4)**

The course centers on issues in the theory and practice of literary translation. Students should be proficient in at least one language other than their native language. Their primary task will be to translate several literary texts and discuss the versions with the instructor and other course members, and they will also do selected readings in translation theory and in published translations. May be taken for credit three times.

**LTWR 110. Screen Writing (4)**

A workshop designed to encourage writing of original screen plays and adaptations. There will be discussion of student work, together with analysis of discussion of representative examples of screen writing. May be taken for credit three times.

**LTWR 111. Prose Poem (4)**

Although prose poems have been written by writers all over the world, the question of what constitutes a prose poem has never been adequately answered. Through practice, we will explore the inner dynamics central to this mixed genre. *Prerequisite: LTWR 8B.*

**LTWR 113. Intercultural Writing (4)**

This course is an introduction to modes of writing from other cultural systems vastly different from the cultural-aesthetic assumptions of Anglo-American writing. While disclosing the limitations of the English language, this course attempts to provide new language strategies for students.

**LTWR 115. Experimental Writing (4)**

This workshop explores writing for which the traditional generic distinctions of prose/poetry, fiction/documentary, narrative/discourse do not apply. Students taking this course will be asked to challenge the boundaries of literature to discover new forms and modes of expression. May be taken for credit three times.

**LTWR 119. Writing for Performance (4)**

A workshop and survey of experimental approaches to the writing and production of performance works in a range of literary genres. Emphasis will be placed on the integration of written texts with non-verbal elements from the visual arts, theater, and music. *Prerequisite: LTWR 8A or 8B, to be determined by quarterly offerings of LTWR 119.*

**Nonfiction Prose Workshops****LTWR 120. Personal Narrative (4)**

A workshop designed to encourage regular writing of all forms of personal experience narrative, including journals, autobiography, firsthand biography, and firsthand chronicle. Instructor and students will discuss student work as well as published personal narratives. May be taken for credit three times. *Prerequisite: LTWR 8C.*

**LTWR 121. Reportage (4)**

A workshop designed to encourage the full range of reportage writing: observations, interviews, case studies, profiles, reporter-at-large. Instructor and students will discuss student work and published reportage. May be taken for credit three times. *Prerequisite: LTWR 8C.*

**LTWR 122. Writing for the Sciences (4)**

A workshop in writing about science for the public. Students will study and then construct metaphors or analogues which introduce readers to scientific perplexities. May be repeated for credit when topics vary.

**LTWR 125. Persuasion (4)**

A workshop in the writing of argument or persuasion, with particular attention to strategies of persuasion for different kinds of audiences. Instructor and students will discuss student work as well as published work. May be taken for credit three times. *Prerequisite: LTWR 8C.*

**LTWR 127. General Nonfiction Prose Workshop (4)**

A workshop designed to encourage the writing of all forms of nonfiction prose. This workshop is usually limited to advanced students in the writing major. May be taken for credit three times. *Prerequisite:* LTWR 8C.

**LTWR 128. Editing Workshop (4)**

A workshop to acquaint students with the fundamentals of bringing written works from concept to publication. Genres covered will vary with instructor.

**LTWR 135. The Art of the Manifesto (4)**

Introduction to the work of modern and avant-garde writers and artists who have developed the manifesto laying out radical propositions and proposals about the nature of literature and art and their functions in the contemporary world. Historical survey within a workshop approach. *Prerequisites:* completion of LTWR 8A/B/C; department approval.

**Writing Process, Written Discourse, and Writing Pedagogy**

These courses are not writing workshop courses like those listed above. Rather, they examine various aspects of writing as a field of study and writing pedagogy. Writing majors who plan to teach writing may be particularly interested in these courses. See the department for applicability of these courses to the writing major requirements.

**Note:** As of fall 1991, all writing majors are required to take one course chosen from offerings numbered LTWR 140–144 to fulfill one of their upper-division requirements.

**LTWR 140. History of Writing (4)**

A review of the history of the development of alphabets and writing systems. Survey of the rise of literacy since the fifteenth century and analysis of continuing literacy problems in developed and developing countries.

**LTWR 141. The Process of Writing (4)**

A study of writing as a creative process. Review of research on creativity and on the writing process and analysis of writers' introspective accounts of their work. Delineation of the stages in writing process and exploration of implications for learning to write.

**LTWR 142. Forms of Written Discourse (4)**

A review of current rhetorical theory and discourse theory. Some attention to recent developments in text linguistics. Students will write several discourse types and explore differences among the types, with special attention to differences for the writing process and for the structure of the written discourse itself.

**LTWR 143. Stylistics and Grammar (4)**

A close look at sentence-level features of written discourse—stylistics and sentence grammars. Students will review recent research on these topics and experiment in their own writing with various stylistic and syntactic options.

**LTWR 144. The Teaching of Writing (4)**

Wide reading in current theory and practice of teaching writing in schools and colleges. Careful attention to various models of classroom writing instruction and to different approaches in the individual conference. Students in this course may observe instruction in the UCSD college writing programs or tutor freshman students in those programs.

**LTWR 146. The Writing of Oral Histories (4)**

A methodological and theoretical introduction to the compilation, transcription, and editing of spoken personal and historical narratives. Along with discussions of the relation of orality to writing, students will engage in a number of fieldwork interviews and in their development and completion as publishable written works. Repeatable for credit when topics vary. *Prerequisites:* LTWR 8A, 8B, and 8C, or consent of instructor.

**Directed Study and Special Study**

**LTWR 180. Senior Writing Workshop (4)**

A workshop in any genre to be offered for advanced students. May be repeated for credit when topics vary. *Prerequisite:* consent of instructor.

**LTWR 191. Honors Seminar (4)**

Discussions of assigned imaginative texts in terms of form and content, and some critical theory. This course, designed to prepare students to write an honors thesis in the genre of either fiction or poetry, is open only to Literature/Writing majors invited into the department's Honors Program.

**LTWR 195. Apprentice Teaching (4)**

Undergraduate instruction assistance. Students will 1) assist TA in editing students' writing for LTWR 8A and 8C during class and outside of class; and 2) prepare a paper and report for the professor at the end of the quarter. *Prerequisite:* LTWR 144, *The Teaching of Writing.*

**LTWR 196. Honors Thesis (4)**

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTGN 191. Oral exam.

**LTWR 198. Directed Group Study (2 or 4)**

Directed group study in areas of writing not normally covered in courses. (P/NP grades only.) Repeatable for credit when areas of study vary.

**LTWR 199. Special Studies (2 or 4)**

Tutorial; individual guidance in areas of writing not normally covered in courses. (P/NP grades only.) *Prerequisites:* upper-division standing and permission of department. May be taken for credit three times.

**GRADUATE**

**LTWR 271. Theory and Practice of College Writing Instruction (4)**

In this course we will explore the implications for writing instruction of current discourse theory and of linguistics (sentence-level and text-level). We will also review research on writing instruction and look carefully at several models of classroom instruction and individual conferencing.

**LTWR 272. Research in Composing and Writing Discourse (4)**

This course will survey current research on composing and written discourse. It will also explore various problems and issues in designing research studies.

**LTWR 276. Theory and Research on Literacy (4)**

This seminar surveys literature on literacy from perspectives such as education, anthropology, and English studies.

**LTWR 280. Graduate Workshop in Imaginative Writing (4)**

This course will be a workshop where students will produce work every week to share with the class. Their work will be critiqued in class and in conference with the instructor. They

will be expected to complete a substantial body of work, one which is publishable as is. Weekly reading assignments will be required, in order to provide a common basis for discussion of poetics, politics, and process. The purpose of the class is to give those graduate students in literature, who have written poetry and fiction already, a chance to develop their abilities in those genres. Repeatable for credit when material/instructors vary.

**The Making of The Modern World**

OFFICE: Eleanor Roosevelt College, Bldg. 412 University Center

The Making of the Modern World is a six-course sequence required of all Eleanor Roosevelt College students. It is designed to encourage them to think historically, comparatively, and in an interdisciplinary manner about both Western and non-Western cultures. Disciplinary perspectives include literature, history, philosophy, anthropology, sociology, political science, and fine arts. Students will examine and interpret primary documents and artifacts from diverse eras and cultures, as well as learn about them from secondary sources. All six quarters of the sequence will include lectures, discussions, and writing assignments. Courses in the sequence may be taken for a letter grade only.

Students in the Making of the Modern World 2 and 3 (offered in winter and spring quarters respectively) fulfill their University of California composition requirement by receiving intensive instruction in university-level writing. Subject matter for writing instruction is drawn from or related to course material. Instruction in writing is provided in small writing laboratory sessions which meet twice each week. Each of these two writing-intensive quarters carries six units of credit. Students must have satisfied the university's Subject A requirement in English composition before enrolling in the Making of the Modern World 2 or 3.

For further details on Eleanor Roosevelt College requirements, see "Eleanor Roosevelt College, General-Education Requirements."

## COURSES

## Traditions

**1. Prehistory and the Birth of Civilization (4)**

This quarter introduces students to what is known about early humans, including the evolution of the human body and the reconstruction of Paleolithic and Neolithic cultures. It examines contemporary hunting-and-gathering and tribal societies and illuminates the complexity of such cultures with respect to mythology and oral tradition, interpersonal relations, and ecological practices. The course will conclude with an analysis of the emergence of large agrarian societies and the earliest great settled communities and civilizations. Three hours of lecture, one hour of discussion. Open to Eleanor Roosevelt College students only. (Letter grade only.) (F)

**2. The Great Classical Traditions (6)**

An introduction to four major classical civilizations of the ancient world, all of which have left legacies to the present. Equal attention will be given to the Ancient Near East, Greece, India, and China. The course covers the great early systems of religious and social thought, using an approach that combines history and social science. This course includes intensive instruction in writing expository prose. Three hours of lecture, two hours of writing and discussion sections. *Prerequisite: satisfaction of the Subject A requirement.* Open to Eleanor Roosevelt College students only. (Letter grade only.) (W)

**3. The Medieval Heritage (6)**

A survey of the period from about 100 A.D. to 1200 A.D., this quarter concentrates on the development of China from the Han to the Sung Dynasties, the emergence of Christian Mediterranean civilization, and the rise of Islam. This course includes intensive instruction in university-level writing. Three hours of lecture, two hours of writing and discussion sections. *Prerequisite: satisfaction of the Subject A requirement.* Open to Eleanor Roosevelt College students only. (Letter grade only.) (S)

## Transformations

**4. European Expansion and the Clash of Cultures (4)**

An examination of the world from 1200 to 1700, the quarter first analyzes the structural impact of empire in America, China, Africa, and Europe. It then discusses four major examples of cultural interaction caused by imperial expansion in Europe, South America, and South Asia. Three hours of lecture, one hour of discussion. *Prerequisite: satisfaction of the Subject A requirement.* Open to Eleanor Roosevelt College students only. (Letter grade only.) (F)

**5. Revolution, Industry, and Empire (4)**

A consideration of the great changes in European society from the late eighteenth century to the Russian Revolution, and their impact on the non-Western world. Topics include industrialization, the rise of nationalism and the nation-state, Western imperialism, and the colonial experience. Developments in non-Western countries during this period will be examined from their own internal perspective. Three hours of lecture, one hour of discussion. *Prerequisite: satisfaction of the Subject A requirement.* Open to Eleanor Roosevelt College students only. (Letter grade only.) (W)

**6. Our Century and After (4)**

Beginning with World War I, this course examines the expansion of state power and conflicts between democratic and anti-democratic forces, along with the social and cultural implications of these developments. It also explores changes in the international system and in the character of warfare. It

concludes with a discussion of the notions of world culture and world system. Three hours of lecture, one hour of discussion. *Prerequisite: satisfaction of the Subject A requirement.* Open to Eleanor Roosevelt College students only. (Letter grade only.) (S)

## Materials Science

Student Affairs: 2601 Engineering Building I,  
Warren College  
World Wide Web homepage: <http://www.soe.ucsd.edu/academic/matsci/matsci.html>

## Professors

M. Lea Rudee, Ph.D., ECE, *Program Coordinator*  
Gustaf Arrhenius, Ph.D., SIO  
Robert J. Asaro, Ph.D., AMES  
Ami Berkowitz, Ph.D., Physics  
Robert Dynes, Ph.D., Physics, *Chancellor*  
Sadik Esener, Ph.D., ECE  
Yuan-Cheng Fung, Ph.D., *Emeritus, Bioengineering*  
David Gough, Ph.D., *Bioengineering*  
Gilbert G. Hegemier, Ph.D., AMES  
Karen L. Kavanagh, Ph.D., ECE  
S.S. Lau, Ph.D., ECE  
Huey-Lin Luo, Ph.D., ECE  
M. Brian Maple, Ph.D., Physics  
Xanthippi Markenscoff, Ph.D., AMES  
Marc A. Meyers, Ph.D., AMES, *Associate Director, Institute for Mechanics and Materials*  
David R. Miller, Ph.D., AMES, *Associate Vice Chancellor, Academic Affairs*  
W.E. Moerner, Ph.D., *Chemistry/Biochemistry*  
Hidenori Murakami, Ph.D., AMES  
Siavouche Nemat-Nasser, Ph.D., AMES, *Director, Institute for Mechanics and Materials*  
Johann K. Oesterreicher, Ph.D., *Chemistry/Biochemistry*  
Michael J. Sailor, Ph.D., *Chemistry/Biochemistry*  
Geert W. Schmid-Schoenbein, Ph.D., *Bioengineering*  
Ivan K. Schuller, Ph.D., Physics  
Lu Jeu Sham, Ph.D., Physics  
Massoud Simnad, Ph.D., *Adjunct/AMES*  
Jan Talbot, Ph.D., AMES  
Frank E. Talke, Ph.D., AMES, *Department Chair, CMRR Endowed Chair*

Charles W. Tu, Ph.D., ECE  
Harry H. Wieder, D.Sc., ECE  
Paul Yu, Ph.D., ECE

## Associate Professors

John E. Crowell, Ph.D., *Chemistry/Biochemistry*  
Frances Hellman, Ph.D., *Physics*  
Richard K. Herz, Ph.D., AMES  
John B. Kosmatka, Ph.D., AMES  
Joanna McKittrick, Ph.D., AMES  
Vitali F. Nesterenko, Ph.D., AMES  
Kenneth S. Vecchio, Ph.D., AMES  
Edward T. Yu, Ph.D., ECE

## Assistant Professor

Yitzhak Tor, Ph.D., *Chemistry/Biochemistry*

Materials science is concerned with the study of the structure and properties of materials. The Materials Science Program at UCSD aims to provide fundamental knowledge for quantitative understanding of materials with the objective of predicting, modifying, and tailoring the properties of materials to yield, at the technology level, enhanced material performance. The foundations of materials science are the basic sciences of physics, chemistry, and mathematics. The great variety of materials response, at the optical, magnetic, electrical, mechanical, and chemical levels, requires a solid scientific foundation and breadth of basic knowledge from the materials scientists. The interdisciplinary nature of the program at UCSD is ideally suited to address this requirement. The graduate of the Materials Science Program benefits from unique research facilities existing at UCSD. These include the resources in the Departments of AMES, ECE, Physics, Chemistry/Biochemistry, Bioengineering, and SIO, as well as in the Center of Excellence for Advanced Materials and the Center for Magnetic Recording Research. Of particular emphasis within the program is the experimental investigation and theoretical modeling of the mechanical response and failure models of advanced materials at ultrahigh strain rates as well as electronic, superconducting, magnetic, and optical properties of materials for advanced applications.

## The Graduate Program

The Materials Science Program is interdisciplinary, with participation of faculty members from several departments. Faculty from the

following departments participate in the Materials Science Graduate Program: the Departments of Applied Mechanics and Engineering Sciences (AMES), Bioengineering, Physics, Scripps Institution of Oceanography (SIO), Electrical and Computer Engineering (ECE), and Chemistry. The governance of the program is carried out by the executive committee of the program. The executive committee coordinates all affairs of the Materials Science Program, including student admissions, degree requirements, graduate courses in materials science given by various participating departments, maintenance of laboratory instructional facilities, seminars, special courses, part-time instructors, and related matters.

Undergraduate preparation for the materials science M.S. and Ph.D. normally would include a degree in engineering or physical sciences, such as physics, chemistry, geology, and related disciplines. Students are expected to have an adequate mathematics, physics, chemistry and related basic sciences background.

### Master's Degree Program

The program offers the M.S. degree in materials science under both the Thesis Plan I and the Comprehensive Examination Plan II; see "Graduate Studies: Master's Degree." The requirements for the M.S. degree are as follows:

1. All students must complete a total of thirty-six units.
2. All students must complete a core of the following six courses:  
(1)MS 227; (2)MS 201A; (3)MS 201B;  
(4)MS 201C; (5)MS 205A; (6)Physics 152.  
(Physics 211A can replace 152 with adviser's permission.) See "Courses" for descriptions.
3. Students may include up to twelve units of undergraduate courses. These include the one undergraduate core course, Physics 152.
4. Enroll in MATS200, as required. See "Courses" for descriptions.
5. Remaining courses to complete the thirty-six unit requirement for the M.S. degree may be selected from an approved list of graduate courses with the consent of a faculty adviser.
6. Students either complete a thesis (Plan I) or pass a comprehensive examination (Plan II) as

described in the "Graduate Studies" section of this catalog.

7. Students must meet all other requirements established by the university.

Students who transfer with some graduate credit or an M.S. from another institution will have their records reviewed by a faculty adviser, and an appropriate individual course of study may be approved.

### The Ph.D. Program

After completing the M.S. degree (or meeting equivalent requirements) and meeting the minimum standard on the comprehensive examination to be admitted to or continue in the Ph.D. program, a student must:

1. Meet all the university's residency and other requirements.
2. Successfully complete three advanced graduate courses (in addition to those required for the M.S. degree) which have been approved by the student's potential dissertation adviser.
3. Enroll in MATS200, as required. See "Courses" for descriptions.
4. Pass the Literature Review Examination. This requirement must be successfully completed within one year after passing the Comprehensive Examination.
5. Pass the Ph.D. Qualifying Examination (Senate Exam) to be advanced to Ph.D. candidacy.
6. Successfully complete and defend a dissertation which, in the opinion of the dissertation committee, contains original work that should lead to publication of at least one significant article in an appropriate refereed journal.

In principle, it should be possible to finish the M.S. degree in three quarters, and a Ph.D. in an additional three years. Ph.D. time limits are as follows: Pre-candidacy—four years; Support limit—six years; Total time limit—seven years; Normative time limit for a properly prepared B.S. student—five years. (See "Graduate Studies—Ph.D. Time Limits" for further explanation.)

### Departmental Examinations

#### THE COMPREHENSIVE EXAMINATION

The examination will consist of twelve questions, two from each of the six core courses. A passing grade is 60 percent for the Master's degree, and 70 percent for the Ph.D. The examination will not exceed six hours in duration. The examination is administered the second week in January, and a week after spring quarter finals week in June. Typically, students take the exam after one year of full-time enrollment. This exam may only be retaken once before the end of the second year of study.

#### THE LITERATURE REVIEW EXAMINATION

The Literature Review Examination tests the student's ability to prepare and present a comprehensive overview of a topic based on existing journal literature. It should be a comprehensive discussion of the literature, scientific theory, problems or theoretical deficiencies, and possible areas of research in some area of materials science. The topic may be in the general area in which the student plans to pursue his or her thesis research, or it may be in an unrelated field. The topic must be approved by the three faculty member committee in advance of the seminar. The Literature Review Examination is not to be a discussion of the student's research project or their research proposal. A presentation which includes the student's own work which has not been published will constitute a no pass grade. This exam must occur within one year of the student having passed the Comprehensive Examination.

## COURSES

### GRADUATE

#### 200. Graduate Seminar (0)

Each graduate student in the Materials Science Program is expected to attend a weekly seminar in materials science or related areas. M.S. students must enroll for three quarters, Ph.D. students for six quarters, as of fall 1995. (S/U grades only.) (F,W,S)

#### 201A. Thermodynamics of Solids (4)

The thermodynamics and statistical mechanics of solids. Basic concepts; equilibrium properties of alloy systems; thermody-

dynamic information from phase diagrams, surfaces, and interfaces; crystalline defects. *Prerequisite: consent of instructor.*

**201B. Solid State Diffusion and Reaction Kinetics (4)**

Thermally activated processes, Boltzmann factor, homogeneous and heterogeneous reactions, solid state diffusion, Fick's laws, diffusion mechanisms, Kirkendall effect, Boltzmann-Matano analysis, high diffusivity paths. *Prerequisite: consent of instructor.*

**201C. Phase Transformations (4)**

Classification of phase transformations: displacive and reconstructive transformations: classical and nonclassical theories of nucleation: Becker-Doering, Volmer-Weber, lattice instabilities, spinodal decomposition. Growth theories: interface migration, stress effects, terrace-ledge mechanisms, epitaxial growth, kinetics, and mechanics. Precipitation. Order-disorder transformations. Solidification. Amorphization. *Prerequisite: consent of instructor.*

**205A. Imperfections in Solids (4)**

Point, line, and planar defects in crystalline solids, including vacancies, self-interstitials, solute atoms, dislocations, stacking faults, and grain boundaries; effects of imperfections on mechanical, electrical, and chemical properties; interactions of dislocations with point defects; hardening by localized obstacles, and precipitation and dispersion hardened alloys. *Prerequisite: consent of instructor.*

**205B. Advanced Study of Defects in Solids (4)**

Advanced topics in dislocation theory and dislocation dynamics. Defects and defects interactions. Atomistic and subatomic effects. Physical models based on microscopic considerations. *Prerequisite: MS 205A or consent of instructor.*

**207. Surface Reactions, Corrosion, and Oxidation (4)**

The nature of surfaces; nucleation and growth of surface films. Techniques for studies of surface structures and of surface films. Types of corrosion phenomena and mechanisms of corrosion. Methods of corrosion control and prevention. Mechanisms of oxidation. Control of oxidation by alloying and surface coatings. *Prerequisite: MS 201A or consent of instructor.*

**211A. Mechanical Properties (4)**

Review of basic concepts in mechanics of deformation; elasticity, plasticity, viscoelasticity, and creep; effects of temperature and strain-rate on inelastic flow; microstructure and mechanical properties; application of basic concepts to selected advanced materials. *Prerequisite: consent of instructor.*

**211B. Advanced Mechanical Behavior (4)**

Rate mechanisms in crystalline solids. Kinetics and dynamics of plastic flow by slip at low and high strain rates. Mechanisms of inelasticity in nonmetals, metals, and polymeric materials. Mechanisms of failure and effects of strain rates. *Prerequisite: MS 211A or consent of instructor.*

**213A. Dynamic Behavior of Materials I (4)**

Elastic waves in continuum; longitudinal and shear waves. Surface waves. Plastic waves; shock waves; Rankine-Hugoniot relations. Method of characteristics, differential and difference form of conservation equations; dynamic plasticity and dynamic fracture. Shock wave reflection and interaction. *Prerequisite: consent of instructor. (F)*

**213B. Dynamic Behavior of Materials II (4)**

Shock induced phase transformations and reactions. Wave propagation through distended materials. Impact; Mie-Grüneisen and other equations of state, the Gurney equation. Detonation theory. Dislocation behavior at high strain rates. Shear instabilities. Spalling and fragmentation. *Prerequisite: consent of instructor. (W)*

**218. Fatigue, Fracture, and Failure Analysis in Engineering Materials (4)**

The course will cover the engineering and scientific aspects of fatigue crack initiation, stable crack growth, fatigue life predictions, selection of materials for fatigue applications, fractography, and failure analysis, including case studies. *Prerequisite: AMES 102 or equivalent and consent of instructor.*

**225. Materials for Magnetic Recording (4)**

Properties of magnetic materials utilized as magnetic recording media and heads: magnetic structure of oxides and metals; fine particle magnetism; micromagnetic analysis; hysteresis and reversal mechanisms of hard materials; dynamic processes and domain patterns of soft materials; thermal fluctuations; multilayer phenomena; giant magnetoresistance. *Prerequisites: undergraduate electromagnetism and solid state physics or consent of instructor.*

**227. Structure and Bonding of Solids (4)**

Key concepts in the atomic structure and bonding of solids such as metals, ceramics, and semiconductors. Symmetry operations, point groups, lattice types, and space groups will be covered. Simple and complex inorganic compounds will be studied and structure/property comparisons will be made. Structure determination with X-ray diffraction will be discussed. Ionic, covalent, and metallic bonding will be analyzed and compared with physical properties. Atomic and molecular orbitals, bands vs. bonds, and free electron theory are other topics that will be discussed. *Prerequisites: graduate student or consent of instructor; Physics 152 (may be concurrent).*

**230. Electrochemistry (4)**

Application of electrochemical techniques to chemistry research. Basic electrochemical theory and instrumentation: the diffusion equations, controlled potential, and current methods. Electro-chemical kinetics, Butler-Volmer, Marcus-Hush theories, preparative electro-chemistry, analytical electrochemistry, solid and polymer electrolytes, semiconductor photo-electrochemistry.

**233A-B. Processing and Synthesis of Advanced Materials (4-4)**

Background information on conventional techniques: forging, rolling, drawing, casting. Rapid solidification processing of metals and ceramics. Production of composites. Directionally solidified eutectics. Combustion synthesis. Sol-gel synthesis of ceramics. Mechanical alloying. Shockwave synthesis and processing. Thin film techniques. Laser glazing. Electron beam mixing. Molecular beam epitaxy. Superplastic processing. *Prerequisite: consent of instructor.*

**236. Ceramic and Glass Technology (4)**

Powder synthesis, powder compaction and densification via different processing routes. Phase equilibria and crystallography in ceramic materials. Sintering, liquid and vapor phase processing and single crystal growth. Control of the microstructural development and interfacial properties to optimize properties for structural, thermal, electrical, or magnetic use. Topics in processing and use of advanced ceramic materials. Glass formation and structure, phase separation, viscous flow and relaxation. *Prerequisite: consent of instructor.*

**240A. Scanning Electron Microscopy and X-Ray Microanalysis (4)**

Electron optics, electron-beam-specimen interactions. Image formation in the SEM. The role of specimen and detector in contrast formation. Imaging strategies. X-ray spectral measurements. Qualitative and quantitative X-ray microanalysis. Materials specimen preparation. *Prerequisite: consent of instructor. The laboratory section will teach the operation of the microscope to conduct material analysis via SEM.*

**240B. Transmission Electron Microscopy (4)**

Operation and calibration of the TEM, lens defects and resolution, formation of images and diffraction patterns, electron diffraction theory (kinematic dynamical), indexing diffraction patterns, diffraction contrast. Quantitative analysis of crystal defects, phase contrast, and specimen preparation. *Prerequisite: MS 240A or consent of instructor. The laboratory section will teach the operation of the microscope to conduct material analysis via TEM.*

**240C. Analytical Electron Microscopy (4)**

Concepts of AEM and AEM capabilities, alignment in the AEM. Imaging modes in the AEM (TEM and STEM). Quantitative X-ray microanalysis. Limits of microanalysis. Electron energy loss spectroscopy (EELS). Microdiffraction. Convergent beam electron diffraction (CBED), and high-resolution transmission electron microscopy (HRTEM). *Prerequisite: MS 240B or consent of instructor. The laboratory section will teach the operation of the microscope to conduct material analysis via AEM.*

**242. X-Ray Diffraction Analysis of Materials (4)**

This class will cover the physics of x-ray diffraction and its application to the analysis of crystal structure, grain size, grain orientation, surface roughness, epitaxy, film thickness, etc. Experimental techniques to be discussed and will include theta-2 theta diffractometry, high resolution x-ray rocking curves, Laue patterns, pole figures, reflectivity, small angle scattering, laboratory experiments, and computer simulation. *Prerequisite: consent of instructor.*

**243. Modern Materials Analysis (4)**

Analysis of the near surface of materials via ion, electron, and x-ray spectroscopies. Topics to be covered include particle solid interactions. Rutherford Backscattering, secondary ion mass spectroscopy, electron energy loss spectroscopy, particle induced x-ray emission, Auger electron spectroscopy, extended x-ray absorption fine structure and channeling. *Prerequisite: consent of instructor.*

**250. Display Technologies (4)**

This class will introduce various types of information displays such as CRTs, plasma panels, field emission devices, and liquid crystals. The fundamentals of luminescence in solids will be covered. The performance parameters which need to be evaluated for display performance will be described. *Prerequisite: B.S. in a science or engineering field.*

**290. Topics in Materials Science (4)**

A course to be given at the discretion of the faculty on topics of current interest in materials science.

**295. Research Conference (2)**

Group discussion of research activities and progress of group members. *Prerequisite: consent of instructor.*

**296. Independent Study (4)**

*Prerequisite: consent of instructor.*

**298. Directed Group Study (1-4)**

Directed group study on a topic or in a field not included in the regular materials science curriculum by special arrangement with a faculty member. *Prerequisite: consent of instructor. (S/U grades permitted.)*

**299. Graduate Research (1-12)**

(S/U grades only.)

Subject to the approval of a faculty adviser, students may also choose from the following courses offered by departments participating in the Materials Science Program (see the relevant pages of this catalog for descriptions):



### Applied Mechanics and Engineering Sciences (AMES)

- AMES 229A. Mechanical Properties (4)
- AMES 229B. Advanced Mechanical Behavior (4)
- AMES 231A. Foundations of Solid Mechanics (4)
- AMES 231B. Elasticity (4)
- AMES 231C. Anelasticity (4)
- AMES 232A-B-C. Finite Element Methods in Solid Mechanics (4-4-4)
- AMES 233A. Fracture Mechanics (4)
- AMES 233B. Micromechanics (4)
- AMES 233C. Advanced Mechanics of Composite Materials (4)
- AMES 234. Experimental Mechanics (4)
- AMES 238. Stress Waves in Solids (4)
- AMES 251. Thermodynamics (4)
- AMES 256. Rheology of Fluids (4)
- AMES 257A. Polymer Processing (4)
- AMES 257B. Polymerization Reactor Design (4)

### Chemistry

- Chem 240. Electrochemistry (4)

### Electrical and Computer Engineering (ECE)

- ECE 230A. Solid State Electronics (4)
- ECE 230B. Solid State Electronics (4)
- ECE 230C. Solid State Electronics (4)
- ECE 231. Thin Film Phenomena (4)
- ECE 233. Structure of Solids (4)
- ECE 234A. Imperfections in Solids (4)
- ECE 234B. Advanced Study of Defect in Solids (4)
- ECE 237. Modern Materials Analysis (4)
- ECE 238A. Thermodynamics of Solids (4)
- ECE 238B. Solid State Diffusion and Reaction Kinetics (4)
- ECE 239. Nanometer-Scale Probes and Devices (4)
- ECE 246A. Physics/Magnetic Recording Materials (4)

### Physics

- Phys. 133. Condensed Matter/Materials Science Laboratory (2)
- Phys. 211A. Solid State Physics (5)
- Phys. 211B. Solid State Physics (4)

### Professors

- Jim Agler, Ph.D.
- Randolph E. Bank, Ph.D.
- M. Salah Baouendi, Ph.D.
- Edward A. Bender, Ph.D.
- James R. Bunch, Ph.D.
- Samuel R. Buss, Ph.D.
- Peter G. Doyle, Ph.D., *Academic Senate Distinguished Teaching Award*
- Bruce K. Driver, Ph.D.
- Thomas J. Enright, Ph.D., *Vice-Chair*
- John W. Evans, M.D., Ph.D., *Emeritus*
- Ronald J. Evans, Ph.D.
- Jay P. Fillmore, Ph.D.
- Carl H. FitzGerald, Ph.D.
- Patrick J. Fitzsimmons, Ph.D.
- Theodore T. Frankel, Ph.D., *Emeritus*
- Michael H. Freedman, Ph.D.
- Adriano M. Garsia, Ph.D.
- Ronald K. Getoor, Ph.D.
- Philip E. Gill, Ph.D.
- Fan Chung Graham, Ph.D.
- Leonard R. Haff, Ph.D.
- Mark D. Haiman, Ph.D.
- Hubert Halkin, Ph.D., *Emeritus*
- Richard S. Hamilton, Ph.D.
- J. William Helton, Ph.D.
- James P. Lin, Ph.D.
- Alfred B. Manaster, Ph.D.
- John O'Quigley, Ph.D.
- Jeffrey B. Remmel, Ph.D.
- Yosef Rinott, Ph.D.
- Burton Rodin, Ph.D., *Emeritus*
- Helmut Rohrl, Ph.D., *Emeritus*
- Murray Rosenblatt, Ph.D., *Emeritus*
- Linda P. Rothschild, Ph.D.
- Michael J. Sharpe, Ph.D., *Chair*
- Lance W. Small, Ph.D.
- Donald R. Smith, Ph.D., *Vice-Chair*
- Harold M. Stark, Ph.D.
- Audrey A. Terras, Ph.D.
- Adrian R. Wadsworth, Ph.D.
- Nolan R. Wallach, Ph.D.
- Hans G. Wenzl, Ph.D.
- Ruth J. Williams, Ph.D.
- Daniel E. Wulbert, Ph.D.

### Associate Professors

- Ian S. Abramson, Ph.D.
- Zheng-Xu He, Ph.D.
- Hans Lindblad, Ph.D.
- Kate Okikiolu, Ph.D.
- Dimitris Politis, Ph.D.

- Jeffrey M. Rabin, Ph.D., *Academic Senate Distinguished Teaching Award*
- Peter Teichner, Ph.D.
- John J. Wavrik, Ph.D.

### Senior Lecturers in Mathematics

- Patrick J. Ledden, Ph.D., *Provost, Muir College*
- Frank B. Thiess, Ph.D., *Emeritus*

### Assistant Professor

- Michael Holst, Ph.D.

### Lecturer SOE

- Norman A. Shenk, Ph.D.

The Department of Mathematics offers a wide range of courses and programs. These vary in their objectives and levels of required mathematical maturity. In certain courses, the cultural aspects of mathematics are emphasized, and the prerequisites are minimal. In others, the scientific and technical aspects are paramount, and the prerequisites are considerable. In making selections, students are advised to keep in mind their particular objectives and backgrounds.

## The Undergraduate Program

### First-Year Courses

During orientation, each freshman is given an examination to determine that student's level of mathematics preparation for the department's calculus courses. Before orientation, students should briefly review their mathematics so that their test performance accurately reflects their competence. The examination results will be used to assist the student in selecting a starting point in the mathematics program. Some students will be required to take precalculus courses before beginning a calculus sequence.

Math. 3C is the department's preparatory course for the Math. 10 sequence, providing a review of algebraic skills, facility in graphing, and working with exponential and logarithmic functions.

Math. 4C is the department's preparatory course for the Math. 20 sequence, providing a brief review of college algebra followed by an introduction to trigonometry and a more advanced treatment of graphing and functions.

## Mathematics

OFFICE: 7018 Applied Physics and Mathematics Building, Muir College

Math. 10A-B-C (formerly numbered 1A-B-C) is one of two calculus sequences. The students in this course have completed a minimum of two years of high school mathematics. This course is acceptable for majors in liberal arts, economics, and some of the majors in biology. It fulfills the mathematics requirements of Revelle College and the option of the general-education requirements of Muir College. Completion of two quarters fulfills the requirement of Marshall College and the option of Warren College and Eleanor Roosevelt College.

The other first-year calculus sequence, Math. 20A-B-C, is taken mainly by students who have completed four years of high school mathematics or have taken a college level precalculus course such as Math. 4C. This sequence fulfills all college level requirements met by Math. 10A-B-C and is required of many majors, including chemistry and biochemistry, biology, bioengineering, cognitive science, economics, mathematics, psychology, AMES, CSE, ECE, and physics. Students with adequate backgrounds in mathematics are strongly encouraged to take Math. 20 since it provides the foundation for Math. 20D-E-F which is required for some science and engineering majors.

Certain transfers between the Math. 10 and Math. 20 sequences are possible, but such transfers should be carefully discussed with an adviser. Able students who begin the Math. 10 sequence and who wish to transfer to the Math. 20 sequence, may follow one of three paths, the first of which is highly recommended over the others:

1. Follow Math. 10A with Math. 20A, with two units of credit given for Math. 20A. This option is not available if the student has credit for Math. 10B or Math. 10C. This option is available only if the student obtains a grade of A in Math. 10A.
2. Follow Math. 10B with Math. 20B, receiving two units of credit for Math. 20B.
3. Follow Math. 10C with Math. 20B, receiving two units of credit for Math. 20B and two units of credit for Math. 20C.

Credit will not be given for courses taken simultaneously from the Math. 10 and the Math. 20 sequence.

### *Electives for Non-Majors*

The department offers a number of courses with minimal prerequisites that are intended

primarily for non-majors (Math. 17, 18, 69, 93). A few upper-division courses are suitable for well-motivated students who have completed Math. 20C and wish to sample more advanced mathematics. Math. 104A, 117, 169, 120A (depending on instructor), 151, 163, 183, do not make serious use of sophomore-level calculus.

### *Major Programs*

The department offers seven different majors: (1) mathematics, (2) applied mathematics, (3) applied mathematics (scientific programming), (4) mathematics-computer science, (5) mathematics-applied science, (6) mathematics-secondary education and (7) joint major in mathematics and economics. The specific emphases and course requirements for these majors are described in the following sections. All majors must obtain a minimum 2.0 grade-point average in the upper-division courses used to satisfy the major requirements. Further, the student must receive a grade of C- or better in any course to be counted toward fulfillment of the major requirements. Any mathematics course numbered 100-194 may be used as an upper-division elective. (**Note:** 195, 196, 198, and 199 cannot be used towards a major.) All courses used to fulfill the major must be taken for a letter grade.

It is strongly recommended that mathematics majors review their programs at least annually with a departmental adviser, and that they consult with the Advising Office in AP&M 2113 before making any changes to their programs. The department holds a quarterly meeting for majors where general information is discussed. Current course offering information for the entire year is maintained on the department's web page at <http://math.ucsd.edu>. Special announcements are also emailed to all majors.

Students who plan to go on to graduate school in mathematics should be advised that only the best and most motivated students are admitted. Many graduate schools expect that students will have completed a full year of abstract algebra as well as a full year of analysis. The advanced Graduate Record Exam (GRE) often has questions that pertain to material covered in the last quarter of analysis or algebra. In addition, it is advisable that students consider Summer Research Experiences for Undergraduates. This is a program funded by the

National Science Foundation to introduce students to math research while they are still undergraduates. In their senior year or earlier, students should consider taking some graduate courses so that they are exposed to material taught at a higher level. In their junior year, students should begin to think of obtaining letters of recommendation from professors who are familiar with their abilities.

### *Major in Mathematics*

The upper-division curriculum provides programs for mathematics majors as well as courses for students who will use mathematics as a tool in the physical and behavioral sciences and the humanities.

All students majoring in mathematics must complete the basic 20 sequence. Math. 109 should be taken in the spring quarter of the sophomore year, but may be taken in the fall, concurrently with Math. 140A, 100A, or 103A. In addition to these lower-division courses, mathematics majors must complete at least twelve one-quarter, upper-division courses including:

1. 140A-B
2. 100A-B or 103A-B

As with all departmental requirements, more advanced courses on the same material may be substituted with written approval from the departmental adviser.

To be prepared for a strong major curriculum, students should complete the last three quarters of the 20 sequence, and Math. 109 before the end of their sophomore year. Either Math. 140A-B or 100A-B (103A-B) should be taken during the junior year.

### *Major in Applied Mathematics*

A major in applied mathematics is also offered. The program is intended for students planning to work on the interface between mathematics and other fields. Students considering this major should obtain the department's list of requirements on applied mathematics. See also requirements for all major programs.

All students majoring in applied mathematics are required to complete the following courses:

1. Calculus: 20A-F, 109 (Math. 109 should be taken in sophomore year).

2. Programming:  
AMES 9 (C++) or AMES 10 (Fortran) or  
CSE 8AB (Java) or CSE 11 (Java)
3. Linear Algebra: Math. 102 or 170A.
4. Statistics: 183 or 181A.
5. Advanced Calculus: Math. 142A-B (or 140A-B). (Math. 142A-B should be taken during the junior year).
6. One of the following sequences: 180A-B-C (probability), 180A-181A-B\* (probability and statistics), or any three courses from 170A-B-C, 172, and 173 (numerical analysis).  
[\*Math. 181C, D or E may be substituted for 181B.]
7. One additional sequence which may be chosen from the list (#6) above or the following list: 110-120A-130A, 111A-B, 120A-B, 130A-132A, 155A-B, 171A-B, 184A-B, 193A-B.

At least fifty-two upper-division units must be completed in mathematics, except:

- a. Up to twelve units may be outside the department in an approved applied mathematical area. A petition approved by an applied math adviser is required. No such units may also be used for a minor or program of concentration.
- b. AMES 154, Econ. 120A-B-C, Math. 195, 196, and 199 cannot be counted toward the fifty-two units.

To be prepared for a strong major curriculum, students should complete the last three quarters of the 20 sequence and Math. 109 before the end of their sophomore year.

### ***Major in Applied Mathematics (Scientific Programming)***

This is a specialized applied mathematics program with a concentration in scientific programming, i.e., computer solution of scientific problems. The requirements are those of the applied mathematics major, except for the following additions and substitutions:

1. Physics 1A-B-C, or 2A-B-C, or 4A-B-C
2. Instead of items 6 and 7 in the applied mathematics major, the following courses are required:  
(6) any three from 170A-B-C, 172, 173  
(7) 171A-B

### ***Major in Mathematics— Applied Science***

This major is designed for students with a substantial interest in mathematics and its applications to a particular field such as physics, biology, chemistry, biochemistry, cognitive science, computer science, economics, management science, and engineering. This curriculum is subject to the general requirements for all math majors outlined under major programs.

#### **Required Courses:**

1. Math. 20A-F or equivalent  
Recommended  
AMES 9 C/C++ Programming  
AMES 10 FORTRAN for Engineers  
CSE 8A-B Intro to Computer Sci: Java  
CSE 11 Intro to Computer Sci: Java  
(Accelerated Pace)
2. Seven upper-division mathematics courses that include:
  - a) Math. 102 or Math. 170A  
and
  - b) Any two-quarter upper-division math sequence.  
and
  - c) Math. 109

#### **Applied Science Requirement:**

1. Seven upper-division courses selected from one or two other departments
2. At least three of these seven upper-division courses must require calculus as a prerequisite

Students must submit an individual plan for approval in advance by a mathematics department adviser, and all subsequent changes in the plan must be approved by a mathematics department adviser.

### ***Major in Mathematics— Computer Science***

The program provides for a major in computer science within the Department of Mathematics. Graduates of this program will be mathematically oriented computer scientists who have specialized in the mathematical aspects and foundations of computer science or in the computer applications of mathematics.

The curriculum for the B.A. in mathematics-computer science requires thirty-six units of lower-division courses and fifty-six units of upper-division courses.

The detailed curriculum is given in the following list.

#### **Lower-Division Requirements:**

1. Calculus: Math. 20-A-F
2. Intro to Computer Science—Java: (Accelerated Pace): CSE 11 or Intro to Computer Science: Java: CSE 8AB
3. Basic Data Structures and Object-oriented Programming: CSE 12
4. Computer Organization and Systems Programming: CSE 30

#### **Upper-Division Requirements:**

5. Mathematical Reasoning: Math. 109
6. Modern Applied Algebra: Math. 103AB (or Modern Algebra: Math. 100AB)
7. Theory of Computability: Math. 166A
8. Intro to Probability: Math. 180A
9. Mathematical Foundations of Computer Science: Math. 184A
10. Computer Implementations of Data Structures: Math. 176A or Data Structures: CSE 100
11. Design & Analysis of Algorithms: CSE 101
12. Eight units from Math. 170A, B, C, 172, 173, 174
13. Eight units from: Math. 107A-B, 179A-B, 155A-B, 176B, 184B, 166B, 168A-B, 187, 160A-B, CSE 120-121, CSE 140-140L-141-141L, CSE 130, CSE 131A-B
14. Eight additional units from: any course in list 12 or 13 above or Math. 102, 110, 111A-B-C, 171A-B, 130A-B, 131, 132A-B, 140A-B, 142A-B, 180B-C, 181A-B-C, 185

In order to graduate by the end of their senior year, students must complete Math. 103A-B by the end of their junior year.

### ***Joint Major in Mathematics and Economics***

Majors in mathematics and the natural sciences often feel the need for a more formal introduction to issues involving business applications of science and mathematics. Extending

their studies into economics provides this application and can provide a bridge to successful careers or advanced study. Majors in economics generally recognize the importance of mathematics to their discipline. Undergraduate students who plan to pursue doctoral study in economics or business need the more advanced mathematics training prescribed in this major.

This major is considered to be excellent preparation for Ph.D. study in economics and business administration, as well as for graduate studies for professional management degrees, including the MBA. The major provides a formal framework making it easier to combine study in the two fields.

Course requirements of the Joint Major in Mathematics and Economics consist principally of the required courses of the mathematics major and the economics/management science majors.

#### Lower-Division Requirements:

1. Calculus and Linear Algebra: 20A-D, F
2. Intro to Economics 1A or 2A and 1B or 2B

#### Upper-Division Requirements:

Fifteen upper-division courses in mathematics and economics, with a minimum of seven courses in each department, chosen from the courses listed below (prerequisites are strictly enforced):

1. Mathematical Reasoning: Math. 109 (formerly 89)
2. One of the following:  
Applied Linear Algebra: Math. 102  
Numerical Linear Algebra: Math. 170A  
Linear Algebra: Math. 100AB
3. One of the following:  
Foundations of Analysis: Math. 140A  
Advanced Calculus: Math. 142A
4. One of the following:  
Ordinary Differential Equations: Math. 130A,  
Foundations of Analysis: Math. 140B  
Advanced Calculus: Math. 142B
5. One of the following:  
Microeconomics: Econ. 120A-B  
Management Science Microeconomics:  
Econ. 170AB
6. Econometrics: Econ. 120A (or Introduction to Probability: Math. 180A and Introduction to Mathematical Statistics: Math. 181) and Econometrics: Econ. 120BC

7. One of the following:  
Macroeconomics: Econ. 110AB  
Mathematical Programming: Numerical  
Optimization: Math. 171AB  
or

- Two of the following:  
Decisions Under Uncertainty: Econ. 171  
Introduction to Operations Research:  
Econ. 172A-B-C, (**Note:** 172 is a  
prerequisite for 172BC)

Other courses which are strongly recommended are: Math. 130B, 131, 181B, 185, 190 and 193AB and Econ. 109, 113, 155, 175, 177, and 178.

#### Major in Mathematics— Secondary Education

This major offers an excellent preparation for teaching mathematics in secondary schools. Students interested in earning a California teaching credential from UCSD should contact the Teacher Education Program (TEP) for information regarding prerequisites and requirements. It is recommended you contact TEP as early as possible.

#### Lower-Division Requirements

1. Calculus 20A-F

Recommended:

1. One of the following:  
Introduction to Computer Science:  
Java: CSE 8A-B,  
Fortran: AMES 10  
C/C++ Programming: AMES 9

#### Upper-Division Requirements:

1. Mathematical Reasoning: Math. 109
2. Number Theory: Math 104A
3. History of Mathematics: Math. 163
4. Practicum in Learning: TEP 129A-B-C
5. One of the following:  
Computer Algebra: Math. 107A  
Computer Graphics: Math. 155A  
Numerical Linear Algebra: Math. 170A  
Intro. to Cryptography: Math. 187  
Mathematical Computing: Math 161
6. One of the following:  
Chance: Math. 169  
Intro. to Probability: Math. 180A  
Statistical Methods: Math. 183

7. One of the following:  
Geometry: Math. 117  
Differential Geometry: Math. 150A  
Topics in Geometry: Math 151  
Intro. to Topology: Math. 190

8. One of the Following:  
Modern Algebra: Math. 100A  
Applied Linear Algebra: Math. 102  
Modern Applied Algebra: Math. 103A

9. One of the following:  
Foundations of Analysis: Math. 140A  
Advanced Calculus: Math. 142A

10. Upper-division courses must total forty-eight units chosen from items 2–10. Upper-division courses must include at least one two-quarter sequence from the following list:

100A-B; 103A-B, 103A-102; 104A-B;  
110-120A; 110-130A-B; 110-132A;  
110-131; 117-190; 120A-B; 130A-132A;  
130A-B; 140A-B; 141-190; 142A-B;  
150A-B; 155A-B; 160A-B; 170A-B;  
170A-172; 170A-173; 170A-171A;  
171A-B; 180A-B; 180A-181A; 184A-B;  
193A-B.

#### Minor in Mathematics

The minor in mathematics consists of seven or more courses. At least four of these courses must be upper-division courses taken from the UCSD Department of Mathematics. Acceptable lower-division courses are Math. 20D or 21D, 20E, and 20F.

Math. 195, 196, 198, and 199 are not acceptable courses for the mathematics minor. A grade of C– or better (or P if the Pass/No Pass option is used) is required for all courses used to satisfy the requirements for a minor. There is no restriction on the number of classes taken with the P/NP option.

#### Duplication of Credit

In the circumstances listed below, a student will not receive full credit for a Department of Mathematics course. The notation "Math. 20A [2 if Math. 10A previously/0 if Math. 10A concurrently/0 if Math. 10B or 10C]" means that a student already having credit for Math. 10A will receive only two units of credit for Math. 20A, but will receive no units if he or she has credit for Math. 10B or 10C, and no credit will be awarded for Math. 20A if Math. 10A is be-

ing taken concurrently. Math. 4C cannot be taken for credit after Math. 10 or Math. 20.

1. Math. 20A [2 if Math. 10A previously/0 if Math. 10A concurrently/0 if Math. 10B or 10C]
2. Math. 20B [2 if Math. 10B or 10C previously/0 if Math. 10B concurrently]
3. Math. 21C [2 if Math. 10C previously/0 if Math. 10C concurrently]
4. Math. 21D [2 if Math. 20D previously/0 if Math. 2DA previously]
5. Math. 20E [0 if Math. 2F previously]
6. Math. 20F [0 if Math. 2EA previously]
7. Math. 142A-B [0 if Math. 140A-B]
8. Math. 155A [0 if CSE 167]
9. Math. 180A [2 if Econ. 120A or Math. 183 previously/0 if Econ. 120A or Math. 183 concurrently]
10. Math. 181A [2 if Econ. 120B/0 if Econ. 120B concurrently]
11. Math. 183 [0 if Econ. 120A]

For duplication or repeat of credit guidelines between the Math. 20 sequence and the Math. 10 sequence, refer to the section titled "The Undergraduate Program."

### Advisers

Advisers change yearly. Contact the undergraduate office at (619) 534-3590 for the current list.

### The Graduate Program

The Department of Mathematics offers graduate programs leading to the M.A. (pure or applied mathematics), M.S. (statistics), and Ph.D. degrees.

The application deadline for fall admission is January 15. Candidates should have a bachelor's or master's degree in mathematics or a related field from an accredited institution of higher education or the equivalent. A minimum scholastic average of B or better is required for course work completed in upper-division or prior graduate study. In addition, the department requires all applicants to submit scores no older than twelve months from both the GRE General Test and Advanced Subject Test in Mathematics. Completed files are judged on

the candidate's mathematical background, qualifications, and goals.

Departmental support is typically in the form of teaching assistantships, research assistantships, and fellowships. These are currently only awarded to students in the Ph.D. program.

### General Requirements

All student course programs must be approved by a faculty adviser prior to registering for classes each quarter, as well as any changes throughout the quarter.

Full-time students are required to register for a minimum of twelve (12) units every quarter, eight (8) of which must be graduate-level mathematics courses taken for a letter grade only. The remaining four (4) units can be approved upper-division or graduate-level courses in mathematics-related subjects (*Math. 500 may not be used to satisfy any part of this requirement*). After advancing to candidacy, Ph.D. candidates may take all course work on a Satisfactory/Unsatisfactory basis. Typically, students should not enroll in Math. 299 until they have satisfactorily passed both qualifying examinations (see *Ph.D. in Mathematics*) or obtained approval of their faculty adviser.

### Master of Arts in Pure Mathematics

[Offered only under the *Comprehensive Examination Plan*.] The degree may be terminal or obtained on the way to the Ph.D. A total of forty-eight units of credit is required. Twenty-four of these units must be graduate-level mathematics courses approved in consultation with a faculty adviser.

In the selection of course work to fulfill the remaining twenty-four units, the following restrictions must be followed:

- a. No more than eight units of upper-division mathematics courses.
- b. No more than twelve units of graduate courses in a related field outside the department (approved by the Department of Mathematics).
- c. No more than four units of Math. 295 (Special Topics) or Math. 500 (Apprentice Teaching).
- d. No units of Math. 299 (Reading and Research) may be used in satisfying the requirements for the master's degree.

### COMPREHENSIVE EXAMINATIONS

Seven written departmental examinations are offered in three areas (refer to "Ph.D. in Mathematics," Areas 1, 2, and 3, for list of exams). A student must complete two examinations, one from Area 1 and one from Area 2, both with an M.A. pass or better.

### FOREIGN LANGUAGE REQUIREMENT

A reading knowledge of one foreign language (French, German, or Russian) is required. In exceptional cases other languages may be substituted. Testing is administered by faculty in the department who selected published mathematical material in one of these languages for a student to translate.

### TIME LIMITS

Full-time students are permitted seven quarters in which to complete all degree requirements. While there are no written time limits for part-time students, the department has the right to intervene and set individual deadlines if it becomes necessary.

### Master of Arts in Applied Mathematics

[Offered only under the *Comprehensive Examination Plan*] The degree may be terminal or obtained on the way to the Ph.D. Out of the total forty-eight units of required credit, two applied mathematics sequences comprising twenty-four units must be chosen from the following list (not every course is offered each year):

- 202A-B-C. (Applied Algebra)
- 210A-B-C. (Mathematical Methods in Physics and Engineering)
- 261A-B-C. (Combinatorial Algorithms)
- 264A-B-C. (Combinatorics)
- 270A-B-C. (Numerical Mathematics)
- 271A-B-C. (Numerical Optimization)
- 272A-B-C. (Numerical Partial Differential Equations)
- 273A-B-C. (Scientific Computation)

In certain cases, a petition may be approved to substitute one of these requirements from the following list of sequences:

- 220A-B-C. (Complex Analysis)
- 230A-B-C. (Ordinary Differential Equations)
- 240A-B-C. (Real Analysis)
- 280A-B-C. (Probability Theory)
- 281A-B-C. (Mathematical Statistics)
- 282A-B. (Applied Statistics)

In choosing course work to fulfill the remaining twenty-four units, the following restrictions must be followed:

- a. At least eight units must be approved graduate courses in mathematics or other departments [a one-year sequence in a related area outside the department such as computer science, engineering, physics, or economics is strongly recommended];
- b. A maximum of eight units can be approved upper-division courses in mathematics; and
- c. A maximum of eight units can be approved upper-division courses in other departments.
- d. A maximum of four units of Math. 500 (Apprentice Teaching).
- e. NO UNITS of Math. 295 (Special Topics) or Math. 299 (Reading and Research) may be used.

Students are strongly encouraged to consult with a faculty adviser in their first quarter to prepare their course of study.

### COMPREHENSIVE EXAMINATIONS

Two written comprehensive examinations must be passed at the master's level in any of the required applied mathematics sequences listed above. The instructors of each course should be contacted for exam details.

### FOREIGN LANGUAGE REQUIREMENT

There is no foreign language requirement for the M.A. in applied mathematics.

### TIME LIMITS

Full-time M.A. students are permitted seven quarters in which to complete all requirements. While there are no written time limits for part-time students, the department has the right to intervene and set individual deadlines if it becomes necessary.

### Master of Science in Statistics

[Offered only under the Comprehensive Examination Plan] The M.S. in statistics is designed to provide recipients with a strong mathematical background and experience in statistical computing with various applications. Out of the forty-eight units of credit needed, required core courses compromise twenty-four units, including:

- Math. 281A-B. (Mathematical Statistics)
- Math. 282A-B. Applied Statistics)

and any two topics comprising eight units chosen at will from Math. 287A-B-C-D and 289A-B-C (see course descriptions for topics).

The following guidelines should be followed when selecting courses to complete the remaining twenty-four units:

- a. For a theoretical emphasis, Math. 280A-B-C (Probability Theory) is required.
- b. For an applied orientation, Math. 270A-B-C (Numerical Mathematics) is recommended.
- c. A maximum of eight units as a combined total of approved upper-division applied mathematics courses (see faculty adviser) and Math. 500 (Apprentice Teaching).

Upon the approval of the faculty adviser, all twenty-four units can be graduate-level courses in other departments.

### COMPREHENSIVE EXAMINATIONS

Two written comprehensive examinations must be passed at the master's level in related course work (approved by a faculty adviser). Instructors of the relevant courses should be consulted for exam dates as they vary on a yearly basis.

### FOREIGN LANGUAGE REQUIREMENT

There is no foreign language requirement for the M.S. in statistics.

### TIME LIMITS

Full-time M.S. students are permitted seven quarters in which to complete all requirements. While there are no written time limits for part-time students, the department has the right to intervene and set individual deadlines if it becomes necessary.

### Ph.D. in Mathematics

#### WRITTEN QUALIFYING EXAMINATIONS

The department offers written qualifying examinations in seven subjects. These are grouped into three areas as follows:

#### Area #1

- Complex Analysis (Math. 220A-B-C)
- Real Analysis (Math. 240A-B-C)

#### Area #2

- Algebra (Math. 200A-B-C)
- Applied Algebra (Math. 202A-B-C)
- Topology (Math. 290A-B-C)

#### Area #3

- Numerical Analysis (Math. 270)
- Statistics (Math. 281)

- i) Three qualifying exams must be passed. At least one must be passed at the Ph.D. level, and a second must be passed at either the Ph.D. or Provisional Ph.D. level.
- ii) Of the three qualifying exams, there must be at least one from each of Areas #1 and #2. Algebra and Applied Algebra do not count as distinct exams in Area #2.
- iii) Students must pass at least two exams from distinct areas with a minimum grade of Provisional Ph.D. (For example, a Ph.D. pass in Real Analysis, Provisional Ph.D. pass in Complex Analysis, M.A. pass in Algebra would NOT satisfy this requirement, but a Ph.D. pass in Real Analysis, M.A. pass in Complex Analysis, Provisional Ph.D. pass in Algebra would, as would a Ph.D. pass in Numerical Analysis, Provisional Ph.D. pass in Applied Algebra, and M.A. pass in Real Analysis.)
- iv) All exams must be passed by the September exam session prior to the beginning of the third year of graduate studies. (Thus, there would be no limit on the number of attempts, encouraging new students to take exams when they arrive, without penalty.)

Department policy stipulates that at least one of the exams must be completed with a Provisional Ph.D. pass or better by September following the end of the first year. Anyone unable to comply with this schedule will be terminated from the doctoral program and transferred to one of our Master's programs.



Any Master's student can submit for consideration a written request to transfer into the Ph.D. program when the qualifying exam requirements for the Ph.D. program have been met and a dissertation adviser is found. Approval by the Qualifying Exam and Appeals Committee (QEAC) is not automatic, however.

Any Master's student can submit for consideration a written request to transfer into the Ph.D. program when the qualifying exam requirements for the Ph.D. program have been met and a dissertation adviser is found. Approval by the Qualifying Exam and Appeals Committee (QEAC) is not automatic, however.

Exams are typically offered twice a year, one scheduled late in the spring quarter and again in early September (prior to the start of fall quarter). Copies of past exams are made available for purchase in the Graduate Office.

In choosing a program with an eye to future employment, students should seek the assistance of a faculty adviser and take a broad selection of courses including applied mathematics, such as those in Area #3.

### FOREIGN LANGUAGE REQUIREMENT

A reading knowledge of two foreign languages (French, German, or Russian) is required prior to advancing to candidacy. In exceptional cases other languages may be substituted. Testing is administered within the department by faculty who select published mathematical material in one of these languages for a student to translate.

### ADVANCEMENT TO CANDIDACY

It is expected that by the end of the third year (nine quarters), students should have a field of research chosen and a faculty member willing to direct and guide them. A student will advance to candidacy after successfully passing the oral qualifying examination, which deals primarily with the area of research proposed but may include the project itself. This examination is conducted by the student's appointed doctoral committee. Based on their recommendation, a student advances to candidacy and is awarded the C.Phil. degree.

### DISSERTATION AND FINAL DEFENSE

Submission of a written dissertation and a final examination in which the thesis is publicly

defended are the last steps before the Ph.D. degree is awarded. When the dissertation is substantially completed, copies must be provided to all committee members at least four weeks in advance of the proposed defense date. Two weeks before the scheduled final defense, a copy of the dissertation must be made available in the department for public inspection.

### TIME LIMITS

The normative time for the Ph.D. in mathematics is five years. Students must be advanced to candidacy by the end of eleven quarters. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

## COURSES

All prerequisites listed below may be replaced by an equivalent or higher-level course. The listings of quarters in which courses will be offered are only tentative. Please consult the Department of Mathematics to determine the actual course offerings each year.

### LOWER-DIVISION

#### 3C. Pre-Calculus (4)

Functions and their graphs. Linear and polynomial functions, zeroes, inverse functions, exponential and logarithmic functions and their inverses. Emphasis on understanding algebraic, numerical and graphical approaches making use of graphing calculators. (No credit given if taken after Math. C, 1A/10A, or 2A/20A.) *Prerequisite: two or more years of high school mathematics or equivalent.*

#### 4C. Pre-Calculus for Science and Engineering (4)

Review of polynomials. Graphing functions and relations: graphing rational functions, effects of linear changes of coordinates. Circular functions and right triangle trigonometry. Reinforcement of function concept: exponential, logarithmic, and trigonometric functions. Vectors. Conic sections. Polar coordinates. Three lectures, one recitation. (No credit given if taken after Math. 1A/10A or 2A/20A. Two units of credit given if taken after Math. 3C.) *Prerequisite: qualifying score on placement examination. With a superior performance in Math. 3C, the placement examination requirement may be waived.*

#### 10A. Calculus (4)

Differentiation and integration of algebraic functions. Fundamental theorem of calculus. Applications. (No credit given if taken after Math. 2A/20A. Formerly numbered Math. 1A.) *Prerequisite: qualifying score on placement examination. With a passing grade in Math. 3C, the placement examination requirement may be waived.*

#### 10B. Calculus (4)

Further applications of the definite integral. Calculus of trigonometric, logarithmic, and exponential functions. Complex

numbers. (No credit given if taken after Math. 2B/20B. Formerly numbered Math. 1B.) *Prerequisite: Math. 1A or 10A.*

#### 10C. Calculus (4)

Vector geometry, velocity, and acceleration vectors. (No credit given if taken after Math. 2C/20C. Formerly numbered Math. 1C.) *Prerequisite: Math. 1B or 10B.*

#### 15A-B. Introduction to Discrete Mathematics (4-4)

Introduction to mathematical structures encountered in our computer-oriented world. Emphasis on concrete examples rather than on general theory. Topics may include combinatorial structures, formal languages (permutations, lattice paths), generating functions (partitions, recurrence relations), graph theory (trees, chromatic polynomials) and information theory (codes, sorting). *Prerequisite: Math. 4C or equivalent.*

#### 17. Geometry and the Imagination (4)

Down-to-earth approach to deep mathematical ideas, emphasizing the richness, diversity, connectedness, and pleasure of mathematics. Assignments emphasize thinking and writing. Discussions and projects replace traditional lectures and exams. Accessible to enthusiastic students of widely varying backgrounds. Topics: see Math. 117. *Prerequisite: calculus occasionally helpful but not necessary.*

#### 18. Computer Animated Statistics (4)

Students will acquire the basics of statistical analysis by working with computer-simulated models rather than abstract mathematical language. Topics include hypothesis testing, maximum likelihood estimation, sampling, chi-square tests and construction of confidence intervals. *Prerequisite: Math. 1B or 10B or 20B*

#### 20A. Calculus for Science and Engineering (4)

Foundations of differential and integral calculus of one variable. Functions, graphs, continuity, limits, derivative, tangent line. Applications with algebraic, exponential, logarithmic, and trigonometric functions. Introduction to the integral. (Two credits given if taken after Math. 1A/10A and no credit given if taken after Math. 1B/10B or Math. 1C/10C. Formerly numbered Math. 2A.) *Prerequisite: qualifying score on placement examination or completion of Math. 4C with a grade of B or better.*

#### 20B. Calculus for Science and Engineering (4)

Integral calculus of one variable and its applications, with exponential, logarithmic, hyperbolic, and trigonometric functions. Methods of integration. Polar coordinates in the plane. (Two units of credits given if taken after Math. 1B/10B or Math. 1C/10C.) *Prerequisite: Math. 20A or equivalent / Score of 4 or better on AB calculus AP test.*

#### 20BL. Honors Mathematics Laboratory (2)

Symbolic, numerical, and graphical explorations of the material of Math. 20B. Student should have received a grade of A- or better in Math. 20A (or equivalent course). *Prerequisite: Math. 20A with corequisite of Math. 20B or consent of instructor. (W)*

#### 20C. Calculus for Science and Engineering (4)

Taylor polynomials. Infinite series. Elementary aspects of multivariable calculus. Extrema. Lagrange multipliers. Double integrals. Introduction to ordinary differential equations. First order separable and linear equations. Second order equations with constant coefficients. *Prerequisite: Math. 20B or equivalent or score of 4 or better on BC calculus Advanced Placement test.*

#### 20CL. Honors Mathematics Laboratory (2)

Symbolic, numerical, and graphical explorations of the material of Math. 20C/21C. Student should have received a grade of A- or better in Math. 20B (or equivalent course). *Prerequisite:*

site: Math. 20B with corequisite of Math. 20C/21C or consent of instructor. (S)

**20D. Differential Equations and Vector Calculus (4)**

Series, convergence tests. Series solutions and Laplace transform methods for differential equations. Algebra and geometry of vectors, dot and cross product. Parametric curves in the plane and in space, tangent and normal. Gradient. *Prerequisite: Math. 20C or equivalent.*

**20E. Vector Calculus (4)**

Change of variable in multiple integrals, Jacobian. Line integrals, Green's theorem. Vector fields, gradient fields, divergence, curl. Spherical and cylindrical coordinates. Taylor series in several variables. Surface integrals, Stokes' theorem. Gauss' theorem and its applications. Conservative fields. *Prerequisite: Math. 20D (or 21D) or consent of instructor.*

**20F. Linear Algebra (4)**

Matrix algebra, solution of systems of linear equations by Gaussian elimination, determinants. Linear and affine subspaces, bases of Euclidean spaces. Eigenvalues and eigenvectors, quadratic forms, orthogonal matrices, diagonalization of symmetric matrices. Applications. *Prerequisite: Math. 20B. Math. 20D strongly recommended.*

**21C. Calculus and Analytic Geometry for Science and Engineering (4)**

Vector geometry, vector functions and their derivatives. Partial differentiation. Maxima and minima. Double integration. (Two units of credits given if taken after Math. 1C/10C. Formerly numbered Math. 2C.) *Prerequisite: Math. 2B/20B or equivalent or consent of instructor.*

**21D. Introduction to Differential Equations (4)**

Infinite series. Ordinary differential equations: exact, separable, and linear; constant coefficients, undetermined coefficients, variation of parameters. Series solutions. Systems, Laplace transforms. Techniques for engineering sciences. *Prerequisite: Math. 21C or equivalent or consent of instructor.*

**69. Chance (4)**

Explores role chance plays in our world; introduces basic tools of probability theory that are used to build, analyze, and interpret mathematical models of chance phenomena. Math. 169 the enhanced version of Math. 69 for math majors, requiring one additional lecture per week, more advanced topics, and more difficult assignments. Four lectures, one recitation. *Prerequisite: Math. 20C or 21C, or a grade of A- or better in Math 20B, or consent of instructor.*

**93. Theory of Interest (4)**

Interest, annuities, amortization, sinking funds, bonds, and other securities. Preparation for actuarial exam 140. *Prerequisite: Math. 10C or Math. 20B.*

**UPPER-DIVISION**

**100A-B-C. Modern Algebra (4-4-4)**

An introduction to the methods and basic structures of higher algebra: sets and mappings, the integers, rational, real and complex numbers, groups, rings (especially polynomial rings) and ideals, fields, real and complex vector spaces, linear transformations, inner product spaces, matrices, triangular form, diagonalization. Both 100 and 103 cannot be taken for credit. Three lectures, one recitation. *Prerequisites: Math. 20F and Math. 89 (may be taken concurrently).* (F,W,S)

**102. Applied Linear Algebra (4)**

A second course in linear algebra from a computational yet geometric point of view. Elementary Hermitian matrices, Schur's

theorem, normal matrices, and quadratic forms. Moore-Penrose generalized inverse and least square problems. Vector and matrix norms. Characteristic and singular values. Canonical forms. Determinants and multilinear algebra. Three lectures, one recitation. *Prerequisite: Math. 20F. (W)*

**103A-B. Modern Applied Algebra (4-4)**

Abstract algebra with applications to computation. Set algebra and graph theory. Finite state machines. Boolean algebras and switching theory. Lattices. Groups, rings and fields: applications to coding theory. Recurrent sequences. Three lectures, one recitation. Both 100 and 103 cannot be taken for credit. *Prerequisites: Math. 20F and Math. 89 (may be taken concurrently).* (F,W)

**104A-B-C. Number Theory (4-4-4)**

Topics from number theory with applications and computing. Possible topics are: congruences, reciprocity laws, quadratic forms, prime number theorem, Riemann zeta function, Fermat's conjecture, diophantine equations, Gaussian sums, algebraic integers, unique factorization into prime ideals in algebraic number fields, class number, units, splitting of prime ideals in extensions, quadratic and cyclotomic fields, partitions. Possible applications are Fast Fourier Transform, signal processing, coding, cryptography. Three lectures. *Prerequisite: consent of instructor.*

**107A-B. Computer Algebra (4)**

An introduction to algebraic computation. Computational aspects of groups, rings, fields, etc. Data representation and algorithms for symbolic computation. Polynomials and their arithmetic. The use of a computer algebra system as an experimental tool in mathematics. Programming using algebra systems. *Prerequisite: prior or concurrent enrollment in the Math. 100 or 103 sequence.*

**109. Mathematical Reasoning (4)**

This course uses a variety of topics in mathematics to introduce the students to rigorous mathematical proof, emphasizing quantifiers, induction, negation, proof by contradiction, naive set theory, equivalence relations and epsilon-delta proofs. Required of all departmental majors. *Prerequisite: Math. 20F.*

**110. Introduction to Partial Differential Equations (4)**

Fourier series, orthogonal expansions, and eigenvalue problems. Sturm-liouville theory. Separation of variables for partial differential equations of mathematical physics, including topics on Bessel functions and Legendre polynomials. *Prerequisites: Math. 20D (or 21D) and 20F, or consent of instructor.* (F,S)

**111A-B. Mathematical Model Building (4-4)**

Analytic techniques and simulation methods will be used to study a variety of models. Students will work on independent projects. Three lectures. *Prerequisites: Math. 20D (21D) and 20F.*

**117. Geometry and the Imagination for Math Majors (4)**

Enhanced Math. 17 for advanced mathematics students. Topics: Geometry and topology in dimensions 2, 3, and higher; polyhedra; Euler characteristic; hyperbolic geometry; knots; symmetry; orbifolds; the 17 kinds of wall paper; curvature; soap films; telling cabbage from kale; Gauss-Bonnet theorem. *Prerequisite: Math. 20C/21C or equivalent.*

**120A. Elements of Complex Analysis (4)**

Complex numbers and functions. Analytic functions, harmonic functions, elementary conformal mappings. Complex integration. Power series. Cauchy's theorem. Cauchy's formula. Residue theorem. Three lectures, one recitation. *Prerequisite or co-registration: Math. 20E, or consent of instructor.* (F,W)

**120B. Applied Complex Analysis (4)**

Applications of the Residue theorem. Conformal mapping and applications to potential theory, flows, and temperature distri-

butions. Fourier transformations. Laplace transformations, and applications to integral and differential equations. Selected topics such as Poisson's formula. Dirichlet problem. Neumann's problem, or special functions. Three lectures, one recitation. *Prerequisite: Math. 120A. (W,S)*

**130A. Ordinary Differential Equations (4)**

Linear and nonlinear systems of differential equations. Stability theory, perturbation theory. Applications and introduction to numerical solutions. Three lectures. *Prerequisites: Math. 20D/21D and 20F. (F)*

**130B. Ordinary Differential Equations (4)**

Existence and uniqueness of solutions to differential equations. Local and global theorems of continuity and differentiability. Three lectures. *Prerequisites: Math. 20D/21D and 20F, and Math. 130A. (W)*

**131. Variational Methods in Optimization (4)**

Maximum-minimum problems. Normed vector spaces, functionals, Gateaux variations. Euler-Lagrange multiplier theorem for an extremum with constraints. Calculus of variations via the multiplier theorem. Applications may be taken from a variety of areas such as the following: applied mechanics, elasticity, economics, production planning and resource allocation, astronautics, rocket control, physics, Fermat's principle and Hamilton's principle, geometry, geodesic curves, control theory, elementary bang-bang problems. Three lectures, one recitation. *Prerequisites: Math. 20D/21D and 20F or consent of instructor. (S)*

**132A. Elements of Partial Differential Equations and Integral Equations (4)**

Basic concepts and classification of partial differential equations. First order equations, characteristics. Hamilton-Jacobi theory, Laplace's equation, wave equation, heat equation. Separation of variables, eigenfunction expansions, existence and uniqueness of solutions. Three lectures. *Prerequisite: Math. 110 or consent of instructor. (W)*

**132B. Elements of Partial Differential Equations and Integral Equations (4)**

Relation between differential and integral equations, some classical integral equations, Volterra integral equations, integral equations of the second kind, degenerate kernels, Fredholm alternative, Neumann-Liouville series, the resolvent kernel. Three lectures. *Prerequisite: Math. 132A. (S)*

**140A-B-C. Foundations of Analysis (4-4-4)**

Axioms, the real number system, topology of the real line, metric spaces, continuous functions, sequences of functions, differentiation, Riemann-Stieltjes integration, partial differentiation, multiple integration, Jacobians. Additional topics at the discretion of the instructor: power series, Fourier series, successive approximations of other infinite processes. Three lectures, one recitation. *Prerequisites: Math. 20E and Math. 89 (may be taken concurrently).* Credit cannot be obtained for both Math. 140A-B and 142A-B. (F,W,S)

**141. Introduction to Abstract Analysis (4)**

General topological spaces, compactness, separation, locally compact Hausdorff spaces, metrization, completeness, Baire category, Stone-Weierstrass theorem, function spaces. Three lectures. *Prerequisites: Math. 140A-B or equivalent. (F)*

**142A-B. Advanced Calculus (4-4)**

The number system. Functions, sequences, and limits. Continuity and differentiability. The Riemann integral. Transcendental functions. Limits and continuity. Infinite series. Sequences and series of functions. Uniform convergence. Taylor series. Improper integrals. Gamma and Beta functions. Fourier series. Three lectures. *Prerequisite: Math. 20E.* Credit cannot be obtained for both Math. 140A-B and 142A-B.

**150A. Differential Geometry (4)**

Differential geometry of curves and surfaces. Gauss and mean curvatures, geodesics, parallel displacement, Gauss-Bonnet theorem. Three lectures. *Prerequisite: Math. 20E or consent of instructor.* (F)

**150B-C. Calculus on Manifolds (4-4)**

Calculus of functions of several variables, inverse function theorem. Further topics, selected by instructor, such as exterior differential forms, Stokes' theorem, manifolds, Sard's theorem, elements of differential topology, singularities of maps, catastrophes, further topics in differential geometry, topics in geometry of physics. Three lectures. *Prerequisite: Math. 150A.* (W)

**151. Topics in Geometry (4)**

A topic, selected by the instructor, from Euclidean geometry, non-Euclidean geometry, projective geometry, algebraic geometry, or other geometries. May be repeated for credit with a different topic. Three lectures. *Prerequisite: consent of instructor.* (S)

**155A. Computer Graphics (4)**

Bezier curves and control lines, de Casteljau construction for subdivision, elevation of degree, control points of Hermite curves, barycentric coordinates, rational curves. Three lectures, one recitation, and approximately eight laboratory hours per week. *Prerequisites: Math. 20F and programming experience.* [Warning: There are duplicate credit restrictions on this course. See section on Duplication of Credit.] (F)

**155B. Topics in Computer Graphics (4)**

Spline curves, spline interpolation, affine and affine cross ratios, polar forms (blossoming), the Oslo algorithm for knot insertion, NURBS and geometric continuity. Three lectures, one recitation, and approximately eight laboratory hours per week. *Prerequisite: Math. 155A or consent of instructor.* (W)

**155C. Topics in Computer Graphics (4)**

Tensor product and Bezier patch surfaces, perspective transformations, projective cross ratios, elevation of degree, derivatives across edges, calculation of illumination intensity. Three lectures, one recitation, and approximately eight laboratory hours per week. *Prerequisite: Math. 155B or consent of instructor.* (S)

**160A-B. Elementary Mathematical Logic (4-4)**

An introduction to recursion theory, set theory, proof theory, and model theory. Turing machines. Undecidability of arithmetic and predicate logic. Proof by induction and definition by recursion. Cardinal and ordinal numbers. Completeness and compactness theorems for propositional and predicate calculi. Three lectures. *Prerequisite: Math. 100A, 103A, 140A, or consent of instructor.*

**161. Mathematical Computing (2 or 4)**

Programming in higher level mathematical language such as Mathematica: Lists, Functions, Expressions, Recursion, Iteration, graphics, packages. Application to diverse areas of mathematics such as differential equations, dynamical systems, fractals, chaos, probability, financial models. *Prerequisite: Math. 20A-F or equivalent.*

**163. History of Mathematics (4)**

Topics will vary from year to year in areas of mathematics and their development. Topics may include the evolution of mathematics from the Babylonian period to the eighteenth century using original sources, a history of the foundations of mathematics and the development of modern mathematics. *Prerequisite: Math. 20B or consent of instructor.* (S)

**166A. Theory of Computability (4)**

An introduction to the mathematical theory of computability, including formal treatment. Finite automata and regular expressions. Context-free languages and push-down automata. Tur-

ing machines and recursive functions. Church's thesis. Unsolvable problems. Further topics selected from computational complexity, arithmetical relations, word problems. Three lectures, one recitation. *Prerequisite: Math. 103A or 100A, or consent of instructor.* (S,F)

**168A-B. Topics in Applied Mathematics-Computer Science (4-4)**

Topics to be chosen in areas of applied mathematics and mathematical aspects of computer science. May be repeated once for credit with different topics. Three lectures, one recitation. *Prerequisite: consent of instructor.* (W,S)

**169. Chance (4)**

Math 69 explores role chance plays in our world; introduces basic tools of probability theory that are used to build, analyze, and interpret mathematical models of chance phenomena. Math 169 the enhanced version of Math 69 for math majors, requiring one additional lecture per week, more advanced topics and more difficult assignments. Four lectures, one recitation. *Prerequisite: Math 20F.*

**170A. Numerical Linear Algebra (4)**

Analysis of numerical methods for linear algebraic systems and least squares problems. Orthogonalization methods. Ill conditioned problems. Eigenvalue and singular value computations. Three lectures, one recitation. *Prerequisites: Math. 20F and knowledge of programming.* (F,S)

**170B. Numerical Analysis (4)**

Rounding and discretization errors. Calculation of roots of polynomials and nonlinear equations. Interpolation. Approximation of functions. Three lectures, one recitation. *Prerequisites: Math. 20F and knowledge of programming.* (W)

**170C. Numerical Ordinary Differential Equations (4)**

Numerical differentiation and integration. Ordinary differential equations and their numerical solution. Basic existence and stability theory. Difference equations. Boundary value problems. Three lectures, one recitation. *Prerequisite: Math. 170B or consent of instructor.* (S)

**171A-B. Mathematical Programming-Numerical Optimization (4-4)**

Mathematical optimization and applications. Linear programming, the simplex method, duality. Nonlinear programming, Kuhn-Tucker theorem. Selected topics from integer programming, network flows, transportation problems, inventory problems, and other applications. Three lectures, one recitation. *Prerequisites: Math. 20F and knowledge of programming.*

**172. Numerical Partial Differential Equations (4)**

Finite difference methods for the numerical solution of hyperbolic and parabolic partial differential equations; finite difference and finite element methods for elliptic partial differential equations. Three lectures. *Prerequisites: Math. 170A or Math. 110 and programming experience.* (F)

**173. Mathematical Software-Scientific Programming (4)**

Development of high quality mathematical software for the computer solution of mathematical problems. Three lectures, one recitation. *Prerequisites: Math. 170A or Math. 174 and knowledge of FORTRAN.* (W)

**174. Numerical Methods in Science and Engineering (4)**

Floating point arithmetic, linear equations, interpolation, integration, ordinary differential equations, nonlinear equations, optimization, least squares. Three lectures and one recitation. Students may not receive credit for both Math. 174 and Physics 105 or AMES 153 or 154. Students may not receive credit for Math. 174 if Math. 170 A,B, or C has been taken already. *Prerequisites: Math. 20F and knowledge of FORTRAN.* (F)

**176A. Computer Implementations of Data Structures (4)**

Introduction to the use of data structures in computer implementation of combinatorial algorithms. This course is designed to give students hands-on experience with these fundamental tools of computer science. Part A covers dictionaries, heaps, priority queues, hashing structures, balanced and self-adjusting trees. Part B includes selected applications to sorting, searching, string processing, elementary parsing, geometric and graph algorithms. Three lectures. *Prerequisites: Math. 20E, Math. 100A or 103A (may be taken concurrently), Math. 79B or CSE 70.*

**179A-B. Introduction to Artificial Intelligence (4-4)**

An introduction to artificial intelligence through its mathematics. The course will develop various areas of mathematics, including logic, probability and optimization. These tools will be applied to various areas of artificial intelligence, including deductive reasoning, uncertain reasoning, neural networks and search. One of the programming languages Prolog and Lisp will be introduced and used for course work. *Prerequisite: Math. 89, 100A or 103A (100A or 103A may be taken concurrently).* (W,S)

**180A. Introduction to Probability (4)**

Probability spaces, random variables, independence, conditional probability, distribution, expectation, joint distributions, central-limit theorem. Three lectures. *Prerequisites: Math. 20D/21D.* [Warning: There are duplicate credit restrictions on this course. See section on Duplication of Credit.] (F)

**180B. Introduction to Probability (4)**

Random vectors, multivariate densities, covariance matrix, multivariate normal distribution. Random walk, Poisson process. Other topics if time permits. Three lectures. *Prerequisites: Math. 180A and Math. 20E.* (W)

**180C. Introduction to Probability (4)**

Markov chains in discrete and continuous time, random walk, recurrent events. If time permits, topics chosen from stationary normal processes, branching processes, queuing theory. Three lectures. *Prerequisite: Math. 180B.* (S)

**181A. Introduction to Mathematical Statistics (4)**

Random samples, linear regression, least squares, testing hypotheses, and estimation. Neyman-Pearson lemma, likelihood ratios. Three lectures, one recitation. *Prerequisites: Math. 180A and 20F.* [Warning: There are duplicate credit restrictions on this course. See section on Duplication of Credit.] (W)

**181B. Introduction to Mathematical Statistics (4)**

Goodness of fit, special small sample distribution and use, nonparametric methods. Kolmogorov-Smirnov statistics, sequential analysis. Three lectures. *Prerequisite: Math. 181A.* (S)

**181C. Mathematical Statistics (4)**

Nonparametric Statistics. Topics covered may include the following: Classical rank test, rank correlations, permutation tests, distribution free testing, efficiency, confidence intervals, nonparametric regression and density estimation, resampling techniques (bootstrap, jackknife, etc.) and cross validations. *Prerequisites: Math. 181A, 181B previously or concurrently.*

**181D. Mathematical Statistics (4)**

Sampling Theory. Basic notions of estimation: bias, variance, and sampling errors. Sampling from finite populations: simple random, stratified, cluster, sampling with unequal probabilities. Ratio and regression estimators, multistage sampling. *Prerequisites: Math. 181A, 181B previously or concurrently.*

**181E. Mathematical Statistics (4)**

Time Series. Analysis of trends and seasonal effects, autoregressive and moving averages models, forecasting, informal introduction to spectral analysis. *Prerequisites: Math. 181A, 181B previously or concurrently.*

**182. Introduction to Combinatorics (4)**

Combinatorial methods and their computer implementation. Permutations and combinations, generating functions, partitions, principle of inclusion and exclusion. Polya's theory of counting. Hall's theorem, assignment problem, backtrack technique, error-correcting codes, combinatorial optimization problems. Three lectures, one recitation. *Prerequisites: Math. 20F and programming experience.* (W)

**183. Statistical Methods (4)**

Introduction to probability. Discrete and continuous random variables—binomial, Poisson and Gaussian distributions. Central limit theorem. Data analysis and inferential statistics: graphical techniques, confidence intervals, hypothesis tests, curve fitting. (Credit not offered for both Math. 183 and Econ. 120A.) *Prerequisite: Math. 20C.* (F,S)

**184A-B. Mathematical Foundations of Computer Science (4-4)**

Enumeration of combinatorial structures. Ranking and unranking. Graph theory with applications and algorithms. Recursive algorithms. Circuit design. Inclusion-exclusion. Generating functions. Polya theory. Three lectures, one recitation. *Prerequisite: Math. 100A or Math. 103A.* (W,S)

**185. Introduction to Computational Statistics (4)**

Statistical analysis of data by means of package programs. Regression, analysis of variance, discriminant analysis, and analysis of categorical data. Emphasis will be on understanding the connections among statistical theory, numerical results, and analysis of real data. Three lectures. *Prerequisite: Math. 181B or equivalent.*

**187. Introduction to Cryptography (4)**

An introduction to the basic concepts and techniques of modern cryptography. Classical cryptanalysis. Probabilistic models of plaintext. Monalphabetic and polyalphabetic substitution. The one-time system. Caesar-Vigenere-Playfair-Hill substitutions. The Enigma. Modern-day developments. The Data Encryption Standard. Public key systems. Security aspects of computer networks. Data protection. Electronic mail. Three lectures, one recitation. *Prerequisite: programming experience.* (S)

**189A-B. Compilers (4-4)**

Compilers for high-level programming languages. Project to develop a working compiler. Part A: regular expressions and finite automata, context free grammars, parsing techniques. Part B: syntax directed translation, semantic actions (for declarations, statement structures, assignments, array references, expression evaluation, procedure and function calls), symbol tables, run-time storage management. Part C: error recovery, optimization, code generation. Three lectures. *Prerequisites: Math. 166A, 176A, and 103A or consent of instructor.* (F,W,S)

**190. Introduction to Topology (4)**

Topological spaces, subspaces, products, sums and quotient spaces. Compactness, connectedness, separation axioms. Selected further topics such as fundamental group, classification of surfaces, Morse theory, topological groups. May be repeated for credit once when topics vary, with consent of instructor. Three lectures. *Prerequisite: Math. 109 or consent of instructor.* (W)

**191. Topics in Topology (4)**

Topics to be chosen by the instructor from the fields of differential algebraic, geometric, and general topology. Three lectures. *Prerequisite: Math. 190 or consent of instructor.* (S)

**193A. Actuarial Mathematics (4)**

Probabilistic Foundations of Insurance. Short-term risk models. Survival distributions and life tables. Introduction to life

insurance. *Prerequisite: Math. 180A or 183, or consent of instructor.*

**193B. Actuarial Mathematics (4)**

Life Insurance and Annuities. Analysis of premiums and premium reserves. Introduction to multiple life functions and decrement models as time permits. *Prerequisite: Math. 193A.*

**193C. Actuarial Mathematics (4)**

Topics to be selected from pension plans, collective risk models, advanced topics in insurance. *Prerequisite: Math. 193B.*

**195. Introduction to Teaching in Mathematics (4)**

Students will be responsible for and teach a class section of a lower-division mathematics course. They will also attend a weekly meeting on teaching methods. (Does not count towards a minor or major.) Five lectures, one recitation. *Prerequisite: consent of instructor.* (F,W,S)

**196. Student Colloquium (1-2)**

A variety of topics and current research results in mathematics will be presented by guest lecturers and students under faculty direction. *Prerequisites: upper-division status or consent of instructor (for one unit) and consent of instructor (for two units).*

**198. Directed Group Studies in Mathematics (1 to 4)**

Group study course in some topic not covered in the undergraduate curriculum. (P/NP grades only.) *Prerequisite: consent of instructor.* (F,W,S)

**199. Independent Study for Undergraduates (2 or 4)**

Independent reading in advanced mathematics by individual students. Three periods. (P/NP grades only.) *Prerequisite: permission of department.* (F,W,S)

**GRADUATE**

**200A-B-C. Algebra (4-4-4)**

Group actions, factor groups, polynomial rings, linear algebra, rational and Jordan canonical forms, unitary and Hermitian matrices, Sylow theorems, finitely generated abelian groups, unique factorization, Galois theory, solvability by radicals, Hilbert Basis Theorem, Hilbert Nullstellensatz, Jacobson radical, semisimple Artinian rings. *Prerequisite: consent of instructor.*

**201A-B-C. Basic Topics in Algebra (4-4-4)**

Recommended for all students specializing in algebra. Basic topics include categorical algebra, commutative algebra, group representations, homological algebra, nonassociative algebra, ring theory. *Prerequisites: Math. 200A-B-C or consent of instructor.* (F,W,S)

**202A-B-C. Applied Algebra (4-4-4)**

Algebra from a computational perspective using Maple, Mathematica and Matlab. Groups, rings, linear algebra, rational and Jordan forms, unitary and Hermitian matrices, matrix decompositions, perturbation of eigenvalues, group representations, symmetric functions, fast Fourier transform, commutative algebra, Grobner basis, finite fields. *Prerequisite: consent of instructor.*

**203A-B-C. Algebraic Geometry (4-4-4)**

Places, Hilbert Nullstellensatz, varieties, product of varieties: correspondences, normal varieties. Divisors and linear systems; Riemann-Roch theorem; resolution of singularities of curves. Grothendieck schemes; cohomology, Hilbert schemes; Picard schemes. *Prerequisites: Math. 200A-B-C.* (F,W,S)

**204. Topics in Number Theory (4)**

Topics in analytic number theory, such as zeta functions and L-functions and the distribution of prime numbers, zeros of zeta

functions and Siegel's theorem, transcendence theory, modular forms, finite and infinite symmetric spaces. *Prerequisite: consent of instructor.*

**205. Topics in Algebraic Number Theory (4)**

Topics in algebraic number theory, such as cyclotomic and Kummer extensions, class number, units, splitting of primes in extensions, zeta functions of number fields and the Brauer-Siegel Theorem, class field theory, elliptic curves and curves of higher genus, complex multiplication. *Prerequisite: consent of instructor.*

**207A-B. Topics in Algebra (4-4)**

In recent years, topics have included number theory, commutative algebra, noncommutative rings, homological algebra, and Lie groups. May be repeated for credit with consent of adviser. *Prerequisite: consent of instructor.*

**208. Seminar in Algebra (1-4)**

*Prerequisite: consent of instructor.* (S/U grades permitted.)

**209. Seminar in Number Theory (1 to 4)**

*Prerequisite: consent of instructor.* (S/U grades permitted.)

**210A. Mathematical Methods in Physics and Engineering (4)**

Complex variables with applications. Analytic functions, Cauchy's theorem, Taylor and Laurent series, residue theorem and contour integration techniques, analytic continuation, argument principle, conformal mapping, potential theory, asymptotic expansions, method of steepest descent. *Prerequisites: Math. 20DEF, 140A/142A or consent of instructor.*

**210B. Mathematical Methods in Physics and Engineering (4)**

Linear algebra and functional analysis. Vector spaces, orthonormal bases, linear operators and matrices, eigenvalues and diagonalization, least squares approximation, infinite-dimensional spaces, completeness, integral equations, spectral theory, Green's functions, distributions, Fourier transform. *Prerequisite: Math. 210A or consent of instructor.* (W)

**210C. Mathematical Methods in Physics and Engineering (4)**

Calculus of variations: Euler-Lagrange equations, Noether's theorem. Fourier analysis of functions and distributions in several variables. Partial differential equations: Laplace, wave, and heat equations; fundamental solutions (Green's functions); well-posed problems. *Prerequisite: Math. 210B or consent of instructor.* (S)

**217A. Topics in Applied Mathematics (4)**

In recent years, topics have included applied complex analysis, special functions, and asymptotic methods. May be repeated for credit with consent of adviser. *Prerequisite: consent of instructor.*

**218. Seminar in Applied Mathematics (1 to 4)**

*Prerequisite: consent of instructor.* (S/U grades permitted.)

**220A-B-C. Complex Analysis (4-4-4)**

Complex numbers and functions. Cauchy theorem and its applications, calculus of residues, expansions of analytic functions, analytic continuation, conformal mapping and Riemann mapping theorem, harmonic functions. Dirichlet principle, Riemann surfaces. *Prerequisites: Math. 140A-B or consent of instructor.* (F,W,S)

**221A-B-C. Topics in Several Complex Variables (4-4-4)**

Formal and convergent power series, Weierstrass preparation theorem; Cartan-Ruckert theorem, analytic sets; mapping theorems; domains of holomorphy; proper holomorphic mappings; complex manifolds; modifications. *Prerequisites: Math. 200A and 220A-B-C or consent of instructor.*

**227A-B-C. Topics in Complex Analysis (4-4-4)**

In recent years, topics have included conformal mapping, Riemann surfaces, value distribution theory, external length. May be repeated for credit with consent of adviser. *Prerequisite: consent of instructor.*

**229. Computing Technology for Mathematics (2)**

Preparation for making effective use of computer technology in research and teaching of mathematics. UNIX basics, document preparation using TEX, Internet resources, HTML, computer technology in teaching. *Prerequisite: graduate status in mathematics.*

**231A-B-C. Partial Differential Equations (4-4-4)**

Existence and uniqueness theorems. Cauchy-Kowalewski theorem, first order systems. Hamilton-Jacobi theory, initial value problems for hyperbolic and parabolic systems, boundary value problems for elliptic systems. Green's function, eigenvalue problems, perturbation theory. *Prerequisites: Math. 210A-B or 240A-B-C or consent of instructor.*

**233. Singular Perturbation Theory for Differential Equations (4)**

Multivariable techniques, matching techniques and averaging techniques, including various approaches to proofs of asymptotic correctness, for singular perturbation problems including initial value problems with nonuniformities at infinity, initial value problems with initial nonuniformities, two point boundary value problems, and problems for partial differential equations. Applications taken from celestial mechanics, oscillation problems, fluid dynamics, elasticity, and applied mechanics. *Prerequisites: Math. 130A-B or 132A-B or consent of instructor. (S/U grades permitted.) (S)*

**237A-B. Topics in Differential Equations (4-4)**

May be repeated for credit with consent of adviser. *Prerequisite: consent of instructor.*

**240A-B-C. Real Analysis (4-4-4)**

Lebesgue integral and Lebesgue measure, Fubini theorems, functions of bounded variations, Stieltjes integral, derivatives and indefinite integrals, the spaces  $L$  and  $C$ , equi-continuous families, continuous linear functionals general measures and integrations. *Prerequisites: Math. 140A-B-C. (F,W,S)*

**241A-B-C. Functional Analysis (4-4-4)**

Metric spaces and contraction mapping theorem; closed graph theorem; uniform boundedness principle; Hahn-Banach theorem; representation of continuous linear functionals; conjugate space, weak topologies; extreme points; Krein-Milman theorem; fixed-point theorems; Riesz convexity theorem; Banach algebras. *Prerequisites: Math. 240A-B-C or consent of instructor.*

**242. Topics in Fourier Analysis (4)**

A course on Fourier analysis in Euclidean spaces, groups, symmetric spaces. *Prerequisites: Math. 240A-B-C or consent of instructor. (F,W,S)*

**247A-B. Topics in Real Analysis (4-4)**

In recent years, topics have included Fourier analysis, distribution theory, martingale theory, operator theory. May be repeated for credit with consent of adviser. *Prerequisite: consent of instructor.*

**248. Seminar in Real Analysis (1 to 4)**

*Prerequisite: consent of instructor. (S/U grades permitted.)*

**250A-B-C. Differential Geometry (4-4-4)**

Differential manifolds, Sard theorem, tensor bundles, Lie derivatives, DeRham theorem, connections, geodesics, Riemannian metrics, curvature tensor and sectional curvature, completeness, characteristic classes. Differential manifolds im-

mersed in Euclidean space. *Prerequisite: consent of instructor. (F,W,S)*

**251A-B-C. Lie Groups (4-4-4)**

Lie groups, Lie algebras, exponential map, subgroup subalgebra correspondence, adjoint group, universal enveloping algebra. Structure theory of semi-simple Lie groups, global decompositions, Weyl group. Geometry and analysis on symmetric spaces. *Prerequisites: Math. 200 and 250 or consent of instructor. (F,W,S)*

**256. Seminar in Lie Groups and Lie Algebras (2 to 4)**

Various topics in Lie groups and Lie algebras, including structure theory, representation theory, and applications. *Prerequisite: consent of instructor. (F,W,S)*

**257A-B-C. Topics in Differential Geometry (4-4-4)**

In recent years, topics have included Morse theory and general relativity. May be repeated for credit with consent of adviser. *Prerequisite: consent of instructor.*

**259A-B-C. Geometrical Physics (4-4-4)**

Manifolds, differential forms, homology, deRham's theorem. Riemannian geometry, harmonic forms. Lie groups and algebras, connections in bundles, homotopy sequence of a bundle, Chern classes. Applications selected from Hamiltonian and continuum mechanics, electromagnetism, thermodynamics, special and general relativity, Yang-Mills fields. *Prerequisite: graduate standing in mathematics, physics, or engineering, or consent of instructor.*

**260A-B-C. Mathematical Logic (4-4-4)**

Propositional calculus and quantification theory. Completeness theorem, theory of equality, compactness theorem, Skolem-Lowenheim theorems. Vaught's test: Craig's lemma. Elementary number theory and recursive function theory. Undecidability of true arithmetic and of Peano's axioms. Church's thesis; set theory; Zermelo-Frankel axiomatic formulation. Cardinal and ordinal numbers. The axiom of choice and the generalized continuum hypothesis. Incompleteness and undecidability of set theory. Relative consistency proofs. *Prerequisites: Math. 100A-B-C or consent of instructor.*

**261A-B. Combinatorial Algorithms (4-4)**

Lexicographic order, backtracking, ranking algorithms, isomorph rejection, sorting, orderly algorithms, network flows and related topics, constructive Polya theory, inclusion-exclusion and sieving methods, Mobius inversion, generating functions, algorithmic graph theory, trees, recursion, depth firstsearch and applications, matroids. *Prerequisites: CSE 160A-B or Math. 184A-B or consent of instructor. (F,W,S)*

**262A-B-C. Topics in Combinatorial Mathematics (4-4-4)**

Development of a topic in combinatorial mathematics starting from basic principles. Problems of enumeration, existence, construction, and optimization with regard to finite sets. Some familiarity with computer programming desirable but not required. *Prerequisites: Math. 100A-B-C.*

**263. History of Mathematics (4)**

Mathematics in the nineteenth century from the original sources. Foundations of analysis and commutative algebra. For algebra the authors studied will be Lagrange, Ruffini, Gauss, Abel, Galois, Dirichlet, Kummer, Kronecker, Dedekind, Weber, M. Noether, Hilbert, Steinitz, Artin, E. Noether. For analysis they will be Cauchy, Fourier, Bolzano, Dirichlet, Riemann, Weierstrass, Heine, Cantor, Peano, Hilbert. *Prerequisites: Math. 100A-B, Math. 140A-B.(S)*

**264A-B-C. Combinatorics (4-4-4)**

Topics from partially ordered sets, Mobius functions, simplicial complexes and shellability. Enumeration, formal power series

and formal languages, generating functions, partitions. Lagrange inversion, exponential structures, combinatorial species. Finite operator methods,  $q$ -analogues, Polya theory, Ramsey theory. Representation theory of the symmetric group, symmetric functions and operations with Schur functions. (F,W,S)

**267A-B-C. Topics in Mathematical Logic (4-4-4)**

Topics chosen from recursion theory, model theory, and set theory. May be repeated with consent of adviser. *Prerequisite: consent of instructor. (S/U grades permitted.)*

**268. Seminar in Logic (1 to 4)**

*Prerequisite: consent of instructor. (S/U grades permitted.)*

**269. Seminar in Combinatorics (1 to 4)**

*Prerequisite: consent of instructor. (S/U grades permitted.)*

**270A-B-C. Numerical Mathematics (4-4-4)**

Error analysis of the numerical solution of linear equations and least squares problems for the full rank and rank deficient cases. Error analysis of numerical methods for eigenvalue problems and singular value problems. Error analysis of numerical quadrature and of the numerical solution of ordinary differential equations. *Prerequisites: Math. 20F and knowledge of programming.*

**271A-B-C. Numerical Optimization (4-4-4)**

Formulation and analysis of algorithms for constrained optimization. Optimality conditions; linear and quadratic programming; interior methods; penalty and barrier function methods; sequential quadratic programming methods. *Prerequisite: consent of instructor. (F,W,S)*

**272A-B-C. Numerical Partial Differential Equations (4-4-4)**

The numerical solution of elliptic, parabolic, and hyperbolic partial differential equations; discretization and solution techniques. *Prerequisite: consent of instructor. (F,W,S)*

**273A-B-C. Scientific Computation (4-4-4)**

The analysis of the complexity of matrix computations and the parallel implementation of numerical algorithms: fast matrix multiplication and inversion, fast Fourier transform, communication schemes, gradient and multilevel methods. *Prerequisite: knowledge of programming and some numerical analysis or computer science, or consent of instructor. (F,W,S)*

**277A-B-C. Topics in Numerical Mathematics (4-4-4)**

Topics vary from year to year. May be repeated for credit with consent of adviser. *Prerequisite: consent of instructor.*

**278. Seminar in Numerical Mathematics (1 to 4)**

*Prerequisite: consent of instructor. (S/U grades permitted.)*

**280A-B-C. Probability Theory (4-4-4)**

Probability measures; Borel fields; conditional probabilities, sums of independent random variables; limit theorems; zero-one laws; stochastic processes. *Prerequisites: advanced calculus and consent of instructor. (F,W,S)*

**281A-B. Mathematical Statistics (4-4)**

Testing and estimation, sufficiency; regression analysis; sequential analysis; statistical decision theory; nonparametric inference. *Prerequisites: advanced calculus and consent of instructor.*

**282A-B. Applied Statistics (4-4)**

Sequence in applied statistics. First quarter: general theory of linear models with applications to regression analysis. Second quarter: analysis of variance and covariance and experimental design. Third quarter: further topics to be selected by instructor. Emphasis throughout is on the analysis of actual data. *Prerequisite: Math. 181B or equivalent or consent of instructor. (S/U grades permitted.)*



**286. Stochastic Differential Equations (4)**

Review of continuous martingale theory. Stochastic integration for continuous semimartingales. Existence and uniqueness theory for stochastic differential equations. Strong Markov property. Selected applications. *Prerequisite: Math. 280A-B or consent of instructor.*

**287A. Time Series Analysis (4)**

Discussion of finite parameter schemes in the Gaussian and non-Gaussian context. Estimation for finite parameter schemes. Stationary processes and their spectral representation. Spectral estimation. *Prerequisite: Math. 181B or equivalent or consent of instructor.*

**287B. Multivariate Analysis (4)**

Bivariate and more general multivariate normal distribution. Study of tests based on Hotelling's T<sup>2</sup>. Principal components, canonical correlations, and factor analysis will be discussed as well as some competing nonparametric methods, such as cluster analysis. *Prerequisite: Math. 181B or equivalent or consent of instructor.*

**287C. Nonparametric Analysis (4)**

Topics covered will include the Mann-Whitney and Wilcoxon, sign, median, and Kruskal-Wallis tests; permutation methods in general; tests for goodness of fit, especially those based on chi-square and Kolmogorov-Smirnov statistics. *Prerequisite: Math. 181B or equivalent or consent of instructor.*

**288. Seminar in Probability and Statistics (1 to 4)**

*Prerequisite: consent of instructor. (S/U grades permitted.)*

**289A-B-C. Topics in Probability and Statistics (4-4-4)**

In recent years, topics have included Markov processes, martingale theory, stochastic processes, stationary and Gaussian processes, ergodic theory. May be repeated for credit with consent of adviser.

**290A-B-C. Topology (4-4-4)**

Point set topology, including separation axioms, compactness, connectedness. Algebraic topology, including the fundamental group, covering spaces, homology and cohomology. Homotopy or applications to manifolds as time permits. *Prerequisites: Math. 100A-B-C and Math. 140A-B-C. (F,W,S)*

**295. Special Topics in Mathematics (1 to 4)**

A variety of topics and current research results in mathematics will be presented by staff members and students under faculty direction.

**296. Student Colloquium (1 to 2)**

A variety of topics and current research in mathematics will be presented by guest lecturers and students under faculty direction. *Prerequisites: for one unit—upper-division status or consent of instructor (may only be taken P/NP), or graduate status (may only be taken S/U); for two units—consent of instructor, standard grading option allowed.*

**297A-B-C. Topics in Topology (4-4-4)**

In recent years, topics have included generalized cohomology theory, spectral sequences, K-theory, homotopy theory. May be repeated for credit with consent of adviser. *Prerequisite: consent of instructor. (F,W,S)*

**298. Seminar in Topology (1 to 4)**

*Prerequisite: consent of instructor. (S/U grades permitted.)*

**299. Reading and Research (1 to 12)**

Independent study and research for the doctoral dissertation. One to three credits will be given for independent study (reading) and one to nine for research. *Prerequisite: consent of instructor. (S/U grades permitted.)*

**Teaching of Mathematics**

**500. Apprentice Teaching (1 to 4)**

Supervised teaching as part of the mathematics instructional program on campus (or, in special cases such as the CTF program, off campus). *Prerequisite: consent of adviser. (S/U grades only.)*

**Mathematics and Science Education**

OFFICE: 3060 Urey Hall Addition

**Professors**

Donald W. Anderson, *Computer Science and Engineering (CSE)*

Ted J. Case, *Biology*

Paul M. Churchland, *Philosophy*

Michael Cole, *Communications*

Melvin Green, *Biology*

Barbara Jones, *Physics*

Douglas Magde, *Chemistry and Biochemistry*

Alfred B. Manaster, *Mathematics*

Hugh B. Mehan, *Sociology*

Douglas W. Smith, *Biology*

**Senior Lecturers (SOE)**

Barbara A. Sawrey, *Chemistry and Biochemistry*

Gabriele Wienhausen, *Biology*

**Assistant Professor**

John Batali, *Cognitive Science*

**Lecturer (SOE)**

Norman A. Shenk, *Mathematics*

**The Joint Doctoral Program**

UCSD and San Diego State University have created this innovative program for students who already have a master's degree in biology, chemistry, mathematics, or physics. In this program, students will complement their discipline knowledge with studies of how people learn mathematics and science. The UCSD Joint Doctoral Group in Mathematics and Science Education currently consists of faculty from the Departments of Biology, Chemistry and Biochemistry, Cognitive Science, Communications, Computer Science and Engineering, Mathematics, Philosophy, Physics, and Sociology. The

SDSU Program faculty is drawn from the Departments of Biology, Mathematical Sciences, Natural Sciences, Physics, Psychology, and Teacher Education.

The program includes research, practical applications, and formal coursework. Students must commit four years to the program, and most students will complete the program in four to five years. An individualized course of study will be designed for each student, depending on the student's background and interests.

The graduates of this program will be able to contribute to the developing body of knowledge about human cognitive processes in mathematics and science. They will be expected to maintain a strong connection to educational practice through teaching and application of research results on learning to instructional situations.

Information regarding admission is found in the current edition of the *Bulletin of the Graduate Division* of San Diego State University.

**Ph.D. Time Limit Policies**

All time limits for this program start when a student first registers in this program. Students must be advanced to candidacy by the end of four years. Total university support to students in this program cannot exceed five years. Total registered time in this program cannot exceed six years. The normative time in this program is five years.

**COURSES**

**MSED 296A-B-C. Mathematics and Science Education/Seminar (4)**

Issues concerning the learning of mathematics and science, with particular emphasis on lower-division coursework, will be addressed from the perspectives of how students learn, what students learn, and how students are taught.

**MSED 298. Research Project (2-12)**

Students will work on an independent research project under the supervision of MSED faculty.



## Middle East Studies

OFFICE: 3024 Humanities and Social Sciences Building, Muir College  
Web site: <http://orpheus.ucsd.edu/history/MiddleEastStud.html>

### Faculty

Guillermo Algaze, *Associate Professor, Anthropology*  
Suzanne Brenner, *Associate Professor, Anthropology*  
David Noel Freedman, *Professor, History*  
Richard Friedman, *Professor, Literature*  
David Goodblatt, *Professor, History*  
Hasan Kayali, *Associate Professor, History*  
Thomas Levy, *Professor, Anthropology*  
Timothy McDaniel, *Professor, Sociology*  
Michael E. Meeker, *Professor, Anthropology*  
William H. Propp, *Associate Professor, History*  
Gershon Shafir, *Professor, Sociology*  
Melford E. Spiro, *Professor Emeritus, Anthropology*  
Winifred Woodhull, *Associate Professor, Literature*  
Oumelbanine Zhiri, *Assistant Professor, Literature*

### The Minor

The minor in Middle East studies is an interdisciplinary program aimed at a comparative study of the Middle East (including North Africa).

The program consists of seven courses, of which at least five must be upper-division courses. Three courses have to deal with the Middle East since the emergence of Islam, as listed here under "Core Courses." The remaining courses may be chosen from either the Core Courses or the Supporting Courses; and they may be courses dealing with the ancient, medieval, or modern Middle East or a three-quarter sequence of a Middle Eastern language (in which case only four of the seven courses need to be upper-division). Ordinarily all seven courses must be taken for a letter grade.

The courses which make up the minor must be approved by the student's college and by the Middle East Studies Program.

Approved courses taken at other universities or through participation in the Education Abroad Program can be included as part of the minor by petition.

## COURSES

### CORE COURSES

ANRG 162. Peoples of the Middle East  
ANPR 199. Independent Study (Middle East Anthropology)  
HINE 108. The Middle East before Islam  
HINE 114. History of the Islamic Middle East  
HINE 116. The Middle East in the Age of European Empires  
HINE 118. The Middle East in the Twentieth Century  
HINE 166. Nationalism in the Middle East  
HINE 186. Special Topics in Middle Eastern History  
HINE 199. Independent Study (Middle East History)  
LTGN 185. Gender and Decolonization in North African and French Literature  
Soc./D 188F. Modern Jewish Societies and Israeli Society  
Soc./D 188H. Middle Eastern Societies  
Soc./D 188M. Historical Sociology of the Middle East  
Soc./D 188N. Modern Jewish Societies  
Soc./D 188O. Dilemmas in Israeli Society  
Soc./E 190. Senior Seminar (Middle East Topics)  
Soc./E 199. Independent Study (Middle East Sociology)

### SUPPORTING COURSES

ANLD 3. World Prehistory  
ANGN 102. Early Urbanism  
ANGN 105. Ethnoarchaeology  
ANGN 182. Origins of Agriculture and Sedentism  
ANGN 183. Chiefdoms, States, and the Emergence of Civilizations  
ANRG 101. Near Eastern Pre-History  
ANRG 115. Foundations/Social Complex/Near East  
ANRG 116. Archaeology of Society in Syro-Palestine  
ANRG 182. Ethnography of Island Southeast Asia  
Judaic Studies 1. Beginning Hebrew  
Judaic Studies 2. Intermediate Hebrew  
Judaic Studies 3. Intermediate Hebrew Continued  
Judaic Studies 101. Introduction to Hebrew Texts  
Judaic Studies 102. Intermediate Hebrew Texts  
Judaic Studies 103. Advanced Hebrew Texts  
HINE 100. The Ancient Near East and Israel  
HINE 101. Hebrew Prophetic Literature  
HINE 102. The Jews in Their Homeland in Antiquity  
HINE 103. The Jewish Diaspora in Antiquity  
HINE 104. The Bible and the Ancient Near East

HINE 160. Special Topics in the Bible and Ancient Near East  
HINE 170. Special Topics in Jewish History  
HINE 180. Cultures of Ancient Near East  
HINE 181. Problems in the Study of Hebrew Manuscripts  
HINE 199. Independent Study (Judaic Studies)  
HITO 100. Ancient Religions  
HJTO 101. Western Religions (Judaism, Christianity, Islam)  
LTHE (LTGN) 151. Bible: The Prophetic Books  
LTHE (LTGN) 152. Bible: The Narrative Books  
LTHE (LTGN) 153. Bible: The Poetic Books  
LTHE (LTGN) 156. Topics in the Prophets  
LTHE (LTGN) 157. Topics in Biblical Narrative  
LTHE (LTGN) 158. Topics in Biblical Poetry  
Soc./C 148E. Ethnicity and Politics  
Soc./D 182. Revolutions  
Soc./D 189. Special Topics in Comparative-Historical Sociology (Middle East Topics)

## Molecular Pathology

OFFICE: 1012 Basic Science Building, School of Medicine

### Professors

Stephen Baird, M.D., *Pathology*  
Roland C. Blantz, M.D., *Medicine*  
Colin M. Bloor, M.D., *Pathology, Director*  
Laurence L. Brunton, Ph.D., *Pharmacology and Medicine*  
Kenneth R. Chien, M.D., *Medicine*  
Lynette B. Corbeil, D.V.M., Ph.D., *Pathology*  
Daniel James Donoghue, Ph.D., *Chemistry and Biochemistry*  
Marilyn G. Farquhar, M.D., *Pathology*  
James Feramisco, Ph.D., *Medicine*  
Joshua Fierer, M.D., *Medicine and Pathology (In-Residence)*  
Martin Haas, Ph.D., *Biology (Adjunct)*  
Martin F. Kagnoff, M.D., *Medicine*  
Michael Karin, Ph.D., *Pharmacology*  
Michael J. Kelner, M.D., *Pathology*  
Thomas J. Kipps, M.D., Ph.D., *Medicine*  
Thomas A. Lane, M.D., *Pathology*  
Eliezer Masliah, M.D., *Neurosciences/Pathology*  
Katsumi Miyai, M.D., Ph.D., *Pathology (Academic Senate Distinguished Teaching Award)*

Michael N. Oxman, M.D., *Medicine and Pathology*

Henry C. Powell, M.D., *Pathology*

C. Ann Rearden, M.D., *Pathology*

Douglas Richman, M.D., *Pathology and Medicine (In-Residence)*

Michael G. Rosenfeld, Ph.D., *Medicine*

Deborah H. Spector, Ph.D., *Biology*

David Tarin, M.D., Ph.D., *Pathology*

Ajit P. Varki, M.D., *Medicine*

Gernot Walter, Ph.D., *Pathology*

### **Associate Professors**

Mark P. Kamps, Ph.D., *Pathology*

Theo N. Kirkland, M.D., *Pathology and Medicine*

### **Assistant Professor**

H. Elizabeth Broome, M.D., *Pathology*

Nigel Calcutt, Ph.D., *Pathology*

Steffan Ho, Ph.D., *Pathology*

Andrew Mizisin, Ph.D., *Pathology*

### **Assistant Adjunct Professors**

Robert Bookstein, M.D., *Medicine*

Susan M. Carroll, Ph.D., *Pathology*

### **Associate Adjunct Professor**

Dale Bredesen, Ph.D., *Neurosciences*

Jane Burns, Ph.D., *Pediatrics*

Mike Kalichman, Ph.D., *Pathology*

Elena Pasquale, Ph.D., *Pathology*

Guy Salvesen, Ph.D., *Pathology*

### **Adjunct Professors**

Floyd Bloom, M.D., *Neurosciences*

Kathryn Ely, Ph.D., *Pathology*

Eva Engvall, Ph.D., *Pathology*

Minoru Fukuda, Ph.D., *Pathology*

Frances D. Gillin, Ph.D., *Pathology*

Werner Heuschele, M.D., *Pathology*

Rich Maki, Ph.D., *Pathology*

Robert Oshima, Ph.D., *Pathology*

Manuel Perucho, Ph.D., *Medicine and Pathology*

John Reed, M.D., Ph.D., *Pathology*

Erkki Ruoslahti, M.D., *Pathology*

Bartholomew Sefton, Ph.D., *Biology*

Ian Wilson, Ph.D., *Pathology*

## **The Graduate Program**

The goal of the molecular pathology Ph.D. program is to provide research training in the

pathobiology of disease for physicians, health scientists, and biologists. The program is interdepartmental in nature. It is centered in the Department of Pathology, but faculty members are also drawn from other departments and institutions. The program provides a comprehensive knowledge of normal and abnormal biological processes, with particular emphasis on the molecular mechanisms of human diseases.

### **Course Work**

The course requirements are designed to ensure that all students acquire competence in cellular and molecular pathology. The requirements are flexible in order to allow students from various backgrounds to join the program. Students holding a bachelor's degree in one of the biological sciences are required to take the introductory course in pathology taught for medical students. This requirement may be waived for students holding medical graduate degrees (M.D. or D.V.M.). All students must take five of seven core courses offered by faculty members from the Department of Pathology. These courses cover topics in molecular pathology, cancer, infectious disease, human genetic disease, nervous system disease, and developmental disorders.

### **Examinations**

#### **First Qualifying Examination (Minor Proposition)**

The purpose of this examination is to test the student's ability to choose a research problem in molecular pathology and to propose an experimental approach to its solution. The problem should be unrelated to the student's thesis project. The student is expected to demonstrate knowledge in molecular biology and basic pathology. The first qualifying examination will be taken by the end of the fall quarter of the second year.

#### **Second Qualifying Examination (Major Proposition)**

The second qualifying examination, a university requirement, consists of an oral report by the student about research accomplished and the goals to be achieved for completion of the thesis. Upon successful completion of the examination, the student will advance to candi-

dacy. The second qualifying examination has to be taken by the end of the third year.

### **Departmental Ph.D. Time Limit Policies**

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

## **COURSES**

#### **PATH 208G. Human Disease (8)**

An integrated consideration of the general principles of pathology and microbiology, epidemiology, and medical therapeutics of the important diseases. An example of their application to a specific organ system will be included.

#### **PATH 220. Molecular Pathology of Disease (4)**

This course will explore the molecular pathology associated with various diseases other than cancer. Emphasis will be placed on understanding the aberrant cellular processes, caused by mutation or environmental factors, that are associated with the disease state. Cardiovascular, neurological, immunological, and other diseases will be investigated.

#### **PATH 221. Molecular Pathology of Cancer (4)**

The purpose of this course is to present exciting new developments in molecular carcinogenesis, with particular emphasis on oncogene expression and functions of oncogenic proteins. The relevance of molecular mechanisms for understanding human cancer will be discussed.

#### **PATH 225. Molecular Pathology Research Seminar (2)**

Group and individual discussion of current literature and ongoing research activities. The format of SOM 225 will encourage student participation. Students are to present on their rotation work or current research project.

#### **PATH 230G. Molecular Biology of the Cell (6)**

An integrated consideration of the general principles of molecular pathology. This course will provide the basic foundation of the molecular biology of the cell for graduate students as a prerequisite for Pathology 208G. This course is for graduate students only.

#### **PATH 231. Modern Methods in Cellular and Molecular Pathology (4)**

This course presents key concepts and methodologies used in cellular and molecular pathology research. Topics will include cell membrane transport, protein purification, recombinant DNA techniques, DNA sequencing, and PCR technology. The relevance of these methods for investigating human disease will be discussed.

#### **PATH 232. Statistical Methods and Experimental Design**

This course will emphasize the relationships between experimental design, statistical methods, and biomedical research. The content of the course will include basic issues in experimental design and commonly used statistical methods. The assumptions behind the statistical tests, their appropriate use, and examples of misuse will be discussed.

#### **PATH 296. Directed Reading (1-4)**

Reading and laboratory study of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases.

**PATH 299. Independent Study or Research (1-12)**  
Independent study or research.

**SOM 213. Histology (2)**

This course teaches the structural basis of normal and abnormal function at the cellular and tissue levels. Emphasis is based on microscopic study conducted in small laboratory groups under close faculty supervision.

## Muir College

OFFICE: Provost, Muir College, 2126 Humanities and Social Sciences Building

### COURSES

**199. Muir Special Project (4-16)**

A course of independent work on a research or creative project to satisfy a Muir graduation requirement. (Only Muir students who have had Muir Special Project proposals approved may enroll in this course.) Students wishing to enroll must submit a written request with a description of the project. (Muir students must submit the Muir Special Project 199 form to the major adviser and to the Office of the Provost by the seventh week of the quarter prior to the quarter in which the 199 is to be undertaken. For information on other requirements, consult the provost's office.) *Prerequisites: upper-division status, approval by project adviser and by provost.* (Letter grades only.)

### The Writing Program

The Muir College Writing Program is a sequence of courses in critical thinking and the writing of expository prose. During these courses, students must advance beyond the basic competency expected at entrance to understand and write discourse acceptable at the university level. Even when faced with challenging topics, students must demonstrate the ability to comprehend texts at more than a superficial level; their writing must exhibit focused theses, systematic methods of analysis and argumentation, awareness of the needs of their audience, strong organization and development, clear presentation of ideas, appropriate syntax and diction, and needless to say—correct grammar and usage.

To achieve these ends, the courses focus on principles of analysis and reasoned argumentation. Through close reading of texts, students learn both to identify underlying issues, assumptions, and values, and to identify rhetorical strategies by which these are conveyed or

revealed. Students also learn to monitor and adapt their own writing processes. Since the ability to evaluate one's own writing and carry out appropriate revision strategies is particularly crucial to effective writing, all students are required to revise their papers several times. Attention is devoted to developing skill in evaluation and revision in discussion sections and in individual conferences with instructors. Sections of MCWP 50 vary in theme and content, giving students the opportunity to write in areas that interest them or that may be relevant to their major fields. (Descriptions of the MCWP 50 sections are available each quarter in the Muir Writing Program office during preregistration.)

Students are required to take both MCWP 40 and MCWP 50 for a letter grade in their first year of residence at the college. All transfer students, upon satisfaction of Subject A, must take MCWP 40 and MCWP 50 in their first year of residence. In cases where more than one quarter of practice is needed to prepare a student for MCWP 50, an IP grade is given in MCWP 40, and the student takes MCWP 41. Completion of the sequence allows students to meet the Muir College writing requirement.

Certain exceptionally well-prepared students, particularly transfer students, may satisfy MCWP 40 or MCWP 50 by examination. The Muir challenge examinations are given at the beginning of fall and winter quarters only. Students may not take the challenge in the same quarter in which they expect to graduate.

**40. Critical Writing (4)**

First course of sequence in university reading and writing which satisfies the Muir College graduation requirement in writing. Required of all Muir College first-year students and of transfer students who have not completed a comparable course elsewhere. MCWP 40 introduces students to the basic elements of argument and analysis. Students engage in close reading of texts, weekly writing and revision, and individual conferences. Course must be taken for a letter grade. Those who need additional work to prepare for MCWP 50 will be given a grade of IP and will be required to take MCWP 41. *Prerequisite: satisfaction of the Subject A requirement.*

**41. Special Study in Writing (4)**

An individualized writing class including both class discussion and tutorials. Students confer individually with instructors on a regular weekly basis to talk about writing problems. The course is designed for students who have taken MCWP 40 or its equivalent but need additional writing practice to prepare for MCWP 50. MCWP 41 does not satisfy the first part of the Muir Writing requirement. MCWP 41 must be taken for a letter grade and must be taken within two quarters of MCWP 40. *Prerequisite: MCWP 40 or its equivalent.*

**50. Critical Writing (4)**

Second course of sequence in reading and writing which satisfies the Muir College graduation requirement in writing. Required of all Muir College first-year students and of transfer students. MCWP 50 focuses on advanced skills of argument and analysis. Students engage in close reading of texts, weekly writing and revision, and individual conferences. Course must be taken for a letter grade. *Prerequisite: satisfaction of MCWP 40 requirement or completion of TAG or IGETC agreement.*

## Music

OFFICE: 110 Mandeville Center for the Arts  
web page: <http://www.ucsd.edu/music>

### Professors

Anthony Davis, B.A.  
Brian Ferneyhough, Dip. Mus.  
Edwin Harkins, Ph.D.  
Aleck Karis, M.M.  
George Lewis, B.A.  
Cecil Lytle, B.A.  
F. Richard Moore, Ph.D., *Chair*  
János Négyesy, Dip. Mus.  
Jann Pasler, Ph.D.  
Carol Plantamura, M.F.A.  
Miller Puckette, Ph.D.  
Roger Reynolds, M.M.  
Steven Schick, M.M.  
Harvey Sollberger, M.A.  
Rand Steiger, M.F.A.  
Bertram Turetzky, M.A.  
Chinary Ung, Ph.D.

### Associate Professors

Gerald Balzano, Ph.D.  
John Fonville, D.M.A.  
Philip Larson, M.M.  
Jane Stevens, Ph.D.

### Assistant Professor

Chaya Czernowin, Ph.D.

### Music Technology Director

Peter Otto, M.F.A.

### Emeritus Professors

James Cheatham, Dip. Mus.  
Peter Farrell, M.M.  
Thomas Nee, M.A.  
Wilbur Ogdon, Ph.D.  
John Silber, Ph.D.  
Joji Yuasa

### UCSD Regents' Professor

Ravi Shankar

### Affiliate Faculty

Kenneth Anderson  
 Susan Barrett, M.A.  
 Edgar Billups, M.M.  
 Garrett Bowles, Ph.D., *Music Librarian*  
 David Chase, D.M.A.  
 Warren Gref  
 Paivikki Nykter, Dip. Mus.  
 Robert Ramsey, B.A.  
 Sylvia Re, B.A.  
 Celin Romero, B.A.  
 Anne Seshadri, M.A.  
 Kartik Seshadri, M.B.A.  
 Stefani Walens, M.M.  
 Robert Zelickman, M.F.A.

### Ensembles In Residence

EOLUS (Woodwind Quintet)  
 La Jolla Symphony and Chorus  
 redfishbluefish (Percussion Ensemble)  
 SIRIUS (New Music Sextet)  
 SONOR (Contemporary Music Ensemble)

This department is dedicated to the development of musical intelligence and capacity, centering its quest on the music of our own time. The undergraduate programs intend to enhance the exercise and comprehension of the music-making process. The graduate programs aim to educate practitioners and researchers who can nourish the entire domain of music as well as extend its boundaries.

### Resources

#### *Production/Performance Facilities*

During the academic year a diverse slate of more than 150 public concerts are presented in well-equipped venues: Mandeville Center Auditorium (792 seats), Mandeville Recital Hall (150 seats), Erickson Hall (150 seats), and Studio A (100 seats). These concerts provide both performance experience and a forum for examining the music of diverse eras and cultures. Substantial resources and staffing are dedicated to producing the music of our time, including faculty and student works, by new music ensembles SONOR (faculty) and SIRIUS (graduate students), experimental and improvisation en-

sembles, and student performance collectives (New Music Forum, Performers' Forum, et al.).

Practice facilities include a complement of grand pianos, disclaviers and uprights, an electronic keyboard lab, several harpsichords, a wide array of percussion, a percussion studio, and a relatively limited collection of musical instruments.

#### *Concert and Recording Technology*

Students can check out recording and concert production tools on a daily basis. All faculty and most student concerts are recorded by professional staff or their assistants, and qualified students can utilize the department's extensive high-tech resources for experimental projects resulting in public performance of new works.

#### *Music Technology Facilities*

The Department of Music maintains highly-sophisticated, newly-refurbished facilities for the support of graduate and undergraduate instruction and production. These facilities include the following:

Computer Music Instructional Laboratory (CMIL)—Mandeville Center. CMIL is a facility which supports networked Silicon Graphics and other workstations, high-resolution presentation technology, experimental music software, excellent audio monitoring, a Disklavier, and an extensive complement of digital and analog audio peripherals.

Digital Music Instructional Laboratory (DMIL)—Mandeville Center. This state-of-the-art studio supports digital synthesis, mixing, digital multitrack recording, processing, and control in music composition and performance. Silicon Graphics and Macintosh computers host digital audio workstations with extensive software and I/O capabilities; remote facility linkages and an isolation booth are included in a professional production package for precise recording and editing.

Macintosh Laboratory—Mandeville Center. This facility supports many facets of the Department of Music with Macintosh computer workstations, each with a MIDI interface and synthesizer. Music theory, acoustics, electronic music, music notation, interdisciplinary computing and the arts, and library/bibliography are among the curriculum areas supported.

#### *Music Library*

The Music Library (located in Geisel Library) houses an extensive collection of holdings in all areas of Western music, and possesses one of the most exhaustive collections of twentieth-century music in this country. In addition, materials in non-Western music are being very aggressively expanded. The Music Library has a remote playback facility to support the course work and research of UCSD faculty and students. The listener can directly control any of the cassette decks, reel-to-reel tape decks, turntables, CD players, laser disc players, VHS HiFi VCRs, and BETA HiFi VCRs. Ten of the remote control listening stations are equipped with video monitors. An auxiliary studio and seminar room are equipped with full remote control of any of the audio or video equipment. The Music Library has a homepage on the World Wide Web—[<http://orpheus.ucsd.edu/music/index.html>].

#### *Warren Studios*

The Warren Studios are state-of-the-art musical recording and faculty research facilities. The studios were designed to meet the following objectives:

- to serve as an unsurpassed facility for recording and mastering musical works;
- to serve as a reference-critical listening space for the evaluation of audio production;
- to support faculty research in psychoacoustics, computer music, audio signal processing, and musical performance.

These fully-professional studios support most formats of analog and digital audio, all phases of tracking, mixing, and CD mastering, and feature sufficient infrastructure to enable large video and film shoots with full synchronization. For more information visit [<http://orpheus.ucsd.edu/dept.music/musictech>] on the World Wide Web.

#### *Center for Research in Computing and the Arts (CRCA)*

The Center for Research in Computing and the Arts (CRCA) is an organized research unit of the University of California, San Diego. CRCA exists to foster collaborative working relationships among artists, scientists, and technologists by identifying and promoting projects

in which common research interests may be advanced through the application of computer-mediated strategies. Visit the CRCA homepage on the World Wide Web for more information [<http://www-crca.ucsd.edu>].

### The Undergraduate Program

Undergraduate courses offered in the Department of Music satisfy a wide range of interests for non-music majors as well as for students majoring in music.

Students wishing to acquire a musical background to support further study should take Music 1A-B-C, which develops skills musicians use in the analysis and performance of music. Students interested in "music appreciation" should choose from the following courses, which introduce aspects of the rich heritage of music: Music 4–15. None of the aforementioned courses have prerequisites. For students with prior musical background who wish to continue in upper-division theory courses, Music 2A-B-C (in lieu of 1A-B-C) is essential.

### Interdisciplinary Computing and the Arts Major

The interdisciplinary *computing and the arts major* with emphasis in either music or visual arts is detailed under Computing and the Arts in the *UCSD General Catalog*. Interested students should contact the respective departmental adviser for additional information.

### Music Major Programs

The undergraduate program at UCSD offers a bachelor of arts degree in *music* and in *music humanities*. The curriculum emphasizes the development of musical listening and performance skills as applied to both contemporary and traditional music.

The *music major* is intended for students who may choose to engage in music as a profession. This major thus requires extensive development of musical skills. A student without the appropriate level of those skills upon entrance to UCSD must devote considerable time to attaining them, either in lower-division courses or independent study. Students can concentrate in composition, performance, literature, or technology.

The Department of Music is committed to creative music making; thus all music majors are required to enroll in Music 95, Music 130, or Music 131 ensemble performance for at least six quarters, with three quarters of participation in a choral ensemble chosen from Music 95C, 95D, or 95K.

The *music/humanities major* is intended for students who wish to pursue a broad liberal arts program that includes music as a central element. This program emphasizes music history and literature, and allows the individual student to select an area of interest for the major within the broad field of the humanities.

### Music Major Requirements

The lower-division prerequisites for the music major are Music 2A-B-C, and Music 2AK-BK-CK. To continue within the major, all prospective students must pass a proficiency exam given at the end of the Music 2 series. All required music major courses must be taken for a letter grade, with the exception of Music 143, which is taken on a Pass/No Pass basis. All courses to be counted toward satisfying the major requirements must be passed with a grade of C or better.

To complete the music major the following courses are required:

1. Music 101A-B-C.
2. Music 102A-B-C.
3. Music 120A-B-C.
4. Two quarters of Music 133 (normally taken in the winter quarters of the junior and senior years).
5. Music 111 or Music 114.
6. One of the following sequences: Music 103A-B-C (composition), three courses (in addition to Music 111 or 114) from the series Music 111-127 (literature), Music 160A-B-C (music science and technology), or three quarters of Music 132 (performance).
7. Six quarters of Music 95, 130, or 131 (three from 95C, 95D, or 95K).
8. Music 143 every quarter.

### Music/Humanities Major Requirements

The prerequisite for the music/humanities major is Music 1A-B-C (or 2A-B-C, if qualified).

To complete the major the following courses are required:

1. Music 120A-B-C.
2. Three courses chosen from Music 111–127.
3. Six upper-division courses, selected from the humanities or the fine arts, that form a coherent program of study relevant to the chosen upper-division music courses.
4. Six quarters of Music 95, 130, or 131.
5. Music 143 every quarter.

Students interested in this major should confer with the music/humanities faculty adviser to work out a course of study, which must be submitted at the beginning of the junior year for the adviser's written approval.

### Honors

1. **To be admitted into the honors program** a student must have the following:

- Excellence in a specific subject matter (performance, composition, literature, technology, or music/humanities) and faculty support.
- A GPA in the Department of Music of 3.6; an overall GPA of 3.0
- Students must be supervised by a faculty adviser throughout the honors program.
- *Composition* students admitted to the honors program will enroll in twelve units of the Composition Honors course (Music 103D-E-F). *Performance* students will enroll in twelve units of Music 132R (after at least three quarters of Music 132). *Technology* students will enroll in twelve units of Music 163 or 199; *Music literature and music humanities* students will enroll in twelve units of Music 199, 150, or 107.
- Performers must have previously performed on Performers Forum and enrolled in Chamber Music, Music 130. (Vocalists can seek an exception.) Other students must have completed all Music 95 requirements prior to entering the honors program.

All of the requirements below **must** be completed before the last day of instruction in the spring quarter prior to the academic year in which the student proposes to pursue an honors curriculum.

- Performance students must present a piece before the performance faculty that demonstrates their technical and musical abilities. In addition, students must provide a proposed program for an honors recital.
- Composition students must have a composition performed on the New Music Forum series. Either the student's principal instructor must attend this performance or a tape of this performance must be provided for faculty review. In addition, students must provide a proposed portfolio of original scores for an honors recital.
- Literature students who have (1) presented historically- or musicologically-oriented research papers at campus venues featuring undergraduate research, or (2) been involved in the faculty mentor program, or (3) participated in the presentation of the winter opera with the accompanying symposium, may submit a portfolio of papers to the Critical Studies/Experimental Practices (CSEP) faculty. In addition, students must propose a fifty minute lecture for the Department Seminar (Music 143).
- Music science and technology students must present a portfolio of projects to the music technology faculty and propose a fifty-minute lecture/demonstration for the Department Seminar (Music 143).

**Please Note:** Being admitted to the honors curriculum does not guarantee that a student will receive honors. In accordance with university policy, no more than 20 percent of graduating students may be granted honors.

2. To receive honors:

- A student must publicly demonstrate an appropriate level of excellence, an acceptable GPA, and suitable participation in department presentations and seminars, as determined by the student's honors committee.

For further information on the Department of Music Honors Program and to obtain an application form, students should make an appointment with the undergraduate staff adviser.

### Transfer Students

Students who plan to transfer into the music major should have strong skills in basic musicianship. For those planning to emphasize performance, solid proficiency on the instrument is required. A general course in the history of music is recommended. All transfer students must pass a proficiency examination in Music 2C (Basic Musicianship) and Music 2CK (Basic Keyboard). To verify the acceptability of transfer courses, students must make an appointment with the undergraduate staff adviser.

### Minor Programs

Please obtain a Department of Music brochure of approved minors from the undergraduate office. Students must seek advice and obtain approval from a music faculty adviser prior to embarking upon a minor program.

The music minor for students entering UCSD in and after winter quarter 1998 consists of:

- two lower-division music courses except performance ensembles (Music 95A–Music 95W)
- five upper-division music courses

Students who entered UCSD before winter 1998 may select either the new minor or one of the music minors offered at the time of their entry into the university.

### Advising Office

Undergraduate Staff Adviser

Stephanie Ferneyhough, Room 124  
Mandeville Center, (619) 534-8226  
sferneyhough@ucsd.edu

### The Graduate Program

UCSD offers the master of arts and doctor of philosophy in music as well as a doctor of musical arts. Areas of emphasis for the M.A. include *Composition*, *Computer Music*, *Critical Studies/Experimental Practices (CS/EP)*, and *Performance*. For the Ph.D., areas of emphasis offered are *Composition* and *Critical Studies/Experimental Practices*. The doctoral of musical arts has an emphasis in *Contemporary Music Performance*.

### Composition

The Composition Program is committed to encouraging the individual gifts and capacities of student composers in a diverse and active environment. This is done in a variety of ways, but primarily through intensive personal interaction between faculty and student.

An incoming member of the M.A. or Ph.D. program begins with a year-long seminar (taught by a different faculty composer each quarter) and continues with individual studies thereafter. At the close of the first fall and again after the spring quarter, the entire composition community gathers for what is typically a day-long "jury." Each seminar member is allotted a block of time during which the composition that he or she has just completed is performed and recorded in a carefully rehearsed presentation. There is a detailed discussion of each work by the faculty present, and the student has opportunity to comment, explain, and question. Following the performance and discussions of this day, the composition faculty meets to assess the students' work. These events constitute the uniqueness of the UCSD program, and manifest the range, seriousness, and vitality with which compositional issues are explored here.

After completing three quarters of seminar and two juries, students have come to know something about the ideas and attitudes of each faculty composer; the faculty is, in turn, aware of each student's aims and needs. At this point, then, an individual mentor is agreed upon and this relationship becomes the center of the student's continuing work as he or she completes the degree. There is also a biweekly Focus on Composition Seminar at which faculty, students and selected visitors present work of interest (compositional, analytical, technological, even, perhaps, whimsical).

The seminars serve to foster mutual awareness on the part of the student composer group. Collegial relationships can develop which lead to creative outlets in cooperative projects. (These include the student-run Composers' Forums, performance collectives and recital projects.) UCSD performers—faculty and student—are all committed to the playing of new music, and frequent composer/performer collaborations are a vital aspect of life in the Department of Music.



## Computer Music

The Computer Music Program emphasizes research in new techniques for electronic music composition and performance, catalyzed through an active concert program of new works by students, faculty, and visitors.

Areas of research include:

- new audio synthesis techniques,
- audio signal processing,
- psychoacoustics,
- live improvisation with and by computers,
- integrating audio and video,
- electronic spatialization of sounds, and
- synchronization and control in live computer music performance.

Computers today are ubiquitous in all aspects of music theory and music-making. The Computer Music Program encourages work which overlaps with the other programs of study: composition, performance, and critical studies/experimental practices. Analyzing and performing electronic music repertoire as well as writing new music involving electronics are encouraged.

## Critical Studies/Experimental Practices

The Program in Critical Studies/Experimental Practices (CS/EP) explores what music is about over the widest possible range of traditions and possibilities. An exploration of experimental, Western, and non-Western music-making is combined with the critical examination of music and musical ideas within human societies.

This interactive environment encourages a cross-fertilization between diverse musical forms and the theoretical and critical discourses that surround them, often drawing in those who may not fit conventional categories of "composer" or "performer," or those whose work is not constrained by traditional disciplinary boundaries.

Thinking about music requires both analytic engagement with real music and the creative investigation of ideas relevant to its nature, creation, production, and reception. Core seminars explore multiple ways of thinking about music, including critical, cognitive, and intercultural approaches as well as traditional syntactical analysis. Recent seminar topics include experimental and world-music systems of tun-

ing and rhythm, film and popular music, psychoacoustics, representations of sexuality and gender in music, the analysis of complex music from both the nineteenth and the twentieth centuries, and contemporary theories of narrativity in music.

Music-making in CS/EP encompasses both compositional and performance activities. Experimental performance workshops incorporate improvisation and such diverse elements as new technologies, video, dance, visual, and theatrical components to make music in a multiplicity of ways.

Student-generated projects and workshops are also an important component of the UCSD Graduate Program in CS/EP. Individual student interests and initiatives are welcomed by the faculty, who are expert in such diverse fields as cognitive psychology, computer-aided improvisation, ethnomusicology, historical development of Western music, and contemporary critical thought.

## Performance

Fostering the creative, intelligent, and passionate performance of contemporary music is the mission of the Performance Program of the Department of Music. As once stated by founding faculty composer Robert Erickson, we at UCSD are a "community of musicians."

The performance of contemporary music is viewed as a creative act which balances expertise and exploration. Within this context, performers act and interact in a communal environment, working with faculty and student composers, collaborating in music technology, researching instrument design, improvising, and experimenting in performance practice, among many other pursuits.

Graduate performance students pursue either a master of arts or a doctor of musical arts degree in contemporary performance. The course of study for both programs involves the completion of required graduate seminars and intensive study with a mentoring faculty member. Students are encouraged to adopt a vigorous, exploratory orientation in their private study. Final degree requirements include a recital, or in the case of the DMA, two recitals and the presentation of personal performance research.

The work of graduate performance students forms an integral component of a rich musical environment which produces an astonishing

quantity and variety of performances. Students may perform in SONOR (the university's contemporary music ensemble) or in SIRIUS, (the graduate student contemporary music group). The Performance Forum, a student-initiated concert series, provides an opportunity for students to present a wide variety of concerts of improvised music, world music, and music with technology. A strong, collaborative spirit between the Performance and Composition Programs also yields many new works each year performed on New Music Forum concerts series.

## Graduate Admissions

Normally students will be admitted to begin graduate studies in the fall quarter only.

**Step 1.** Formal university applications should be submitted by January 15th of the admission year; failure to meet that deadline will jeopardize the applicant's opportunity for admission and financial support.

**Step 2.** As part of the portfolio of supporting documents, applicants to graduate studies in music must submit the following:

- a. statement of purpose
- b. three letters of recommendation
- c. official transcripts
- d. graduate Record Examination scores which includes the General Test and the Subject Test in Music
- e. foreign applicants must submit TOEFL scores and a Foreign Applicant Financial Statement
- f. a repertory list of works (solo and chamber) performed during the past few years and a sample of printed concert programs in which they have participated, either as performer or composer
- g. a minimum of two papers illustrating writing ability in any of the following areas: analysis, criticism, aesthetics, music theory, or music technology

**Step 3.** In addition:

- h. for *Composition* applicants, a minimum of three scores of instrumental works with taped examples of the works being performed. (These may include, but should not be exclusively electroacoustic.)
- i. for *CS/EP* and *Computer Music*, prospective students should submit appropriate

documentation (i.e., papers, performances, computer programs, etc.) of their prior work

- j. for *Performance* applicants, tapes and/or personal audition demonstrating their level of vocal and/or instrumental performance

### Advisory Examinations

After completion of an advisory examination during Welcome Week, each new student will meet with the departmental M.A. or Ph.D. adviser. Students found to be deficient in any areas covered on the advisory examination (dictation, sight reading, keyboard proficiency, history, and literature) will be advised to remedy deficiencies during their first year.

### Core Graduate Curriculum

All graduate students are required to take Music 201 (Projects in New Music Performance), Music 210 (Musical Analysis), Music 228 (Conducting), and Music 291 (Problems and Methods of Music Research and Performance). Students who completed Music 210, 228, and 291 during their master's degree program at UCSD, do not need to retake those courses for their doctoral curriculum.

To assure that all requirements are being adequately met, all graduate students must make an appointment with the graduate staff adviser for a degree check no later than the winter quarter of the second year.

### Master's Degree Program

The master of arts in music degree includes areas of emphasis in *Composition*, *Computer Music*, *Critical Studies/Experimental Practices (CS/EP)*, and *Performance*. The degree requires completion of at least thirty-six quarter units of graduate courses (courses numbered 201-299), including six units of Music 500 (Apprentice Teaching in Music) and six units of Music 299 (Advanced Research Projects and Independent Study) bearing directly on completion of the master's thesis. Master's students are expected to complete all requirements for the degree in six quarters of residence.

### Course Requirements

In addition to the core graduate curriculum, all master's degree students are required to complete requirements in their area of emphasis:

### COMPOSITION

1. Music 201 (A, B or C)—must take at least two times.
2. Music 203ABC (M.A. level)—successful completion of the jury process is necessary to get a passing grade in the corresponding seminar.
3. Music 203D—after successful completion of 203C, students must enroll in Music 203D (with their committee chair) every quarter until graduation.
4. Music 204—every quarter until graduation.
5. Music 206 or 207—a combination of two courses from Music 206/207.

### COMPUTER MUSIC

1. Music 201 (A, B or C)—must take at least two times.
2. Music 203ABC or Music 232 (3 times)—must take within the first year of the program.
3. Music 206 or 207—required at least one time.
4. Music 263—must take at least four times.

### CRITICAL STUDIES/EXPERIMENTAL PRACTICES

1. Music 201 (A, B or C)—must take at least two times.
2. Music 205—every quarter until graduation.
3. Music 206—required at least one time.
4. Music 207—required at least two times.
5. Music 208ABC—must take within the first year of the program.
6. Music 208D—required every quarter of the second year.

### PERFORMANCE

1. Music 201(A, B, or C) or 202—every quarter until graduation.
2. Music 206 or 207—a combination of at least two courses.
3. Music 232—every quarter until graduation.

### Master's Degree Completion Requirements

A folio of **three research papers** in professional format (normally to be written in connection with the courses the student will be taking)

must be accepted by the student's committee prior to approval of the thesis.

M.A. candidates will present a **thesis** consisting of the following under the supervision of the student's committee chair in Music 299:

1. Candidates emphasizing *Composition* will prepare a folio of three chamber compositions together with tape recordings of at least two of them.
2. Candidates emphasizing *Computer Music* will write a research paper (thesis) and present a lecture-performance in which the scientific, technological, and musical aspects of an original computer music composition are documented, played, and discussed.
3. Candidates emphasizing *Critical Studies/Experimental Practices* will write an extended research paper (thesis) on a topic chosen with their committee chair.
4. Candidates emphasizing *Performance* will present a lecture-recital lasting at least an hour. The program must be approved by the student's committee chair.

All of the above master's requirements must have final approval from the student's individual committee upon completion.

### Doctoral Degree Program

Students of superior musical competence may pursue a program with emphasis in *Composition* or *Critical Studies/Experimental Practices (CS/EP)* leading to the Ph.D. or doctor of musical arts (D.M.A.) degree in *Contemporary Music Performance*.

All doctoral students within the Department of Music must complete the Core Graduate Curriculum (outlined in the section above the Master's Degree Program) plus additional core requirements for the Ph.D. or D.M.A. program. These additional core requirements are:

1. Successful completion of an M.A. degree, including requirements equivalent to those described above for the M.A. in music. UCSD M.A. students who apply to the Ph.D./D.M.A. program must complete all departmental requirements, obtain OGSR approval, and file the M.A. degree at Geisel Library **before** enrolling in any Ph.D./D.M.A. level courses.
2. The Department of Music strongly recommends that entering students have acquired a reading ability in at least one of the standard reference foreign languages (French,

German, Italian, or Spanish) in addition to their native language.

3. All Ph.D./D.M.A. students are required to complete six units of credit in Music 500 unless the student has completed this requirement in UCSD's master's degree program.
4. After completing the qualifying examination, all students must remain in residence for at least three quarters, during which time they must enroll in twelve units of Music 299 with their committee chair or members every quarter.

### Course Requirements

In addition to the core graduate and Ph.D./D.M.A. curriculum, doctoral students (according to their area of emphasis) must complete the following courses prior to the qualifying examination:

#### COMPOSITION

1. Music 201 (A, B, or C)—must take at least two times.
2. Music 203ABC (Ph.D. level)—successful completion of the jury process is necessary to get a passing grade in the corresponding seminar. Continuing students from the UCSD Composition M.A. program may be excused from Music 203BC by successfully completing Music 203A at the Ph.D. level.
3. Music 203D—after successful completion of 203C, students must enroll in Music 203D (with their committee chair) every quarter in residence.
4. Music 204—every quarter in residence.
5. Music 206 or 207—a combination of three courses from Music 206/207.
6. Music 209—must be taken at least three times.
7. Music 298—must complete at least six units.

#### CRITICAL STUDIES/EXPERIMENTAL PRACTICES

1. Music 201 (A, B or C)—must take at least two times.
2. Music 205—every quarter in residence.
3. Music 206 or 207—a combination of three courses from Music 206/207. Ph.D. students in the CS/EP program emphasizing computer music may replace one 206/207 requirement

with three 263 seminars or two 206/207 requirements with four 263 courses.

4. Music 208ABC—must take within the first year of the program.
5. Music 208D—required every quarter of the second year.
6. Music 209—must be taken at least three times.
7. Music 263—these seminars may be substituted for the CS/EP Seminar by those Ph.D. students emphasizing computer music within the CS/EP Program.
8. Music 298—must complete at least six units.

#### PERFORMANCE

1. Music 201(A, B, or C) or 202—every quarter until completion of qualifying examination.
2. Music 206/207/209—as approved by D.M.A. adviser, students must take at least six seminars related to the primary and secondary area of specialization. Music 296 may be substituted for up to four seminars with permission of D.M.A. adviser.
3. Music 232—every quarter until completion of qualifying examination.
4. Music 250—must be taken at least three times.
5. Music 298—must complete at least six units.

#### Qualifying Examination/ Advancement to Candidacy

Requirements prior to taking the qualifying examination:

1. Completion of all Ph.D./D.M.A. required course work.
2. For Ph.D. students, one research paper judged to be of publishable quality must be completed prior to qualifying examinations. The subject of the publishable paper will be developed during the student's first two years and must be approved by the student's Ph.D. committee chair.
3. For *Composition* students, in addition to the publishable paper, a folio of not fewer than three compositions (not previously accepted for an M.A. degree) must be completed prior to qualifying examinations.
4. For D.M.A. students, in addition to the written and oral defense, students must provide

either: (a) an abstract of the thesis or research project which will be given to the Doctoral Committee at the qualifying examination; or (b) a presentation of a substantial portion of the works to be performed on the student's "major recitals" will be performed as part of the qualifying examination.

The qualifying examination will consist of the following:

A written and oral defense of three questions provided by the Doctoral Committee pertaining to appropriate areas of specialization.

#### Ph.D./D.M.A. Degree Completion Requirements

1. For *Composition* students, completion of a major composition project.
2. For *CS/EP* students, completion of an acceptable dissertation.
3. For *D.M.A.* students, two major recitals plus one of the following: (a) thesis or research project; or (b) a concert that is innovative in design and/or content, and which is supported by a document containing extensive stylistic or analytical discussion of the program; or (c) a lecture/concert pertaining to innovative and/or original material, with appropriate documentation as determined by the committee.
4. A final public defense of the composition/dissertation/recitals.

Materials previously submitted for other degrees are not acceptable for submission for the Ph.D./D.M.A. degree.

#### Time Limit Policy for the Doctoral Degree

##### NORMATIVE TIME LIMITS

- 4 years: Students entering the Ph.D./D.M.A. program with a master's degree from another institution.
- 6 years: Students continuing into the Ph.D./D.M.A. program with a master's degree from UCSD. Time limit is calculated from the beginning of the M.A. program (i.e., 2 years for M.A. program plus 4 years normative time for Ph.D./D.M.A.).

Educational fee grants are provided to students within normative time after advancement to Ph.D./D.M.A. candidacy and until accrued time in graduate status exceeds the normative time.

**SUPPORT TIME LIMITS**

6 years: Students entering the Ph.D./D.M.A. program with a master's degree from another institution.

7 years: Students continuing into the Ph.D./D.M.A. program with a master's degree from UCSD. Time limit is calculated from the beginning of the M.A. program

**TOTAL REGISTERED TIME LIMITS**

6 years: Students entering the Ph.D./D.M.A. program with a master's degree from another institution.

8 years: Students continuing into the Ph.D./D.M.A. program with a master's degree from UCSD. Time limit is calculated from the beginning of the M.A. program

Students who have not completed all Ph.D. requirements within the maximum total registered time will no longer be permitted to register for classes.

**Advising Office**

Graduate Staff Adviser  
Lori Bantz, Room 109  
Mandeville Center, (619) 534-3279  
lbantz@ucsd.edu

**COURSES**

NOTE: The following course offerings outline the general scope of our program. Not all courses are offered every year. It is essential that students work closely with departmental advisers when planning their degree programs.

**LOWER-DIVISION**

**1A-B-C. Musical Literacy (4-4-4)**

Primarily intended for students whose major is other than music, this course develops musical abilities through a conceptual understanding of the structure of music together with listening exercises and techniques. Topics include musical nota-

tion, melodic transcription, scales, chords, intervals, keys, rhythm, meter, and rudiments of musical form. *Prerequisite: none.*

**2A-B-C. Basic Musicianship (4-4-4)**

Primarily intended for music majors. Development of basic skills: perception and notation of pitch and temporal relationships. Introduction to functional harmony. Studies in melodic writing. Drills in sight singing, rhythmic reading, and dictation. *Prerequisites: passing score on placement exam. Must be taken in sequence. Music majors must be concurrently enrolled in Music 2AK, 2BK, and 2CK (Basic Keyboard).*

**2AK-BK-CK. Basic Keyboard (2-2-2)**

Scales, chords, harmonic progressions, transposition, and simple pieces. *Prerequisites: concurrent enrollment in Music 2A, B, C.*

**4. Introduction to Western Music (4)**

A brief survey of the history of Western Music from the Middle Ages to the present. Much attention will be paid to the direct experience of listening to music and attendance of concerts. Class consists of lectures, listening labs, and live performances. *Prerequisite: none.*

**5. Introduction to Music Making (4)**

A one-quarter course designed to discover musical potential and expand musical experience. No knowledge of music, notation, or instrumental skill is necessary. Small lab sessions present music through composing, improvising, and performing. Results take the form of works for tape, theatre, voices, or instruments. *Prerequisite: none.*

**6. History of Electronic Music (4)**

This course will feature lectures and listening sessions devoted to the most significant works of music realized through the use of computers and other electronic devices from the middle of this century through the present. *Prerequisite: none.*

**7. Music, Science, and Computers (4)**

An exploration of the interactions among music, science, and technology, including the development and history of science and technology from the perspective of music, and the modern resynthesis of these disciplines occurring around computers. *Prerequisite: none.*

**8. American Music (4)**

A course designed to study the development of music in America. The focus will be on both the vernacular traditions including hymn singing, country music, jazz, big band, rock, etc., as well as the cultivated traditions of various composers from William Billings to John Cage. *Prerequisite: none.* (Offered in selected years.)

**9. Symphony (4)**

The symphonic masterworks course will consist of lectures and listening sessions devoted to a detailed discussion of a small number of recognized masterworks (e.g., Mozart, Beethoven, Berlioz, Stravinsky, Ligeti, etc.). *Prerequisite: none.* (Offered in selected years.)

**10. Chamber Music (4)**

Chamber Music will consist of lectures and listening sessions devoted to a detailed discussion of recognized chamber masterworks (e.g., Haydn, Mozart, Beethoven, Bartok, etc.). *Prerequisite: none.* (Offered in selected years.)

**11. Folk Music (4)**

A course on folk musics of the world, covered through lectures, films, and listening sessions devoted to detailed discussion of music indigenous to varying countries/areas of the world. Topics vary from year to year. May be repeated once for credit. *Prerequisite: none.*

**12. Opera (4)**

A study of opera masterworks that often coincide with operas presented in the San Diego Opera season. Class consists of lectures, listening labs, live performances, and opera on video. *Prerequisite: none.*

**13AF. World Music/Africa (4)**

A course that focuses on the particular music of Africa and on African ways of music-making in the Diaspora to the Caribbean, North and South America. No prior technical knowledge of music is necessary. *Prerequisite: none.*

**13AM. World Music/Ethnic Americans (4)**

A study of music cultures in the United States, particularly Native American, Hispanic American, Anglo and European American, from the perspective of ethnicity, origin, interaction, and the contribution of various ethnic groups to American musical life. No prior technical knowledge of music is necessary. *Prerequisite: none.*

**13AS. World Music/Asia (4)**

Exposure to selected musical traditions of Asia and Oceania with links to local and visiting musicians from these cultures. No prior technical knowledge of music is necessary. *Prerequisite: none.*

**14. Contemporary Music (4)**

This course offers opportunities to prepare oneself for experiences with new music (through preview lectures), hear performances (by visiting or faculty artists), to discuss each event informally with a faculty panel: an effort to foster informed listening to the new in music. *Prerequisite: none.*

**15. Popular Music (4)**

A course on popular music from different time periods, covered through lectures, films, and listening sessions. Topics vary from year to year. May be repeated once for credit. *Prerequisite: none.*

**32. Instrumental/Vocal Instruction (2)**

Individual instruction in instrumental or vocal technique and repertory. Intermediate level. For declared music majors: students must be enrolled in courses in the music major curriculum. Students must audition for performance faculty on first Monday of fall quarter. *Prerequisites: department stamp required. Enrollment by consent of instructor after audition.* May be taken for credit six times.

**32G. Group Instrumental Instruction (2)**

Group instruction in instrumental or vocal technique and repertory. Intermediate level. Intended for students who make an important contribution to Department of Music ensembles. *Prerequisites: Written recommendation of ensemble director and audition for performance faculty on first day of classes required. Department stamp required.* May be taken for credit six times. (Offered in selected years)

**95. Ensemble Performance (2)**

Performance in an ensemble appropriate to student abilities and interests. Normally each section requires student participation for the whole academic year, with credit for participation each quarter. Music majors should enroll in at least one section each quarter. Sections of Music 95W have included: African drumming, Korean percussion, Indian sitar and tabla, koto, and Indonesian flute. Not all sections will be offered every year. May be repeated for credit. Grading on participation level, individual testing, comparative papers on repertoire covered, etc. *Prerequisites: audition and consent of instructor for each section.*

**Note:** Students in the Music 95 series courses may enroll with a letter grade option a total of twelve units for registered music majors and a total of six units for all other students; after which students may continue to enroll in Music 95 courses, but only

with a P/NP grade option. There is one exception to the above grading policy. Music 95G, Gospel Choir, can only be taken for a P/NP grading option.

Section A. Symphony Orchestra

Section B. Instrument Choir

Section C. Concert Choir

Section D. Symphonic Chorus

Section F. Collegium Musicum (Not offered every year.)

Section G. Gospel Choir

Section H. Chamber Opera (Not offered every year.)

Section I. Music Theater (Not offered every year.)

Section J. Jazz Ensemble

Section K. Chamber Singers

Section L. Wind Ensemble

Section W. World Music Ensembles

## UPPER-DIVISION

### 101A-B-C. Music Theory and Practice I (4-4-4)

Study of the materials and structures of music through hearing, analysis, writing, and performance. Writing in two voices (101A) and four voices (101B-C). Continues sight singing, dictation, and keyboard. *Prerequisites:* Music 2C and 2CK, and passing grade on proficiency exam.

### 102A-B-C. Music Theory and Practice II (4-4-4)

Advanced study of the materials and structures of music. Chromatic harmony and twentieth-century techniques. Aural discrimination, analysis, exercises, and short compositions. Continues sight singing, dictation, and keyboard. *Prerequisites:* Music 101A-B-C. Department stamp required.

### 103A-B-C. Seminar in Composition (4-4-4)

Individual projects in composition critically reviewed in seminar with fellow student and faculty composers. *Prerequisites:* Music 2A-B-C.

### 103D-E-F. Honors Seminar in Composition (4-4-4)

Advanced individual projects for senior music majors pursuing honors in composition. Projects will be critically reviewed in seminar with fellow students and faculty composers. *Prerequisites:* Music 103A-B-C and admission into the Department of Music Honors Program in composition. Department stamp required.

### 107. Critical Studies Seminar (4)

Explore music in relation to various traditions of critical thought and their methodologies, such as in literature, cultural studies, sociology, and philosophy. Readings and scores to be determined by the professor. *Prerequisite:* upper-division standing or consent of instructor.

### 110. Doing Ethnomusicology (4)

A how-to course in the practice and theory of studying the music of contemporary cultures. Students will record, document, analyze, and present music from their local environment. Designed for students in music, ethnic studies, anthropology, and the social sciences. *Prerequisite:* none. (Offered in selected years.)

### 111. World Music Traditions (4)

A study of particular regional musics in their repertory, cultural context, and interaction with other traditions. Topics vary. *Prerequisite:* upper-division standing or consent of instructor.

### 112. European Music Before 1600 (4)

This course will focus on music of the Middle Ages and Renaissance; topics will vary from year to year. May be repeated

five times for credit. *Prerequisites:* knowledge of music notation or consent of instructor; Music 4, 8-10 or 120 recommended.

### 113. Music of the Baroque, Classic, and Romantic Periods (4)

This course will treat topics in Western music history between 1600 and 1900; topics will vary from year to year. May be repeated five times for credit. *Prerequisites:* knowledge of music notation or consent of instructor; Music 4, 8-10 or 120 recommended.

### 114. Music of the Twentieth Century (4)

An exploration of materials and methods used in the music of our time. There will be an extra discussion group for music majors. May be repeated once for credit. *Prerequisites:* consent of instructor; Music 5 recommended.

### 115. Women in Music (4)

An historical survey of women musicians from the Middle Ages to today. The course will deal with an historical view of women's place as creative and representative artists, the societal and political influences that governed their existence and their music. *Prerequisite:* consent of instructor. (Offered in selected years.)

### 120A-B-C. Survey of Music History and Literature (4-4-4)

Intensive historical, analytical, and cultural-esthetic examination of music from Gregorian chant through the twentieth century. *Prerequisites:* knowledge of music notation; Music 1C or 2C strongly recommended.

### 121. Experimental Writing (4)

This workshop explores writing for which the traditional generic distinctions of pre/poetry, fiction/documentary, narrative/discourse do not apply. How music, prose, and poetry relate. Students taking this course will be asked to challenge the boundaries of these relations to discover new forms and modes of expression. *Prerequisite:* consent of instructor.

### 126. Introduction to Oral Music (4)

An introductory course in the study of oral music in Western and non-Western cultures, with particular emphasis on the impact of oral transmission of ideas and customs, and the nature of improvisation in various indigenous cultures. Music to be studied includes Afro-American, African, Asian, and Oceanian. Presentations by distinguished visiting artists demonstrating aspects of their native musical crafts. *Prerequisite:* consent of instructor.

### 127A-B. Music of African Americans (4-4)

The first quarter of this course will investigate the vocal music of African American culture, primarily the development of the spiritual and the blues traditions, while the second quarter will critically study the history of jazz in America. *Prerequisite:* consent of instructor.

### 128. Principles and Practice of Conducting (4)

The theory and practice of instrumental and/or choral conducting as they have to do with basic baton techniques, score reading, interpretation, orchestration, program building, and functional analysis. Members of the class will be expected to demonstrate their knowledge in the conducting of a small ensemble performing literature from the eighteenth, nineteenth, and twentieth centuries. *Prerequisites:* Music 2A-B-C and 101A-B-C. Department stamp required.

### 129. Orchestration (4)

This course will give practical experience in orchestration. Students will study works from various eras of instrumental music and will demonstrate their knowledge by orchestrating works in the styles of these various eras, learning the capabilities, timbre, and articulation of all the instruments in the orchestra. *Prerequisite:* Music 101B.

### 130. Chamber Music Performance (2-4/0)

Instruction in the preparation of small group performances of representative instrumental and vocal chamber music literature. May be taken for credit six times, after which students must enroll for zero units. *Prerequisite:* consent of instructor through audition.

### 131. Jazz Improvisation (4/0)

An extensive study of jazz improvisation, including performance techniques, concepts, and styles. Students' theoretical knowledge will be applied to their instruments, and a repertory of melodic and harmonic devices will be mastered. Also covered will be jazz soloing, demands of melodic/harmonic innovations, and modes of chord changes or progressions. May be taken for credit six times, after which students must enroll for zero units. *Prerequisites:* basic knowledge of major-minor scales and major, minor, and dominant seventh chords on respective instruments. Basic functional keyboard techniques.

### 132. Pro-Seminar in Music Performance (4)

Individual or master class instruction in advanced instrumental/vocal performance. May be repeated for credit, but only twenty-four units will be counted within the 180-unit requirement for graduation. *Prerequisite:* consent of instructor through audition. Preference given to music majors and some approved music minors.

### 132R. Recital Preparation (4)

Advanced instrumental/vocal preparation for senior music majors pursuing honors in performance. Repertoire for a solo recital will be developed under the direction of the appropriate instrumental/vocal faculty member. Special audition required during Welcome Week preceding fall quarter. *Prerequisites:* by audition only; Music 132. Department stamp required.

### 133. Projects in New Music Performance (2)

Performance of new music of the twentieth century. Normally offered winter quarter only. Required a minimum of two times for all music majors and music humanities majors. May be taken four times for credit. *Prerequisite:* consent of instructor through audition. (Winter quarter only.)

### 143. Department Seminar (1)

The department seminar serves both as a general department meeting and as a forum for the presentation of research and performances by visitors, faculty, and students. Required of all undergraduate music majors every quarter.

### 150. Senior Seminar (4)

Independent research with faculty guidance to afford the opportunity to pursue a creative project or substantial paper in a seminar context. *Prerequisites:* Music 120B and declared music major or music humanities major.

### 160A. Musical Acoustics (4)

An introduction to the acoustics of music with particular emphasis on contemporary digital techniques for understanding and manipulating sound. *Prerequisite:* Music 4. Cross-listed with ICAM 103.

### 160B. Musical Psychoacoustics (4)

Survey of psychoacoustical phenomena, theories of hearing, and their relation to musical perception and cognition. Techniques of psychoacoustical experimentation. *Prerequisite:* consent of instructor. Music 160A recommended. Department stamp required.

### 160C. Electronics in Music (4)

Seminars in theoretical and applied research in the generation and processing of electronic sound for composition and performance. *Prerequisites:* Music 160A and consent of instructor. Department stamp required.

**161. Programming for Musical Applications (4)**  
A first hands-on course in computer programming designed around the application of computers to the processing of musical sound and structures. *Prerequisites: Music 160A-B-C and consent of instructor. Department stamp required.*

**162. Introduction to Computer Music (4)**  
Hands-on introduction to building instruments and creating music with computers. *Prerequisites: Music 161 and consent of instructor. Department stamp required.*

**163. Music Technology Seminar (4)**  
Selected topics in music technology and its application to composition and/or performance. Offerings vary according to faculty availability and interest. May be repeated for credit. *Prerequisites: Music 162 and consent of instructor. Department stamp required.*

**164. Recording/MIDI Studio Lab (2)**  
This course surveys hardware and software resources in an advanced recording and MIDI studio. It is a required course for anyone who wishes to use the B108 Studio. Topics include: electronic and computer music, digital audio, and composition, performance and studio techniques. These topics will vary from quarter to quarter. *Prerequisites: Music 160ABC or consent of instructor. May be repeated for credit.*

**195. Instructional Assistance (2)**  
Assisting in the instruction of an undergraduate music class under the direct and constant supervision of a faculty member. May be taken for credit three times. *Prerequisites: consent of instructor and departmental approval.*

**198. Directed Group Study (1-4)**  
Concentrated inquiry into various problems not covered in the usual undergraduate courses. *Prerequisites: consent of instructor and department chair approval. Pass/No Pass grade only.*

**199. Independent Study (1-4)**  
Independent reading, research, or creative work under the direction of a faculty member, provided no course covering the material to be studied already exists, and the study area derives from previous course work. *Prerequisites: consent of instructor and department chair approval. Department stamp required. Pass/No Pass grade only. May be taken for credit two times.*

## GRADUATE

All courses numbered 200 and above are intended for students admitted to the graduate program in music.

**201A-B-C. Projects in New Music Performance (1-4, 1-4, 1-4)**  
Performance of new music of the twentieth century. All performance emphasis graduate students must take every quarter. (Please note that Lab. 1 is intended for students participating in the Twentieth-Century Ensemble.) Non-performance students must take 201B or C twice.

**202. Advanced Projects in Performance (1-4)**  
Advanced performance of new music with members of the performance faculty (SONOR). Students taking this course do not need to take Music 201 that quarter. Enrollment by consent of instructor/director of SONOR.

**203A-B-C. Advanced Projects in Composition (4-4-4)**  
Seminar consisting of meetings and laboratory sessions devoted to the study of composition.

**203D. Advanced Projects in Composition (1-4)**  
Meetings on group basis with faculty composer in sessions devoted to the study of composition. *Prerequisites: 203A-B-C and consent of instructor.*

**204. Focus on Composition (2)**  
The purpose of this seminar is to bring together the entire population of the graduate composition program (all students and faculty) for in-depth discussion of critical issues in music theory and composition. Each meeting will feature a formal presentation by either a student, faculty member, or visitor, followed by lively and challenging debate on relevant issues. *Prerequisite: consent of instructor.*

**205. Focus on Critical Studies/Experimental Issues in Music (2)**  
The purpose of this seminar is to bring together CS/EP students and faculty for in-depth discussion(s) of theoretical, critical, and cultural issues in traditional, experimental, and world music. *Prerequisite: consent of instructor.*

**206. Experimental Studies Seminar (4)**  
Seminars growing out of current faculty interests. The approach tends to be speculative and includes individual projects or papers as well as assigned readings. In the past, such areas as new instrumental and vocal resources, mixed media, and compositional linguistics have been offered.

**207. Theoretical Studies Seminar (4)**  
Seminars on subject areas relating to the established dimensions of music and in which theoreticians have produced a substantial body of work. These include studies in analysis, timbre, rhythm, notation, and psychoacoustics. Offerings vary depending on faculty availability and interest. Analytical paper required.

**208A. Critical Methods and Creative Identities (4)**  
The goal of this course is to develop critical thinking and self-reflexive inquiry through study of a diverse range of critical and scholarly traditions as they relate to music. Students are encouraged to investigate their own sense of identity and voice, as embodied in their creative work. *Prerequisite: consent of instructor.*

**208B. Experimental Musical Practices (4)**  
This course examines, from social, cultural, historical and technological perspectives the current state of experimental musical practice. Meetings and laboratory sessions will explore alternative systems of musical organization, such as improvisation, computer-based multimedia, and interdisciplinary performance collaboration. *Prerequisite: consent of instructor.*

**208C. World Musical Perception (4)**  
This seminar attempts to develop alternative procedures for the analysis of intercultural musicality. Methods and practices to be explored will involve computer technology, musical cognition and perception, and world music practices, as these relate to the elucidation and interrogation of notions of self and other, and tradition and innovation. *Prerequisite: consent of instructor.*

**208D. Advanced Projects in CS/EP (4)**  
On a group basis, this course provides an opportunity for students to create individual projects under the guidance of different faculty members each term. Enrollment in this course over three terms would culminate in the development by the student of a portfolio of original work, or in a master's thesis. *Prerequisite: consent of instructor.*

**209. Advanced Music Theory and Practice (4)**  
Advanced integrated studies in music theory; composition and styles study through analysis and performance. This course is intended primarily for doctoral students and may be taken by M.A. students only with special approval of M.A. adviser and course instructor. A major research or analytical publishable paper required.

**210. Musical Analysis (4)**  
The analysis of complex music. The course will assume that the student has a background in traditional music analysis. The goal of the course is to investigate and develop analytical procedures that yield significant information about specific works of music, old and new. Reading, projects, and analytical papers. Normally offered fall quarter only.

**211. Seminar in World Music Traditions (4)**  
Study of the theory, repertory, and cultural features of particular tradition musics. Related to lectures of Music 111. Designed for graduate students in music as a forum for independent projects in research, analysis, performance, composition, and experimental derivatives related to the topic. Open to qualified graduate students in related fields.

**212. Seminar in Vocal and Choral Literature (4)**  
A critical and historical study of selected works and repertory. (Offered in selected years.)

**214. Seminar in Twentieth-Century Music (4)**  
Detailed study of selected literature through the study of scores and writings, supplemented when possible by performance participation. (Offered in selected years.)

**215. Seminar on Women in Music (4)**  
Seminar dealing with a historical survey of women musicians from the Middle Ages to the present. A view of women's place as creative and representative artists, societal, and political influences that governed their existence and their music, and their impact upon their society and ours will be dealt with in-depth. *Prerequisite: consent of instructor.* (Offered in selected years.)

**216. Medieval Music (4)**  
Readings, studies, and performance problems of medieval music from antiquity to the beginning of the Renaissance. Problems of tuning, language, source materials, and media esthetics are incorporated. (Offered in selected years.)

**217. Seminar Studies in Late Renaissance and Early Baroque Music (4)**  
The study of early music as it has to do with theoretical systems, critical analyses, music and documentary source materials. (Offered in selected years.)

**218. Seminar in Music of the Classic Era (4)**  
A critical, analytical study of selected literature of the eighteenth century through the study of scores and writings, supplemented when possible by performance participation. (Offered in selected years.)

**222. Music Drama (4)**  
In-depth analysis of the music and lyrics of important figures from the history of music theatre. Topics will vary each quarter but may include aspects of interpretation, production, direction, and design, and will be integrated with musical analysis. (Offered in selected years.)

**224. Seminar Studies in Chamber Literature (4)**  
A critical and historical study of selected works and repertory. (Offered in selected years.)

**228. Conducting (4)**  
This course will give practical experience in conducting a variety of works from various eras of instrumental and/or vocal music. Students will study problems of instrumental or vocal techniques, formal and expressive analysis of the music, and manners of rehearsal. Required of all graduate students. *Prerequisite: consent of instructor.* (Offered in selected years.)

**229. Seminar in Orchestration (4)**  
A seminar to give practical experience in orchestration. Students will study works from various eras of instrumental music and will demonstrate their knowledge by orchestrating works



in the styles of these various eras, learning the capabilities, timbre, and articulation of all the instruments in the orchestra. *Prerequisite: graduate standing.* (Offered in selected years.)

### 230. Chamber Music Performance (4)

Performance of representative chamber music literature, instrumental and/or vocal, through coached rehearsal and seminar studies. Course may be repeated for credit since the literature studied varies from quarter to quarter. *Prerequisite: consent of instructor.*

### 232. Pro-Seminar in Music Performance (4)

Individual or master class instruction in advanced instrumental/vocal performance. *Prerequisite: consent of instructor through audition.*

### 250. Special Projects (1-12)

An umbrella course offered to music graduate students in lieu of normal seminar offerings. Topics will be generated by faculty and graduate students and submitted in December each year for review by faculty. Students may register for up to four units of a specialized research topic with given faculty. May be taken for up to twelve units a quarter.

### 263. Advanced Music Technology Seminar (4-4-4)

Advanced topics in music technology and its application to composition and/or performance. Offerings vary according to faculty availability and interest. May be repeated for credit. *Prerequisites: Music 162 or equivalent and consent of instructor.*

### 291. Problems and Methods of Music Research and Performance (2)

The course will give practical experience in historical research, including use of important source materials, evaluation of editions, and examination of performance practice problems. (S/U grade option only.)

### 296. Directed Group Research in Performance (4)

This group research seminar involves the investigation and exploration of new and experimental performance concerns. Areas could include: improvisation, graphic notation, performance electronics, and working with combined media (such as dance, poetry, and theater). (S/U grade option only)

### 298. Directed Research (1-4)

Individual research. (S/U grades permitted.) May be repeated for credit. Enrollment by consent of instructor only.

### 299. Advanced Research Projects and Independent Study (1-12)

Individual research projects relevant to the student's selected area of graduate interest conducted in continuing relationship with a faculty adviser in preparation of the master's thesis or doctoral dissertation. (S/U grades permitted.)

### 500. Apprentice Teaching (1-4)

Participation in the undergraduate teaching program is required of all graduate students at the equivalent of 25 percent time for three quarters (six units is required for all graduate students).

## Neurosciences

OFFICE: Building #1, School of Medicine,  
Mail code 0662

### Professors

Thomas Albright, Ph.D., *Adjunct/Neurosciences*  
Ursula Bellugi, Ed.D., *Adjunct/Psychology*  
Darwin K. Berg, Ph.D., *Chair, Biology*  
Reginald G. Bickford, M.D., *Emeritus/Neurosciences*  
Floyd E. Bloom, M.D., *Adjunct/Neurosciences*  
Karen Britton, M.D./Ph.D., *In-Residence/Psychiatry*  
Laurence L. Brunton, Ph.D., *Pharmacology*  
Theodore H. Bullock, Ph.D., *Emeritus/Neurosciences*  
Don Cleveland, Ph.D., *Medicine/Neurosciences*  
Eric Courchesne, Ph.D., *Neurosciences*  
J. Anthony Deutsch, Ph.D., *Emeritus/Psychology*  
Mark H. Ellisman, Ph.D., *Neurosciences*  
Edmund J. Fantino, Ph.D., *Psychology*  
Fred H. Gage, Ph.D., *Adjunct/Neurosciences*  
Robert Galambos, M.D./Ph.D., *Emeritus/Neurosciences*  
Mark A. Geyer, Ph.D., *In-Residence/Psychiatry/Adjunct/Neurosciences*  
J. Christian Gillin, M.D., *Psychiatry*  
Lawrence S.B. Goldstein, Ph.D., *Pharmacology*  
Philip M. Groves, Ph.D., *Psychiatry/Neuroscience*  
Richard H. Haas, M.D., *Neurosciences/Pediatrics*  
Richard L. Hauger, M.D., *Psychiatry*  
Joan Heller-Brown, Ph.D., *Pharmacology*  
Stephen F. Heinemann, Ph.D., *Adjunct/Neurosciences*  
Steven A. Hillyard, Ph.D., *Neurosciences*  
Paul A. Insel, M.D., *Pharmacology/Medicine*  
Vicente J. Iragui-Madoz, M.D., Ph.D., *Clinical Neurosciences*  
Dilip J. Jeste, M.D., *Psychiatry/In-Residence/Neurosciences*  
Harvey J. Karten, M.D., *Neurosciences/Psychiatry*  
Robert Katzman, M.D., *Emeritus/Neurosciences*  
Christopher Kintner, Ph.D., *Adjunct/Neurosciences*  
George F. Koob, Ph.D., *Adjunct/Psychology*  
Daniel F. Kripke, M.D., *In-Residence/Psychiatry*  
William B. Kristan, Ph.D., *Biology/Adjunct/Neurosciences*

Ronald Kuczenski, Ph.D., *In-Residence/Psychiatry/Adjunct/Neurosciences*  
Marta Kutas, Ph.D., *Cognitive Science/Adjunct/Neurosciences*  
Robert B. Livingston, M.D., *Emeritus/Neurosciences*  
Eliezer Masliah, M.D., *Neurosciences/Pathology*  
Pamela Mellon, Ph.D., *Neurosciences*  
Arnold L. Miller, Ph.D., *Neurosciences*  
Maurice S. Montal, M.D./Ph.D., *Biology/Adjunct/Psychiatry*  
R. Glenn Northcutt, Ph.D., *Neurosciences*  
John S. O'Brien, M.D., *Neurosciences*  
Daniel T. O'Connor, M.D., *In-Residence/Medicine*  
Dennis O'Leary, Ph.D., *Adjunct/Neurosciences*  
Mu-ming Poo, Ph.D., *Biology*  
James W. Posakony, Ph.D., *Biology*  
Henry C. Powell, M.D., *In-Residence/Psychiatry*  
Morton Printz, Ph.D., *Pharmacology*  
Vilayanur S. Ramachandran, M.D., *Psychology*  
Michael G. Rosenfeld, M.D., *Medicine*  
Allen F. Ryan, Ph.D., *Surgery/Adjunct Neurosciences*  
David S. Segal, Ph.D., *Psychiatry*  
Terrence J. Sejnowski, Ph.D., *Biology/Adjunct/Neurosciences*  
Nicholas C. Spitzer, Ph.D., *Biology*  
Larry R. Squire, Ph.D., *Psychiatry/In-Residence/Neurosciences*  
Charles Stevens, M.D./Ph.D., *Adjunct/Pharmacology*  
David A. Swinney, Ph.D., *Chair, Psychology*  
Palmer W. Taylor, Ph.D., *Chair, Pharmacology*  
Robert D. Terry, M.D., *Emeritus/Neurosciences/Pathology*  
Leon J. Thal, M.D., *Neurosciences, Chair, Department of Neurosciences*  
Doris A. Trauner, M.D., *Neurosciences/Pediatrics*  
Roger Tsien, Ph.D., *Pharmacology/Chemistry*  
Hoi-Sang U., M.D., *Surgery*  
Wylie Vale, Ph.D., *Adjunct/Medicine*  
Ajit Varki, M.D., *Medicine*  
W.C. Wiederholt, M.D., *Neurosciences*  
Tony Yaksh, Ph.D., *Anesthesiology*  
Samuel S.C. Yen, M.D., *Reproductive Medicine*  
Justin Zivin, M.D./Ph.D., *Neurosciences*  
Stuart Zola, Ph.D., *In-Residence/Psychiatry, Group Chair/Director of Psychiatric Neurosciences*  
Charles Zuker, Ph.D., *Biology*

**Associate Professors**

- Jody Corey-Bloom, M.D./Ph.D., *Clinical Neurosciences*  
 Dale E. Bredesen, M.D., *Adjunct/Neurosciences*  
 Douglas R. Galasko, M.D., *In-Residence/Neurosciences*  
 Donna Gruol, Ph.D., *Adjunct/Neurosciences*  
 Vivian Hook, Ph.D., *Adjunct/Medicine*  
 Michael W. Kalichman, Ph.D., *Adjunct/Pathology*  
 John Kelsoe, M.D., *Psychiatry*  
 David Kleinfeld, Ph.D., *Physics*  
 Edward Koo, M.D., *Neurosciences*  
 Leah Levi, M.D., *Clinical Neurosciences/Ophthalmology*  
 John Liu, Ph.D., *In-Residences/Ophthalmology*  
 Patrick D. Lyden, M.D., *In-Residence/Neurosciences/Chief of Neurology, UCSD Medical Center*  
 Robert R. Myers, Ph.D., *Anesthesiology*  
 Jaime Pineda, Ph.D., *Cognitive Sciences*  
 Barbara Ranscht, Ph.D., *Adjunct/Neurosciences*  
 David H. Rapaport, Ph.D., *Anatomy/Surgery*  
 Martin I. Sereno, Ph.D., *Cognitive Sciences*  
 Clifford Shults, M.D., *Neurosciences*  
 Linda Sorokin, Ph.D., *In-Residence/Anesthesiology*  
 Neal Swerdlow, M.D./Ph.D., *In-Residence/Psychiatry*  
 Evelyn Tecoma, M.D./Ph.D., *Clinical Neurosciences*  
 John Thomas, Ph.D., *Adjunct/Neurosciences*  
 Ronald G. Thomas, Ph.D., *Adjunct/Family and Preventive Medicine/Neurosciences*  
 Mark Tuszyński, M.D./Ph.D., *Neurosciences*  
 Matthew Weinger, M.D., *Anesthesiology*  
 Friedbert Weiss, Ph.D., *Neuropharmacology*  
 Mark C. Whitehead, Ph.D., *Surgery*  
 David Williams, Ph.D., *Adjunct/Pharmacology/Neurosciences*

**Assistant Professors**

- Edward M. Callaway, Ph.D., *Neurosciences*  
 Jerold J.M. Chun, M.D./Ph.D., *Pharmacology*  
 Karen R. Dobkins, Ph.D., *Psychology*  
 Sascha du Lac, Ph.D., *Neurobiology*  
 Yukiko Goda, Ph.D., *Biology*  
 Lisa Gold, Ph.D., *Adjunct/Neurosciences*  
 Christy Jackson, M.D., *Clinical Neurosciences*  
 Kuo-Fen Lee, Ph.D., *Neurosciences*  
 Greg Lemke, Ph.D., *Adjunct/Neurosciences*  
 Greg Maquire, Ph.D., *Ophthalmology*  
 Paul Martin, Ph.D., *Neurosciences*

- Mark Mayford, Ph.D., *Neurosciences*  
 Sharon L. Nichols, Ph.D., *Adjunct/Pediatric Neurology*  
 John Olichney, M.D., *Adjunct/Neurosciences*  
 William R. Schafer, Ph.D., *Biology*  
 Gery Schulteis, Ph.D., *Anesthesiology*  
 Eric Turner, M.D./Ph.D., *In-Residence/Psychiatry*

**The Graduate Program**

The group in neurosciences accepts candidates for the Ph.D. degree who have undergraduate majors in such disciplines as biology, chemistry, engineering, microbiology, mathematics, physics, psychology, and zoology. A desire and competence to understand how the nervous system functions is more important than previous background and training.

**Doctoral Degree Program**

Students in this program receive guidance and instruction from a campuswide group of faculty interested in nervous system mechanisms. Each student, in consultation with an advisory committee, selects courses relevant to his or her research interests and goals. The selection will include formal courses listed in this catalog and informal seminars offered by the department. A regular schedule of rotation through the laboratories of faculty members is a feature of the first year; the student is exposed in this way to the various approaches, techniques, and disciplines represented on the campus.

**Course Work**

By the time of the minor proposition (see below), students are expected to demonstrate competence in the basics of neuroscience by taking five quarters of mandatory course work—three quarters of Basic Neuroscience (Neurosci. 200 A, B, C), and one quarter each of Neuroanatomy Lab (Neurosci. 257) and Statistical Methods and Experimental Design (Neurosci. 225). In addition, students choose among three of six remaining courses: Molecular and Cellular Neuroendocrinology (Neurosci. 222), Molecular and Cellular Neurochemistry (Neurosci. 234), Neuropsychopharmacology (Neurosci. 277), Molecular and Cellular Neurobiology (Neurosci. 268), Behavioral Neuro-

science (Neurosci. 264), and Developmental Neuroscience (Neurosci. 263). Students are also permitted to substitute previous courses that are similar to the Neurosciences core courses. Such a substitution would require approval of the graduate advisor in consultation with the Core Curriculum Committee and course instructor(s).

**Minor Proposition**

The purpose of this examination is to test the student's ability to choose a problem in the neurosciences and propose an experimental approach to its solution. The problem should be broad, requiring experimental approaches from more than one discipline. The problem should be outside the area of the student's anticipated dissertation research. Students will be required to demonstrate a working knowledge of the disciplines involved in the minor proposition.

Oral defense of the minor proposition will be required at the end of the spring quarter of the second year of study. Exemptions may be granted to entering students already holding a master's degree.

**Dissertation**

During the second year, students are expected to propose and initiate work on a dissertation problem under the guidance of a faculty preceptor. The neurosciences group at UCSD currently conducts animal research and clinical studies in the fields of neuroanatomy, neurochemistry, neuropharmacology, neurophysiology, comparative neurology, physiology of excitable membranes, synaptic transmission, neuronal integration and coding, nervous system tissue culture, neuroimmunology, brain function, sensory physiology, motor mechanism, and systems analysis as applied to neurological problems.

**Qualifying Examination**

This examination, a university requirement, focuses on the proposed research that the student will undertake for his or her dissertation. This examination is conducted by the approved doctoral committee.

**Dissertation Examination**

The required formalities listed in the *Instruction for Preparation and Submission of Doctoral*

Dissertations issued by the Office of Graduate Studies and Research to students should be followed closely. The final examination includes both a public presentation followed by a closed defense of the dissertation with members of the Committee.

## Teaching

Students are required to teach and to develop their talents as teachers. To this end, opportunities to lecture and to assist in laboratory exercises and demonstrations are provided.

## Ph.D. Time Limit Policies

Students must advance to candidacy by the end of four years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

## COURSES

### UNDERGRADUATE

#### 199. Independent Research (2 or 4)

Laboratory research under the supervision of individual members of the faculty of the neurosciences department in one or a combination of neurosciences disciplines, e.g., neuroanatomy, neurophysiology, neurochemistry, neuropharmacology. (P/NP grades only.) *Prerequisite:* consent of department chair. (F,W,S)

### GRADUATE

#### 200A-B-C. Basic Neuroscience (4-4-4)

These courses are designed for graduate students in the neurosciences and other departments that are part of the interdisciplinary program (i.e. Biology, Cog. Sci.). These courses have been designed to cover as much basic neuroscience as possible in *three quarters of study*. It will combine two three-hour meetings each week with a 1.5 hour lecture and a 1.5 hour discussion of papers. These will be required courses for all first-year neurosciences graduate students. Biology will cross-list courses under Biology headings, making it a requirement of first year Biology graduate students. *Prerequisite:* graduate student or consent of instructor. (F,W,S)

#### 222. Molecular and Cellular Neuroendocrinology (4)

This course will examine the role of the CNS in controlling reproductive functions, stress, growth and behavior, with emphasis on the cellular and molecular mechanisms of neuroendocrine function. The lectures will be given by experts on each of the topic subjects. Lectures will include a basic introduction on the topic followed by a description of the current research in the area. (S/U grades only.) (F)

#### 225. Statistical Methods and Experimental Design (4)

This course is designed for graduate students in the neurosciences, but will address issues of statistical methods and experiment design for investigators working in any field of biological research. The course will combine lectures, discussion,

and practical examples drawn from the experience of the participant. *Prerequisite:* graduate student in the neuroscience graduate program or consent of the instructor. (F)

#### 233. Comparative Vertebrate Neurobiology (4)

Survey of the organization and evolution of vertebrate nervous systems. *Prerequisite:* consent of instructor. (S/U grades only.) (W)

#### 234. Molecular and Cellular Neurochemistry (4)

Topics include membrane and nerve function in nervous system, structure and function of receptors for neurotransmitters, role of cAMP as a second messenger in the nervous system, synthesis and processing of neuropeptides. (S/U grades only.) (W)

#### 235. Neurobiology of the Chemical Senses (1)

This lecture and seminar course surveys the neuroanatomy and neurophysiology of the central and peripheral taste and olfactory systems. Plasticity of the mature and developing chemosensory systems will also be covered. Behavioral studies of sensory function will be related to psychophysical studies in humans, including those directed at evaluating clinical chemosensory disorders. Students are expected to discuss readings of journal articles. (S)

#### 243. Physiological Basis of Human Information (2)

Psychological processes including attention, perception, and memory will be studied in connection with event-related potentials of the human brain. The interrelations among psychological and physiological events will be explored in order to arrive at unified concepts of human information processing. *Prerequisites:* Neurosci. 238 or Psych. 231, and consent of instructor. (S/U grades only.) (F)

#### 251. Scientific Communication (2)

(Same as SIO 292) Forms of scientific communication, practical exercise in scientific writing and short oral communication, and in criticism and editing, preparation of illustrations, preparation of proposals; scientific societies and the history of scientific communication. Examples from any field of science, most commonly biology, marine biology, ecology, and neuroscience. *Prerequisite:* graduate status in science. (S/U grades only.) (S)

#### 253. Clinical Neuroanatomy (1)

Review of neuroanatomy, with emphasis on clinical correlations. Pertinent physiological, chemical, and clinical information will be included and functional organization will be stressed. It is essential that students be familiar with neuroanatomical nomenclature. *Prerequisite:* medical student, graduate student, intern, resident, or consent of instructor. (S/U grades only.) (F)

#### 256. Mammalian Neuroanatomy (4)

Lectures presenting the basic features of the anatomy of the mammalian nervous system. This will include consideration of cellular components, development, topographic anatomy, and a detailed presentation of the organization of functional systems. *Prerequisite:* graduate status or consent of instructor. (S/U grades only.) (F)

#### 257. Mammalian Neuroanatomy Laboratory (4)

Neuroanatomy laboratory course taught in conjunction with Mammalian Neuroanatomy (256). Laboratories deal with gross and microscopic neuroanatomy of brain systems. Sessions include microscopic analysis of histological sections and observations and dissections of human brain material. *Prerequisite:* Neuroanatomy 256 or concurrent enrollment. (S/U grades permitted.) (W)

#### 259. Workshop in Electron Microscopy (4)

This course is to introduce graduate students in the neurosciences to research methods used in electron microscopy (EM) through one hour of formal lecture, one hour of seminar, three hours of demonstration, and three hours of supervised laboratory work per week. Students will become familiar with sec-

tioning EM, scanning EM, and freeze-fracture EM. *Prerequisites:* graduate-student standing in neurosciences doctoral program and consent of instructor. Enrollment limited. (S/U grades only.) (S)

#### 262. Neurophysiology (4)

An overview of neurophysiological systems, emphasizing mammalian neurophysiology and related model vertebrate systems and concepts. *Prerequisites:* graduate-student status in neurosciences, biology or physiology-pharmacology, or medical student, core course in neurophysiology and core course in neuroanatomy or equivalent. (S/U grades permitted.) (S)

#### 263. Developmental Neurobiology (3)

(Same as Biology 258.) Cellular and developmental aspects of the nervous system. Methods of investigation and culture approaches. Basic neuroembryology and selected examples of regional developments. Neuroglial cells and neuron-glia interactions. Extrinsic controls of survival growth and maturation of neural cells. Neurite growth and synapse formation. Potential for plasticity and regeneration in the nervous system. *Prerequisite:* graduate students or consent of instructor. (S/U grades only.) (S)

#### 264. Behavioral Neuroscience (5)

The course is to cover different areas of behavioral biology, such as ethology, behavioral biology, learning and memory, perception psychophysics. Some outside reading will be required. *Prerequisite:* medical student, graduate student, or consent of instructor. (S/U grades only.) (W)

#### 268. Molecular and Cellular Neurobiology (4)

This course focuses on cellular anatomy of the nervous system at the molecular level. The lectures will communicate current molecular genetic and cell biological approaches used to study the specialized structures and cell types of nervous tissue. Topics will include cell organelles; chromatin structure/function; gene expression/regulation; cytoskeleton and membrane interactions; signal transduction/receptors, channels and pumps; cellular junctions/synapses; node of Ranvier; and neuroplasmic transport. *Prerequisites:* neurochemistry, neuroanatomy, biochemistry. (S/U grades permitted.) (F)

#### 269. Electroencephalography and Clinical Neurophysiology (1)

Using the Journal of Electroencephalography and Clinical Neurophysiology as a core text, subjects chosen from the journal will be discussed and critically evaluated by the participants, and the literature pertinent to each topic reviewed. *Prerequisites:* Neurosci. 238, Basic Neurology (205), neurology resident, or consent of instructor. (F,W,S)

#### 274. Neurobiology of Cognitive Developmental Disorders (2)

Neurobiological foundation of developmental disorders in information processing including infantile autism, developmental dysphasia, attention deficit disorder, and childhood schizophrenia. Neurophysiological, neuroanatomical, and psychological evidence will be explored. *Prerequisite:* undergraduate or graduate course in neurobiology. (S/U grades permitted.)

#### 276. Neuroscience Research Rounds (2)

Neurosciences group faculty members and graduate students will present and discuss ongoing research. Attendance will be mandatory for first- and second-year graduate students. Faculty, advanced graduate students, medical students, postdoctoral trainees, and other interested parties are encouraged to attend. (S/U grades only.) (F,W,S)

#### 277. Neuropsychopharmacology (4)

An examination of the molecular and biochemical bases of drug and transmitter action. The course is devoted to receptor mechanisms, neuropharmacology, and drug action on excitable tissues. (S)

**296. Neurosciences Research Rotation (1-12)**  
Independent study. (S/U grades only.) (F,W,S)

**298. Neurosciences Independent Study Project (ISP) (1-12)**  
*Prerequisite: approved ISP proposal.* (F,W,S)

**299. Neurosciences Research (1-12)**  
Independent study. (S/U grades only.) (F,W,S)

**401. Neurology General Clinical Selective Clerkship (7)**  
Provides opportunities for practical application of neurological skills to the understanding and treatment of a variety of clinical disorders of the nervous system. *Prerequisite: successful completion of first two years of medical school.* (F, W, S)

**426. Subintern Pediatric Neurology (7)**  
Subinterns are responsible for the primary care of hospitalized pediatric neurology patients under the direct resident and attending physician supervision. They will perform procedures such as lumbar puncture and participate in night call, daily teaching round, neurology Grand Rounds, and Journal Clubs. *Prerequisite: Neurology 401 or consent of instructor.* (F, W, S)

**427. Neurology Outpatient Clerkship (7)**  
The student will rotate through the general and subspecialty (stroke, epilepsy, headache, nerve, and muscle) neurology clinics based at UCSD Medical Center. Lectures and clinical conferences will be attended as well. *Prerequisite: Neurosciences 401 or equivalent.* (F, W, S)

**496. Clinical Independent Study (1-12)**  
Independent clinical study for medical students (S/U grades only.) (F, W, S)

**500. Apprenticeship Teaching (1-4)**  
Participation in the department teaching program is required of all students working toward a Ph.D. degree. In general, students are not expected to teach in the first year, but are required to serve as teaching assistants or tutors for one quarter at any time during their subsequent years of training. The amount of teaching required is equivalent to the duties expected of a 50 percent assistant for one quarter. *Prerequisite: neurosciences graduate students. (S/U grades only.)* (F, W, S)

## Philosophy

OFFICE: 7002 H&SS, Muir College  
Web site: <http://www.ucsd.edu/philosophy>

### Professors

Georgios H. Anagnostopoulos, Ph.D.  
Richard J. Arneson, Ph.D.  
David O. Brink, Ph.D.  
Nancy D. Cartwright, Ph.D.  
Patricia Smith Churchland, B.Phil.  
Paul M. Churchland, Ph.D.  
Gerald D. Doppelt, Ph.D., *Academic Senate Distinguished Teaching Award*  
Clark N. Glymour, Ph.D., *Valtz Family Professor of Philosophy*  
S. Nicholas Jolley, Ph.D.  
Patricia W. Kitcher, Ph.D., *Chair*

Philip S. Kitcher, Ph.D., *Presidential Professor of Philosophy*

### Associate Professors

Michael O. Hardimon, Ph.D.  
Sandra D. Mitchell, Ph.D.  
Frederick W. Neuhouser, Ph.D.  
Gila Sher, Ph.D., *Graduate Adviser*

### Assistant Professors

Wayne M. Martin, Ph.D., *Undergraduate Adviser*  
Steven Yalowitz, Ph.D.

### Visiting Associate Professor

Mary Devereaux, Ph.D.

### Emeriti Professors

Henry E. Allison, Ph.D., *Research Professor (not-in-residence)*  
Edward N. Lee, Ph.D., *Professor Emeritus*  
Frederick A. Olafson, Ph.D., *Professor Emeritus*  
Avrum Stroll, Ph.D., *Research Professor*  
Zeno Vendler, Ph.D., *Professor Emeritus (not-in-residence)*

### Introduction to the Department

Philosophy is the study of conceptual problems that pertain to the nature of knowledge, reality, and human conduct. Among the chief areas of the subject are logic, metaphysics, theory of knowledge, ethics, political philosophy, and the philosophy of science. The academic study of philosophy at UCSD emphasizes a sound understanding of the history of the discipline and the development of analytical skills, and an undergraduate major in philosophy may be regarded as an excellent preparation for many careers in which such skills are emphasized.

The Department of Philosophy also offers a graduate program leading to the M.A. and Ph.D. degrees. It is the intention of the graduate program to enable the student to obtain an understanding of divergent philosophical traditions and to develop as a philosopher in his or her own right. To this end, the department offers courses and seminars in the history of philosophy, philosophy of language, philosophy of mind, philosophy of science, ethics, social philosophy, contemporary Anglo-American and European philosophy, etc.

### Undergraduate Program—Major

The Department of Philosophy offers the degree of bachelor of arts (B.A.) in philosophy for the undergraduate major. A major in philosophy requires a total of fifteen philosophy courses, at least twelve of which must be upper-division (courses numbered 100 and above). Up to two upper-division courses outside of philosophy can count among the twelve required for the major if they are drawn from a related field and contribute to the major's philosophical program; such credit must be approved by the undergraduate adviser. Honors and directed study courses (Philosophy 191–199) may not be used to satisfy the major requirement of fifteen philosophy courses. Major requirements may be met by examination.

There is no standard or required introduction to philosophy or the major. The department offers a variety of lower-division courses and sequences (numbered 1–99), any of which could be a suitable introduction to philosophy. Though many upper-division courses have no prerequisite, any combination of three lower-division courses would provide a good foundation for taking most upper-division courses.

### Area Requirements for the Major

- History of Philosophy.** Majors must complete three courses in the history of philosophy. At least one course must be in ancient philosophy (courses 31, 100–103) and one course must be in modern philosophy (courses 32–33 and 104–107). This requirement can be met by taking the lower-division sequence 31, 32, 33 or by taking any suitable combination of courses from the sequences 31–33 and 100–110.
- Logic.** Philosophy 120 (formerly Philosophy 110) is required of all majors. Note that Philosophy 120 has as a prerequisite Philosophy 10 (or an equivalent course from another department or institution). Because Philosophy 120 is a prerequisite for a variety of upper-division courses, prospective majors are strongly encouraged to take it and Philosophy 10 (or its equivalent) as early as possible.
- Moral and Political Philosophy.** Majors must take at least one upper-division course

in moral or political philosophy from among Philosophy 160, 161, 166, or 167.

4. **Metaphysics and Epistemology.** Majors must take at least one upper-division course in traditional areas of analytic philosophy—metaphysics, epistemology, philosophy of language, and philosophy of mind—from among Philosophy 130, 132, 134, or 136.

### **Grade Rules for Majors/Minors**

All courses applied toward the major or minor must be completed with a grade of C– or higher. Further, a GPA of 2.0 must be maintained in courses applied toward the major or minor. It should be noted that courses taken under the Pass/Not-Pass (P/NP) grading option cannot be applied toward the major or minor.

### **Honors Program**

The philosophy department offers an honors program for outstanding students in the major. Majors who have a 3.7 GPA in philosophy (3.25 overall) at the end of their junior year and who have taken at least four upper-division philosophy courses are eligible to apply. Interested students must consult with a faculty sponsor by the last day of classes during the spring term of their junior year. Admission to the honors program requires nomination by a faculty sponsor and approval of the undergraduate adviser. Nominating Petitions can be obtained from the undergraduate coordinator.

In addition to the usual major requirements, an honors student is required to complete a senior honors thesis by the end of winter quarter. During the fall and winter quarters, the student will be registered for Philosophy 191 and 192 and will be engaged in thesis research that will be supervised and evaluated by the student's faculty sponsor. A departmental committee will read and assess the completed thesis and determine if philosophy honors are to be awarded. Honors students are expected to maintain an average of 3.7 or better for all work taken in the program. (Qualified students wishing to participate in the honors program according to a different timetable than the one described above can apply to do so by petitioning the undergraduate adviser.)

### **Transfer Credit**

Courses taken at other institutions may be applied toward the major by petition only. Petitions should be submitted to the undergraduate coordinator, and must be accompanied by supporting materials (transcripts, syllabi, course work, etc.). Students are required to submit one petition per transfer course.

It is important to note that eight of the twelve upper-division courses in the major must be taken in the Department of Philosophy at UCSD.

**Note:** All courses applied towards major must be taken for a letter grade.

### **Undergraduate Program—Minor**

The Department of Philosophy offers a minor in philosophy. A minor requires a total of seven philosophy courses, at least five of which must be upper-division. All courses must be taken for a letter grade.

### **Advising Office**

Students who desire additional information concerning our course offerings or program may contact individual faculty or the undergraduate adviser through the department office at 7030 H&SS, (619) 534-3077.

### **Graduate Program Requirements**

The department offers programs leading to the M.A. and Ph.D. It is the intention of the graduate program to enable the student to obtain an understanding of divergent philosophical traditions and to develop as a philosopher in his or her own right. To this end, the department offers courses and seminars in the history of philosophy and in traditional and contemporary philosophical issues, from a variety of perspectives.

### **Master's Degree Program**

To qualify for a master's degree in philosophy, a student must pass eight of the distribution requirement seminars as described below,

under the subheading "Distribution Requirements." At least one of the seminars must be from the ethic/social-political category, and no more than four from either of the other two areas may count toward the master's degree. The student must also complete a master's research paper following one four-unit directed study course with a faculty member of his or her choice.

Although Ph.D. students sometimes elect to complete their studies with a master's degree, *we do not admit students to a master's degree program.*

### **Doctoral Degree Program**

#### **Course Work**

During the first two years of residence the student's course work will normally total thirty-six units (nine courses) per year. At least twelve of these units in each year must be graduate philosophy seminars (those numbered 201–285). The balance may be made up from additional graduate courses in philosophy, upper-division courses in philosophy (those numbered 100–199), approved upper-division or graduate courses in related departments, and, if the student is a teaching assistant, Philosophy 500 (Apprentice Teaching).

Before the beginning of each term, and especially before the fall term, students are required to have their course choices approved by an assigned adviser. Courses should be chosen with an eye toward meeting the program's distribution requirements, as outlined below.

#### **Logic Requirement**

During the first term of residence, all entering graduate students will taken an examination designed to demonstrate their level of proficiency in formal logic. The examination covers the predicate calculus, up to and including functions, relations, and identity. Students who pass the examination with a grade of B+ or better have satisfied the first component of the logic requirement. Students who do not score a B+ or better must take Philosophy 120 (Symbolic Logic I) during the first year of study and achieve a grade of B+ or better. By the end of the sixth term of residence, all students must also pass an advanced logic course (Philosophy

121, 122, 211, or another logic class approved by the graduate adviser) with at least a grade of B+.

### ***Distribution Requirements***

By the end of the seventh quarter of residence, a student must have completed ten graduate seminars in philosophy. The seminars must be distributed across the following areas:

1. **Four seminars** in the history of philosophy. At least one of these courses must be in ancient philosophy; at least one must be in modern philosophy.
2. **Two seminars** chosen from the fields of ethics, social philosophy, political philosophy.
3. **Four seminars** chosen (in any combination) from the fields of metaphysics, epistemology, philosophy of mind, philosophy of science, philosophy of language, philosophy of mathematics, philosophy of logic.

Courses used to satisfy a requirement in one category cannot be used to satisfy a requirement in another category.

At the end of the fifth quarter of residence, a student must have completed eight of the required seminars. In order to remain in the program, a student must have attained an average of B+ or better in all philosophy seminars completed by this point.

Before the beginning of each quarter, and especially before the fall quarter, a student is required to have all course choices approved by a faculty adviser.

### ***Independent Study Courses***

Philosophy 290 (Directed Independent Study) is appropriate for a graduate student still in the process of fulfilling course requirements for the degree.

Philosophy 295 (Research Topics) is an appropriate course for a student in the process of coming up with a dissertation prospectus.

Philosophy 299 (Thesis Research) is appropriate for a student working on his or her dissertation.

### ***Language Requirement***

Before advancing to candidacy, all students must demonstrate reading proficiency in one of the following languages:

German  
French  
Latin  
Classical Greek

If a student's chosen dissertation topic requires competence in a second language from the above list, then the student's dissertation adviser can require suitable demonstration of competence. In special circumstances students may be permitted to substitute a different language or a special competency (such as a specialized computer language) if educationally compelling reasons can be given for doing so. These exceptions will be decided on a case-by-case basis by the department as a whole or by a committee it delegates.

### ***Third Year***

In the third year of residence, the student must complete with a passing grade at least one regular graduate seminar in each quarter until the end of that year or admission to candidacy, whichever comes first.

### ***Dissertation Prospectus and Oral Candidacy Exam***

Some time after completing the distribution requirements, the student must submit a dissertation prospectus to his or her doctoral committee. The committee will then orally examine the student on the intended subject and plan of the research. The examination will seek to establish that the thesis proposed is a satisfactory subject of research and that the student has the preparation and the abilities necessary to complete that research. This oral qualifying examination must be passed before the end of the twelfth quarter of residence. Students who are passed and have met the other requirements will be advanced to candidacy for the Ph.D.

### ***Teaching Requirements***

Participation in undergraduate teaching is one of the requirements for a Ph.D. in philosophy. The student is required to serve as a teaching assistant for the equivalent of one-quarter time for three academic quarters. The duties of a teaching assistant normally entail grading papers and examinations, conducting discussion sections, and related activities, including

attendance at lectures in the course for which he or she is assisting.

### ***Doctoral Dissertation***

Under the supervision of a doctoral committee, each candidate will write a dissertation demonstrating a capacity to engage in original and independent research. The candidate will defend the thesis in an oral examination by the doctoral committee. (See "Graduate Studies: The Doctor of Philosophy Degree.")

### ***Application Request***

For information regarding the graduate program call (619) 534-6809 or write to: University of California, San Diego; Graduate Adviser; Philosophy, 0119; 9500 Gilman Drive; La Jolla, CA 92093-0119.

Email address: [casmann@ucsd.edu](mailto:casmann@ucsd.edu).

### ***Joint Degree Programs***

The philosophy department at UCSD participates in two interdisciplinary programs, the requirements for which are outlined below. For each program, students are expected to satisfy roughly two-thirds of the distribution requirements in the philosophy program. This means that instead of ten philosophy seminars at the end of the seventh quarter, students must have completed six (properly distributed), and that instead of eight philosophy seminars by the end of the fifth quarter, students in those programs must have completed five, with a cumulative average of B+ or better.

### ***Joint Degree Program with the UCSD Cognitive Science Faculty***

The UCSD cognitive science faculty is an interdisciplinary group of twenty-seven scholars drawn from the Departments of Psychology, Neuroscience, Biology, Computer Science and Engineering, Electrical and Computer Engineering, Linguistics, Philosophy, Sociology, Anthropology, and Psychiatry. This group includes many of the outstanding figures in contemporary cognitive science.

Students wishing to pursue a Ph.D. in "Cognitive Science and Philosophy" register in the philosophy program in the normal fashion, but pursue a significant portion of their studies



within an interdisciplinary group of departments affiliated with the Department of Cognitive Science. These departments include Anthropology, Computer Science and Engineering, Linguistics, Neurosciences, Psychology, and Sociology. Students may apply for admission to the interdisciplinary program at the same time they apply to the Department of Philosophy, or at some point after entering UCSD. (All students wishing to transfer into any interdisciplinary program must do so prior to the end of the fifth quarter of residency.)

Students in philosophy/cognitive science studies are required to take:

1. A total of nine seminars in philosophy, including four courses from either history or epistemology and metaphysics, and two courses from one of the other groups listed above under the subheading "Distribution Requirements." By the end of the fifth quarter of residence, a student must have taken at least five of these seminars (distributed across at least two areas), and must have achieved an average of B+ or better in all philosophy seminars taken up to that point. Failure to take a sufficient number of seminars or to achieve a B+ average means that the student may not continue in the program after the fifth quarter.
2. The equivalent of one year's course work (usually six courses) in one or more of the other departments affiliated with the Department of Cognitive Science.
3. Six quarters of Cognitive Science 200.

A plan detailing the course of study must be approved by the Cognitive Science Program Committee. The dissertation should be interdisciplinary, reflecting the two areas of specialization.

### **Science Studies Program**

The Science Studies Program at UCSD is committed to interdisciplinary investigations. Understanding, interpreting, and explaining the scientific enterprise demand a systematic integration of the perspectives developed within the history, sociology, and philosophy of science. The program offers students an opportunity to work towards such integration, while receiving a thorough training at the profes-

sional level in one of the component disciplines.

Students enrolled in the program choose one of the three disciplines for their major field of specialist studies, and are required to complete minor field requirements in the other two. The core of the program, however, is a year-long seminar in science studies, led by faculty from all three participating departments.

Students pursuing a "Philosophy and Science Studies" degree are required to take a total of eighteen courses. At least nine of these must be in philosophy, with the remainder drawn from history of science, sociology of science, or the sciences. The courses must satisfy distribution requirements: six seminars must be taken in philosophy by the end of the seventh quarter of residence, distributed across the three required areas listed above. No more than four and no fewer than two courses in any one area may be used to satisfy the requirements. Two courses must be taken in history of science; and two must be in sociology of science. All science studies students are required to take the science studies year-long core seminar. This seminar contributes toward the distribution requirements, counting as one seminar in history of science, one seminar in sociology of science, and one seminar in philosophy (the epistemology-metaphysics group). By the end of the fifth quarter of residence, a student must have taken at least five of these philosophy seminars (distributed across at least two areas), and must have achieved an average of B+ or better in all philosophy seminars taken up to that point. Failure to take a sufficient number of seminars or to achieve a B+ average means that the student may not continue in the program after the fifth quarter.

Students may apply for admission to the interdisciplinary program at the same time they apply to the Department of Philosophy, or at some point after entering UCSD. (All students wishing to transfer into any interdisciplinary program must do so prior to the end of the fifth quarter of residency.)

### **Ph.D. Time Limit Policies**

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

## **COURSES**

### **LOWER-DIVISION**

#### **1. The Nature of Philosophy (4)**

What is philosophy? A study of major philosophical questions, making use of both classical and contemporary sources. An introduction to the basic methods and strategies of philosophical inquiry.

#### **10. Introduction to Logic (4)**

Basic concepts and techniques in both informal and formal logic and reasoning, including a discussion of argument, inference, proof, and common fallacies, and an introduction to the syntax, semantics, and proof method in sentential (propositional) logic. (May be used to fulfill general-education requirements for Warren and Eleanor Roosevelt Colleges.)

#### **12. Logic and Decision Making (4)**

An introduction to the study of probability, inductive logic, scientific reasoning, and rational choice among competing hypotheses and alternative courses of action when the evidence is incomplete or uncertain. (May be used to fulfill general-education requirements for Marshall, Warren, and Eleanor Roosevelt Colleges.)

#### **13. Introduction to Philosophy: Ethics (4)**

An inquiry into the nature of morality and its role in personal or social life by way of classical and/or contemporary works in ethics. (May be used to fulfill general-education requirements for Muir and Marshall Colleges.)

#### **14. Introduction to Philosophy: Metaphysics (4)**

A survey of central issues and figures in the Western metaphysical tradition. Topics include the mind-body problem, freedom and determinism, personal identity, appearance and reality, and the existence of God. (May be used to fulfill general-education requirements for Muir and Marshall Colleges.)

#### **15. Introduction to Philosophy: Theory of Knowledge (4)**

A study of the grounds and scope of human knowledge, both commonsense and scientific, as portrayed in the competing traditions of Continental rationalism, British empiricism, and contemporary cognitive science. (May be used to fulfill general-education requirements for Muir and Marshall Colleges.)

#### **23-24-25. Individual and Society (4-4-4)**

A course dealing with the historical and systematic development of social and political thought and institutions. Analysis and critical examination of representative texts drawn from classical and contemporary sources. (Philosophy 23-24-25 may be used to fulfill the Muir College breadth requirement.)

#### **27. Ethics and Society (4)**

(Same as Political Science 27) An inquiry into the principles of ethical conduct and their applications. The course examines some of the major theories (including natural law, individual rights, utilitarianism) and the general issue of rights and obligations with respect to adherence to law (as in civil disobedience, abortion and the refusal to obey an unjust law or order). Case studies will be employed to consider the relevance of these principles to various occupations such as business, engineering, law and government, in order to enable students to anticipate some of the difficulties that will arise for them in real-life situations whenever hard moral choices must be made. Satisfies the Warren College ethics and society requirement. This course is required for all Warren students entering the college in fall 1985 and thereafter.

**31. History of Philosophy: Ancient Philosophy (4)**

A survey of classical Greek philosophy with an emphasis on Socrates, Plato and Aristotle, though some consideration may be given to Presocratic and/or Hellenistic philosophers. (May be used in fulfilling the Muir College breadth requirement.)

**32. History of Philosophy: The Origins of Modern Philosophy (4)**

A survey of the major modern philosophy. Beginning with the contrast between medieval and modern thought, the course focuses on modern philosophy and its relation to the scientific revolution of the sixteenth and seventeenth centuries. Philosophers to be studied include Descartes, Hobbes, Spinoza, and Leibniz. (May be used in fulfilling the Muir College breadth requirement.)

**33. History of Philosophy: Philosophy in the Age of Enlightenment (4)**

A survey of the major philosophers of the late seventeenth and eighteenth centuries with a focus on the British empiricists—Locke, Berkeley, and Hume—and the critical philosophy of Kant. (May be used in fulfilling the Muir College Breadth requirement.)

**90. Undergraduate Seminar (1)**

Investigation of a selected philosophical topic through readings, discussions, and written assignments. Emphasis on student participation. *Prerequisite: consent of instructor.* Limited enrollment.

**UPPER-DIVISION**

**100. Plato (4)**

A study of Socrates and/or Plato through major dialogues of Plato. Possible topics include the virtues and happiness; weakness of the will; political authority and democracy; the theory of Forms and sensible flux; immortality; relativism, skepticism, and knowledge. May be repeated for credit with change of content and approval of instructor. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 101.*

**101. Aristotle (4)**

A study of major issues in Aristotle's works, such as the categories; form and matter; substance, essence, and accident; the soul; virtue, happiness, and politics. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 102.*

**102. Hellenistic Philosophy (4)**

A study of selected texts from the main schools of Hellenistic philosophy—Stoicism, Epicureanism, and Skepticism. *Prerequisite: upper-division standing or consent of instructor.*

**103. Medieval Philosophy (4)**

A study of major trends in medieval philosophy through the works of philosophers such as Augustine, Aquinas, Scotus, and Ockham. *Prerequisite: upper-division standing or consent of instructor.*

**104. The Rationalists (4)**

The major writings of one or more of the seventeenth century rationalists—Descartes, Spinoza, and Leibniz. Topics include the existence of God, the mind-body problem, free will, the nature of knowledge, belief, and error. May be repeated for credit with change of content and approval of instructor. *Prerequisite: upper-division standing or consent of instructor.*

**105. The Empiricists (4)**

The major writings of one or more of the British empiricists—Locke, Berkeley, Hume, and Reid. May be repeated for credit with change of content and approval of instructor. *Prerequisite: upper-division standing or consent of instructor.*

**106. Kant (4)**

A study of selected portions of the Critique of Pure Reason and other theoretical writings and/or his major works in moral theory. *Prerequisite: Philosophy 33 or 105 or consent of instructor.* May be repeated for credit with change in content and approval of the instructor.

**107. Hegel (4)**

A study of one or more of Hegel's major works, in particular, *The Phenomenology of Spirit* and *The Philosophy of Right*. Readings and discussion may also include other figures in the Idealist tradition—such as Fichte, Hölderlin, and Schelling—and critics of the Idealist tradition—such as Marx and Kierkegaard. *Prerequisite: upper-division standing or consent of instructor.* May be repeated for credit with change of content and approval of instructor.

**108. Nineteenth Century Philosophy (4)**

A study of one or more figures in nineteenth-century philosophy, such as Schopenhauer, Nietzsche, Kierkegaard, Marx, Emerson, Thoreau, James, and Mill. The focus may be on particular figures or intellectual themes and traditions. May be repeated for credit with change of content and approval of instructor. *Prerequisite: upper-division standing or consent of instructor.*

**109. History of Analytic Philosophy (4)**

Central texts, figures, and traditions in analytic philosophy. Figures may include Frege, Russell, Wittgenstein, Carnap, Moore, Austin, Tarski, Quine, Davidson, Kripke, and Putnam. May be repeated for credit with change of content and approval of instructor. *Prerequisite: Philosophy 120 or consent of instructor.*

**110. Wittgenstein (4)**

Central themes and writings in the philosophy of Ludwig Wittgenstein. Topics include the nature of logic and philosophy, solipsism, the private language argument, certainty, meaning, and rule-following. Readings include *Tractatus Logico-Philosophicus*, *Philosophical Investigations*, and *On Certainty*. *Prerequisite: upper-division standing or consent of instructor.*

**111. Quine (4)**

Central themes in Quine's philosophy, such as the nature of logical truth, ontological commitment and relativity, extensionality, the rejection of the analytic-synthetic distinction, holism, epistemology naturalized, and the indeterminacy of meaning and translation. *Prerequisite: Philosophy 120 or consent of instructor.*

**120. Symbolic Logic I (4)**

The syntax, semantics, and proof-theory of first-order predicate logic with identity, emphasizing both conceptual issues and practical skills (e.g. criteria for logical truth, consistency, and validity, the application of logical methods to everyday as well as scientific reasoning). *Prerequisite: Philosophy 10 or consent of instructor. Formerly Philosophy 110.*

**121. Symbolic Logic II (4)**

The meta-theory of first-order predicate logic: expressive power, the notions of a model, truth-in-a-model, effective procedure, proof and decidability, the completeness of first-order logic (co-extensionality of the semantic and proof-theoretic methods), etc. The course is fairly formal. *Prerequisite: Philosophy 120 or consent of instructor. Formerly Philosophy 111.*

**122. Topics in Logic (4)**

A study of new, extended, or alternative logics and/or special issues in meta-logic. Topics include the nature of logic, modal logic, higher-order logic, generalized logic, free logic, the Skolem-Löwenheim theorem, the incompleteness of arithmetic, undecidability. May be repeated for credit with change in content and approval of instructor. *Prerequisite: Philosophy 120*

(and for advanced topics: Philosophy 121) or consent of instructor.

**123. Philosophy of Logic (4)**

Philosophical issues underlying standard and non-standard logics, the nature of logical knowledge, the relation between logic and mathematics, the revisability of logic, truth and logic, ontological commitment and ontological relativity, logical consequence, etc. May be repeated for credit with change in content and approval of instructor. *Prerequisite: Philosophy 120 or consent of instructor. Formerly Philosophy 115.*

**124. Philosophy of Mathematics (4)**

The character of logical and mathematical truth and knowledge; the relations between logic and mathematics; the significance of Gödel's incompleteness theorem; Platonism, logicism, and more recent approaches. May be repeated for credit with change in content and approval of instructor. *Prerequisite: Philosophy 120 or consent of instructor.*

**125. Games and Decisions (4)**

Formal and philosophical issues in the theory of games and the theory of rational decision. *Prerequisite: Philosophy 12 or consent of instructor.*

**130. Metaphysics (4)**

Central problems in metaphysics, such as free will and determinism, the mind-body problem, personal identity, causation, primary and secondary qualities, the nature of universals, necessity, and identity. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 170.*

**131. Topics in Metaphysics (4)**

An in-depth study of some central problem, figure, or tradition in metaphysics. May be repeated for credit with change of content and approval of instructor. *Prerequisite: upper-division standing or consent of instructor.*

**132. Epistemology (4)**

Central problems in epistemology such as skepticism; a priori knowledge; knowledge of other minds; self-knowledge; the problem of induction; foundationalist, coherence, and causal theories of knowledge. *Prerequisite: upper-division standing or consent of instructor.*

**133. Topics in Epistemology (4)**

An in-depth study of some central problem, figure, or tradition in epistemology. May be repeated with change of content and approval of instructor. *Prerequisite: upper-division standing or consent of instructor.*

**134. Philosophy of Language (4)**

Examination of contemporary debates about meaning, reference, truth, and thought. Topics include descriptive theories of reference, sense and reference, compositionality, truth, theories of meaning, vagueness, metaphor, and natural and formal languages. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 130.*

**135. Meaning and Communication (4)**

The possibility and nature of communication and its bearing on how signs get their meaning. Topics include the relationship between language and thought, problems with translation and interpretation, the role of environmental and social context, and speech act theory. *Prerequisite: upper-division standing or consent of instructor.*

**136. Philosophy of Mind (4)**

Different conceptions of the nature of mind and its relation to the physical world. Topics include identity theories, functionalism, eliminative materialism, internalism and externalism, subjectivity, other minds, consciousness, self-knowledge, perception, memory, and imagination. *Prerequisite: upper-division standing or consent of instructor.*

**137. Philosophy of Action (4)**

The nature of action and psychological explanation. Topics include action individuation, reasons as causes, psychological laws, freedom and responsibility, weakness of will, self-deception, and the emotions. *Prerequisite: upper-division standing or consent of instructor.*

**138. Consciousness (4)**

Philosophical issues about consciousness, such as multiple or split consciousness, altered consciousness, perspectives and points of view, neuroscientific and cognitive theories, animal, machine, and social consciousness, the evolution of consciousness, zombies. *Prerequisite: upper-division standing or consent of instructor.*

**139. The Nature of Representation (4)**

A philosophical grounding in concepts and distinctions that govern the use of representations in various media, such as analog/digital, implicit/explicit, imagistic/propositional, indexical/descriptive, medium/message, distributed/local, symbolic/associative, situated/context-independent, and opaque/transparent. *Prerequisite: upper-division standing or consent of instructor.*

**145. Philosophy of Science (4)**

Central problems in philosophy of science, such as the nature of confirmation and explanation, the nature of scientific revolutions and progress, the unity of science, and realism and anti-realism. *Prerequisite: upper-division standing or consent of instructor.*

**146. Philosophy of Physics (4)**

Philosophical problems in the development of modern physics, such as the philosophy of space and time, the epistemology of geometry, the philosophical significance of Einstein's theory of relativity, the interpretation of quantum mechanics, and the significance of modern cosmology. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 181.*

**147. Philosophy of Biology (4)**

Philosophical problems in the biological sciences, such as the relation between biology and the physical sciences, the status and structure of evolutionary theory, and the role of biology in the social sciences. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 182.*

**148. Philosophy and the Environment (4)**

Investigation of ethical and epistemological questions concerning our relationship to the environment. Topics may include the value of nature, biodiversity, policy and science, and responsibility to future generations. *Prerequisite: upper-division standing or consent of instructor.*

**149. Philosophy of Psychology (4)**

Philosophical issues raised by psychology, including the nature of psychological explanation, the role of nature versus nurture, free will and determinism, and the unity of the person. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 174.*

**150. Philosophy of the Cognitive Sciences (4)**

Theoretical, empirical, methodological, and philosophical issues at work in the cognitive sciences (e.g. Psychology, Linguistics, Neuroscience, Artificial Intelligence, and Computer Science), concerning things such as mental representation, consciousness, rationality, explanation, and nativism. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 187.*

**151. Philosophy of Neuroscience (4)**

An introduction to elementary neuroanatomy and neurophysiology and an examination of theoretical issues in cognitive neuroscience and their implications for traditional philosophi-

cal conceptions of the relation between mind and body, perception, consciousness, understanding, emotion, and the self. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 183.*

**152. Philosophy of Social Science (4)**

Philosophical issues of method and substance in the social sciences, such as causal and interpretive models of explanation, structuralism and methodological individualism, value neutrality, and relativism. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 184.*

**153. Philosophy of History (4)**

A study of classical and/or contemporary conceptions of history and historical knowledge. Topics may include the structure of historical explanation, historical progress, objectivity in historiography, hermeneutics and the human sciences. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 164.*

**160. Ethical Theory (4)**

Systematic and/or historical perspectives on central issues in ethical theory such as deontic, contractualist, and consequentialist conceptions of morality; rights and special obligations; the role of happiness and virtue in morality; moral conflict; ethical objectivity and relativism; and the rational authority of morality. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 123.*

**161. Topics in the History of Ethics (4)**

Central issues and texts in the history of ethics. Subject matter can vary, ranging from one philosopher (e.g. Aristotle, Hobbes, Kant, or Mill) to a historical tradition (e.g. Greek ethics or the British moralists). May be repeated for credit with change in content and approval of instructor. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 125.*

**162. Contemporary Moral Issues (4)**

An examination of contemporary moral issues, such as abortion, euthanasia, war, affirmative action, and freedom of speech. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 124.*

**163. Bio-Medical Ethics (4)**

Moral issues in medicine and the biological sciences, such as patient's rights and physician's responsibilities, abortion and euthanasia, the distribution of health care, experimentation, and genetic intervention. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 122.*

**164. Technology and Human Values (4)**

Philosophical issues involved in the development of modern science, the growth of technology, and control of the natural environment. The interaction of science and technology with human nature and political and moral ideals. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 186.*

**165. Professional Ethics (4)**

An inquiry into questions about what a profession is; the fundamental norms that ought regulate the professions, professionals, and the professional-client relationship; the relation between the duties of professionals and those of ordinary people; and special problems faced in specific professions (e.g. law, medicine, business, and engineering). *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 127.*

**166. Classics in Political Philosophy (4)**

Central issues about the justification, proper functions, and limits of the state through classic texts in the history of political philosophy by figures such as Plato, Aristotle, Hobbes, Locke, Rousseau, Mill, and Marx. *Prerequisite: upper-division standing or consent of instructor.*

**167. Contemporary Political Philosophy (4)**

Different perspectives on central issues in contemporary political philosophy, such as the nature of state authority and political obligation, the limits of government and individual liberty, liberalism and its critics, equality and distributive justice. *Prerequisite: upper-division standing or consent of instructor.*

**168. Philosophy of Law (4)**

A study of issues in analytical jurisprudence such as the nature of law, the relation between law and morality, and the nature of legal interpretation and issues in normative jurisprudence such as the justification of punishment, paternalism and privacy, freedom of expression, and affirmative action. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 162.*

**169. Feminism and Philosophy (4)**

Examination of feminist critiques of, and alternatives to, traditional philosophical conceptions of such things as morality, politics, knowledge, and science. *Prerequisite: upper-division standing or consent of instructor.*

**175. Aesthetics (4)**

Central issues in philosophical aesthetics such as the nature of art and aesthetic experience, the grounds of artistic interpretation and evaluation, artistic representation, and the role of the arts in education, culture, and politics. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 150.*

**176. Film Aesthetics (4)**

An examination of the features that make film a distinctive art form and of philosophical issues that arise in relation to the medium. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 153.*

**177. Philosophy and Literature (4)**

A study of philosophical themes contained in selected fiction, drama, or poetry, and the philosophical issues that arise in the interpretation, appreciation, and criticism of literature. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 152.*

**180. Phenomenology (4)**

An examination of the phenomenological tradition through the works of its major classical and/or contemporary representatives. Authors studied will vary and may include Brentano, Husserl, Heidegger, Merleau-Ponty, Levinas, Bourdieu. *Prerequisite: upper-division standing or consent of instructor.*

**181. Existentialism (4)**

Classical texts and issues of existentialism. Authors studied will vary and may include Nietzsche, Kierkegaard, Sartre, and Heidegger. *Prerequisite: upper-division standing or consent of instructor.*

**182. Marx and Marxism (4)**

Central issues in the writings of the early and late Marx, such as alienation, false consciousness, exploitation, historical materialism, the critique of capitalism, and communism. Attention may be given to Marx's philosophical predecessors (e.g. Smith, Rousseau, Hegel, Feuerbach) and/or to subsequent developments in Marxism (e.g. the Frankfurt school and analytical Marxism). *Prerequisite: upper-division standing or consent of instructor.*

**183. Topics in Continental Philosophy (4)**

The focus will be on a leading movement in continental philosophy (e.g. the critical theory of the Frankfurt school, structuralism and deconstruction, post-modernism) or some particular issue that has figured in these traditions (e.g. freedom, subjectivity, historicity, authenticity). May be repeated for credit with change in content and approval of instructor. *Prerequisite: upper-division standing or consent of instructor.*

**184. Religious Existentialism (4)**

This course will deal with the existential approach to the religious life and with issues such as faith, freedom, and guilt. Authors studied will vary and may include Pascal, Kierkegaard, Dostoyevsky, Buber, and Tillich. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 161.*

**185. Philosophy of Religion (4)**

A general introduction to the philosophy of religion through the study of classical and/or contemporary texts. Among the issues to be discussed are the existence and nature of God, the problem of evil, the existence of miracles, the relation between reason and revelation, and the nature of religious language. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 160.*

**190. Special Topics (4)**

A special philosophical topic. May be repeated for credit with change of content and approval of instructor. *Prerequisite: upper-division standing or consent of instructor. Formerly Philosophy 185.*

**191. Philosophy Honors (4)**

Independent study by special arrangement with and under the supervision of a faculty member, including a proposal for the honors essay. An IP grade will be awarded at the end of this quarter; a final grade will be given for both quarters at the end of 192. *Prerequisite: consent of instructor. Formerly Philosophy 196A.*

**192. The Honors Essay (4)**

Continuation of 191: independent study by special arrangement with and under the supervision of a faculty member, leading to the completion of the honors essay. A letter grade for both 191 and 192 will be given at the end of this quarter. *Prerequisite: consent of instructor. Formerly Philosophy 196B.*

**195. Introduction to Teaching Philosophy (4)**

By special arrangement with and under the supervision of the instructor, each student will run a regular class section in one of the philosophy department's courses. *Prerequisites: consent of instructor and department chair; appointment by faculty member as instructor's assistant.*

**199. Directed Individual Study (4)**

Directed individual study by special arrangement with and under the supervision of a faculty member. (P/NP grades only.) *Prerequisite: consent of instructor.*

**GRADUATE COURSES**

**201. Greek Philosophy (4)**

A Study of selected authors and texts from the history of ancient Greek philosophy. May be repeated for credit with change of content.

**204. Early Modern Philosophy (4)**

A study of selected philosophers of the sixteenth and seventeenth centuries; for example, Descartes, Spinoza, Leibniz, and Locke. May be repeated for credit with change of content.

**205. Eighteenth-Century Philosophy (4)**

A study of major philosophical texts for the period, such as Kant's Critique of Pure Reason and Hume's Treatise of Human Nature. May be repeated for credit with change of content.

**206. Nineteenth-Century Philosophy (4)**

A selective study of major philosophical texts for the period, with emphasis on such figures as Hegel, Marx, Nietzsche, Mill, and others. May be repeated for credit with change of content.

**207. Contemporary European Philosophy (4)**

A study of selected topics in twentieth-century European philosophy as reflected in the major writings of Husserl, Heidegger, Sartre, Merleau-Ponty, and others.

**208. Contemporary Analytical Philosophy (4)**

A study of the historical development of the analytical movement, with emphasis on major texts. May be repeated for credit with change of content.

**209A-B-C. Seminar in Science Studies (4-4-4)**

A three-quarter sequence of readings and discussions, taught each quarter by a member of one of the departments (history, sociology, philosophy) participating in the graduate science studies program. Required of all students in the program in their first year; those in later years are expected to audit this course, the content of which will change from year to year. IP grade to be awarded the first and second quarters; the final grade will not be given until the end of the third quarter.

**210. Philosophy of Logic (4)**

A study of major topics in logical theory: the status of logical truth, the epistemology and metaphysics of logic, the significance of recent results in mathematical and logical theory, the significance of alternative systems of logic. *Prerequisite: Philosophy 110 or equivalent.*

**211. Advanced Symbolic Logic (4)**

Topics in mathematical logic and set theory, metatheory, non-standard logics, and other contemporary developments in logical theory. *Prerequisite: Philosophy 111 or equivalent.*

**212. Contemporary Topics in the Philosophy of Science (4)**

This seminar will cover current books and theoretical issues in the philosophy of science. Topics will vary from year to year. *Prerequisite: Philosophy 180 or equivalent or consent of instructor.*

**223. Ethics (4)**

An examination of the nature of moral problems, judgments, and principles, with emphasis on recent developments in moral philosophy and classic formulations of ethical theories.

**224. Social and Political Philosophy (4)**

An analysis of social philosophies and ideologies in their relationship to basic types of social structure. May be repeated for credit with change of content.

**235. Philosophy of Language (4)**

(Same as Linguistics 286.) Examination of some current philosophical and scientific views on the nature, use and acquisition of natural languages. May be repeated for credit as course content may vary.

**250. Aesthetics (4)**

An exploration of problems in the philosophy of art, aesthetic experience, and aesthetic judgment within the context of a critical survey of some current aesthetic theories, and their illustrative application in various fields of art.

**270. Contemporary Epistemology and Metaphysics (4)**

A detailed examination of some fundamental issues in contemporary philosophy, especially those centering about the theories of meaning and reference.

**274. Philosophy of Mind (4)**

Contemporary work on the relation of mind and body, subjectivity, and the problem of other minds. May be repeated for credit with change of content.

**285. Seminar on Special Topics (4)**

A seminar for examination of specific philosophical problems (S/U grades permitted.)

**290. Direct Independent Study (4)**

Supervised study of individually selected philosophical topics. May be repeated for credit. *Prerequisite: consent of instructor. (S/U grades permitted.)*

**295. Research Topics (1-12)**

Advanced, individual research studies under the direction of a member of the staff. May be repeated for credit. *Prerequisite: consent of graduate adviser. (S/U grades permitted.)*

**299. Thesis Research (1-12)**

(S/U grades permitted.)

**500. Apprentice Teaching (1-4)**

A course designed to satisfy the requirement that graduate students should serve as teaching assistants, either in the Department of Philosophy or in the Humanities Program in Revelle College, or in the writings programs offered by the various colleges. Each Ph.D. candidate must teach the equivalent of quarter-time for three academic quarters. (S/U grades only.)

**Physics**

**OFFICES:**

General Administration:  
1110-113 Urey Hall Addition, Revelle College

Graduate Student Affairs:  
1110-121 Urey Hall Addition

Undergraduate Student Affairs:  
1110-115 Urey Hall Addition

Chair's Office: 1110-113 Urey Hall Addition  
www address: <http://physics.ucsd.edu>

**Professors**

Henry D. I. Abarbanel, Ph.D., *Director, Institute for Nonlinear Science*

Ami E. Berkowitz, Ph.D., *Research Professor*

James G. Branson, Ph.D.

Keith A. Brueckner, Ph.D., *Emeritus*

E. Margaret Burbidge, Ph.D., *Emeritus*

Geoffrey R. Burbidge, Ph.D.

Joseph C. Y. Chen, Ph.D.

Patrick H. Diamond, Ph.D.

C. Fred Driscoll, Ph.D.

Robert C. Dynes, Ph.D., *Chancellor*

George Feher, Ph.D., *Research Professor*

Zachary Fisk, Ph.D., *Emeritus*

Donald R. Fredkin, Ph.D.

George M. Fuller, Ph.D.

Marvin L. Goldberger, Ph.D., *Dean, Division of Natural Sciences*

John M. Goodkind, Ph.D.

Robert J. Gould, Ph.D., *Research Professor*

Benjamin Grinstein, Ph.D.

Jorge E. Hirsch, Ph.D.

Barbara Jones, Ph.D.  
 Norman M. Kroll, Ph.D., *Research Professor*  
 Julius Kuti, Ph.D.  
 Herbert Levine, Ph.D.  
 Leonard N. Liebermann, Ph.D., *Emeritus*  
 Ralph H. Lovberg, Ph.D., *Emeritus*  
 David B. MacFarlane, Ph.D.  
 Aneesh V. Manohar, Ph.D.  
 M. Brian Maple, Ph.D., *Bernd T. Matthias  
 Endowed Chair, Director, Institute for Pure  
 and Applied Physical Sciences; Director,  
 Center for Interface and Materials Science*  
 George E. Masek, Ph.D., *Research Professor*  
 Carl E. McIlwain, Ph.D., *Research Professor*  
 Xuong Nguyen-Huu, Ph.D.  
 Melvin Y. Okamura, Ph.D.  
 Thomas M. O'Neil, Ph.D., *Chair*  
 José N. Onuchic, Ph.D.  
 Hans P. Paar, Ph.D., *Vice Chair for Education*  
 Laurence E. Peterson, Ph.D., *Research Professor*  
 Oreste Piccioni, Ph.D., *Emeritus*  
 Sally K. Ride, Ph.D., *Ingrid and Joseph W.  
 Hibben, Endowed Chair*  
 Marshall N. Rosenbluth, Ph.D., *Research  
 Professor*  
 Ivan K. Schuller, Ph.D.  
 Sheldon Schultz, Ph.D., *Director, Center of  
 Magnetic Recording Research, Research  
 Professor*  
 Lu J. Sham, Ph.D.  
 Vitali D. Shapiro, Ph.D.  
 Harding E. Smith, Ph.D.  
 Harry Suhl, Ph.D., *Research Professor*  
 Clifford M. Surko, Ph.D.  
 Robert A. Swanson, Ph.D., *Research Professor*  
 Harold Ticho, Ph.D., *Emeritus*  
 David R. Tytler, Ph.D.  
 Wayne Vernon, Ph.D., *Emeritus*  
 Arthur M. Wolfe, Ph.D., *Director, Center for  
 Astrophysics and Space Sciences, Endowed  
 Chancellor's Associates Chair*  
 David Y. Wong, Ph.D., *Emeritus*  
 Herbert F. York, Ph.D., *Emeritus*

#### Associate Professors

Daniel P. Arovas, Ph.D.  
 Daniel H.E. Dubin, Ph.D.  
 Kim Griest, Ph.D.  
 Frances Hellman, Ph.D.  
 Terence T-L. Hwa, Ph.D.  
 Kenneth A. Intriligator, Ph.D.  
 Elizabeth E. Jenkins, Ph.D.  
 David Kleinfeld, Ph.D.

Oscar J. Lumpkin, Ph.D.  
 Andreas Quirrenbach, Ph.D.

#### Assistant Professors

Dmitri N. Basov, Ph.D.  
 Scot R. Renn, Ph.D.  
 Vivek A. Sharma, Ph.D.

#### Adjunct Professors

Hans Kobrak, Ph.D., *Emeritus*  
 Tihiro Ohkawa, Ph.D.  
 Philip M. Platzman, Ph.D.  
 Terrence J. Sejnowski, Ph.D.  
 Shmuel Shtrikman, Ph.D.  
 Valentin L. Telegdi  
 Ronald E. Waltz, Ph.D.

#### Senior Lecturers

Roger Judge, Ph.D., *Emeritus*  
 Valentin Shevchenko, Ph.D.

The Department of Physics was established in 1960 as the first new department of the UCSD campus. Since then it has developed a strong faculty and student body with unusually diversified interests which lie primarily in the following areas:

1. Physics of elementary particles
2. Quantum liquids and superconductivity
3. Solid state and statistical physics
4. Plasma physics
5. Astrophysics and space physics
6. Atomic and molecular collision and structure
7. Biophysics
8. Geophysics
9. Nonlinear dynamics

In addition to on-campus research facilities, the high energy program uses accelerators at SLAC, CERN, Cornell, and Fermi Laboratory. The astrophysics program uses facilities at Keck, Lick, Mt. Lemmon, and Kitt Peak Observatories.

#### The Undergraduate Program

The Department of Physics offers undergraduate programs leading to the following degrees:

- B.S., Physics
- B.S., Physics with Specialization in Biophysics

B.S., Physics with Specialization in Biophysics-Premedical

B.S., Physics with Specialization in Earth Sciences

B.A., General Physics

B.A., General Physics/Secondary Education

A grade-point average of 2.0 or higher in the upper-division major program is required for graduation. Students must receive a grade of C- or better in any course to be counted toward fulfillment of the major requirements. In exceptional cases, students with a grade-point average in the major of 2.5 or greater may petition to have one grade of D accepted. All courses (lower- and upper-division) required for the major must be taken for a letter grade.

#### Shang-keng Ma Award

The Department of Physics presents the Shang-keng Ma Memorial Award at commencement each year to a graduating physics student who has shown exceptional ability and promise during the UCSD undergraduate years. The award was established in 1984 to commemorate the contributions of Professor Ma to the UCSD Department of Physics and to the field of theoretical condensed matter physics.

#### John Holmes Malmberg Prize

The John Holmes Malmberg Prize is presented annually at commencement to a graduating physics student who is recognized for potential for a career in physics and a measure of experimental inquisitiveness. This prize was established in 1993 in memory of Professor Malmberg who pioneered the use of non-neutral plasmas for sophisticated tests of plasma equilibrium, wave, and transport effects. He was an involved teacher of undergraduate and graduate students and was active in departmental and campus affairs.

#### Physics Major (B.S. Degree)

The upper-division program for physics majors is intended to provide basic education in several principal areas of physics, with some opportunity for study in neighboring areas in the form of restricted electives. Provision is made, both in the main courses and in the elective subjects, for some training in a few of the more technological aspects of physics.

In the junior year, the emphasis is on macroscopic physics; the two principal physics subjects are electromagnetism and mechanics. The mathematics background required for the physics program is completed in this year.

In the senior year, a sequence of courses in quantum physics provides the student the modern view of atomic and some aspects of subatomic physics and the principal analytical methods appropriate in this domain. The relation of the microscopic to the macroscopic world is the subject of courses in thermodynamics and statistical physics, with illustrations drawn from gas dynamics and solid-state physics. The quantum physics sequence aims at an integrated, descriptive, and analytical treatment of those areas of physics in which quantum effects are important, particularly atomic and nuclear physics and elementary particle physics.

Students are encouraged to incorporate Mathematics 110 into their lower-division studies.

The following courses are required for the physics major:

**Lower-Division**

1. Physics 4A-B-C-D-E\* and 2CL-DL.
2. Chemistry 6A
3. Mathematics 20C, 20D, 20E, 20F or 21C, 21D, 20E, 20F

\*If students transfer from another major or transfer from another college or university and have already completed the Physics 2 sequence or equivalent, they may petition to count Physics 2A-B-C-D plus Chemistry 6B or equivalent as a substitute for Physics 4A-B-C-D-E.

**Upper-Division**

1. Physics 100A-B-C, 105 or 130C, 110A-B, 120A-B, 130A-B, 140A-B, and two additional laboratory courses from the following group: 121, 131, 132, 133. Students may petition to have one Physics 199 replace Physics 132 or 133.
2. Mathematics 110.
3. Restricted Electives: Three upper-division (four-unit) or graduate courses in natural sciences or mathematics (one only), subject to departmental approval. (Mathematics 120A is recommended).

**Suggested Schedule**

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Physics 100A	Physics 100B	Physics 100C
Physics 105†	Physics 110B	Physics 120B
Physics 110A	Physics 120A	Physics 130A
Mathematics 110		
<b>SENIOR YEAR</b>		
Physics 130B	Physics 130C†	Restr. Elec.
Physics 140A	Physics 140B	Physics 132* or 133*
Restr. Elec.	Physics 131*	
Physics 121*	Restr. Elec.	

\*Students choose two out of these four senior lab courses.

†Students choose either Physics 105 or Physics 130C or may take both courses.

**Physics Major with Specialization in Biophysics (B.S. Degree)**

The upper-division program for physics majors with specialization in biophysics is essentially the same as the standard physics major with some modification to provide the education in biology and chemistry needed for advanced work in biophysics. Students entering the program with backgrounds deficient in mathematics or chemistry will be required to remedy the deficiency in their junior year. The consequent rearrangement of the upper-division program will be devised by consultation between the student and the physics departmental adviser for biophysics.

Students are encouraged to incorporate Mathematics 110 into their lower-division studies.

The following courses are required for the physics major with specialization in biophysics:

**Lower-Division**

1. Physics 4A-B-C-D-E and 2CL-DL; or Physics 2A-B-C-D and 2CL-DL (Physics 4 sequence is strongly recommended).
2. Chemistry 6A-B-C and 6BL-CL.
3. BILD 1.
4. Mathematics 20C, 20D, 20E, 20F or 21C, 21D, 20E, 20F.

**Upper-Division**

1. Physics 100A-B-C, 105, 110A, 120A-B, 130A-B, 153.
2. Chemistry 127 or 131, 140A-B, 143A.

3. BIBC 100, BIBC 103, BIMM 100, BICD 110, BICD 100.

4. Mathematics 110.

**Suggested Schedule**

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Physics 100A	Physics 100B	Physics 100C
Physics 105	Physics 120A	Physics 120B
Physics 110A	Chem. 140B	Physics 130A
Chem. 140A		Chem. 143A
<b>SENIOR YEAR</b>		
Physics 130B	BIBC 103	Physics 153
BIBC 100	Chem. 127#	BIMM 100
BICD 100		BICD 110
Chem. 131#		

#Students choose Chemistry 127 or Chemistry 131.

**Physics Major with Specialization in Biophysics-Premedical (B.S. Degree)**

The upper-division program for physics majors with specialization in biophysics-premedical is essentially the same as the standard physics major with some modification to provide the education in biology and chemistry needed for the study of medicine. Students entering the program with backgrounds deficient in mathematics or chemistry will be required to remedy the deficiency in their junior year. The consequent rearrangement of the upper-division program will be devised by consultation between the student and the departmental adviser for biophysics.

Students are encouraged to incorporate Mathematics 110 into their lower-division studies.

The following courses are required for the physics major with specialization in biophysics-premedical:

**Lower-Division**

1. Physics 4A-B-C-D-E and 2CL-DL; or Physics 2A-B-C-D and 2CL-DL (Physics 4 sequence is strongly recommended).
2. Chemistry 6A-B-C and 6BL-CL.
3. BILD 1.
4. Mathematics 20C, 20D, 20E, 20F or 21C, 21D, 20E, 20F.



**Upper-Division**

1. Physics 100A-B-C, 105, 110A, 120A-B, 130A, 153.
2. Chemistry 127 or 131, 140A-B, 143A.
3. BIBC 100, BICD 110, BICD 100, BIMM 100.
4. Mathematics 110.
5. Restricted Elective: one biology course (BICD 130, BICD 134, or BIMM 112).

**Suggested Schedule**

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Physics 100A	Physics 100B	Physics 100C
Physics 105	Physics 120A	Physics 120B
Physics 110A	Chem. 140B	Physics 130A
Chem. 140A		Chem. 143A
<b>SENIOR YEAR</b>		
BIBC 100	Chem. 127#	Physics 153
BICD 100	Restr. Elec.	BICD 110
Chem. 131#		BIMM 100

#Students choose Chemistry 127 or Chemistry 131

**Physics Major with Specialization in Earth Sciences (B.S. Degree)**

The upper-division program for physics majors with specialization in earth sciences is essentially the same as the standard physics major augmented by courses in earth sciences.

Students may wish to incorporate a small portion of the major program into their lower-division studies, for example, Earth Sciences 101, Physics 105, and Mathematics 110.

The following courses are required for the physics major with specialization in earth sciences:

**Lower-Division**

1. Physics 4A-B-C-D-E and 2CL-DL; or Physics 2A-B-C-D and 2CL-DL (Physics 4 sequence is strongly recommended).
2. Chemistry 6A-B and 6BL.
3. Mathematics 20C, 20D, 20E, 20F or 21C, 21D, 20E, 20F.

**Upper-Division**

1. Physics 100A-B-C, 105, 110A-B, 120A-B, 130A, 140A-B.
2. Earth Sciences 101, 102, 103, 120.
3. Mathematics 110.

4. Restricted Electives: three upper-division (four-unit) or graduate courses to be chosen with the approval of the SIO earth sciences adviser.

**Suggested Schedule**

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Physics 100A	Physics 100B	Physics 100C
Physics 110A	Physics 110B	Physics 120B
Earth Sci. 101	Physics 120A	Physics 130A
Mathematics 110	Earth Sci. 102	Earth Sci. 103
<b>SENIOR YEAR</b>		
Physics 105	Physics 140B	Restr. Elec.
Physics 140A	Earth Sci. 120	Restr. Elec.
Restr. Elec.		

**General Physics Major (B.A. Degree)**

This program covers the essential topics in physics and provides a broadly based education in the natural sciences. Starting with lower-division courses in mathematics, physics, computing, biology and/or chemistry, students proceed to upper-division mechanics, electricity and magnetism, thermal physics, quantum physics, and a physical measurements laboratory course. In addition, students take sixteen units of upper-division elective courses in the natural sciences or mathematics.

While the B.A. program is suitable for students who pursue a terminal degree in physics or use it as a preparation for other professional careers, it is not intended for those who wish to proceed to the Ph.D. in physics. The latter should enroll in the B.S. program.

The following courses are required for the general physics major:

**Lower-Division**

1. Physics 2A-B-C-D and 2CL-DL.
2. Mathematics 20A, 20B, 20C, 20D, 20E, 20F.
3. Three restrictive elective courses in science and engineering (a list of acceptable courses is given below).

**Upper-Division**

1. Physics 100A-B, 110A-B, 120A, 129 or 130A, 140A or Chemistry 127 or 131.
2. Mathematics 110.
3. Restricted Electives: Sixteen units of upper-division courses in science and engineering (excluding mathematics).

**Suggested Schedule**

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Physics 100A	Physics 100B	Physics 129 or 130A
Physics 110A	Physics 110B	Mathematics 110
<b>SENIOR YEAR</b>		
Physics 140A	Physics 120A	Restr. Elec.
(or Chem. 127 or 131)		
Restr. Elec.	Restr. Elec.	Restr. Elec.

**Approved Lower-Division Elective Courses**

One course in computing chosen from the following list:

- AMES 10, FORTRAN for Engineers
- AMES 15, Introduction to Engineering Graphics and Design
- CSE 10, Introduction to Programming Techniques
- CSE 30, Introduction to Systems Programming
- Physics 105, Computational Physics

Plus two of the following courses:

- BILD 1, The Cell
- BILD 2, Multicellular Life
- BILD 3, Organismic and Evolutionary Biology
- Chem. 6A, General Chemistry
- Chem. 6B, General Chemistry
- Chem. 6C, General Chemistry
- Chem. 6BL plus 6CL, General Chemistry Lab plus Intro. Analytical Chemistry

**General Physics/Secondary Education Major (B.A. Degree)**

This program is intended for students preparing for a career as a physics teacher in secondary schools. It covers the essential topics in physics and provides a broadly based education in the natural sciences. The program includes three courses in general chemistry plus a lab, one course in organic chemistry plus a lab, and a course in earth science as required by the Single Subject Credential Program of the state of California. It also includes three courses in Practicum in Learning offered by the Teacher Education Program. This degree is particularly suitable for students pursuing a Single Subject (Physics) credential for high schools. If you are interested in earning a California teaching credential from UCSD, contact the Teacher Education Program (TEP) for information about the prerequisite and professional preparation requirements. It is recommended that you contact TEP as early as possible in your academic career.

The following courses are required for the general physics/secondary education major:

**Lower-Division**

1. Physics 2A-B-C-D and 2CL-DL.
2. Chemistry 6A-B-C and 6BL.
3. Earth Sciences 10, 12, 30, or 40.
4. Mathematics 20A, 20B, 20C, 20D, 20E, 20F or 21C, 21D, 20E, 20F.

**Upper-Division**

1. Physics 100A-B, 110A-B, 120A, 129 or 130A.
2. Chemistry 140A and 143A.
3. Earth Sciences 101.
4. Mathematics 110.
5. TEP 129A-B-C.

**Suggested Schedule**

FALL	WINTER	SPRING
<b>JUNIOR YEAR</b>		
Physics 100A	Physics 100B	Chem. 143A
Physics 110A	Physics 110B	Physics 129 or 130A
Mathematics 110	Chem. 140A	
<b>SENIOR YEAR</b>		
Earth Sci. 101	TEP 129B	TEP 129C
TEP 129A	Physics 120A	

**Engineering Physics Program**

The engineering physics program is offered jointly by the Departments of Physics, AMES, and ECE, and is administered by the Department of ECE. (See "ECE, Engineering Physics Program.")

**Transfer Students**

Students who have had prior course work in the major at other institutions must consult with the Department of Physics, Student Affairs Office, 1110-115 Urey Hall Addition to make an appointment to see a faculty adviser.

**Minor in Physics**

Students may arrange minor programs or programs of concentration in physics by consulting with the Department of Physics Student Affairs Office, 1110-115 Urey Hall Addition, and their college for specific requirements. The Department of Physics requires at least twenty-eight units, of which at least twenty units must be upper-division. All courses must be taken for a letter grade. Lower-division transfer courses are permitted.

**Advising Office**

All students are assigned an academic adviser. It is strongly recommended students see their adviser at least once a quarter.

Additional advising information may be obtained from the Department of Physics Student Affairs Office, 1110-115 Urey Hall Addition (619) 534-3290.

**Honors Program**

The Department of Physics offers an Honors Program for students who demonstrate excellence in the major. Students interested in the Honors Program should consult the Student Affairs Office. Eligibility for the Honors Program includes completion of all lower-division physics courses, nine upper-division physics courses, Mathematics 110, and a GPA of a least 3.50 in the physics major.

The Honors Program consists of a minimum of eight units of Honors Thesis Research (Physics 199H), an Honors Thesis, and the presentation of the research to faculty and peers at UCSD's Undergraduate Research Conference or an Undergraduate Seminar.

Admission to the Honors Program is contingent upon the prior approval of the Honors Thesis "research topic" by the Vice Chair for Education.

**The Graduate Program**

The Department of Physics offers curricula leading to the following degrees:

- M.S., Physics
- C.Phil., Physics
- Ph.D., Physics
- Ph.D., Physics (biophysics)

Biophysics students will receive their M.S. and C.Phil. degrees in physics. Only their Ph.D. will be in physics (biophysics).

Entering graduate students are required to have a sound knowledge of undergraduate mechanics, electricity and magnetism; to have had senior courses or their equivalent in atomic and quantum physics, nuclear physics, and thermodynamics; and to have taken upper-division laboratory work. An introductory course in solid-state physics is desirable.

**Master's Degree Program**

Requirements for the master of science degree can be met according to Plan II (comprehensive examination). (See "Graduate Studies: The Master's Degree.") The comprehensive examination is identical to the first-year departmental examination for Ph.D. students. A list of acceptable courses is available in the Department of Physics Graduate Student Affairs office. There is no foreign language requirement.

**Doctoral Degree Program**

The department has developed a flexible Ph.D. program which provides a broad, advanced education in physics while at the same time giving students opportunity for emphasizing their special interests. This program consists of graduate courses, apprenticeship in research, teaching experience, and thesis research.

Entering students are assigned a faculty adviser to guide them in their program. Many students spend their first year as teaching assistants or fellows and begin apprentice research in their second year. When a student's association with a research area and research supervisor is well established, a faculty research progress committee is formed with the responsibility of conducting an annual review of progress and, at the appropriate time, initiating the formation of a doctoral committee. After three years of graduate study, or earlier, students complete the departmental examinations and begin thesis research. Students specializing in biophysics make up deficiencies in biology and chemistry during the first two years and complete the departmental examinations by the end of their third year of graduate study. There is no foreign language requirement.

**Entrance Testing**

An entrance test covering undergraduate physics is given to entering students during the first week of orientation to give better guidance to students in their graduate program. The results are not entered in the student's file. Entering students are encouraged, but not obliged, to bring the results to the first meeting with their academic adviser. Entering students may elect to take the Departmental Examination instead of taking the Entrance Test.

## Requirements for the Ph.D.

Students are required to pass a departmental examination, advanced graduate courses, an oral topic examination, a qualifying examination, and a final defense of the thesis as described below.

### 1. DEPARTMENTAL EXAMINATION

Physics students are required to take the departmental examination after completing one year of graduate work at UCSD. The examination is on the level of material usually covered in upper-division courses and the graduate courses listed below:

#### Fall

Physics 200A (Theoretical Mechanics)  
Physics 201 (Mathematical Physics)  
Physics 212A (Quantum Mechanics)

#### Winter

Physics 200B (Theoretical Mechanics)  
Physics 203A (Adv. Classical Electrodynamics)  
Physics 212B (Quantum Mechanics)

#### Spring

Physics 203B (Adv. Classical Electrodynamics)  
Physics 210A (Equilibrium Statistical Mechanics)  
Physics 212C (Quantum Mechanics)

The examination is offered twice a year, at the beginning of the fall and spring quarters, and lasts two days, four hours per day. The examination may be repeated once, the next time it is offered.

Biophysics students take the departmental examination after completing two years of graduate work.

### 2. ADVANCED GRADUATE COURSES

Physics students are required to take five advanced graduate courses (with a grade of C or better) from at least three of the groups listed below no later than the end of the third year of graduate work. A 3.0 average in four of the five courses is required. (In lieu of the course requirement, students may petition to take an oral examination covering three areas of physics.)

**Group 1:** Physics 218A, 218B, 218C (Plasma); 234 (Nonneutral Plas.); 235 (Nonlin. Plas. Th.)

**Group 2:** Physics 210B (Nonequil. Stat. Mech.); 211A, 211B (Solid State); 230 (Adv. Solid State); 236 (Many-body Th.)

**Group 3:** Physics 214 (Elem. Part.); 215A, 215B, 215C (Part. & Fields); 217A, 217B (Renorm. Field Th.); 233 (Adv. Elem. Part. Th.)

**Group 4:** Physics 220 (Group Th.); 221A, 221B (Nonlinear Dyn.); Mathematics 210A, 210B, 210C (Mathematics Physics); Mathematics 259A, 259B, 259C (Geom. Physics)

**Group 5:** Physics 206 (BioPhysics); Physics 207 (X-ray Crystallography); 213A, 213B (Nuc.); 216 (Atomic); 225A, 225B (Relativ.); 231 (Collision Th.)

**Group 6:** Physics 223 (Stel. Str.); 224 (Intrstel. Med.); 226 (Gal. & Gal. Dyn.); 227 (Cosmology); 228 (HE Astro. & Comp. Obj.)

Biophysics students select five courses from biology, biochemistry, chemistry, or physics in consultation with their adviser. At least three courses must be graduate courses.

### 3. ORAL TOPIC EXAMINATION

Physics students are required to take an oral topic examination the first time it is offered after passing the departmental examination. Three topics of current interest in physics or biophysics are announced two weeks prior to the examination week, and a list of relevant references is supplied. Students select one of the topics and present a one-half hour talk on it to a faculty examination committee. The oral presentation is followed by approximately 30–45 minutes of questioning generally related to the topic. This examination is offered twice a year, at the beginning of the fall and spring quarters, and may be repeated once, the next time it is offered.

Biophysics students take this examination no later than the spring of the third year of graduate work.

### 4. QUALIFYING EXAMINATION AND ADVANCEMENT TO CANDIDACY

In order to be advanced to candidacy, students must have met the departmental requirements and obtained a faculty research supervisor. At the time of application for advancement to candidacy, a doctoral committee responsible for the remainder of the student's graduate program is appointed by the Graduate Council. The committee conducts the Ph.D. qualifying examination during which students must demonstrate the ability to engage in the-

sis research. Usually this involves the presentation of a plan for the thesis research project. The committee may ask questions directly or indirectly related to the project and questions on general physics which it determines to be relevant. Upon successful completion of this examination, students are advanced to candidacy and are awarded the Candidate of Philosophy degree.

### 5. INSTRUCTION IN PHYSICS TEACHING

All graduate students are required to participate in "Instruction in Physics Teaching" under the supervision of a professor as part of their training for future careers. Students will participate in teaching recitation sections, problem sessions, or laboratory sections. Students are required to take a total of two units of Physics 500.

### 6. THESIS DEFENSE

When students have completed their theses, they are asked to present and defend them before their doctoral committees.

### TIME LIMITS FOR PROGRESS TO THE PH.D.

In accordance with university policy, the Department of Physics has established the following time limits for progress to the Ph.D. A student's research progress committee helps ensure that these time limits are met.

	Theorists	Experimentalists
Advancement to Candidacy	4 years	5 years
Total Registered Time and Support	7 years	8 years

### Departmental Colloquium

The department offers a weekly colloquium on topics of current interest in physics and on departmental research programs. Students are expected to register and attend the colloquium.

### Supplementary Course Work and Seminars

The department offers regular seminars in several areas of current interest. Students are strongly urged to enroll for credit in seminars related to their research interests and, when appropriate, to enroll in advanced graduate courses beyond the departmental requirement. To help beginning students choose a research

area and a research supervisor, the department offers a special seminar (Physics 261) that surveys physics research at UCSD.

### Course Credit by Examination

Students have an option of obtaining credit for a physics graduate course by taking the final examination without participating in any class exercises. They must, however, officially register for the course and notify the instructor and the Department of Physics graduate student affairs office of their intention no later than the first week of the course.

## COURSES

### LOWER-DIVISION

The lower-division courses are usually offered in the quarters indicated below:

FALL	WINTER	SPRING
Physics 1A	Physics 1A	Physics 1A
Physics 1B	Physics 1B	Physics 1B
Physics 1C	Physics 1C	Physics 1C
Physics 2A	Physics 2A	Physics 2A
Physics 2B	Physics 2B	Physics 2B
Physics 2BL	Physics 2BL	Physics 2BL
Physics 2C	Physics 2C	Physics 2C
Physics 2CL	Physics 2CL	Physics 2CL
Physics 2D	Physics 2D	Physics 2D
Physics 4C	Physics 2DL	Physics 2DL
Physics 5	Physics 4A	Physics 4B
Physics 10	Physics 4D	Physics 4E
Physics 11A	Physics 6	Physics 5
	Physics 7	Physics 8
	Physics 11B	Physics 10

The Physics 1 sequence is primarily intended for biology.

The Physics 2 sequence is intended for physical science and engineering majors and those biological science majors with strong mathematical aptitude.

The Physics 4 sequence is intended for all physics majors and for students with an interest in physics. This five-quarter sequence covers the same topics as the Physics 2 sequence, but it covers these topics more slowly and in more depth. The Physics 4 sequence provides a solid foundation for the upper-division courses required for the physics major.

Physics 5, 6, 7, 10, 11A and 11B are intended for non-science majors. Physics 5, 6, 7 and 10 do not use calculus while Physics 11A and B use some calculus.

#### 1A. Mechanics (Lecture and Laboratory) (5)

First quarter of a three-quarter calculus-based lecture and laboratory introductory physics course, geared toward life-science majors. Equilibrium and motion of particles in Newtonian mechanics, examples from astronomy, biology and sports, oscillations and waves, vibrating strings and sound. *Prerequisites: Mathematics 10A and concurrent enrollment in Mathematics 10B; or concurrent enrollment in Mathematics 20A.* (F,W,S) Effective fall 1998.

#### 1B. Electricity, Magnetism and Thermodynamics (Lecture and Laboratory) (5)

Second quarter of a three-quarter calculus-based lecture and laboratory introductory physics course geared toward life-science majors. Electric fields, magnetic fields, DC and AC circuitry, and thermal physics. *Prerequisites: Physics 1A and concurrent enrollment in Mathematics 10C or Mathematics 20B.* (F,W,S) Effective winter 1999.

#### 1C. Diffusion, Radiation and Modern Physics (Lecture and Laboratory) (5)

Third quarter of a three-quarter calculus-based lecture and laboratory introductory physics course geared toward life-science majors. Behavior of systems under combined thermal and electric forces, the interaction of light with matter as illustrated through optics and quantum mechanics. Examples from biology and instrumentation. *Prerequisites: Physics 1B and Mathematics 10C or Mathematics 20B.* (F,W,S) Effective spring 1999.

#### 2A. Physics-Mechanics (4)

A calculus-based science-engineering general physics course covering vectors, motion in one and two dimensions, Newton's first and second laws, work and energy, conservation of energy, linear momentum, collisions, rotational kinematics, rotational dynamics, equilibrium of rigid bodies, oscillations, gravitation. *Prerequisites: Mathematics 20A, and concurrent enrollment in Mathematics 20B.* (F,W,S)

#### 2AS. Physics-Mechanics (4)

Same as Physics 2A except that it is offered as a self-paced (Keller plan) course. *Prerequisites: Mathematics 20A and concurrent enrollment in Mathematics 20B.* (summer session only 1998-99)

#### 2B. Physics-Electricity and Magnetism (4)

Continuation of Physics 2A covering charge and matter, the electric field, Gauss's law, electric potential, capacitors and dielectrics, current and resistance, electromotive force and circuits, the magnetic field, Ampere's law, Faraday's law, inductance, electromagnetic oscillations, alternating currents and Maxwell's equations. *Prerequisites: Physics 2A, Mathematics 20B, and concurrent enrollment in Mathematics 20C or 21C.* (F,W,S)

#### 2BL. Physics Laboratory-Mechanics and Electrostatics (2)

One hour lecture and three hours' laboratory. Experiments include gravitational force, linear and rotational motion, conservation of energy and momentum, collisions, oscillations and springs, gyroscopes. Experiments on electrostatics involve charge, electric field, potential, and capacitance. Data reduction and error analysis are required for written laboratory reports. *Prerequisite: concurrent enrollment in Physics 2B, 2BS, or 4C.* (F,S)

#### 2BS. Physics-Electricity and Magnetism (4)

Same as Physics 2B, except that it is offered as a self-paced (Keller plan) course. *Prerequisites: Physics 2A, Mathematics 20B, and concurrent enrollment in Mathematics 20C or 21C.* (summer session only 1998-99)

#### 2C. Physics-Fluids, Waves, Thermodynamics, and Optics (4)

Continuation of Physics 2B covering fluid mechanics, waves in elastic media, sound waves, temperature, heat and the first law of thermodynamics, kinetic theory of gases, entropy and

the second law of thermodynamics, Maxwell's equations, electromagnetic waves, geometric optics, interference and diffraction. *Prerequisites: Physics 2B, Mathematics 20C or 21C, and concurrent enrollment in Mathematics 20D or 21D.* (F,W,S)

#### 2CS. Physics-Fluids, Waves, Thermodynamics, and Optics (4)

Same as Physics 2C, except that it is offered as a self-paced (Keller plan) course. *Prerequisites: Physics 2B, Mathematics 20C or 21C, and concurrent enrollment in Mathematics 20D or 21D.* (summer session only 1998-99)

#### 2CL. Physics Laboratory-Electricity and Magnetism, Waves, and Optics (2)

One hour lecture and three hours' laboratory. Experiments on refraction, interference/diffraction using lasers and microwaves; lenses and the eye; acoustics; oscilloscope and L-R-C circuits; oscillations, resonance and damping, measurement of magnetic fields; and the mechanical equivalence of heat. (Students may not receive credit for both Physics 1CL and Physics 2CL.) *Prerequisites: Prior or concurrent enrollment in Physics 1C, 2C, 2CS, or 4D.* (F,W)

#### 2D. Physics-Relativity and Quantum Physics (4)

A modern physics course covering atomic view of matter, electricity and radiation, atomic models of Rutherford and Bohr, relativity, X-rays, wave and particle duality, matter waves, Schrödinger's equation, atomic view of solids, natural radioactivity. *Prerequisites: Physics 2B and Mathematics 20D or 21D.* (F,W)

#### 2DS. Physics-Relativity and Quantum Physics (4)

Same as Physics 2D except that it is offered as a self-paced (Keller plan) course. *Prerequisites: Physics 2B and Mathematics 20D or 21D.* (summer session only 1998-99)

#### 2DL. Physics Laboratory-Modern Physics (2)

One hour of lecture and three hours of laboratory. Experiments to be chosen from refraction, diffraction and interference of microwaves, Hall effect, thermal band gap, optical spectra, coherence of light, photoelectric effect, e/m ratio of particles, radioactive decays, and plasma physics. *Prerequisites: 2BL or 2CL, prior or concurrent enrollment in Physics 2D, 2DS, or 4E.* (S)

#### 4A. Physics for Physics Majors-Mechanics (4)

The first quarter of a five-quarter calculus-based physics sequence for physics majors and students with a serious interest in physics. The topics covered are vectors, particle kinematics and dynamics, work and energy, conservation of energy, conservation of momentum, collisions, rotational kinematics and dynamics, equilibrium of rigid bodies. *Prerequisites: Mathematics 20A and concurrent enrollment in Mathematics 20B.* (W)

#### 4B. Physics for Physics Majors-Mechanics, Fluids, Waves, and Heat (4)

Continuation of Physics 4A covering oscillations, gravity, fluid statics and dynamics, waves in elastic media, sound waves, heat and the first law of thermodynamics, kinetic theory of gases, second law of thermodynamics, gaseous mixtures and chemical reactions. *Prerequisites: Physics 4A, Mathematics 20B and concurrent enrollment in Mathematics 20C or 21C.* (S)

#### 4C. Physics for Physics Majors-Electricity and Magnetism (4)

Continuation of Physics 4B covering charge and Coulomb's law, electric field, Gauss's law, electric potential, capacitors and dielectrics, current and resistance, magnetic field, Ampere's law, Faraday's law, inductance, magnetic properties of matter, LRC circuits, Maxwell's equations. *Prerequisites: Physics 4B, Mathematics 20C or 21C and concurrent enrollment in Mathematics 20D or 21D.* (F)

**4D. Physics for Physics Majors—Electromagnetic Waves, Optics, and Special Relativity (4)**

Continuation of Physics 4C covering electromagnetic waves and the nature of light, cavities and wave guides, electromagnetic radiation, reflection and refraction with applications to geometrical optics, interference, diffraction, holography, special relativity. *Prerequisites: Physics 4C, Mathematics 20D or 21D and concurrent enrollment in Mathematics 20E.* (W)

**4E. Physics for Physics Majors—Quantum Physics (4)**

Continuation of Physics 4D covering experimental basis of quantum mechanics: Schrödinger equation and simple applications; spin; structure of atoms and molecules; selected topics from solid state, nuclear, and elementary particle physics. *Prerequisites: Physics 4D, Mathematics 20E, and concurrent enrollment in Mathematics 20F.* (S)

**5. The Universe (4)**

Introduction to astronomy. Topics include the earth's place in the universe; the atom and light; the birth, life, and death of stars; the Milky Way galaxy; normal and active galaxies; and cosmology. Physics 5 or 7, and Earth Sciences 10 and 30 form a three-quarter sequence. Students may not receive credit for both Physics 5 and Physics 7. Restricted to P/NP grading option if taken after Physics 1A, 2A, or 4A. (F,S)

**6. Physics of Space Science and Exploration (4)**

Descriptive introduction to basic physics concepts relevant to space science and exploration. Topics include gravity; orbits, weightlessness, and Kepler's laws; the Earth's physical environment (including its atmosphere, its magnetic field, and radiation from the sun); and light as an electromagnetic wave. These topics form the basis for an introduction to the space program and discussion of the scientific reasons for performing experiments or observations in space. Restricted to P/NP grading option if taken after Physics 1A, 2A, or 4A. (W)

**7. Introductory Astronomy (4)**

Introduction to astronomy and astrophysics. Topics same as Physics 5. This course uses basic pre-calculus level mathematics (algebra, proportions, logs, similar triangles). Physics 5 or 7 and Earth Sciences 10 and 30 form a three-quarter sequence. Students may not receive credit for both Physics 5 and Physics 7. Restricted to P/NP grading option if taken after Physics 1A, 2A, or 4A. (W)

**8. Physics of Everyday Life (4)**

Examines phenomena and technology encountered in daily life from a physics perspective. Topics include waves, musical instruments, telecommunication, sports, appliances, transportation, computers, and energy sources. Physics concepts will be introduced and discussed as needed employing some algebra. No prior physics knowledge is required. Restricted to P/NP grading option if taken after Physics 1A, 2A, or 4A. (S)

**9. The Solar System (4)**

A non-mathematical exploration of our Solar System and other planetary systems for non-science majors. The Sun, terrestrial and giant planets, satellites, asteroids, comets and meteors. The formation of planetary systems, space exploration, the development and search for life. *Prerequisite: a companion to Physics 5—The Universe.* (W)

**10. Concepts in Physics (4)**

This is a one-quarter general physics course for nonscience majors. Topics covered are motion, energy, heat, waves, electric current, radiation, light, atoms and molecules, nuclear fission and fusion. This course emphasizes concepts with minimal mathematical formulation. *Prerequisite: college algebra or equivalent.* Restricted to P/NP grading option if taken after Physics 1A, 2A, or 4A. (W)

**11A. Survey of Physics (4)**

First quarter of a two-quarter survey of physics for non-science majors with strong mathematical background, including calculus. Physics 11A describes the laws of motion, gravity, energy, momentum, and relativity. A laboratory component consists of two experiments with gravity and conservation principles. *Prerequisites: Mathematics 10A or 20A and concurrent enrollment in Math 10B or 20B.* (F)

**11B. Survey of Physics (4)**

Second quarter of a two-quarter introductory physics course for non-science majors covering topics in classical and modern physics. Topics are taken from magnetism, electromagnetic radiation, relativity, quantum mechanics, atomic and nuclear physics, and cosmology. The laboratory requirement consists of two experiments of the student's choice. *Prerequisites: Physics 11A and Mathematics 10B or 20B.* (W)

**90. Undergraduate Seminar—Physics Today (1)**

Undergraduate seminars organized around the research interests of various faculty members. *Prerequisite: none.* (F,W,S)

**91. Undergraduate Seminar on Physics (1)**

Undergraduate seminars organized around the research interests of various faculty members. (F,W,S)

**UPPER-DIVISION****100A. Electromagnetism (4)**

Coulomb's law, electric fields, electrostatics; conductors and dielectrics; steady currents, elements of circuit theory. Four hours lecture. *Prerequisites: Physics 2C or 4D, Mathematics 20D or 21D; 20E, 20F.* (Concurrent enrollment in Math 20F permitted.) (F)

**100B. Electromagnetism (4)**

Magnetic fields and magnetostatics, magnetic materials, induction, AC circuits, displacement currents; development of Maxwell's equations. Four hours lecture. *Prerequisite: Physics 100A.* (W)

**100C. Electromagnetism (4)**

Electromagnetic waves, radiation theory; application to optics; motion of charged particles in electromagnetic fields; relation of electromagnetism to relativistic concepts. Four hours lecture. *Prerequisite: Physics 100B.* (S)

**105. Computational Physics (4)**

A laboratory-lecture course on practical computer programming, numerical methods and applications to physics problems. Problems in classical mechanics, quantum mechanics, statistical physics, and electromagnetism are solved using numerical techniques such as: root finding, interpolation, numerical differentiation and integration, and Monte Carlo methods. Use of graphics to interpret results. Some previous programming is expected. Two hours lecture, three hours laboratory. *Prerequisites: Physics 4E or 2D or equivalent; Mathematics 20E and 20F.* (F or S)

**107/207. Macromolecule Structure Determination by X-ray Crystallography (4)**

This course will describe the different steps used in solving for a three dimensional structure of a macromolecule using X-ray crystallography. Topics covered: Theory of X-ray Diffraction by a crystal; X-ray Sources & Detectors; Crystallization of a Protein; Crystal Symmetry; Solution of Phase Problem by the Isomorphous Replacement Method; Anomalous Scattering; Molecular Replacement Method; Model building and Phase Improvement; Structure Refinement. *Prerequisites: Mathematics 20D, Physics 100A, or BIBC 100 or Chemistry 114A or consent of instructor.* (F)

**110A. Mechanics (4)**

Coordinate transformations, review of Newtonian mechanics, linear oscillations, gravitation, calculus of variations, Hamilton's principle, Lagrangian dynamics, Hamilton's equations, central force motion. Four hours lecture. *Prerequisites: Physics 2C or 4D, Mathematics 20D or 21D, 20E, 20F* (co-registration in Mathematics 20F permitted). (F)

**110B. Mechanics (4)**

Noninertial reference systems, dynamics of rigid bodies, coupled oscillators, special relativity, continuous systems. *Prerequisites: Physics 110A and Mathematics 20E.* (W)

**120A-B. Physical Measurements (4-4)**

A laboratory-lecture course in physical measurements with an emphasis on electronic methods. Topics include circuit theory, special circuits. Fourier analysis, noise, transmission lines, transistor theory, amplifiers, feedback, operational amplifiers, oscillators, pulse circuits, digital electronics. Three hours lecture, four hours laboratory. *Prerequisites: Physics 2CL and 2DL, Physics 100A-B.* (W,S)

**121. Experimental Techniques (4)**

A laboratory-lecture course on the performance of scientific experiments with an emphasis on the use of microcomputers for control and data handling. Topics include microcomputer-architecture, interfacing, and programming, digital to analog and analog to digital conversion, asynchronous buses, interrupt and control techniques, transducers, actuators, digital signal processing—signal filtering, deconvolution, averaging and detection, construction techniques—soldering, parts selection, assembly methods, project management—planning, funding, scheduling, and utilization of personnel. Three hours lecture, four hours laboratory. *Prerequisite: Physics 120A-B or equivalent.* (F)

**129. Introduction to Quantum Theory (4)**

Particle-wave duality and empirical basis of quantum theory. Probability amplitudes and probability distributions. Wave mechanics and reduction to Newtonian mechanics. Schrödinger equation and hydrogenic wave functions. Semiclassical theory of radiation. Stern-Gerlach experiment and half-integer angular momentum. Spin, statistics, and the periodic table. Selected topics on periodic table. Selected topics on applications of quantum theory. *Prerequisites: Physics 2D, Mathematics 20D or 21D; 20F.* (S)

**130A. Quantum Physics (4)**

Phenomena which led to the development of quantum mechanics. Wave mechanics; the Schrödinger equation, interpretation of the wave function, the uncertainty principle, piece-wise constant potentials, simple harmonic oscillator, central field and the hydrogen atom. Observables and measurements. Four hours' lecture. *Prerequisites: Mathematics 110 or equivalent, Physics 2C or 2D, 4E, or equivalent.* (S)

**130B. Quantum Physics (4)**

Matrix mechanics, angular momentum and spin, Stern-Gerlach experiments, dynamics of two-state systems, approximation methods, the complete hydrogen spectrum, identical particles. Four hours lecture. *Prerequisite: Physics 130A.* (F)

**130C. Quantum Physics (4)**

Scattering theory, symmetry and conservation laws, systems of interacting particles, interaction of electromagnetic radiation with matter, Fermi golden rule, the relativistic electron. *Prerequisites: Physics 100C or equivalent, 130B.* (W)

**131. Modern Physics Laboratory (2)**

Experiments in radioactivity, X-rays, atomic physics, resonance physics, solid-state physics, etc. Four hours laboratory. *Prerequisites: Physics 2CL and 2DL, Physics 130A.* (W)

**132. Modern Physics Laboratory (2)**

Experiments in Elementary Particle Physics utilizing cosmic rays and experimental techniques of High Energy Physics. Four hours laboratory per week. *Prerequisites: Physics 2CL and 2DL, Physics 130A-B.* (S)

**133/219. Condensed Matter/Materials Science Laboratory (4)**

A project-oriented laboratory course utilizing state-of-the-art experimental techniques in materials science. The course prepares students for research in a modern condensed matter-materials science laboratory. Under supervision, the students develop their own experimental ideas after investigating current research literature. With the use of sophisticated state of the art instrumentation students conduct research, write a research paper, and make verbal presentations. *Prerequisites: Physics 2CL and 2DL for undergraduates; Physics 152 or Physics 211A for graduate students.* (S)

**140A. Statistical and Thermal Physics (4)**

Statistical description of physical systems, the concepts of ensembles, entropy and temperature, the thermodynamic laws, thermodynamic potentials, and the ideal gas. Four hours lecture. *Prerequisites: Physics 110A or equivalent, and 130A, or consent of instructor.* (F)

**140B. Statistical and Thermal Physics (4)**

Bose-Einstein and Fermi-Dirac statistics, phase transitions, fluctuation and transport phenomena. Applications to the non-ideal gas, radiation, and chemical and condensed matter physics. Four hours lecture. *Prerequisites: Physics 130B and 140A.* (W)

**151. Plasma Physics (4)**

Particle motions, plasmas as fluids, waves, diffusion, equilibrium and stability, nonlinear effects, controlled fusion. Three hours lecture. *Prerequisites: Physics 100A-B and 110A.* (S)

**152. Introduction to Condensed Matter Physics (4)**

Crystal symmetry, free electron gas, band structure, properties of insulators, semiconductors and metals; atomic diffusion, alloys, electric transport phenomena. Four hours lecture. *Prerequisites: Physics 130B, concurrent enrollment in 140B.* (W)

**153. Topics in Biophysics/Photobiology (4)**

(Course content varies yearly.) Basic principles of photobiology and photochemistry. Photochemical mechanisms in photosynthesis. Photoreceptor pigment systems and photobiological control mechanisms in living organisms. Three hours lecture. (Same as BIBC 153, Chemistry 153.) *Prerequisite: upper-division standing in biology, chemistry, or physics, or consent of instructor.* (S)

**154. Nuclear and Particle Physics (4)**

Elementary nuclear physics. Quantum mechanics of radiation. Elementary particles and scattering. *Prerequisites: Physics 100C and 130B.* (S)

**155. Nonlinear Dynamics (4)**

Qualitative aspects of Hamiltonian and dissipative dynamical systems: stability of orbits, integrability of Hamiltonian systems, chaos and nonperiodic motion, transition to chaos. Examples to be drawn from mechanics, fluid mechanics, and related physical systems. Numerical work and graphical display and interpretation will be emphasized. Three hours lecture. *Prerequisites: Physics 100B and 110B.* (S)

**160. Stellar Astrophysics (4)**

Introduction to stellar astrophysics: observational properties of stars, solar physics, radiation and energy transport in stars, stellar spectroscopy, nuclear processes in stars, stellar structure and evolution, degenerate matter and compact stellar objects. Physics 160, 161, 162 may be taken as a three-quarter

sequence for students interested in pursuing graduate study in astrophysics or individually as topics of interest. *Prerequisites: Physics 2 or 4 sequence or equivalent, upper-division standing in physical science or engineering.* (F)

**161. The Galaxy and the Interstellar Medium (4)**

The physics of the interstellar medium: thermal and nonthermal processes, 21 cm radiation, ionized hydrogen regions, supernovae and supernovae remnants; the physics and chemistry of interstellar dust; star formation, the structure of the Milky Way galaxy, stellar motions and distances, stellar populations. Physics 160, 161, 162 may be taken as a three-quarter sequence for students interested in pursuing graduate study in astrophysics or individually as topics of interest. Some outside preparation may be required for students who have not taken Physics 160. *Prerequisites: Physics 2 or 4 sequence or equivalent, upper-division standing in physical science or engineering.* (W)

**162. Galaxies and Cosmology (4)**

The structure and properties of normal galaxies, galaxy rotation and dynamics, galaxy formation and evolution, the physics of active galactic nuclei: radio galaxies, Seyfert galaxies and quasi-stellar objects, the extragalactic distance scale, and physical cosmology. Physics 160, 161, 162 may be taken as a three-quarter sequence for students interested in pursuing graduate study in astrophysics or individually as topics of interest. Some outside preparation may be required for students who have not taken Physics 160 and 161. *Prerequisites: Physics 2 or 4 sequence or equivalent, upper-division standing in physical science or engineering.* (S)

**163. Exploring the Solar System (4)**

Topics will include: the early solar system, and planetary formation; an introduction to the Sun and planets; the solar wind and its interaction with planets; spacecraft instruments and observations; the search for life in the solar system; and the search for planets outside our solar system. *Prerequisites: Physics 2A-B or Physics 4A-C4.* (F)

**170. Physics of Medical Instruments (4)**

The physics principles of medical diagnostic instruments, including electrokinetic phenomena, chromatography, spectroscopy, microscopy; ultrasounds, X-ray, MRI, tomography, lasers in surgery, fiber optics in diagnostics. *Prerequisites: Physics 1C.* (F)

**182. Atmospheric Physics and Flight Aerodynamics (4)**

The application of thermodynamics and fluid mechanics to a study of the earth's atmosphere and to the flight of aircraft in that atmosphere. Topics include winds, stability, fronts, cloud physics, lift, drag, aircraft stability, and performance. Three hours' lecture. *Prerequisites: upper-division standing in physical science, engineering, or consent of instructor.* (S)

**195. Physics Instruction (2-4)**

Students will be responsible for and teach a class section of a lower-division physics course. They will also attend a weekly meeting on teaching methods and materials conducted by the professor who supervises their teaching. (P/NP grades only.) *Prerequisite: consent of instructor.* (F,W,S)

**198. Directed Group Study (2 or 4)**

Directed group study on a topic or in a field not included in the regular departmental curriculum. (P/NP grades only.) *Prerequisites: consent of instructor and departmental chair.* (F,W,S)

**199. Research for Undergraduates (2 or 4)**

Independent reading or research on a problem by special arrangement with a faculty member. (P/NP grades only.) *Prerequisites: consent of instructor and departmental chair.* (F,W,S)

**199H. Honors Thesis Research for Undergraduates (2-4)**

Honors thesis research for seniors participating in the Honors Program. Research is conducted under the supervision of a

physics faculty member. *Prerequisites: admission to the Honors Program in physics.* (F,W,S)

**GRADUATE**

**200A. Theoretical Mechanics (4)**

Lagrange's equations and Hamilton's principle; symmetry and constants of the motion. Applications to: charged particle motion; central forces and scattering theory; small oscillations; anharmonic oscillations; rigid body motion; continuum mechanics. *Prerequisite: Physics 110B or equivalent.* (F)

**200B. Theoretical Mechanics (4)**

Hamilton's equations, canonical transformations; Hamilton-Jacobi theory; action-angle variables and adiabatic invariants; introduction to canonical perturbation theory, nonintegrable systems and chaos; Liouville equation; ergodicity and mixing; entropy; statistical ensembles. *Prerequisite: Physics 200A.* (W)

**201. Mathematical Physics (5)**

An introduction to mathematical methods used in theoretical physics. Topics include: a review of complex variable theory, applications of the Cauchy residue theorem, asymptotic series, method of steepest descent, Fourier and Laplace transforms, series solutions for ODE's and related special functions, Sturm Liouville theory, variational principles, boundary value problems, and Green's function techniques. (F)

**203A. Advanced Classical Electrodynamics (5)**

Electrostatics, symmetries of Laplace's equation and methods for solution, boundary value problems, electrostatics in macroscopic media, magnetostatics, Maxwell's equations, Green functions for Maxwell's equations, plane wave solutions, plane waves in macroscopic media. *Prerequisite: Physics 100C or equivalent.* (W)

**203B. Advanced Classical Electrodynamics (4)**

Special theory of relativity, covariant formulation of electrodynamics, radiation from current distributions and accelerated charges, multipole radiation fields, waveguides and resonant cavities. *Prerequisite: Physics 203A.* (S)

**206. Topics in Biophysics and Physical Biochemistry (4)**

(Same as BIOG 206, Chemistry 206.) Selection of topics of current interest. Examples: primary processes of photosynthesis; membrane biophysics; applications of physical methods to problems in biology and chemistry, e.g., magnetic resonance, X-ray diffraction, fluctuation spectroscopy, optical techniques (fluorescence, optical rotary dispersion, circular dichroism). Topics may vary from year to year. *Prerequisite: consent of instructor.* (W)

**107/207. Macromolecule Structure Determination by X-ray Crystallography (4)**

This course will describe the different steps used in solving for a three dimensional structure of a macromolecule using X-ray crystallography. Topics covered: Theory of X-ray Diffraction by a crystal; X-ray Sources & Detectors; Crystallization of a Protein; Crystal Symmetry; Solution of Phase Problem by the Isomorphous Replacement Method; Anomalous Scattering; Molecular Replacement Method; Model building and Phase Improvement; Structure Refinement. *Prerequisites: Mathematics 20D, Physics 100A, or BIBC 100 or Chemistry 114A or consent of instructor.* (F)

**210A. Equilibrium Statistical Mechanics (5)**

Thermodynamic potentials; equation of state; cluster expansion for interacting systems. Quantum statistics. Bose condensation. Phase transitions via mean field theory. Ising model and critical phenomena. *Prerequisites: Physics 140A-B, 152, or equivalent; concurrent enrollment in Physics 212C.* (S)

**210B. Nonequilibrium Statistical Mechanics (4)**

Transport phenomena; kinetic theory of gases; Boltzmann equation; Chapman-Enskog method; stochastic processes; Langevin



and Fokker-Planck equation; BBGKY hierarchy; molecular dynamics; quantum kinetics. Fluctuation-dissipation theorem. Other topics may include: Kubo's formula; dispersion relations; Onsager reciprocity; conduction and diffusion. Fluids; hydrodynamic modes; nonlinear effects and mode-mode coupling; Benard convection, BZ reaction; turbulent mixing and Kolmogorov spectrum. First order phase transitions; nucleation; spinodal decomposition. *Prerequisite: Physics 210A.* (F)

#### 211A. Solid-State Physics (5)

The first of a two-quarter course in solid-state physics. Covers a range of solid-state phenomena that can be understood within an independent particle description. Topics include: chemical versus band-theoretical description of solids, electronic band structure calculation, lattice dynamics, transport phenomena and electrodynamics in metals, optical properties, semiconductor physics. *Prerequisite: Physics 152 or equivalent.* (F)

#### 211B. Solid-State Physics (4)

Continuation of 211A. Deals with collective effects in solids arising from interactions between constituents. Topics include electron-electron and electron-phonon interactions, screening, band structure effects, Landau Fermi liquid theory. Magnetism in metals and insulators, superconductivity; occurrence, phenomenology, and microscopic theory. *Prerequisites: Physics 210A, 211A.* (Offered in alternate years.) (W)

#### 212A. Quantum Mechanics (4)

Hilbert space formulation of quantum mechanics and application to simple systems: states and observables, uncertainty relations and measurements, time evolution, and mixed states and density matrix. Symmetries: commuting observables and symmetries, rotation group representations, Clebsch-Gordon coefficients, Wigner-Eckhardt theorem, and discrete symmetries (parity, time reversal, etc.). *Prerequisite: Physics 130B or equivalent.* (F)

#### 212B. Quantum Mechanics (4)

Time independent perturbation theory: non-degenerate and degenerate cases, Zeeman effect, fine structure, exclusion principle, and many-electron atoms. Time dependent perturbation theory: interaction picture and Dyson series, transition rates. Radiation theory: quantization of EM field, calculation of atomic level transition rates, line width, and spontaneous decay. *Prerequisite: Physics 212A.* (W)

#### 212C. Quantum Mechanics (4)

Scattering theory: Lippman-Schwinger formalism, Born approximation, partial waves, inelastic processes, and spin dependence. Path integrals: introductions and simple examples, rigid rotator, and Bohm-Aharonov effect. Dirac equation: single particle equation, hydrogen atom, and holes. *Prerequisites: Physics 212A, 212B.* (S)

#### 214. Physics of Elementary Particles (4)

Classification of particles using symmetries and invariance principles, quarks and leptons, quantum electrodynamics, weak interactions,  $e^+p$  interactions, deep-inelastic lepton-nucleon scattering, pp collisions, introduction to QCD. *Prerequisite: Physics 215A.* (W)

#### 215A. Particles and Fields (4)

The first quarter of a three-quarter course on field theory and elementary particle physics. Topics covered include the relation between symmetries and conservation laws, the calculation of cross sections and reaction rates, covariant perturbation theory, and quantum electrodynamics. (F)

#### 215B. Particles and Fields (4)

Continuation of 215A. Gauge theory quantization by means of path integrals, SU(3) symmetry and the quark model, spontaneous symmetry breakdown, introduction to QCD and the Glashow-Weinberg-Salam model of weak interactions, basic issues of renormalization. *Prerequisite: Physics 215A.* (W)

#### 215C. Particles and Fields (4)

Modern applications of the renormalization group in quantum chromodynamics and the weak interactions. Unified gauge theories, particle cosmology, and special topics in particle theory. *Prerequisites: Physics 215A, 215B.* (Offered in alternate years.) (S)

#### 216. Atomic and Molecular Physics (4)

Structure of atoms, the Hartree-Fock method, correlation energy and relativistic corrections. Structure of molecules, the Born-Oppenheimer method, the molecular electronic state, the stability and build-up of molecules, molecular orbital theory. The interaction of atoms and molecules with external fields. Atomic and molecular collisions. *Prerequisite: Physics 212A.* (W)

#### 217A-B. Renormalization in Field Theory, the Renormalization Group, and Critical Phenomena (4-4)

The pertinent concepts and ideas in the theory of critical phenomena are explained using the field theory techniques of renormalization and the renormalization group. Modern applications of the renormalization group in quantum chromodynamics and the electroweak model are discussed in part B. Part A is oriented towards condensed matter and particle physics theorists. The focus of part B is on particle physics. *Prerequisite: Physics 212C or consent of instructor.* (S,F)

#### 218A. Plasma Physics (4)

The basic physics of plasmas is discussed for the simple case of an unmagnetized plasma. Topics include: thermal equilibrium statistical properties, fluid and Landau theory of electron and ion plasma waves, velocity space instabilities, quasi-linear theory, fluctuations, scattering or radiation, Fokker-Planck equation. (F)

#### 218B. Plasma Physics (4)

This course deals with magnetized plasma. Topics include: Appleton-Hartree theory of waves in cold plasma, waves in warm plasma (Bernstein waves, cyclotron damping). MHD equations, MHD waves, low frequency modes, and the adiabatic theory of particle orbits. *Prerequisite: Physics 218A.* (W)

#### 218C. Plasma Physics (4)

This course deals with the physics of confined plasmas with particular relevance to controlled fusion. Topics include: topology of magnetic fields, confined plasma equilibria, energy principles, ballooning and kink instabilities, resistive MHD modes (tearing, rippling and pressure-driven), gyrokinetic theory, microinstabilities and anomalous transport, and laser-plasma interactions relevant to inertial fusion. *Prerequisite: Physics 218B.* (S)

#### 133/219. Condensed Matter/Materials Science Laboratory (4)

A project-oriented laboratory course utilizing state-of-the-art experimental techniques in materials science. The course prepares students for research in a modern condensed matter-materials science laboratory. Under supervision, the students develop their own experimental ideas after investigating current research literature. With the use of sophisticated state of the art instrumentation students conduct research, write a research paper, and make verbal presentations. *Prerequisites: Physics 2CL and 2DL for undergraduates; Physics 152 or Physics 211A for graduate students.* (S)

#### 220. Group Theoretical Methods in Physics (4)

Study of the representations and applications of groups to problems in physics, with particular emphasis on the permutation of unitary groups. *Prerequisite: Physics 212C.* (S)

#### 221A. Nonlinear and Nonequilibrium Dynamics of Physical Systems (4)

An introduction to the modern theory of dynamical systems and applications thereof. Topics include maps and flows, bifurcation theory and normal form analysis, chaotic attractors in dissipative systems, Hamiltonian dynamics and the KAM theo-

rem, and time series analysis. Examples from real physical systems will be stressed throughout. *Prerequisite: Physics 200B.* (Offered in alternate years.) (W)

#### 221B. Nonlinear and Nonequilibrium Dynamics of Physical Systems (4)

Nonlinear dynamics in spatially extended systems. Material to be covered includes fluid mechanical instabilities, the amplitude equation approach to pattern formation, reaction-diffusion dynamics, integrable systems and solitons, and an introduction to coherent structures and spatio-temporal chaos. *Prerequisites: Physics 210B and 221A.* (Offered in alternate years.) (S)

#### 223. Stellar Structure and Evolution (4)

Energy generation, flow, hydrostatic equilibrium, equation of state. Dependence of stellar parameters (central surface temperature, radius, luminosity, etc.) on stellar mass and relation to physical constants. Relationship of these parameters to the H-R diagram and stellar evolution. Stellar interiors, opacity sources, radiative and convective energy flow. Nuclear reactions, neutrino processes. Polytropic models. White dwarfs and neutron stars. *Prerequisites: Physics 130C or equivalent, Physics 140A-B or equivalent.* (S/U grades permitted.) (Offered in alternate years.) (F)

#### 224. Physics of the Interstellar Medium (4)

Gaseous nebulae, molecular clouds, ionized regions, and dust. Low energy processes in neutral and ionized gases. Interaction of matter with radiation, emission and absorption processes, formation of atomic lines. Energy balance, steady state temperatures, and the physics and properties of dust. Masers and molecular line emission. Dynamics and shocks in the interstellar medium. *Prerequisites: Physics 130A-B or equivalent, Physics 140A-B or equivalent.* (S/U grades permitted.) (Offered in alternate years.)

#### 225A-B. General Relativity (4-4)

This is a two-quarter course on gravitation and the general theory of relativity. The first quarter is intended to be offered every year and may be taken independently of the second quarter. The second quarter will be offered in alternate years. Topics covered in the first quarter include special relativity, differential geometry, the equivalence principle, the Einstein field equations, and experimental and observational tests of gravitation theories. The second quarter will focus on more advanced topics, including gravitational collapse, Schwarzschild and Kerr geometries, black holes, gravitational radiation, cosmology, and quantum gravitation. (225B offered in alternate years) (F,W)

#### 226. Galaxies and Galactic Dynamics (4)

The structure and dynamics of galaxies. Topics include potential theory, the theory of stellar orbits, self-consistent equilibria of stellar systems, stability and dynamics of stellar systems including relaxation and approach to equilibrium. Collisions between galaxies, galactic evolution, dark matter, and galaxy formation. *Prerequisite: consent of instructor.* (Offered in alternate years.)

#### 227. Cosmology (4)

An advanced survey of topics in physical cosmology. The Friedmann models and the large-scale structure of the universe, including the observational determination of  $H_0$  (the Hubble constant) and  $q_0$  (the deceleration parameter). Galaxy number counts. A systematic exposition of the physics of the early universe, including vacuum phase transitions; inflation; the generation of net baryon number, fluctuations, topological defects and textures. Primordial nucleosynthesis, both standard and nonstandard models. Growth and decay of adiabatic and isocurvature density fluctuations. Discussion of dark matter candidates and constraints from observation and experiment. Nucleocosmo-chronology and the determination of the age of the universe. *Prerequisite: consent of instructor.* (Offered in alternate years.)

**228. High-Energy Astrophysics and Compact Objects (4)**

The physics of compact objects, including the equation of state of dense matter and stellar stability theory. Maximum mass of neutron stars, white dwarfs, and super-massive objects. Black holes and accretion disks. Compact x-ray sources and transient phenomena, including x-ray and  $\gamma$ -ray bursts. The fundamental physics of electromagnetic radiation mechanisms: synchrotron radiation, Compton scattering, thermal and nonthermal bremsstrahlung, pair production. Pulsars. Particle acceleration models. Neutrino production and energy loss mechanisms. Supernovae and neutron star production. *Prerequisites: Physics 130A-B-C or equivalent.* (Offered in alternate years.)

**230. Advanced Solid-State Physics (4)**

Selection of advanced topics in solid-state physics; material covered may vary from year to year. Examples of topics covered: disordered systems, surface physics, strong-coupling superconductivity, quantum Hall effect, low-dimensional solids, heavy fermion systems, high-temperature superconductivity, solid and liquid helium. *Prerequisite: Physics 211B.* (Offered in alternate years.) (S)

**234. Nonneutral Plasmas (4)**

This course treats the physics of nonneutral plasmas. Topics include equilibrium, stability, transport, linear modes and instabilities, and the effects of strong correlation and strong magnetization. *Prerequisite: Physics 218C or consent of instructor.* (Offered in alternate years.) (F)

**235. Nonlinear Plasma Theory (4)**

This course deals with nonlinear phenomena in plasmas. Topics include: orbit perturbation theory, stochasticity, Arnold diffusion, nonlinear wave-particle and wave-wave interaction, resonance broadening, basics of fluid and plasma turbulence, closure methods, models of coherent structures. *Prerequisite: Physics 218C or consent of instructor.* (Offered in alternate years.) (W)

**236. Many-Body Theory (4)**

Effects of interactions in large quantum mechanical systems at zero or finite temperature analyzed from a unified viewpoint. Symmetries, conservation laws, perturbation theory, sum rules, inequalities. Applications to Bose, Fermi, normal, superfluid, charged, neutral, degenerate, dilute, etc., systems. *Prerequisites: Physics 210A-B, 212C.* (Offered in alternate years.) (S)

**239. Special Topics (1-3)**

From time to time a member of the regular faculty or a resident visitor will find it possible to give a self-contained short course on an advanced topic in his or her special area of research. This course is not offered on a regular basis, but it is estimated that it will be given once each academic year. (S/U grades permitted.)

**250. Condensed Matter Physics Seminar (0-1)**

Discussion of current research in physics of the solid state and of other condensed matter. (S/U grades only.) (F,W,S)

**251. High-Energy Physics Seminar (0-1)**

Discussions of current research in nuclear physics, principally in the field of elementary particles. (S/U grades only.) (F,W,S)

**252. Plasma Physics Seminar (0-1)**

Discussions of recent research in plasma physics. (S/U grades only.) (F,W,S)

**253. Astrophysics and Space Physics Seminar (0-1)**

Discussions of recent research in astrophysics and space physics. (S/U grades only.) (F,W,S)

**255. Theoretical Solid-State Seminar (0-1)**

Discussions of current research in theoretical solid-state physics. (S/U grades only.) (F,W,S)

**256. Biophysics Special Topics Seminar (0-1)**

Discussions of current research in experimental solid state physics and biophysics. (S/U grades only.) (F,W,S)

**257. High-Energy Physics Special Topics Seminar (0-1)**

Discussions of current research in high-energy physics. (S/U grades only.) (F,W,S)

**258. Astrophysics and Space Physics Special Topics Seminar (0-1)**

Discussions of current research in astrophysics and space physics. (S/U grades only.) (F,W,S)

**260. Physics Colloquium (0-1)**

Discussions of recent research in physics directed to the entire physics community. (S/U grades only.) (F,W,S)

**261. Seminar on Physics Research at UCSD (0-1)**

Discussions of current research conducted by faculty members in the Department of Physics. (S/U grades only.) (W,S)

**262. Complex Dynamical Systems Seminar (0-1)**

Discussions of recent research in nonlinear and nonequilibrium physics. (S/U grades only.) (F,W,S)

**263. Physics and Physics-Related Topics of Current Interest Seminar (0-1)**

Discussion of "cutting edge" topics and current advances in physics and physics-related topics, directed to all physics graduate students. The seminars are designed to foster an interactive mode of information transfer with extensive discussion. *Prerequisite: none.*

**265. Neuronal Networks Topics Seminar (1)**

Discussion of current research on neuronal systems and dynamics. (F,W,S)

**297. Special Studies in Physics (1-4)**

Studies of special topics in physics under the direction of a faculty member. *Prerequisites: consent of instructor and departmental vice chair, education.* (S/U grades permitted.) (F,W,S)

**298. Directed Study in Physics (1-12)**

Research studies under the direction of a faculty member. (S/U grades permitted.) (F,W,S)

**299. Thesis Research in Physics (1-12)**

Directed research on dissertation topic. (F,W,S)

**500. Instruction in Physics Teaching (1-4)**

This course, designed for graduate students, includes discussion of teaching, techniques and materials necessary to teach physics courses. One meeting per week with course instructors, one meeting per week in an assigned recitation section, problem session, or laboratory section. Students are required to take a total of two units of Physics 500. (F,W,S)

- Ellen T. Comisso, Ph.D.
- Wayne A. Cornelius, Ph.D.
- Gary W. Cox, Ph.D.
- Paul W. Drake, Ph.D.
- Peter A. Gourevitch, Ph.D.
- H. N. Hirsch, Ph.D., *Chair*
- Germaine A. Houston, Ph.D.
- Peter H. Irons, Ph.D., J.D.
- Gary C. Jacobson, Ph.D.
- Samuel H. Kernell, Ph.D.
- David A. Lake, Ph.D.
- Sanford A. Lakoff, Ph.D., *Professor Emeritus*
- Arend Lijphart, Ph.D., *Professor Emeritus*
- David R. Mares, Ph.D.
- Mathew D. McCubbins, Ph.D.
- Samuel L. Popkin, Ph.D.
- Susan L. Shirk, Ph.D.
- Peter H. Smith, Ph.D.
- Kaare Strom, Ph.D.
- Tracy B. Strong, Ph.D.

**Adjunct Professors**

- Peter F. Cowhey, Ph.D.
- Harvey Goldman, Ph.D.
- Stephan Haggard, Ph.D.
- Daniel Hallin, Ph.D.
- Miles Kahler, Ph.D.
- Kevin Middlebrook, Ph.D.

**Associate Professors**

- Ann L. Craig, Ph.D.
- Steven P. Erie, Ph.D.
- Alan C. Houston, Ph.D.
- Arthur W. Lupia, Ph.D.
- Victor V. Magagna, Ph.D.
- Philip G. Roeder, Ph.D.

**Adjunct Associate Professor**

- Richard Kronick, Ph.D.
- Andrew MacIntyre, Ph.D.
- Matthew Shugart, Ph.D.

**Assistant Professors**

- Elisabeth R. Gerber, Ph.D.
- Michael J. Hiscox, Ph.D.
- Paul A. Papayoanou, Ph.D.
- Gary A. Shiffman, Ph.D.

**Senior Lecturer with Security of Employment**

- William M. Chandler, Ph.D.

**Political Science**

OFFICE: Social Science Building

**Professors**

- Nathaniel L. Beck, Ph.D.
- Amy Bridges, Ph.D.
- Marsha A. Chandler, Ph.D., *Senior Vice Chancellor, Academic Affairs*

## The Major Program

Political science addresses some of the fundamental problems facing human society. Questions concerning world peace, government policies aimed at achieving economic stability and growth, the management of environmental quality, control over political competition, the possibility of using law to affect social and political change, and the gap between the rich and poor in the U.S. and abroad are all on the research agenda of contemporary political scientists. The general purpose of the major is to address these and other issues systematically, and, simultaneously, to raise the broad theoretical questions which can help students relate today's political debates to those debates about politics which have kept a theoretical tradition alive for over 2,000 years.

Students may major in political science as a general program of study, or they may concentrate in one of six areas: (1) American politics, (2) comparative politics, (3) international relations, (4) political theory, (5) public law, and (6) public policy. All majors in political science must satisfy the following sixteen courses: PS 30 (Political Inquiry), three of the following four lower-division courses (Political Science 10, 11, 12 and 13) and twelve upper-division courses. Moreover, as stated below, students concentrating in one of the fields must satisfy that field's particular lower- and upper-division requirements.

### *Requirements for Major in Political Science without an Area of Concentration*

1. Three of the four lower-division courses
2. Any twelve upper-division political science courses

### *Requirements for Major in Political Science with an Area of Concentration*

#### **Major in Political Science/American Politics**

1. Lower-division required: PS 10 (in addition to two other lower-division courses)
2. Five upper-division American courses:

- A. at least two of which must be from the 100 sequence: 100A, 100B, 100C, 100DA, 100E, 100F, 100G, 100H, 100I
- B. the additional courses for the American concentration must be chosen from: 102B, 102C, 102E, 102F, 102G, 102H, 102IA-IB, 102J, 102L, 103A, 104A, 104B, 104C, 104F, 104I, 104L, 107A.

#### **Major in Political Science/Comparative Politics**

1. Lower-division required: PS 11 (in addition to two other lower-division courses)
2. Five upper-division courses including:
  - A. at least one from the following thematic courses: 122A, 123A-B, 124A, 124B, 126AA, 126AC, 132A, 136B, 137A, 139A, 150A-B
  - B. and at least one each from two of the following three regional areas:
 

Asia: 130B, 130H, 131C, 132B, 133A, 133E

Europe: 120A, 120B, 120C, 120D, 120E, 120F, 120G, 120H, 126AB, 130AA, 130AD

Latin America: 134AA-AB, 134B-C-D, 134G, 134I, 134N, 134P, 134Q, 134R

#### **Major in Political Science/International Relations**

1. Lower-division required: PS 10, 11, 12
2. Five upper-division IR courses with at least one each from the following four groups:
  - A. Foreign Policy: 142A, 146A, 147A, 150A-B, 152
  - B. National and International Security: 142I, 142J, 142K, 146E
  - C. Political Economy: 144AA, 144AB, 144D
  - D. Theory of International Relations: 141, 145B, 145C, 152

#### **Major in Political Science/Political Theory**

1. Three of four lower-division courses
2. 110A, 110B, 110C
3. And at least two additional courses from: 110DA, 110DC, 110EA, 110EB, 110H, 110J, 110T, 112B, 112C, 113B, 113C, 114B, 115A, 116A, 116B, 117, 118A, 118B, 119A

#### **Major in Political Science/Public Law**

1. Lower-division required: PS 10 (in addition to two other lower-division courses)
2. Five of the following: 100A, 100B, 102H, 102L, 104A, 104B, 104C, 104F, 104I, 104L, 124B

#### **Major in Political Science/Public Policy**

1. Lower-division required: PS 10 (in addition to two other lower-division courses)
2. 160AA
3. One of 160AB, 167A, 167B, 168, 170A
4. Two of 100A, 100B, 100C, 100E, 100F, 100G, 100I
5. One of 102B, 102C, 102E, 102H, 102L, 103A, 123A, 126AC, 142A, 142J, 150A-B, 161, 162, 165, 166F

Two upper-division courses in a field may be substituted for that field's lower division course. However, these courses cannot also be used to satisfy the upper division course requirements for a concentration of that field.

Since course offerings may change from year to year, students are strongly advised to consult the department for the latest listing of courses before preregistration.

Agreements signed between UCSD and several community colleges allow students to apply some community college courses toward lower-division course requirements for the major. Transfer students must, however, take at least one of the lower-division courses in residence at UCSD. Courses taken elsewhere may be credited toward the major. Please check with the undergraduate coordinator for more information on credit for courses taken elsewhere.

Students who pass the Advanced Placement (AP) Tests in American or Comparative Politics may petition to be exempted from taking PS 10 or 11 (respectively).

At least nine courses in political science must be taken in residence at UCSD. A total maximum of six courses may be taken elsewhere and applied toward the major. This applies to transfer students, students who pass the AP exam(s), as well as students who study abroad on the Education Abroad Program (EAP) or the Opportunities Abroad Program (OAP). Students

planning to transfer course work completed elsewhere are urged to consult the undergraduate coordinator.

Double majors who include political science as one of their two majors must fulfill the requirements of both programs. Please consult the undergraduate coordinator for more information.

Students must maintain an overall 2.0 GPA in the major. To be counted toward satisfying the requirements for the major, upper- and lower-division courses must be completed with a C- or better grade. Courses taken to satisfy requirements for the major may not be taken Pass/No Pass with the exception of a maximum of two independent study courses (PS 199).

Candidates for departmental honors are required to take PS 191A and B in which they write a senior thesis. (A 3.5 GPA in the major, senior standing, a significant writing project, and a recommendation from a political science faculty member are currently prerequisites for honors.) These courses may be counted toward the upper-division requirement.

### Career Guidance

The premise of our educational philosophy is that the best professional preparation for productive careers which we can provide is one which is broad, theoretical, and only indirectly related to the current job market. Our majors graduate into a wide range of career options.

Many political science majors at UCSD will seek admission to a *law school*. Although law schools make no recommendation concerning the usefulness of any undergraduate major, a B.A. in political science should be seen as a useful complement to a law degree. Students who take courses in American government, policy analysis, and law and politics find that they develop a keen understanding of the role of law in the general political process. This helps students understand the limits and possibilities of the legal process in fostering change or in preserving the status quo. This same curriculum provides a solid foundation for a career in *journalism*. Students with any specific questions regarding law are advised to consult with the prelaw adviser.

Increasingly, political science majors are preparing for careers in *business* or as *policy analysts* in both the public and private sectors. Many of these students pursue advanced de-

grees in public policy or study for a master's in business administration. Students interested in this option should look into public policy, American, or comparative politics as an area of concentration. Students interested in public policy might wish to consider the public policy minor, which is described separately in the catalog. Some political science majors are interested in careers in international organization or *diplomacy*. These students should look into international relations as an area of concentration. In addition, a broad array of courses in comparative politics is essential for anyone interested in a career of international service.

A political science major offers excellent preparation for teaching in the elementary schools. If you are interested in earning a California teaching credential from UCSD, contact the Teacher Education Program for information about the prerequisite and professional preparation requirements. It is recommended that you contact TEP as early as possible in your academic career.

Students interested in majoring or minoring in political science should stop by the Department of Political Science Office, SSB301, or visit our Web site: <http://dssadmin.ucsd.edu/PoliSci/index.htm>.

### Study Abroad

Political science majors are encouraged to participate in the Education Abroad Program (EAP) and to investigate other options for foreign study through the Opportunities Abroad Program (OAP). By petition, credits earned through them can fulfill UCSD degree and major requirements.

### Minor in Political Science

For students entering UCSD winter 1998 or later the following guidelines for a political science minor will apply: seven political science courses, with a minimum of five upper-division. Continuing students may follow the guidelines for a minor of a total of six political science courses, with a minimum of three upper-division. All courses taken for a political science minor must be taken for a letter grade.

### Interdisciplinary Minors

The Department of Political Science takes part in two interdisciplinary minors offered at UCSD. The law and society minor offers students the opportunity to examine the role of the legal system in society. Students should note that Law and Society 101 (Contemporary Legal Issues) may be used in fulfilling the twelve upper-division course requirement for the political science major. The minor in health care-social issues offers students a variety of perspectives that will enhance their ability to deal with complex social and ethical issues in modern health care. Additional information on these programs is available through the Warren Interdisciplinary Programs Office.

### Research

The Department of Political Science is closely affiliated with several research centers/institutes/projects currently on campus. Faculty members directly involved include: Amy Bridges, director, Urban Studies Program; Michael Hiscox and Barbara Walter, co-coordinators, Project in International Security Affairs; Germaine Hoston, director, Center for TransPacific Studies in Values, Culture, and Politics; Mathew McCubbins, director, Public Policy Research Project; Samuel Kernell, coordinator, American Political Institutions Project; Stephan Haggard, acting director, Institute on Global Conflict and Cooperation; Peter Smith, director, Center for Iberian and Latin American Studies; Wayne Cornelius, director of Studies and Programs, Center for U.S.-Mexican Studies; Peter Irons, director, Earl Warrn Bill of Rights Project. For further information please refer to the General Catalog section on "Research at UCSD."

### The Ph.D. Program

The Department of Political Science at the University of California, San Diego offers a program of graduate studies leading to the Ph.D. degree. Instruction is provided in the major fields of the discipline. For purposes of comprehensive examinations, the discipline is broken into four fields: American politics, comparative politics, international relations, and political theory. Students present exams in two of these

fields. In their first field, students also present a focus area (such as legislative behavior, Latin America, international political economy, or modern political theory). The department also offers a variety of courses that are of a methodological or epistemological nature, spanning the various fields.

Students take two years of course work in preparation for their comprehensive exams. These eighteen courses include only two required courses (political theory and empirical research); they also include independent studies and reading courses. Students also attend regularly scheduled colloquia which feature presentations by faculty, outside speakers, and dissertation students.

During the first two years each student must take at least two specially designated research seminars (at least one in each of the two exam fields). Each seminar is devoted primarily to the completion of a seminar paper (thirty to forty pages) involving original research or other creative effort.

The comprehensive exams are both written and oral. They test more than just mastery of course work and hence there is no single set of courses required for any field exam. To pass the exams a student is expected not only to master the relevant literature, but also to be able to synthesize and analyze the major issues in the field.

Each comprehensive exam tests both knowledge of the major theoretical approaches in the field and the ability to apply those theories to important questions in the field. For one of the two exam fields, the student also designates a specific area of interest (a "focus area"). The written focus area exam tests the student's in-depth knowledge and understanding. The focus area exam is taken the same week as the general field exam, and there is one oral covering both exams. Each field publishes a list of focus areas; students may, with approval, craft their own focus area. Each field, in addition, publishes a list of suggested ways to prepare for its exams; each field also determines the research tools required for scholars in that field.

Students are expected to complete their comprehensive exams no later than their third year. Students who have done prior graduate work should be able to complete their exams by the end of their second year.

After passing both exams, students are expected to write a dissertation prospectus.

This prospectus must be defended before a committee of five faculty, including two members outside the department. This committee also administers the final oral defense of the thesis.

It is expected that students will complete their dissertations within six years of starting the program.

Students interested in the program should consult the department graduate brochure for more detailed information.

### *Departmental Ph.D. Time Limit Policies*

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

## COURSES

### LOWER-DIVISION

#### 10. Introduction to Political Science: American Politics (4)

This course surveys the processes and institutions of American politics. Among the topics discussed are individual political attitudes and values, political participation, voting, parties, interest groups, Congress, presidency, Supreme Court, the federal bureaucracy, and domestic and foreign policy making.

#### 11. Introduction to Political Science: Comparative Politics (4)

The nature of political authority, the experience of a social revolution, and the achievement of an economic transformation will be explored in the context of politics and government in a number of different countries.

#### 12. Introduction to Political Science: International Relations (4)

The issues of war/peace, nationalism/internationalism, and economic growth/redistribution will be examined in both historical and theoretical perspectives.

#### 13. Power and Justice (4)

An exploration of the relationship between power and justice in modern society. Materials include classic and contemporary texts, films and literature.

#### 27. Ethics and Society (4)

An examination of ethical principles (e.g., utilitarianism, individual rights, etc.) and their social and political applications to contemporary issues such as abortion, environmental protection, and affirmative action). Ethical principles will also be applied to moral dilemmas familiar in government, law, business, and the professions. Satisfies the Warren College ethics and society requirement.

#### 30. Political Inquiry (4)

Introduction to the logic of inference in social science and to quantitative analysis in political science and public policy including research design, data collection, data description and

computer graphics, and the logic of statistical inference (including linear regression).

#### 40. Introduction to Law and Society (4)

This course is designed as a broad introduction to the study of law as a social institution and its relations to other institutions in society. The focus will be less on the substance of law (legal doctrine and judicial opinions) than on the process of law—how legal rules both reflect and shape basic social values and their relation to social, political, and economic conflicts within society.

#### 90. Undergraduate Seminar (1)

Selected topics to introduce students to current issues and trends in political science. May not be used to fulfill any major or minor requirements in political science.

### UPPER-DIVISION

Minimum requirement for all upper-division courses is at least one quarter of lower-division political science, or upper-division standing.

### American Politics

#### 100A. The Presidency (4)

The role of the presidency in American politics. Topics will include nomination and election politics, relations with Congress, party leadership, presidential control of the bureaucracy, international political role, and presidential psychology.

#### 100B. The U.S. Congress (4)

This course will examine the nomination and election of congressmen, constituent relationships, the development of the institution, formal and informal structures, leadership, comparisons of House with Senate, lobbying, and relationship with the executive branch.

#### 100C. American Political Parties (4)

This course examines the development of the two major parties from 1789 to the present. Considers the nature of party coalitions, the role of leaders, activists, organizers, and voters, and the performance of parties in government.

#### 100DA. Voting, Campaigning, and Elections (4)

A consideration of the nature of public opinion and voting in American government. Studies of voting behavior are examined from the viewpoints of both citizens and candidates, and attention is devoted to recent efforts to develop models of electoral behavior for the study of campaigns. The role of mass media and money also will be examined.

#### 100E. Interest Group Politics (4)

The theory and practice of interest group politics in the United States. Theories of pluralism and collective action, the behavior and influence of lobbies, the role of political action committees, and other important aspects of group action in politics are examined. *Prerequisite: sophomore standing.*

#### 100F. American State and Local Politics (4)

This course explores the changing role of state and local governments in modern American politics. We will discuss state and local political institutions, processes, and politics, and examine several current policy areas including tax reform, water and land use, education, health policy, and welfare reform.

#### 100G. American Politics and Public Policy (4)

Surveys arguments about the determinants of public policy, pairing theoretical arguments with case studies. Does government choose policies to please the electorate because bureaucratic momentum overcomes political will and interest group bargaining? Or do the rules determine the outcomes?

**100H. Race and Ethnicity in American Politics (4)**

This course examines the processes by which racial and ethnic groups have/have not been incorporated into the American political system. The course focuses on the political experiences of European immigrant groups, blacks, Latinos, and Asians.

**100I. The Washington Community (4)**

For students who plan to intern in Washington. It examines the way Washington's elected officeholders, government officials, news media, and interest group representatives transact the public's business. History of Washington as a community will also be covered. *Prerequisite: department stamp required. Application for internship must be submitted to AIP office or consent of instructor.*

**102B. Politics of American Economic Policy (4)**

The impact of politics on American post-war economic policy making. Causes and solutions to America's current economic problems. Evaluation of the political dimensions of policy making in the Reagan and earlier administrations. Consideration of Marxian, liberal, and other interpretations of policy outcomes will be discussed.

**102C. American Political Development (4)**

Examines selected issues and moments in the political history of the United States, comparing competing explanations and analyses of U.S. politics. Likely topics include the founding, "American exceptionalism," change in the party system, race in U.S. politics, the "new institutionalism."

**102E. Urban Politics (4)**

(Same as USP 107) This survey course focuses upon the following six topics: the evolution of urban politics since the mid-nineteenth century; the urban fiscal crisis; federal/urban relationships; the "new" ethnic politics; urban power structure and leadership; and selected contemporary policy issues such as downtown redevelopment, poverty, and race.

**102F. Mass Media and Politics (4)**

This course will explore both the role played by mass media in political institutions, processes and behaviors, and reciprocally, the roles played by political systems in guiding communication processes.

**102G. Special Topics in American Politics (4)**

An undergraduate course designed to cover various aspects of American politics.

**102H. Political and Legal Foundations of the American Economy (4)**

An examination of the political and legal arrangements necessary for the working of the modern American economy. Particular attention is given to the development of rules about private property. Insights from the "law and economics" fields are also considered.

**102IA-IB. The American News Media (4-4)**

(Same as Com/Cul 171A-B and Soc./C 165A-B.) History, politics, social organization, and ideology of the American news media. 102IA surveys the development of the news media as an institution, from earliest newspapers to modern mass news media. 102IB deals with special topics, including the nature of television news, and with methods of news media research, and requires a research paper. *Prerequisites: 102IA is required for 102IB or consent of instructor.*

**102J. Advanced Topics in Urban Politics (4)**

Building upon the introductory urban politics course, the advanced topics course explores issues such as community power, minority empowerment, and the politics of growth. A research paper is required. Students wishing to fulfill the paper requirement with field research should enroll in the subsequent PS 102JJ course (offered Summer Session 2). *Prerequisite: consent of instructor.*

**102JJ. Field Research in Urban Politics (2)**

To be taken with the approval of the PS 102J instructor, this course allows students to do original field research on topics in urban politics. This course is offered in Summer Session 2 subsequent to a 102J course. *Prerequisite: consent of instructor.* May not be used to fulfill any major or minor requirements in Political Science.

**102L. The Politics of Regulation (4)**

Political and policy-making issues in regulation. Themes: regulation versus legislation; general versus specific grants of regulatory power; market versus command mechanisms; private property; and risk assessment. Emphasis on American regulatory policy, examples from current regulatory debates (e.g., health care and environment).

**103A. California Government and Politics (4)**

This survey course explores six topics: 1) the state's political history; 2) campaigning, the mass media, and elections; 3) actors and institutions in the making of state policy; 4) local government; 5) contemporary policy issues; e.g., Proposition 13, school desegregation, crime, housing and land use, transportation, water; 6) California's role in national politics.

**104A. The Supreme Court and the Constitution (4)**

An introduction to the study of the Supreme Court and constitutional doctrine. Topics will include the nature of judicial review, federalism, race, and equal protection. The relation of judicial and legislative power will also be examined.

**104B. Civil Liberties—Fundamental Rights (4)**

This course will examine issues of civil liberties from both legal and political perspectives. Topics will include the First Amendment rights of speech, press, assembly, and religion; other "fundamental" rights, such as the right to privacy; and some issues in equal protection. Conflicts between governmental powers and individual rights will be examined.

**104C. Civil Liberties—The Rights of Criminals and Minorities (4)**

Examines the legal issues surrounding the rights of "marginal" groups such as aliens, illegal immigrants, and the mentally ill. Also includes a discussion of the nature of discrimination in American society.

**104F. Seminar in Constitutional Law (4)**

This seminar will provide an intensive examination of a major issue in constitutional law, with topics varying from year to year. Recent topics have included equal protection law and the rights of civilians in wartime. Students will be required to do legal research on a topic, write a legal brief, and argue a case to the seminar. *Prerequisites: PS 104A/B; department stamp.*

**104I. Law and Politics—Courts and Political Controversy (4)**

This course will examine the role of the courts in dealing with issues of great political controversy, with attention to the rights of speech and assembly during wartime, questions of internal security, and the expression of controversial views on race and religion. The conflict between opposing Supreme Court doctrines on these issues will be explored in the context of the case studies drawn from different historical periods.

**104L. Positive Political Theory of Law (4)**

We will discuss modern theories of the origins of law and legal behavior.

**107A. Gay and Lesbian Politics (4)**

A consideration of the historical interrelationship between religious, psychological, and social constructs of homosexuality, the embodiment of these constructs in the law, and their use in the political arena.

**Political Theory**

**110A. Citizens and Saints: Political Thought from Plato to Augustine (4)**

This course focuses on the development of politics and political thought in ancient Greece, its evolution through Rome and the rise of Christianity. Readings from Plato, Aristotle, Augustine, Machiavelli, and others.

**110B. Sovereigns, Subjects and the Modern State: Political Thought from Machiavelli to Rousseau (4)**

The course deals with the period which marks the rise and triumph of the modern state. Central topics include the gradual emergence of human rights and the belief in individual autonomy. Readings from Machiavelli, Hobbes, Locke, Rousseau, and others.

**110C. Revolution and Reaction: Political Thought from Kant to Nietzsche (4)**

The course deals with the period which marks the triumph and critique of the modern state. Central topics include the development of the idea of class, of the irrational, of the unconscious, and of rationalized authority as they affect politics. Readings drawn from Rousseau, Kant, Hegel, Marx, Nietzsche, and others.

**110DA. Freedom and Discipline: Political Thought in the Twentieth Century (4)**

This course addresses certain problems which are characteristic of the political experience of the twentieth century. Topics considered are revolution, availability of tradition, and the problems of the rationalization of social and political relations. Readings from Nietzsche, Weber, Freud, Lenin, Gramsci, Dewey, Oakeshott, Arendt, Merleau-Ponty.

**110DC. Seminar: Contemporary Political Theory (4)**

This course focuses on selected theories and topics since the mid-nineteenth century. Theorists will include Nietzsche, Max Weber, Lenin, Freud, and Foucault. Topics will include authority, power, and political leadership. May be repeated once with instructor's permission.

**110EA. American Political Thought from Revolution to Civil War (4)**

The first quarter examines the origins and development of American political thought from the revolutionary period to the end of the nineteenth century with special emphasis on the formative role of eighteenth-century liberalism and the tensions between "progressive" and "conservative" wings of the liberal consensus.

**110EB. American Political Thought from Civil War to Civil Rights (4)**

The second quarter examines some of the major themes of American political thought in the twentieth century including controversies over the meaning of democracy, equality, and distributive justice, the nature of "neoconservatism," and America's role as a world power.

**110H. Democracy and Its Critics (4)**

This course will examine the historical development of the ideal of democracy from Periclean Athens to the present in the light of criticism by such thinkers as Plato, Tocqueville, and Mosca and difficulties encountered in efforts to realize the ideal.

**110J. Power in American Society (4)**

This course examines how power has been conceived and contested during the course of American history. The course explores the changes which have occurred in political rhetoric and strategies as America has moved from a relatively isolated agrarian and commercial republic to a military and industrial empire.



**110T. Modern Political Ideologies (4)**

An examination of some of the ideas and values associated with major social and political movements in Europe and the United States since the French Revolution. Topics will vary and may include liberalism, populism, democracy, communism, nationalism, fascism, and feminism.

**112A. Economic Theories of Political Behavior (4)**

An introduction to theories of political behavior developed with the assumptions and methods of economics. General emphasis will be upon theories linking individual behavior to institutional patterns. Specific topics to be covered will include collective action, leadership, voting, and bargaining.

**112B. Politics, Philosophy, and Social Science Methodology (4)**

An introduction to philosophy and the political implications of social science. Topics considered will include the nature of theory and evidence, the formulation of research questions, special problems in the study of human behavior or action and the relation between social science and public policy, events, and ideologies.

**112C. Political Theory and Artistic Vision (4)**

The course explores the modes of political thinking found in arts, especially in drama and literature. It focuses on particular topics (e.g., ends and means, political leadership, political economy). Some attempt will be made to develop implications inherent in art for the writing of political theory as a genre.

**113B. Chinese and Japanese Political Thought (I) (4)**

An examination of the competing philosophical traditions of ancient and modern China and Japan, with an eye toward understanding how these have been reflected in Chinese and Japanese development. Readings and class sessions will be in English, although students with Chinese or Japanese language capability will be given the opportunity to use their special skills.

**113C. Chinese and Japanese Political Thought (II) (4)**

A continuation of 113B which follows political philosophical themes in China and Japan through the twentieth century. Important topics will include Buddhism and Confucianism as they changed in each context in response to internal and external stimuli. *Prerequisite: PS 113B.*

**114B. Marxist Political Thought (4)**

An introduction to Marxist thought from its roots in the western tradition through its development in non-western contexts. Emphasis is placed on how adaptations were made in Marxism to accommodate the specific challenges of each environment.

**115A. Gender and Politics (4)**

Our understanding of politics, power, conflict, and quality continue to be challenged and transformed by considering gender as it intersects with nationality, race, class, and ethnicity. We will consider the importance of gender in each of the subfields of political science.

**116A. Feminist Theory (4)**

Readings in historical and contemporary feminist theory; development of gender as a category of political analysis; alternative perspectives on core concepts and categories in feminist thought.

**116B. Advanced Feminist Theory (4)**

Advanced critical analysis of contemporary feminist theory; emphasis on the interrelationships among discourses of gender, race, ethnicity, class, and sexuality in the work of different feminist theorists; alternative perspectives on feminist political strategies and practices. *Prerequisite: PS 115B or PS 116A.*

**117. Violence and Social Order (4)**

This course explores the relationship between violence and the elements of social order, including social hierarchies, group boundaries, power, and authority. Topics include both classic and contemporary works in political theory, as well as some fiction and journalism.

**118A. The "Political" in Systematic Theology (4)**

An historical analysis of systematic theology in the Judeo-Christian tradition as political theory. Emphasis is placed on the politicization of the political dimensions of the early church, its encounter with positivism, and the emergence of Catholic social doctrine.

**118B. The Political Theory of Liberation Theology (4)**

A comparative study of liberation theologies, including Continental, Latin American, South African, and East Asian. *Prerequisite: PS 118A.*

**119A. Special Topics in Political Theory (4)**

An undergraduate course designed to cover various aspects of political theory.

**Comparative Politics****120A. Political Development of Western Europe (4)**

An examination of various paths of European political development through consideration of the conflicts which shaped these political systems: the commercialization of agriculture; religion and the role of the church; the army and the state bureaucracy; and industrialization. Stress will be on alternative paradigms and on theorists.

**120B. The German Political System (4)**

An analysis of the political system of the Federal Republic of Germany with an emphasis on the party system, elections, executive-legislative relations, and federalism. Comparisons will be made with other West European democracies and the Weimar Republic.

**120C. Politics in France (4)**

This course will examine the consequences of social and economic change in France. Specific topics will include institutional development under a semi-presidential system, parties, and elections.

**120D. Germany: Before, During, and After Division (4)**

Consideration of political, economic, and security factors that have kept Germany at the center of European developments for more than a century.

**120E. Scandinavian Politics (4)**

Introduction to the politics and societies of the Scandinavian states (Denmark, Finland, Norway, and Sweden). Focuses on historical development, political culture, constitutional arrangements, political institutions, parties and interest groups, the Scandinavian welfare states, and foreign policy.

**120G. British Politics (4)**

Emphasis will be placed on the interaction between British political institutions and processes and contemporary policy problems: the economy, social policy, foreign affairs. The course assumes no prior knowledge of British politics, and comparisons with the United States will be drawn.

**120H. European Integration (4)**

This course reviews the origins and development of the European Community/European Union and its institutions, theories of integration and the challenges inherent in the creation of a supranational political regime.

**121. Middle East Politics (4)**

This course will analyze the political systems, regional conflicts, and patterns of socioeconomic change in the Middle East

with reference to specific cases. In so doing, the course will also examine the role of religion in politics, and the politics of economic reform and democratization.

**122A. Authoritarian Politics (4)**

This lecture course explores alternative approaches to the analysis of authoritarian regimes. The readings draw from cases on all continents. Special attention will be given to the political institutions of these regimes.

**123A-B. Comparative Parliamentary Studies (4-4)**

This course surveys the academic literature on parliamentary studies, comparing the research on legislative elections, behavior, and organization in American, European, and Asian democracies. The course will also compare various approaches to studying legislative activity. *Prerequisites: PS 11 for 123A; 123A for 123B.*

**124A. Political Consequences of Electoral Systems (4)**

A comparative survey of the major dimensions of the electoral systems used in contemporary democracies (including plurality and majority systems, proportional representation, and districting methods) and of their effects on party competition.

**124B. The Politics of Comparative Judicial Development (4)**

Focusing on judicial systems in civil and common law traditions, and in authoritarian as well as democratic politics, this course explores the judicial branch's traditional weakness, even in some democracies. The course considers alternative theories of judicial development and applies them to evidence from judicial systems in several countries.

**126AA. Fundamentals of Political Economy: Modern Capitalism (4)**

This course explores how economic factors affect political institutions and how political action affects economic behavior in the United States and Western Europe. Particular attention is given to relations between business and labor, economic policy choices, and the impact of international trade. *Prerequisite: PS 11 or consent of instructor.*

**126AB. Politics and Economics in Eastern Europe (4)**

This course explores the interrelationship of politics and economics in Eastern Europe, analyzing the historic evolution of the area, the socialist period, and contemporary political and economic change there.

**126AC. Issues in Political Economy (4)**

Seminar deals in-depth with one or some of the issues touched on in PS 126AA and/or 126AB. Potential topics may include: labor and politics, privatization and divestment, regulation and deregulation, the welfare state, politics of public and private bureaucracy, and other such issues. *Prerequisites: PS 126AA and/or 126AB or consent of instructor.*

**130AA. The Soviet Successor States (4)**

An overview of the historical background and contemporary politics of the fifteen successor states of the Soviet Union.

**130AD. The Politics of the Russian Revolution (4)**

An examination of the dynamics of the Russian Revolution from 1905 through the Stalinist period and recent years in light of theories of revolutionary change. Emphasis is placed on the significance of political thought, socio-economic stratification, and culturo-historical conditions.

**130B. Politics in the People's Republic of China (4)**

This course analyzes the political system of China since 1949, including political institutions, the policy-making process, and the relationship between politics and economics. The main focus is on the post-Mao era of reform beginning in 1978.

**130H. Vietnam: The Politics of Intervention (4)**

This course will examine the interventions of foreign powers in Vietnam between 1945 and 1975 (including France, the United States, China, and the Soviet Union) and the effects of intervention.

**131C. The Chinese Revolution (4)**

An analysis of the dynamics of the Chinese Revolution from the fall of the Qing Dynasty (1644–1911) to the present. Emphasis is placed on the relationship between political thought and the dynamics of the revolutionary process.

**132A. Political Modernization Theory (4)**

A survey of state building and the politics of economic development in a world historical perspective.

**132B. Politics and Revolution in China and Japan (4)**

An intensive examination of the quests for modernity undertaken by Chinese and Japanese leaders from the mid-nineteenth century to the present. Emphasis is placed upon the relationship among indigenous values, international pressures, and issues concerning national identity.

**133A. Japanese Politics: A Developmental Perspective (4)**

This course will analyze the political systems of modern Japan in comparative-historical perspective.

**133E. Public Policy in Japan (4)**

This course combines an examination of general models of the way in which public policy is made in Japan, and a review of outcomes in several substantive policy areas, such as education, public works, health and welfare, and pollution.

**134AA-AB. Comparative Politics of Latin America (4-4)**

Comparative analysis of contemporary political systems and developmental profiles of selected Latin American countries, with special reference to the ways in which revolutionary and counter-revolutionary movements have affected the political, economic, and social structures observable in these countries today. Analyzes the performance of "revolutionary" governments in dealing with problems of domestic political management, reducing external economic dependency, redistributing wealth, creating employment, and extending social services. Introduction to general theoretical works on Latin American politics and development first quarter. Intensive study of Chile and Cuba in second quarter. *Prerequisites: PS 11 or consent of instructor for 134AA; PS 134AA for 134AB.*

**134B. Politics in Mexico (4)**

General survey of the Mexican political system as it operates today. Emphasis on factors promoting the breakdown of Mexico's authoritarian regime and the transition to a more democratic political system. Changing relationship between the state and various segments of Mexico society (economic elites, peasants, urban labor, and the Church). New patterns of civil-military relations.

**134C. Politics in Mexico (4)**

Continuation of PS 134B. Emphasis on government policies and performance affecting economic development, job creation, population growth, social inequality, poverty, rural-urban imbalances, and migration. Case studies of specific government programs and regional variations in policy outcomes.

**134D. Selected Topics in Latin American Politics (4)**

A comparative analysis of contemporary political issues in Latin America. Material to be drawn from two or three countries. Among the topics: development, nationalism, political change.

**134G. Politics in the Andes (4)**

A comparative examination of twentieth-century political conflicts and currents in the Andean countries of South America:

Bolivia, Colombia, Ecuador, and Peru. Topics include economic underdevelopment, Indian relations, militarism, guerrilla warfare, and revolutionary movements.

**134I. Politics in the Southern Cone of Latin America (4)**

This course is a comparative analysis of twentieth-century political developments and issues in the Southern Cone of Latin America: Argentina, Chile, and Uruguay. The course will also examine the social and economic content and results of contrasting political experiments.

**134N. Politics in Central America (4)**

Focused examination of political conflict in one or more countries of the region, emphasizing issues, ideology, and process in grassroots political organization. Limited coverage of international politics.

**134P. Organizing Women in Latin America (4)**

Survey of women's participation in formal political institutions in Latin America (public bureaucracies, political parties, trade unions, peasant organizations), the politics of gender in recent women's movements, and the impact on women of democratization and neoliberal economic policies.

**134Q. Organization, Resistance, and Protest in Latin America (4)**

Comparative, case-based study of historical and contemporary political organizations and social movements in Latin America. Emphasis on local and regional activism through politicized urban neighborhood and church groups, trade unions, and peasant organizations. Focus on group objectives, strategies, and identities.

**134R. Political Parties in Latin America (4)**

(Formerly PS 146D) Compares and contrasts different types of political parties in Latin America; conservative, liberal, populist, christian, democratic, socialist, and communist. Investigates their origins, ideologies, programs, leadership, followings, organizations, and successes or failures within varying political systems in different countries. Cannot also receive credit for PS 146D.

**136B. Comparative Politics and Political Culture (4)**

This course is designed to provide undergraduates with a sound introduction to cultural interpretations of power and politics. The course will also attempt to render an explicit account of the process of theory formation in social science. Special attention will be given to Africa and Asia.

**137A. Comparative Political Parties and Interest Groups (4)**

This course serves as an introduction to the comparative study of political parties and interest groups. The course has three parts: 1) an analytical introduction to parties, interest groups, and their role in democratic representation; 2) parties and interest groups in Great Britain; and 3) parties and interest groups in Italy. *Prerequisite: PS 11 or consent of instructor.*

**138D. Special Topics in Comparative Politics (4)**

An undergraduate course designed to cover various aspects of comparative politics.

**139A. Politics of the Ancient World Order (4)**

An introduction to the domestic and international political orders of the ancient West. Primary focus will be on the strengths and limitations of comparative and international relations theories when applied to the ancient world of city-states, kingdoms, and empires.

**International Relations**

**140A. International Law and Organizations (4)**

International law and organizations are central to the efforts to create a world order to limit armed conflict, regulate world

economy, and advance programs for economic redistribution among nations, and set minimum standards of human rights. This course explains the theory of international law and organizations that is accepted by diplomats and compares this viewpoint to the analysis of social scientists concerning the past record and likely future of world order concerning conflict, economic redistribution, and human rights.

**140B. Concepts and Aspects of Revolution (4)**

Introduction to the analytical and comparative study of revolutionary movements and related forms of political violence. Topics include: the classical paradigm; types of revolutionary episodes; psychological theories; ideology and belief systems; coups; insurgencies; civil wars; terrorism and revolutionary outcomes.

**141. Seminar: Game Theory and International Relations (4)**

This course covers the rudiments of game theory and its use in the study of international relations to explore various substantive and theoretical issues. *Prerequisite: PS 12 or consent of instructor.*

**142A. United States Foreign Policy (4)**

United States foreign policy from the colonial period to the present era. Systematic analysis of competing explanations for U.S. policies—strategic interests, economic requirements, or the vicissitudes of domestic politics. Interaction between the U.S., foreign states (particularly allies), and transnational actors are examined. *Prerequisite: PS 12 or consent of instructor.*

**142I. National and International Security (4)**

A survey of theories of defense policies and international security.

**142J. National Security Strategy (4)**

A survey of American strategies for national defense. Topics may include deterrence, coercive diplomacy, limited war, and unconventional warfare.

**142K. War (4)**

This course examines the causes of war in the international system by analyzing prominent cases and theoretical perspectives.

**144AA. Politics and the International Economic Order (4)**

This course examines the interplay of politics and economics in international relations and entails a review of the history of the international economic order from the seventh century through the present. Stress is placed on the evolution of the bargaining about money, trade, and investment.

**144AB. Selected Topics in International Political Economy (4)**

This course will consider major theories purporting to explain and predict the workings of the international order from the point of view of political economy. An extended discussion of one aspect of the economic order (e.g., the multinational corporation) will serve as the test case. PS 144AA and one quarter of economics recommended. *Prerequisite: PS 12.*

**144D. International Political Economy: Money and Finance (4)**

(Conjoined with PS 262, IP/Gen 402, and IP 202.) Examination of effects of national policies and international collaboration of public and private international financial institutions, in particular management of international debt crisis, economic policy coordination, and the role of international lender of last resort. *Prerequisite: upper-division standing or permission of instructor. Previous background in economics strongly recommended.*

**145A. International Politics and Drugs (4)**

This course examines the domestic and international aspects of the drug trade. It will investigate the drug issues from the perspectives of consumers, producers, traffickers, money launderers, and law enforcement. Course material covers the experience of the United States, Latin America, Turkey, Southeast Asia, Western Europe, and Japan.

**145B. Conflict and Cooperation in International Politics (4)**

Course on how countries overcome problems of conflict and cooperation in their dealings with one another. Focuses on theories of emergence of cooperation among states and applies these to various issue-areas. Subjects examined include international monetary relations, military alliances, economic sanctions, human rights, arms control, international trade, and others. *Prerequisite: PS 12.*

**145C. International Relations After the Cold War: Theory and Prospect (4)**

The nature of international politics appears to have changed dramatically since the end of the Cold War in 1989. This course applies different theoretical approaches to enhance our understanding of the new international environment, the future prospects for peace and war, and current problems of foreign policy.

**146A. The U.S. and Latin America: Political and Economic Relations (4)**

An analytical survey of U.S. relations with Latin America from the 1820s to the present, with particular emphasis on the post-Cold War environment. Topics include free trade and economic integration; drugs and drug trafficking; illegal migration and immigration control. Focus covers U.S. policy, Latin American reactions, dynamics of cooperation, and options for the future.

**146E. U.S.-Latin American Relations: Security Issues (4)**

This course will examine the history of security relations in the western hemisphere. They will be considered in global, regional, and rational contexts. International institutions, economic relations, domestic politics, and military issues will be examined for their contribution to explaining the evolution of the inter-American security agenda from independence to the post-Cold War. *Prerequisite: PS 12.*

**147A. Soviet Foreign Policy**

This course analyzes Soviet international behavior over seven decades, with particular attention to the period of Soviet superpower status. Close attention will be given to competing explanations for Soviet behavior, to the diverging assessments of Soviet power, and to specific modes of Soviet behavior such as weapons procurement, military intervention, and arms control compliance.

**150A. Politics of Immigration (4)**

Comparative analysis of attempts by the United States, western Europe, and Japan to initiate, regulate and reduce immigration from Third World countries. Social and economic factors shaping outcomes of immigration policies, public opinion toward immigrants, anti-immigration movements, and immigration policy reform options in industrialized countries.

**150B. Politics of Immigration (4)**

Continuation of PS 150A. Impacts of U.S. immigration laws and policies on experiences of specific immigrant groups (Mexicans, Central Americans, Chinese, Japanese, Southeast Asians, Europeans). Immigrants as political actors in United States, Europe, and Japan. Interactions between local and national immigration policies.

**151. Seminar: Theories of International Relations (4)**

This course will examine the efforts to develop models and theories of international relations from Hobbes to the present. Theories and approaches will be studied through analysis of

current and historical cases. *Prerequisite: PS 11 and 12 and consent of instructor.*

**152. Comparative Foreign Policy (4)**

This upper-division course focuses on the comparative study of foreign policies in contemporary and historical world affairs. Competing theoretical approaches drawn from international, domestic, and individual levels of analyses will be examined. War, security, alliances, and international crises will be used to evaluate the utility of competing approaches. *Prerequisite: PS 12.*

**154. Special Topics in International Relations (4)**

An undergraduate course designed to cover various aspects of international relations.

**Policy Analysis****160AA. Introduction to Policy Analysis (4)**

This course will explore the process by which the preferences of individuals are converted into public policy. Also included will be an examination of the complexity of policy problems, methods for designing better policies, and a review of tools used by analysts and policy makers. *Prerequisite: PS 10 or 11.*

**160AB. Introduction to Policy Analysis (4)**

In this course, students will use their knowledge of the political and economic foundations of public policy making to conduct research in a wide variety of public policy problems. *Prerequisite: PS 160AA.*

**161. Understanding Direct Legislation (4)**

The purpose of the course is to examine how the referendum, initiative, and recall (direct legislation) are used to determine policy. The class will survey the historical and contemporary direct legislation literature in order to understand the popular and academic debate concerning direct legislation's use.

**162. Environmental Policy (4)**

This course will explore contemporary environmental issues such as global warming, endangered species, and land use. Students will be asked to analyze various policy options and to write case analyses. Policies may be debated in class.

**165. Special Topic: Policy Analysis (4)**

An undergraduate course designed to cover various aspects of policy analysis.

**166F. The American Welfare State (4)**

This course examines the building of the welfare state in the twentieth century. Topics include the legacy of progressivism, the New Deal and Great Society; Reaganite retrenchment; social programs, party and electoral dynamics; and the welfare state's impact on groups and the class structure.

**167A-B. Seminar: Public Policy Analysis (4-4)**

Students are asked to analyze various policy options related to contemporary American policy issues. Students are also required to do directed research on policy issues, to write case analyses based on their findings, and to debate policy alternatives in class. *Prerequisite: PS 10 or 11.*

**168. Policy Assessment (4)**

The use of real data to assess policy alternatives. Introduction to benefit/cost analysis, decision theory, and the valuation of public goods. Applications to health, environmental, and regulatory economic policy making.

**Research Methods****170A. Introductory Statistics for Political Science and Public Policy (4)**

Introduction to the use of statistics in both political science and public policy, concentrating on regression based ap-

proaches. Students undertake a series of small quantitative analyses and one project. *Prerequisites: PS 60, Soc. Sci. 60, PS 30, Psych. 60 or equivalent or consent of instructor.*

**181. Field Research Methods (4)**

Introductory survey of methods used by political and other social scientists to gather primary research data, including sample surveys, "elite" interviewing, ethnographic observation, and archival research. Students will have opportunities for practical application of one or more of these methods. *Prerequisites: PS 10, 11, or 12; permission of instructor; department stamp; student must be interviewed by instructor.*

**Special Studies****191A-B. Senior Honors Seminar: Frontiers of Political Science (4-4)**

This course is open only to seniors interested in qualifying for departmental honors. Admission to the course will be determined by the department. Each student will write an honors essay under the supervision of a member of the faculty. *Prerequisites: department stamp; senior standing; PS major with 3.5 GPA or consent of instructor; significant writing project and recommendation by political science faculty member.*

**194. Research Seminar in Washington, D.C. (4)**

(Same as Comm 194/USP 194) Course attached to six-unit internship taken by students participating in the UCDC program. Involves weekly seminar meetings with faculty and teaching assistant and a substantial research paper. *Prerequisites: participating in UCDC program.*

**198. Directed Group Study (2 or 4)**

Directed group study in an area not presently covered by the departmental curriculum. (P/NP grades only.)

**199. Independent Study for Undergraduates (2 or 4)**

Independent reading in advanced political science by individual students. (P/NP grades only.) *Prerequisite: consent of instructor.*

**GRADUATE**

All graduate courses are categorized as either seminars or independent study.

**Seminars****201. Politics, Political Science, and Political Theory (4)**

An analysis of the intersections of political theory, political science, and politics. Readings will vary from year to year. Themes include liberalism and democracy, rights and interests, voting and representation, citizenship and equality. This course is required of all graduate students in political science. No prior work in political theory is presupposed. *Prerequisite: graduate standing or consent of instructor.*

**202. Designing Political Research (4)**

The theory and practice of research in political science. This course examines the major approach to the study of politics represented by significant works in the discipline. It considers how interesting and important questions are discovered and how research appropriate to them is designed and executed.

**210A. Systems of Political Thought (I): Thucydides to Hobbes (4)**

This course will review major texts and selected commentaries in the history of political thought as preparation for the field examination. Readings will include Thucydides, Plato, Aristotle, Augustine, Machiavelli, and Hobbes. *Prerequisite: graduate standing or consent of instructor.*

**210B. Systems of Political Thought (II): Locke to Nietzsche (4)**

This course will review major texts and selected commentaries in the history of political thought as preparation for the field examination. Readings will include Locke, Rousseau, Kant, Marx, Mill, and Nietzsche. *Prerequisite: graduate standing or consent of instructor.*

**211A. American Political Thought (4)**

This course explores American debates over political ideals, institutions, and identity from the Puritans to the present. Themes will include freedom and slavery, sovereignty and representation, individual and community, diversity and equality. Readings will vary from year to year. *Prerequisite: graduate standing or consent of instructor.*

**212A. The Political Uses of Antiquity (4)**

This course explores debates in the history of political thought about classical antiquity and its relationship to the modern world. The meaning, motivation, and significance of gestures toward antiquity as a model for judging contemporary politics and culture will be discussed. *Prerequisite: graduate standing or consent of instructor.*

**213A. Contemporary Political Theory (4)**

This course focuses on theories and topics since the mid-nineteenth century. Among the themes to be discussed are authority, power, leadership, modernity, and post-modernity. Readings will include Nietzsche, Weber, Lenin, Freud, Oakeshott, Dewey, Foucault, Walzer, and Rawls. *Prerequisite: graduate standing or consent of instructor.*

**213B. Chinese and Japanese Political Thought (I) (4)**

An examination of the competing philosophical traditions of ancient and modern China and Japan, with an eye toward understanding how these have been reflected in Chinese and Japanese development. Readings and class sessions will be in English, although students with Chinese or Japanese language capability will be given the opportunity to use their special skills. *Prerequisite: graduate standing or consent of instructor.*

**213C. Chinese and Japanese Political Thought (II) (4)**

A continuation of 213B which follows political philosophical themes in China and Japan through the twentieth century. Important topics will include Buddhism and Confucianism as they changed in each context in response to internal and external stimuli. *Prerequisites: PS 213B and preferable that students be able to read modern or classical Chinese or Japanese.*

**214. Marxist Political Philosophy (4)**

An examination of selected texts in Marxist and post-Marxist political philosophy, with a focus on the theme of individual and collective identity including issues concerning alienation, consciousness, and ideology. *Prerequisite: graduate standing or consent of instructor.*

**215. The Self and the Political Order (4)**

The course deals with the interrelationship of understandings of the political order and understandings of the self. The course will focus on the two great theorists of modernity, Rousseau and Nietzsche. Extensive readings from primary and secondary sources. *Prerequisite: graduate standing or consent of instructor.*

**216. Radical Thought: Theologies of Liberation (4)**

An examination of theologies of liberation combining Marxist social critiques with Christian Theological perspectives. The course will compare Augustinian theology and mainstream Roman Catholic social teachings with alternative Latin American, African, and feminist theologies embracing radical change in social structures. *Prerequisite: graduate standing or consent of instructor.*

**217. Feminist Political Theory (4)**

This course focuses on contemporary feminist political thought. Topics: theories of gender construction; relationship between

gender and traditional political concepts; and debates about the social and political subordination of women. *Prerequisite: graduate standing or consent of instructor.*

**218A. The "Political" in Systematic Theology (4)**

An historical analysis of systematic theology in the Judeo-Christian tradition as political theory. Emphasis is placed on the politicization of the political dimensions of the early Church, its encounter with positivism, and the emergence of Catholic social doctrine. *Prerequisite: upper-division standing or consent of instructor. Two courses in philosophy, or political or social theory are recommended, or graduate standing.*

**218B. The Political Theory of Liberation Theology (4)**

A comparative study of liberation theologies, including Continental, Latin American, South African, and East Asian. *Prerequisite: graduate standing or consent of instructor.*

**219. Special Topics in Political Theory (4)**

This seminar is an examination of the different approaches to the study of political theory. Issues and research areas will vary each time the course is offered. *Prerequisite: graduate standing or consent of instructor.*

**220. Comparative Politics: State and Society (4)**

This course will provide a general literature review in comparative politics to serve as preparation for the field examination. *Prerequisite: graduate standing in any discipline in the social sciences or humanities, or consent of instructor.*

**221. Comparative Politics: Institutions (4)**

This is a second course in comparative politics designed as a preparation for the field examination. It will focus on the comparative study of political institutions. *Prerequisite: graduate standing in any discipline in the social sciences or humanities, or consent of instructor.*

**222. Measuring Democracy (4)**

Research seminar that focuses on the problems of measurement, operationalization, and validity in the comparative study of types, causes, and consequences of democracy.

**223A-B. Comparative Parliamentary Studies (4-4)**

This course surveys the academic literature on parliamentary studies comparing the research on legislative elections. Behavior and organization in American, European, and Asian democracies. The course will also compare various approaches to studying legislative activity. *Prerequisite: graduate standing.*

**224. The Politics of Democratization (4)**

This course will examine the following questions: Why do some countries fail and others succeed in establishing democracies? How do leaders "institutionalize" uncertainty? Should economic or political liberalization come first? Why are there periodic "waves" of democratic breakthrough and breakdown? *Prerequisite: graduate standing.*

**225. The Politics of Divided Societies (4)**

Research seminar that surveys the theoretical literature on divided societies in Africa, Asia, Europe, North America, and South America, particularly conflict and peacemaking in multiethnic countries. Cases to be studied in depth will be selected in accordance with students' area and country interests. *Prerequisite: graduate standing or consent of instructor.*

**226. Authoritarian Politics (4)**

Research seminar that surveys the theoretical literature on non-democratic political systems. Readings draw from cases in Africa, Asia, Europe, and Latin America. *Prerequisite: graduate standing or consent of instructor.*

**227. Marxism and National Development in East Asia (4)**

A systematic consideration of the significance—positive and negative—of Marxism in the recent history of East Asia. Emphasis is placed on the role of Marxism as a conception of

"modernity" and as a model of "development." *Prerequisite: graduate standing.*

**228. Bureaucracy and Public Policy (4)**

(Conjoined with IRGN 407 and IRGN 207) What determines the degree of influence bureaucrats exert over public policy outcomes, versus the influence of politicians? Overview of themes such as developmental state, state autonomy, legislative oversight, clientelism, corruption. Applications to Japan, East Asia, United States, and Latin America. *Prerequisite: graduate standing or consent of instructor.*

**229. Special Topics in Comparative Politics (4)**

This seminar is an examination of the different approaches to the study of comparative politics. Issues and research areas will vary each time the course is offered. *Prerequisite: graduate standing or consent of instructor.*

**230A-B. The Mexican Political System (4-4)**

An interdisciplinary graduate seminar covering selected aspects of Mexican politics, economic development, and social change. Attention to both domestic and international factors affecting Mexico's transition to a more democratic system. Materials to be drawn from literatures in anthropology, economics, history (twentieth century), political science, sociology, urban studies, and communication. Topics vary from year to year partly reflecting research interests of participating students. Students are expected to write substantial research papers or thesis proposals. *Prerequisite: graduate standing or consent of instructor.*

**231A. Political and Economic Development in Eastern Europe: Historical Perspective (4)**

This course deals with issues in economic and political development in Eastern Europe prior to World War II. *Prerequisite: graduate standing or consent of instructor.*

**231B. Socialism in Eastern Europe (4)**

This course focuses on the economics and politics of the socialist regimes in Eastern Europe. It will deal both with Marxist theory as well as its practical ramifications as institutionalized in the economies and political orders in Eastern Europe. *Prerequisite: graduate standing or consent of instructor.*

**231C. The Post-Socialist Evolution of Eastern Europe (4)**

This course focuses on the contemporary political and economic order that is emerging in various states of Eastern Europe. *Prerequisite: graduate standing or consent of instructor.*

**231D. Politics of the Soviet Successor States (4)**

A colloquium surveying major controversies in the analyses of Soviet and post-Soviet politics. *Prerequisite: graduate standing or consent of instructor. Cannot also receive credit for PS 231.*

**232. The Chinese Political System (4)**

The evolution of political institutions and processes in the People's Republic of China. The course will examine the changing roles of the leader, the Communist Party, the government, the army; the shifting authority relations between central and local governments; and changing patterns of citizen behavior. *Prerequisite: graduate standing or consent of instructor.*

**232B. Politics and Revolution in China and Japan (4)**

An intensive examination of the quests for modernity undertaken by Chinese and Japanese leaders from the mid-nineteenth century to the present. Emphasis is placed upon the relationship among indigenous values, international pressures, and issues concerning national identity. *Prerequisite: graduate standing or consent of instructor.*

**233. Politics and Political Economy in Contemporary Japan (4)**

Japanese politics in theoretical and comparative perspective. Topics covered may vary from year to year, and include the

dynamics of the party system, the influence of international economic integration on policy making and the nature and evolution of democracy in Japan. *Prerequisite: graduate standing or consent of instructor.*

#### 234. Politics, Economics, and Socialism (4)

This course examines how economic structures and behavior affect political institutions and how political institutions and actions affect economic structures and behavior in socialist countries. Focus primarily on socialist/communist states, but reference will be made to communist parties and the dynamics of the public sector in nonsocialist countries as well. *Prerequisite: graduate standing.*

#### 235A. Latin American Politics (4)

(Conjoined with IP/Gen 477 and IP 277.) Introductory reading seminar on Latin American politics to acquaint students with leading schools of thought, provide critical perspective on premises and methodology, and identify themes for further inquiry. Themes include authoritarianism, revolution, democratization, regional conflict, and the emergence of middle-level powers. *Prerequisite: graduate standing or consent of instructor.*

#### 235B. Regime Transformation in Latin America (4)

This seminar will focus on processes of regime transformation in Latin America, with particular emphasis on recent patterns of democratization. The goals will be to explore the current literature, to examine its theoretical foundations, to identify unresolved questions, and to frame topics for further research. *Prerequisite: graduate standing or consent of instructor.*

#### 236. Immigration Policy and Politics (4)

An interdisciplinary seminar covering origins, consequences, and characteristics of worker migration from Third World countries (especially Mexico, Central America, and the Caribbean basin) to the United States, from the nineteenth century to the present.

#### 237. Grassroots Organizations and Political Change (4)

Comparative studies of subnational political organizations and their capacity for effecting political change and influencing public policy. Topics may include new social movements, trade unions, peasant movements, politicized church groups, urban neighborhood organizations, and women's groups. Organized around case studies and competing theoretical approaches. Cases will vary and emphasize contemporary Latin America. *Prerequisite: graduate standing.*

#### 240. International Relations Theory (4)

A survey of the principal theories and approaches to the study of international relations. *Prerequisite: graduate standing or consent of instructor.*

#### 243. International Security (4)

A colloquium surveying the major theoretical controversies in the study of international and national security. *Prerequisite: graduate standing or consent of instructor.*

#### 244. Models of International Change (4)

The seminar will explore models that account for international change by linking international (systemic or structural) and domestic variables. Particular attention will be given to evolutionary and learning models as they have been employed in a number of disciplines. *Prerequisites: MPA students—IP/Core 410; Ph.D. students—no prerequisites.*

#### 245. International Political Economy (4)

A seminar surveying the major theoretical controversies in the study of international political economy. *Prerequisite: graduate standing or consent of instructor.*

#### 246. Formal Theory in International Relations (4)

This course covers the rudiments of game theory and its use in the study of international relations to explore various substan-

tive and theoretical issues. *Prerequisite: graduate standing or consent of instructor.*

#### 248. Special Topics in International Relations (4)

This seminar is an examination of the different approaches to the study of international relations. Issues and research areas will vary each time the course is offered. *Prerequisite: graduate standing or consent of instructor.*

#### 250. American Politics (4)

This course will provide a general literature review in American politics to serve as preparation for the field examination. *Prerequisite: graduate standing in any discipline in the social sciences or humanities, or consent of the instructor.*

#### 251. American Political Institutions (4)

A critical examination of major contributions to the theoretical and empirical literature on the U.S. Congress, presidency, and federal bureaucracy. *Prerequisite: graduate standing or consent of instructor.*

#### 252. American Politics: Behavior

Theoretical and empirical perspectives on voting and other forms of political participation, parties, interest groups, and public opinion in the United States. *Prerequisite: graduate standing or consent of instructor.*

#### 254. American Political Development (4)

This course examines the historical evolution of the American state with particular attention to theories of political development. Special topics include the development of the party system, electoral and policy realignments, and the evolution of national political institutions. *Prerequisite: graduate standing in any discipline of the social sciences or humanities or consent of instructor.*

#### 255. Urban Politics (4)

Examines central works on the development of political institutions in U.S. cities; analyses of community power structures; who governs, why, and to what ends; processes and prospects for minority empowerment; the prominence of "growth machines"; the political economy of contemporary cities. *Prerequisite: graduate standing or consent of instructor.*

#### 256. Jurisprudence and Public Law (4)

An introduction to the field, including discussion of major jurisprudential theories (Dworkin, Ely, etc.) and constitutional controversies (e.g., abortion, the First Amendment). *Prerequisite: graduate standing.*

#### 257. Voting and Elections (4)

This course is designed to acquaint graduate students with the central themes and issues in the study of voting in national elections. *Prerequisite: graduate standing or consent of instructor.*

#### 259. Special Topics in American Politics (4)

This seminar is an examination of the different approaches to the study of American politics. Issues and research areas will vary each time the course is offered. *Prerequisite: graduate standing or consent of instructor.*

#### 260. Political Economy: Institutional Change (4)

This advanced seminar will focus on attempts to use economic theory in comparative and American politics. The micro foundations of macro models will be stressed. *Prerequisite: graduate standing or consent of instructor.*

#### 260AA. Policy Analysis (4)

This course reviews the process involved in converting the preferences of individuals into public policy as well as the methods and tools used by analysts and policy makers. *Prerequisite: graduate standing.*

#### 260AB. Introduction to Policy Analysis (4)

This course will emphasize the political and organizational problems of designing and implementing public policies. Students will attend lectures and carry out research and writing assignments designed for graduate students.

#### 262. International Political Economy: Money and Finance (4)

Examination of effects of national policies and international collaboration of public and private international financial institutions, in particular management of international debt crises, economic policy coordination, and the role of international lender of last resort. *Prerequisite: graduate standing.*

#### 269. Special Topics in Political Economy (4)

This seminar is an examination of the different approaches to the study of political economy. Issues and research areas will vary each time the course is offered. *Prerequisite: graduate standing or consent of instructor.*

#### 270A. Introductory Statistics for Political Science and Public Policy (4)

Introduction to the use of statistics in both political science and public policy, concentrating on regression based approaches. Students undertake a series of small quantitative analyses, one project, and a literature review. *Prerequisite: graduate standing in any discipline in the social sciences or humanities or consent of instructor.*

#### 271A-B. Advanced Statistical Applications (4-4)

Use of advanced quantitative techniques in political science. Students will use political science data to complete small exercises and a major project. *Prerequisites: PS 270A for 271A, 271A for 271B.*

#### 272. Historical Methods in Political Science (4)

This seminar explores various methodologies employed in the historical study of politics. It focuses upon specific substantive controversies, e.g., the changing nature of electoral politics, political recruitment and careers, social mobility, and acquaints students with appropriate methodologies and statistical techniques.

#### 273. Game Theory and Political Applications (4)

Introduction to the use of formal models in political science including game theory and social choice theory. Course will provide preparation for the field examination.

#### 274. Axiomatic Social Choice Theory (4)

An introduction to some of the central issues in the axiomatic approach to social choice initiated by Arrow's Social Choice and Individual Values. Because of the many complexities that underly an analysis of social choice, the course will be quite technical in nature. *Prerequisite: PS 250 or consent of instructor.*

#### 281A-B-C. Workshop on Political Institutions (4-4-4)

Examination of recent research in American politics and comparative politics concerning political institutions; development and presentation of research projects by graduate students; presentations of research projects by faculty. Second year students present seminar paper; third year students present dissertation prospectus; candidates make yearly presentations of dissertation research. *Prerequisite: PS 202.*

#### 282A-B-C. Workshop on State and Society (4-4-4)

Examination of recent research in American politics, comparative politics, and political theory concerning the relationship of politics to society; development and presentation of research projects by graduate students; presentations of research projects by faculty. Second-year students present seminar paper; third-year students present dissertation prospectus; candidates make yearly presentations of dissertation research. *Prerequisite: PS 202 or consent of instructor.*



**283A-B-C. Workshop in International Relations (4-4-4)**  
Examination of recent research in international politics; development and presentation of research projects by graduate students; presentations of research projects by faculty. Second year students present seminar paper; third year students present dissertation prospectus; candidates make yearly presentation of dissertation research. *Prerequisite: PS 202 or permission of instructor.*

**284. Workshop on Scientific Communication (4)**  
Forms of scientific communication, practical exercise in scientific writing and short oral communication, and in criticism and editing; preparation of illustrations, preparation of proposals; scientific societies, and the history of scientific communication. Examples from any field of science, most commonly political: science, economics, and law. *Prerequisite: PS 202 or consent of instructor.*

**285. Workshop: Law and Social Science Colloquium (4)**  
A weekly, multi-disciplinary colloquium for presentations from scholars in psychology, political science, cognitive science, and other areas (UCSD and other campuses). Presented by the Public Policy Research Project, research and approaches to studying law and the courts will be the focus. Short review papers due weekly. *Prerequisite: graduate standing or consent of instructor.*

### Independent Study

**291A. Research Tutorial in American Politics (4)**  
Tutorial in a selected area of American politics leading to a research paper. The content of each tutorial will be determined by the professor. *Prerequisite: graduate standing in political science.*

**291B. Research Tutorial in Comparative Politics (4)**  
Tutorial in a selected area of comparative politics leading to a research paper. The content of each tutorial will be determined by the professor. *Prerequisite: graduate standing in political science.*

**291C. Research Tutorial in International Relations (4)**  
Tutorial in a selected area of international relations leading to a research paper. The content of each tutorial will be determined by the professor. *Prerequisite: graduate standing in political science.*

**291D. Research Tutorial in Political Theory (4)**  
Tutorial in a selected area of political theory leading to a research paper. The content of each tutorial will be determined by the professor. *Prerequisite: graduate standing in political science.*

**292. Directed Reading in Comparative Politics (4)**  
Directed reading in a selected area of comparative politics for graduate students. The content of each reading course is to be decided by the professor directing the course with the approval of the graduate student's faculty adviser.

**293. Directed Reading in International Relations (4)**  
Directed reading in a selected area of international relations for graduate students. The content of each reading course is to be decided by the professor directing the course with the approval of the graduate student's faculty adviser.

**295. Directed Reading in American Politics (4)**  
Directed reading in a selected area of American politics for graduate students. The content of each reading course is to be decided by the professor directing the course with the approval of the graduate student's faculty adviser.

**296. Directed Reading in Political Theory (4)**  
Directed reading in a selected area of political theory for graduate students. The content of each reading course is to be de-

cidated by the professor directing the course with the approval of the graduate student's faculty adviser.

**298. Directed Reading (1-12)**  
Guided and supervised reading in the literature of the several fields of political science.

**299. Independent Research (1-12)**  
Independent work by graduate students engaged in research and writing of second-year paper and doctoral dissertation, under direct supervision of adviser.

**500. Apprentice Teaching (1-4)**  
A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty: handling of discussions, preparation, and grading of examinations and other written exercises, and student relations. Twenty-four units of teaching apprenticeship meets the department teaching requirement for the Ph.D. degree.

## Psychology

STUDENT SERVICES OFFICE:  
1533 McGill Hall Annex

### Professors

Thomas D. Albright, Ph.D., *Adjunct*  
Norman H. Anderson, Ph.D., *Emeritus*  
Stuart M. Anstis, Ph.D.  
Mark I. Appelbaum, Ph.D.  
Richard C. Atkinson, Ph.D., *UC President*  
Elizabeth A. Bates, Ph.D.  
Ursula Bellugi, Ph.D., *Adjunct*  
Robert M. Boynton, Ph.D., *Emeritus*  
Sandra A. Brown, Ph.D.  
Francis H. C. Crick, Ph.D., *Adjunct*  
Diana Deutsch, Ph.D.  
J. Anthony Deutsch, D. Phil, *Emeritus*  
Ebbe B. Ebbesen, Ph.D.  
Edmund J. Fantino, Ph.D.  
Vladimir J. Konečni, Ph.D.  
George F. Koob, Ph.D., *Adjunct*  
James A. Kulik, Ph.D.  
Donald I. A. MacLeod, Ph.D.  
George Mandler, Ph.D., *Emeritus*  
Harold E. Pashler, Ph.D.  
John M. Polich, Ph.D., *Adjunct*  
Vilayanur S. Ramachandran, Ph.D., M.B.B.S.  
Laura E. Schreibman, Ph.D.  
Cheryl L. Spinweber, Ph.D., *Adjunct*  
Larry R. Squire, Ph.D., *In Residence*  
Joan Stiles, Ph.D., *Adjunct*  
David A. Swinney, Ph.D., *Chair*  
Paul E. Touchette, Ph.D., *Adjunct*  
Ben A. Williams, Ph.D.

### Associate Professors

Nicholas Christenfeld, Ph.D.  
Brett A. Clementz, Ph.D.  
John T. Wixted, Ph.D.

### Assistant Professors

Karen R. Dobkins, Ph.D.  
Victor S. Ferreira  
Michael R. Gorman  
Kimberly A. Jameson, Ph.D.  
Shirley McGuire, Ph.D.  
Craig R. M. McKenzie, Ph.D.  
Timothy C. Rickard, Ph.D.

### Affiliated Faculty

Philip M. Groves, Ph.D., *Professor of Psychiatry*  
Steven A. Hillyard, Ph.D., *Professor of Neurosciences*  
Jean M. Mandler, Ph.D., *Professor of Cognitive Science*  
Pamela A. Sample, Ph.D., *Associate Professor in Residence, Ophthalmology*  
David S. Segal, Ph.D., *Professor of Psychiatry*  
Terrence J. Sejnowski, Ph.D., *Professor of Biology and Adjunct Professor of Physics*

## The Undergraduate Program

### The Psychology Major Program

The department now offers a choice of two degree programs: bachelor of arts (B.A.) and bachelor of science (B.S.). The department offers courses in all major areas of experimental psychology, with emphasis in the areas of behavior analysis, cognitive psychology and human information processing, developmental psychology, physiological psychology, sensation and perception, and social psychology. The department emphasizes research in the experimental and theoretical analysis of human and animal behavior, and the study of the mind. Students who major in psychology can expect to develop a knowledge of a broad range of content areas, as well as basic skills in experimental and analytic procedures.

### Prerequisites for the B.A. in Psychology

Experimental psychology uses the tools and knowledge of science: calculus, probability theory, computer science, chemistry, biology,



statistics, and physics. Accordingly, students in upper-division courses must have an adequate background in these topics. Prerequisites for individual courses are specified in the catalog.

A Bachelor of Arts (B.A.) degree in psychology will be granted if the following requirements have been met:

1. Three general introductory courses in the natural sciences, i.e., biology, chemistry, and physics. The following is a list of acceptable natural science courses offered at UCSD:
  - Biology: 1, 2, 3, 10, 12 (or Cognitive Science 17), 20, 24, 26, 30
  - Chemistry: 4, 6A, 6B, 6C, 11, 12, 13
  - Physics: Any of the 1 and 2 series, 10, 11A
2. Three formal skills courses, at least one of which must be calculus. The other two courses may consist of any combination of courses in calculus or logic. Acceptable calculus courses at UCSD include Mathematics 10A-B-C, 20A-B-C. Acceptable logic courses at UCSD include Philosophy 10 and 12.
3. One introduction to computer programming course. Acceptable courses at UCSD are CSE 5A, CSE 5B, CSE 9A, CSE 9B, CSE 10, AMES 5, AMES 9, AMES 10, CogSci 18 or equivalent. Other courses will be accepted only if they are primarily concerned with programming in a high-level computer language.
 

*All courses listed under 1–3 may be taken Pass/No Pass.*
4. One quarter of statistics. Acceptable courses at UCSD are Psychology 60, Sociology 60, Mathematics 181, BIEB 100, Cognitive Science 14, or equivalent. Statistics **MUST** be taken for a letter grade.

Students should complete these prerequisite requirements by the end of the sophomore year.

### ***Major Requirements for the B.A. in Psychology***

A minimum of **twelve** upper-division courses in psychology are required. Five must be taken from the core courses (Psychology 101–106), and at least seven from the upper-division elective courses. **A minimum of six upper-division psychology courses must be taken at UCSD.** These courses must be taken for a letter grade; courses taken on a Pass/No

Pass basis prior to declaring psychology as a major **cannot** be used to satisfy the major requirement. Excluded from credit toward the major are Psychology 199 (Special Studies), Psychology 197 (Internship), and graduate research seminars (usually designated as "Special Topics in . . ."); Psychology 195 (Instructional Assistant) can be credited once. A grade-point average of at least 2.0 in the upper-division courses of the major is required for graduation.

### ***Honors Program***

Students are encouraged to participate in the department's honors program. Prerequisite is an overall GPA of 3.3. Admission is granted by application in the fall of the junior year (deadline October 31). This program is composed of the following courses.

1. Junior year: Winter: Junior Honors Research Seminar 110
  - Winter and Spring: Advanced Statistics and Research Methods 111A+B
2. Senior Year: A year-long independent research project (Psychology 194-A-B-C) under the sponsorship of a faculty adviser. This research culminates in an honors thesis.
3. At least one laboratory course (Psychology 109, 112, 116, 117, 118A, 118B, 119, 120/121, 127) or, upon petitioning, two Psychology 199 Independent Study courses culminating in a paper (199s, however, do not count as upper-division credit toward the major).

Successful completion of the honors program requires a grade of A- in Psychology 194 and a minimum GPA of 3.5 in the upper-division courses taken for the major.

The honors program is strongly recommended for all students interested in graduate schools.

### **The Minors Program**

All five colleges offer a **minor** program with differing requirements. Students are encouraged to see the respective college advisers for pertinent details.

The minor normally consists of seven courses of which at least five courses have to be upper-division. At least four courses have to be taken at UCSD. For grading options, please contact

your provost's office. For the department a P grade is acceptable—EXCEPT for Psychology 60 (Statistics), which **must** be taken for a letter grade.

### ***Prerequisites for the B.S. in Psychology***

In general, the prerequisites for the B.S. degree in psychology overlap with the B.A. prerequisites. To fulfill the formal skills, however, we require the mathematics sequence 20A, 20B, 20C.

### ***Major Requirements for the B.S. in Psychology***

A minimum of twelve upper-division courses are required. Five of these courses must come from the core courses: Psychology 101–106. The seven elective courses may be chosen from any of the upper-division courses listed for the Psychology program at UCSD. Students must choose an area of specialization (behavior analysis, biopsychology, clinical psychology, cognitive and cognitive neuropsychology, developmental psychology, sensation and perception, or social psychology), and three of the seven electives must be in this area.

**In addition to the twelve upper-division courses**, all B.S. degree students must complete **two research experience courses** in the chosen area. Research experience courses will be comprised of a combination of laboratory courses and, upon petition, Psychology 199 course (Independent Study). The Psychology 199 courses taken to fulfill the area of specialization research experience requirement must be directed by the faculty within the chosen area of specialization and culminate in a paper.

### ***Honors Program for the B.S. in Psychology:***

Psychology 110, Psychology 111A and B, Psychology 194A, B, C. The senior honors thesis, if done with a faculty member affiliated with the chosen area of concentration, will satisfy the two-course laboratory experience requirement.

**Majors must have departmental approval for electives taken outside the department. Of the required courses in the area of specialization (three regular upper-**

division courses and two research experiences), no more than two may be taken outside the department. We recommend consulting the department before enrolling in courses offered by other departments.

Students who major in the B.A. program and wish to change to the B.S. track must submit a petition through the Student Affairs Office, 1533 McGill Annex.

### *Upper-Division Course Requirements for the B.S. in Psychology*

**Core courses of which five have to be taken for any area of concentration.**

- Psych 101 Intro to Developmental Psychology
- Psych 102 Intro to Sensation and Perception
- Psych 103 Intro to Principles of Behavior
- Psych 104 Intro to Social Psychology
- Psych 105 Intro to Cognitive Psychology
- Psych 106 Intro to Physiological Psychology

**Areas of concentration and their associated courses are listed in alphabetical order below.** (Subject to change—for additional qualifying courses, see the department's Student Affairs Office, 1533 McGill Annex.)

#### **Concentration in Behavior Analysis**

Behavior analysis is based on the principles of Pavlovian and operant conditioning, and other aspects of contemporary associative learning theory. Also includes the application of reinforcement principles and other behavior modification techniques in applied settings (applied behavior analysis).

##### **Courses:**

- Psych 120\* Learning and Motivation
- Psych 121\* Lab / Operant Psychology
- Psych 143 Control and Analysis of Human Behavior
- Psych 146 Theory of Conditioning and Learning
- Psych 154 Behavior Modification
- Psych 168 Psychological Disorders of Childhood
- Psych 184 Choice and Self Control

\* to be taken concurrently.

(For additional qualifying courses, see the department's Student Affairs Office, 1533 McGill Annex.)

#### **Concentration in Biopsychology**

The study of how the nervous system mediates behavioral effects in the realms of motivation, perception, learning and memory, and attention. Also includes human neurophysiology and aphasia.

##### **Courses:**

- Psych 129 Logic of Perception
- Psych 137 Sleep and Dreaming
- Psych 152 Brain Waves and Thought Processes
- Psych 159 Physiological Basis of Perception
- Psych 169 Brain Damage and Mental Function
- Psych 176 Functional Neuroanatomy
- Psych 179 Drugs, Addiction, and Mental Disorders
- Psych 181 Drugs and Behavior
- Psych 188 Impulse Control Disorders
- Psych 199 Since there are no lab courses in this field, you will have to take two independent studies which culminate in a paper to fulfill lab requirement (but do not count as upper-division psychology courses towards the major).

(For additional qualifying courses, see the department's Student Affairs Office, 1533 McGill Annex.)

#### **Concentration in Clinical Psychology**

The study of the psychological and physiological causes of and treatments for mental illness in children and adults.

##### **Courses:**

- Psych 124 Intro to Clinical Psychology
- Psych 131 Personality: Theory and Research
- Psych 137 Sleep and Dreaming
- Psych 150 Advanced Abnormal Psychology
- Psych 153 Clinical Psychology
- Psych 151 Test and Measurement
- Psych 154 Behavior Modification
- Psych 163 Abnormal Psychology
- Psych 168 Psychological Disorders in Children
- Psych 188 Impulse Control Disorders

(For additional qualifying courses, see the department's Student Affairs Office, 1533 McGill Annex.)

#### **Concentration in Cognitive Psychology and Cognitive Neuropsychology**

- a. The study of reasoning, thinking, language, judgment and decision-making in adults and children (including attention, memory, and visual and auditory information processing).
- b. The study of cognitive processes and their implementation in the brain. Cognitive neuroscientists use methods drawn from brain damage, neuropsychology, cognitive psychology, functional neuroimaging, and computer modeling.

##### **Courses:**

- Psych 112 Applied Cognitive Research Lab
- Psych 113 Seminar in Applied Cognitive Research
- Psych 115 Lab / Cognitive Psychology
- Psych 116 Experimental Analysis of Attention and Cognitive Processes
- Psych 118 Lab / Language Processing
- Psych 119 Lab / Psycholinguistics
- Psych 123 Cognition: Aspects/Methodology
- Psych 126 Language Acquisition
- Psych 129 Logic of Perception
- Psych 136 Cognitive Development
- Psych 142 Psychology of Consciousness
- Psych 144 Memory and Amnesia
- Psych 145 Psychology of Language
- Psych 148 Psychology of Judgment and Decision
- Psych 156 Cognitive Development in Infancy
- Psych 174 Communication Disorders in Children and Adults

(For additional qualifying courses, see the department's Student Affairs Office, 1533 McGill Annex.)

#### **Concentration in Developmental Psychology**

The study of all aspects of human development with emphasis on social and personality development, perceptual development, and language acquisition. Also includes the study of developmental psychopathology.

##### **Courses:**

- Psych 114 Lab / Developmental Psycholinguistics
- Psych 117 Lab / Developmental Psychology
- Psych 122 Aging

- Psych 128 Practicum in Child Development  
 Psych 133 Brain and Cognitive Development  
 Psych 136 Cognitive Development  
 Psych 145 Psychology of Language  
 Psych 156 Cognitive Development in Infancy  
 Psych 167 Social and Emotional Development  
 Psych 168 Psychological Disorder of  
 Childhood  
 Psych 174 Communication Disorders in  
 Children and Adults  
 Psych 180 Adolescence

(For additional qualifying courses, see the department's Student Affairs Office, 1533 McGill Annex.)

### **Concentration in Sensation and Perception**

The study of how our sense organs and brain make it possible for us to construct our consciously experienced representation of the environment. Experiments using stimuli and computer control can be used to test models of sensory or perceptual processes. Processes of particular interest include color vision, motion perception, and auditory illusions and paradox.

#### **Courses:**

- Psych 129 Logic of Perception  
 Psych 138 Sound and Music Perception  
 Psych 159 Physiological Basis of Perception  
 Psych 169 Brain Damage and Mental  
 Functions

(For additional qualifying courses, see the department's Student Affairs Office, 1533 McGill Annex.)

### **B.S. in Social Psychology**

The study of human behavior in social situations, with specialization in such topics as emotion, aggression, social cognition, and aesthetics. It also encompasses applied social psychology, including psychology and the law and behavioral medicine.

#### **Courses:**

- Psych 127 Applied Social Psychology  
 Psych 130 Delay of Gratification  
 Psych 149 Social Psychology of Theater  
 Psych 155 Social Psychology and Medicine  
 Psych 160 Groups  
 Psych 162 Psychology and the Law  
 Psych 167 Social and Emotional Development  
 Psych 175 Psychology and the Arts  
 Psych 178 Organizational Psychology

- Psych 185 Communication: Nonverbal and  
 Disfluent

- Psych 186 Psychology and Social Policy

(For additional qualifying courses, see the department's Student Affairs Office, 1533 McGill Annex.)

### **Advising**

Students are strongly encouraged to choose an adviser among the faculty. The Undergraduate Student Services Office will assist with the choice, office hours, or appointments. The student then plans her or his major program with the aid of the adviser. Such planning should take place in the student's sophomore year or as soon as possible thereafter.

### **Preparation for Graduate School**

Regardless of the area of specialization that a student chooses to pursue, it is strongly advised that she or he obtain a strong general background in statistics and experimental methods through research with a faculty member. A recommended program of study to accomplish these goals is the following:

1. At least five courses from the group numbered Psychology 101-106 (Core Courses)
2. At least one laboratory course (Psychology 112, 116, 117, 118A, 118B, 119, 120/121, 127)
3. Introduction to Statistics and Advanced Statistics (Psychology 60 and 111A and B)
4. The Senior Independent Research Project, Psychology 194A-B-C, as part of the Honors Program
5. Strongly recommended: Independent Studies (Psychology 199).

(Quarterly, the Associated Students' U.S. Grants Program awards funds to undergraduate student independent or in-class projects. We encourage students to apply.)

### **Preparation for Graduate School in Clinical Psychology**

The above program is recommended for all students planning to go on to graduate school, including those interested in a clinical graduate program. Experience in research methodology and a general knowledge of psychology are considered the most important features and are preferred over a large number of courses in one

particular area. Students are strongly advised **not** to take a large number of clinical courses in lieu of the recommended program of study listed above.

### **Education Abroad**

Students are often able to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP) while still making progress toward the major. Students considering this option should discuss their plans with the director of Undergraduate Studies before going abroad, and courses taken abroad must be approved by the department. Information on EAP/OAP is detailed in the Education Abroad Program of the *UCSD General Catalog*. Interested students should contact the Program Abroad Office in the International Center.

### **Transfer Credit**

In general, all introductory courses in experimental psychology are accepted for lower-division credit toward a psychology minor. Lower-division courses covering special topics in psychology (e.g., personal adjustment, human sexuality) will be accepted only if: 1) the student had a general introductory course as a prerequisite, and 2) the student had satisfied this prerequisite before taking the special topics course. Upper-division psychology courses will be evaluated for transfer credit on a course by course basis.

### **Elementary School Teaching**

Majoring in psychology offers excellent preparation for teaching in the elementary schools. If you are interested in earning a California teaching credential from UCSD, contact the Teacher Education Program (TEP) as early as possible in your academic career for information about the prerequisite and professional preparation requirements.

### **The Graduate Program**

The Department of Psychology provides broad training in experimental psychology. Increased specialization and the general burgeoning of knowledge make it impossible to provide training in depth in every aspect of experimental psychology, but most aspects are represented in departmental research.

## Preparation

Apart from the general university requirements, the department generally expects adequate undergraduate preparation in psychology. A major in the subject, or at least a strong minor, is normally a prerequisite, but applicants with good backgrounds in such fields as biology and mathematics are also acceptable.

## Language Requirements

There is no foreign language requirement.

## Graduate Curriculum

All students must fulfill all course requirements—stated below—while registered as graduate students in psychology at UCSD. There may occasionally be exceptions granted to this rule. Requests for exception should be in the form of petitions from students and their advisers to the Committee on Graduate Affairs. It is in the best interest of the student if these petitions are forthcoming at the time of admission to the graduate program. In this way, the committee, the students, and their advisers will all be aware of the course requirements before any of them are taken.

## Program of Study

Courses are divided into six areas: behavior analysis (including basic and applied), biopsychology (including neuropsychology and neurophysiology), cognitive (including attention, language, perception), developmental (including language acquisition), sensation and perception (including vision and audition), and social (including health and law). The Graduate Affairs Committee provides an approved list of courses from these areas. In the first year of study, each student must fulfill the following four requirements:

1. Each student must fulfill a quantitative methods requirement, either by taking two quantitative methods courses approved by the Graduate Affairs Committee or by showing a satisfactory knowledge of these courses through an examination.
2. In addition to the quantitative methods requirement, each student is expected to take four proseminars and four approved

courses from the list prepared by the Graduate Affairs Committee. All course work must be completed by the end of the third year.

3. Each first-year graduate student is required to submit a research paper on the project completed as part of a research practicum. The paper should be comparable in style, length, and quality to papers published in the normal, refereed journals of the student's research area. (The publication manual of the American Psychological Association, third edition, 1983, gives an acceptable format.)

The research paper will be read and evaluated by the student's research adviser and by at least two other readers appointed by the graduate adviser.

The research paper is presented orally at a research meeting held at the end of the spring quarter. Attendance at this meeting is a requirement for the department's graduate students and faculty. Typically, each student is allowed ten minutes to present the paper, with a five-minute question period following the presentation.

4. A teaching requirement must be met. (See below.)

Students are evaluated by the entire faculty at the end of the academic year. The normal minimum standards for allowing a student to continue beyond the first year are completion of all department requirements, satisfactory completion of the first-year research project (including the oral presentation), a B+ in the quantitative methods courses, and a B+ average in other course work.

Any student whose needs cannot be reasonably met with courses conforming to these guidelines is encouraged to petition the Graduate Affairs Committee. The petition should contain a specific list of courses and a statement of justification and must be approved by the student's adviser.

## Qualifying Examination for the Ph.D. Degree

The qualifying examination is divided into two sections to be taken separately by all students. *Part I* of the qualifying exam consists of a paper written by the student that is modeled after those published in *Psychological Bulletin*

or *Psychological Review*. Ideally, the paper would consist of a detailed review and theoretical synthesis of a coherent body of research. The paper should demonstrate independent and original thinking on the part of the student, and should either take a theoretical stance or recommend experiments designed to resolve theoretical ambiguities (i.e., the paper should not merely review published research).

Students form a qualifying committee in much the same way that they form a dissertation committee. The same rules apply, except that members from outside the department need not be included (although up to two may be). Once the committee is formed, the student should prepare a brief (e.g., three page) proposal defining the area of research and the theoretical issues that will be addressed in the paper. A proposal meeting is then arranged (usually in spring quarter of the student's second year), and committee members may at that time recommend changes in the scope of the paper, and define their expectations.

The paper does not have a prescribed length, although low-end and high-end limits of thirty and fifty pages, respectively, seem reasonable. An oral defense of the paper is required (and should be completed by the end of the student's third year).

*Part II* of the qualifying examination is the defense of the dissertation proposal. This will normally follow *Part I* of the qualifying examination and will be an oral examination including outside examiners.

## Teaching

Each student is required to participate in the teaching activities of the department. Students are required to serve as teaching assistants for one quarter during their first year in the program and for two quarters during years two through four.

## Residency

Each student must complete the requirements for qualification for candidacy for the Ph.D. degree by the end of the third year of residence. Any student failing to qualify by this time will be placed on probation. A student who fails to qualify by the end of the spring quarter of the fourth year of residence will automatically be terminated from the department.

No student may allow more than eight calendar years to elapse between starting the graduate program and completing the requirements for the Ph.D. degree. Students will automatically be terminated from the program at the end of the spring quarter of their eighth calendar year in the department.

### Research

In each year of graduate study all students are enrolled in a research practicum (Psychology 270 in the first year; Psychology 296 in subsequent years). Students are assigned to current research projects in the department and receive the personal supervision of a member of the staff.

### Departmental Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed eight years. Total registered time at UCSD cannot exceed eight years.

## COURSES

### LOWER-DIVISION

#### Experimental Requirements

Psychology at UCSD is a laboratory science. We are concerned with the scientific development of knowledge about human and animal behavior and thought. Accordingly, experience with experimental procedures plays an important role in the undergraduate and graduate training of students.

All psychology majors must learn experimental methods, including basic statistical techniques. Students in the honors program must take laboratory courses and also do a year-long undergraduate thesis.

#### LOWER-DIVISION STUDENTS

Students enrolled in the lower-division psychology courses must serve as experimental subjects for three hours per course. The requirement is intended to be a positive educational supplement to the course work. Part of each experimental session will be devoted to explanation and discussion of the purpose and

nature of the experiment. This usually will be done at the end of the experimental session. Students always have the right to discontinue participation at any point in any study. Students who are unable to participate or who choose not to participate will be provided alternate service assignments which are designed to serve similar educational goals.

#### 1. Psychology (4)

A comprehensive series of lectures covering the basic concepts of modern psychology in the areas of human information processing, learning and memory, motivation, developmental processes, language acquisition, social psychology, and personality.

#### 2. General Psychology: Biological Foundations (4)

A survey of physiological and psychological mechanisms underlying selected areas of human behavior. Emphasis will be upon sensory processes, especially vision, with emphasis also given to the neuropsychology of motivation, memory, and attention.

#### 3. General Psychology: Cognitive Foundations (4)

This course is an introduction to the basic concepts of cognitive psychology. The course surveys areas such as perception, attention, memory, language, and thought. The relation of cognitive psychology to cognitive science and to neuropsychology is also covered.

#### 4. General Psychology: Behavioral Foundations (4)

This course will provide a basic introduction to behavioral psychology, covering such topics as classical conditioning, operant conditioning, animal learning and motivation, and behavior modification.

#### 6. General Psychology: Social Foundations (4)

This course will provide a basic introduction to social psychology, covering such topics as emotion, aesthetics, behavioral medicine, person perception, attitudes and attitude change, and behavior in social organizations.

#### 7. General Psychology: Developmental Psychology (4)

This course is an introduction to the cognitive and social changes that take place over the course of a lifetime. This course introduces influential theories of child development, such as those of Freud and Piaget, together with recent criticisms of these theories.

#### 8. Psychopharmacology: Everyday Addiction (4)

This course explores the defining characteristics, etiology, prevention, and treatment of excessive consummatory behaviors known as addictions in our daily lives, including those motivated by legal drugs (caffeine, nicotine, and alcohol), foods including junk food, and other appetites such as sex, gambling, and even exercise.

#### 10. Cognition and Perception: Applied Aspects (4)

An introduction to cognitive and perceptual psychology as applied to real-world concerns, and the research issues that are important for the ultimate applicability of psychological findings. Topics covered will include gender differences in cognitive processing, sensory processing, memory and its distortions, pragmatic use of language and information processing, and cross-cultural universals.

#### 60. Introduction to Statistics (4)

Introduction to the experimental method in psychology and to mathematical techniques necessary for experimental research. *Prerequisite: one year of mathematics or consent of instructor.*

### UPPER-DIVISION

#### 101. Introduction to Developmental Psychology (4)

A lecture course on a variety of topics in the development of the child, including the development of perception, cognition, language, and sex differences. *Prerequisite: Psychology 60.*

#### 102. Introduction to Sensation and Perception (4)

An introduction to problems and methods in the study of perceptual and cognitive processes. *Prerequisite: Psychology 60 or one year of college-level mathematics.*

#### 103. Introduction to Principles of Behavior (4)

An example of the principles of conditioning and their application to the control and modification of human behavior.

#### 104. Introduction to Social Psychology (4)

An intensive introduction and survey of current knowledge in social psychology. *Prerequisite: Psychology 60.*

#### 105. Introduction to Cognitive Psychology (4)

Introduction to experimental study of higher mental processes. Topics to be covered include pattern recognition, perception, and comprehension of language, memory, and problem solving. *Prerequisite: junior standing.*

#### 106. Introduction to Physiological Psychology (4)

Intensive introduction to current knowledge of physiological factors in learning, motivation, perception, and memory.

#### 110. Junior Honors Research Seminar (4)

Bi-weekly meetings consist of research seminars by a range of departmental faculty, exposing students to contemporary research problems in all branches of experimental psychology. Evaluation is based on assigned papers. *Prerequisite: admission by application in the fall of the Junior year\*, with a minimum UCSD GPA of 3.3.* Course is offered in winter quarter.

\*Application forms are available from the Student Services Office and due by the end of October of each fall quarter.

#### 111A. Research Methods I (4)

This course is designed to provide training in the applications of advanced statistical methods and in the context of initial instruction in experimental design. Emphasis will be placed on the development of statistical problem-solving skills and practical applications. *Prerequisites: minimum grade of B in either Psychology 60 or equivalent and junior standing. Open to honors students or by consent of instructor.*

#### 111B. Research Methods II (4)

This course is designed to extend the material of Psychology 111A by focusing on the use of the techniques developed previously on several in-class experiments. Students will be required to participate in data collection, data organization, statistical analysis, and graphic displays. *Prerequisite: Psychology 111A or consent of instructor.*

#### 112. Applied Cognitive Research Lab (4)

This laboratory course involves empirical study of basic research issues in applied cognitive psychology, emphasizing both psychological theory and research applications. Students will be instructed in experimental design and method, data handling and analysis, and will actively participate in the implementation and completion of experimental studies. *Prerequisites: upper-division standing and consent of instructor.*

#### 113. Seminar in Applied Cognitive Research (4)

This seminar involves instruction on basic research issues in applied cognitive psychology. Psychological theory and interdisciplinary methods will be illustrated through seminar readings and discussions of recent research publications. The emphasis will be on exploring interesting applied problems in psychology that are

## Preparation

Apart from the general university requirements, the department generally expects adequate undergraduate preparation in psychology. A major in the subject, or at least a strong minor, is normally a prerequisite, but applicants with good backgrounds in such fields as biology and mathematics are also acceptable.

## Language Requirements

There is no foreign language requirement.

## Graduate Curriculum

All students must fulfill all course requirements—stated below—while registered as graduate students in psychology at UCSD. There may occasionally be exceptions granted to this rule. Requests for exception should be in the form of petitions from students and their advisers to the Committee on Graduate Affairs. It is in the best interest of the student if these petitions are forthcoming at the time of admission to the graduate program. In this way, the committee, the students, and their advisers will all be aware of the course requirements before any of them are taken.

## Program of Study

Courses are divided into six areas: behavior analysis (including basic and applied), biopsychology (including neuropsychology and neurophysiology), cognitive (including attention, language, perception), developmental (including language acquisition), sensation and perception (including vision and audition), and social (including health and law). The Graduate Affairs Committee provides an approved list of courses from these areas. In the first year of study, each student must fulfill the following four requirements:

1. Each student must fulfill a quantitative methods requirement, either by taking two quantitative methods courses approved by the Graduate Affairs Committee or by showing a satisfactory knowledge of these courses through an examination.
2. In addition to the quantitative methods requirement, each student is expected to take four proseminars and four approved

courses from the list prepared by the Graduate Affairs Committee. All course work must be completed by the end of the third year.

3. Each first-year graduate student is required to submit a research paper on the project completed as part of a research practicum. The paper should be comparable in style, length, and quality to papers published in the normal, refereed journals of the student's research area. (The publication manual of the American Psychological Association, third edition, 1983, gives an acceptable format.)

The research paper will be read and evaluated by the student's research adviser and by at least two other readers appointed by the graduate adviser.

The research paper is presented orally at a research meeting held at the end of the spring quarter. Attendance at this meeting is a requirement for the department's graduate students and faculty. Typically, each student is allowed ten minutes to present the paper, with a five-minute question period following the presentation.

4. A teaching requirement must be met. (See below.)

Students are evaluated by the entire faculty at the end of the academic year. The normal minimum standards for allowing a student to continue beyond the first year are completion of all department requirements, satisfactory completion of the first-year research project (including the oral presentation), a B+ in the quantitative methods courses, and a B+ average in other course work.

Any student whose needs cannot be reasonably met with courses conforming to these guidelines is encouraged to petition the Graduate Affairs Committee. The petition should contain a specific list of courses and a statement of justification and must be approved by the student's adviser.

## Qualifying Examination for the Ph.D. Degree

The qualifying examination is divided into two sections to be taken separately by all students. *Part I* of the qualifying exam consists of a paper written by the student that is modeled after those published in *Psychological Bulletin*

or *Psychological Review*. Ideally, the paper would consist of a detailed review and theoretical synthesis of a coherent body of research. The paper should demonstrate independent and original thinking on the part of the student, and should either take a theoretical stance or recommend experiments designed to resolve theoretical ambiguities (i.e., the paper should not merely review published research).

Students form a qualifying committee in much the same way that they form a dissertation committee. The same rules apply, except that members from outside the department need not be included (although up to two may be). Once the committee is formed, the student should prepare a brief (e.g., three page) proposal defining the area of research and the theoretical issues that will be addressed in the paper. A proposal meeting is then arranged (usually in spring quarter of the student's second year), and committee members may at that time recommend changes in the scope of the paper, and define their expectations.

The paper does not have a prescribed length, although low-end and high-end limits of thirty and fifty pages, respectively, seem reasonable. An oral defense of the paper is required (and should be completed by the end of the student's third year).

*Part II* of the qualifying examination is the defense of the dissertation proposal. This will normally follow *Part I* of the qualifying examination and will be an oral examination including outside examiners.

## Teaching

Each student is required to participate in the teaching activities of the department. Students are required to serve as teaching assistants for one quarter during their first year in the program and for two quarters during years two through four.

## Residency

Each student must complete the requirements for qualification for candidacy for the Ph.D. degree by the end of the third year of residence. Any student failing to qualify by this time will be placed on probation. A student who fails to qualify by the end of the spring quarter of the fourth year of residence will automatically be terminated from the department.



No student may allow more than eight calendar years to elapse between starting the graduate program and completing the requirements for the Ph.D. degree. Students will automatically be terminated from the program at the end of the spring quarter of their eighth calendar year in the department.

## Research

In each year of graduate study all students are enrolled in a research practicum (Psychology 270 in the first year; Psychology 296 in subsequent years). Students are assigned to current research projects in the department and receive the personal supervision of a member of the staff.

## Departmental Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed eight years. Total registered time at UCSD cannot exceed eight years.

## COURSES

### LOWER-DIVISION

#### Experimental Requirements

Psychology at UCSD is a laboratory science. We are concerned with the scientific development of knowledge about human and animal behavior and thought. Accordingly, experience with experimental procedures plays an important role in the undergraduate and graduate training of students.

All psychology majors must learn experimental methods, including basic statistical techniques. Students in the honors program must take laboratory courses and also do a year-long undergraduate thesis.

#### LOWER-DIVISION STUDENTS

Students enrolled in the lower-division psychology courses must serve as experimental subjects for three hours per course. The requirement is intended to be a positive educational supplement to the course work. Part of each experimental session will be devoted to explanation and discussion of the purpose and

nature of the experiment. This usually will be done at the end of the experimental session. Students always have the right to discontinue participation at any point in any study. Students who are unable to participate or who choose not to participate will be provided alternate service assignments which are designed to serve similar educational goals.

#### 1. Psychology (4)

A comprehensive series of lectures covering the basic concepts of modern psychology in the areas of human information processing, learning and memory, motivation, developmental processes, language acquisition, social psychology, and personality.

#### 2. General Psychology: Biological Foundations (4)

A survey of physiological and psychological mechanisms underlying selected areas of human behavior. Emphasis will be upon sensory processes, especially vision, with emphasis also given to the neuropsychology of motivation, memory, and attention.

#### 3. General Psychology: Cognitive Foundations (4)

This course is an introduction to the basic concepts of cognitive psychology. The course surveys areas such as perception, attention, memory, language, and thought. The relation of cognitive psychology to cognitive science and to neuropsychology is also covered.

#### 4. General Psychology: Behavioral Foundations (4)

This course will provide a basic introduction to behavioral psychology, covering such topics as classical conditioning, operant conditioning, animal learning and motivation, and behavior modification.

#### 6. General Psychology: Social Foundations (4)

This course will provide a basic introduction to social psychology, covering such topics as emotion, aesthetics, behavioral medicine, person perception, attitudes and attitude change, and behavior in social organizations.

#### 7. General Psychology: Developmental Psychology (4)

This course is an introduction to the cognitive and social changes that take place over the course of a lifetime. This course introduces influential theories of child development, such as those of Freud and Piaget, together with recent criticisms of these theories.

#### 8. Psychopharmacology: Everyday Addiction (4)

This course explores the defining characteristics, etiology, prevention, and treatment of excessive consummatory behaviors known as addictions in our daily lives, including those motivated by legal drugs (caffeine, nicotine, and alcohol), foods including junk food, and other appetites such as sex, gambling, and even exercise.

#### 10. Cognition and Perception: Applied Aspects (4)

An introduction to cognitive and perceptual psychology as applied to real-world concerns, and the research issues that are important for the ultimate applicability of psychological findings. Topics covered will include gender differences in cognitive processing, sensory processing, memory and its distortions, pragmatic use of language and information processing, and cross-cultural universals.

#### 60. Introduction to Statistics (4)

Introduction to the experimental method in psychology and to mathematical techniques necessary for experimental research. *Prerequisite: one year of mathematics or consent of instructor.*

### UPPER-DIVISION

#### 101. Introduction to Developmental Psychology (4)

A lecture course on a variety of topics in the development of the child, including the development of perception, cognition, language, and sex differences. *Prerequisite: Psychology 60.*

#### 102. Introduction to Sensation and Perception (4)

An introduction to problems and methods in the study of perceptual and cognitive processes. *Prerequisite: Psychology 60 or one year of college-level mathematics.*

#### 103. Introduction to Principles of Behavior (4)

An example of the principles of conditioning and their application to the control and modification of human behavior.

#### 104. Introduction to Social Psychology (4)

An intensive introduction and survey of current knowledge in social psychology. *Prerequisite: Psychology 60.*

#### 105. Introduction to Cognitive Psychology (4)

Introduction to experimental study of higher mental processes. Topics to be covered include pattern recognition, perception, and comprehension of language, memory, and problem solving. *Prerequisite: junior standing.*

#### 106. Introduction to Physiological Psychology (4)

Intensive introduction to current knowledge of physiological factors in learning, motivation, perception, and memory.

#### 110. Junior Honors Research Seminar (4)

Bi-weekly meetings consist of research seminars by a range of departmental faculty, exposing students to contemporary research problems in all branches of experimental psychology. Evaluation is based on assigned papers. *Prerequisite: admission by application in the fall of the Junior year\*, with a minimum UCSD GPA of 3.3. Course is offered in winter quarter.*

\*Application forms are available from the Student Services Office and due by the end of October of each fall quarter.

#### 111A. Research Methods I (4)

This course is designed to provide training in the applications of advanced statistical methods and in the context of initial instruction in experimental design. Emphasis will be placed on the development of statistical problem-solving skills and practical applications. *Prerequisites: minimum grade of B in either Psychology 60 or equivalent and junior standing. Open to honors students or by consent of instructor.*

#### 111B. Research Methods II (4)

This course is designed to extend the material of Psychology 111A by focusing on the use of the techniques developed previously on several in-class experiments. Students will be required to participate in data collection, data organization, statistical analysis, and graphic displays. *Prerequisite: Psychology 111A or consent of instructor.*

#### 112. Applied Cognitive Research Lab (4)

This laboratory course involves empirical study of basic research issues in applied cognitive psychology, emphasizing both psychological theory and research applications. Students will be instructed in experimental design and method, data handling and analysis, and will actively participate in the implementation and completion of experimental studies. *Prerequisites: upper-division standing and consent of instructor.*

#### 113. Seminar in Applied Cognitive Research (4)

This seminar involves instruction on basic research issues in applied cognitive psychology. Psychological theory and interdisciplinary methods will be illustrated through seminar readings and discussions of recent research publications. The emphasis will be on exploring interesting applied problems in psychology that are

in need of empirical study. Students will be directed in developing research projects in a content domain of their interest. *Prerequisites: upper-division standing and consent of instructor.*

**115. Laboratory in Cognitive Psychology (4)**

Lecture and laboratory work in human information processing. *Prerequisites: Psychology 105 and 111 or consent of the instructor.*

**116. Experimental Analysis of Attention and Cognitive Processes (4)**

This lab course examines the design and methods for the experimental study of attentional mechanisms; topics will include pre-attentive processes and the role of attentional resources in different aspects of perception, and attentional limitation in planning of action, short-term memory, and other aspects of cognition. *Prerequisite: department stamp required.*

**117. Laboratory in Developmental Psychology (4)**

The laboratory course in developmental psychology is designed around a series of intensive observational assignments, and one experimental project. Each observational assignment will include a lecture providing background on a major area in child development, a supervised structured observation, and a written laboratory report. *Prerequisite: Psychology 101.*

**118A. Real-Time Examination of Language Processing (4)**

This lab course examines the design and methods for the real-time examination of language processing in normal and disordered (aphasic, dyslexic, child language impaired, etc.) language populations. This course serves as preparation for individual research topics in Psychology 118B. *Prerequisite: a course in language or cognition (see professor for exceptions).*

**118B. Real-Time Examination of Language Processing (4)**

This lab is a continuation of Psychology 118A. The instruction to laboratory methods is now applied to individual research projects culminating in a lab presentation and paper. *Prerequisite: Psychology 118A or consent of instructor.*

**119. Psycholinguistics/Cognition Laboratory (4)**

Methods and practicum in experimental study of language, reading, and related cognitive processes (reasoning, problem solving) in young adult populations. *Prerequisites: A course in language or cognition, or Psych 118 (see professor for exceptions). Permission of instructor required. Department stamp required.*

**120. Learning and Motivation (4)**

Survey of research and theory in learning and motivation. Includes instincts, reinforcement, stimulus control, choice, aversive control, and human application. *Prerequisites: upper-division standing. Must be taken concurrently with Psychology 121.*

**121. Laboratory in Operant Psychology (4)**

Lecture and laboratory in operant psychology. *Prerequisite: must be taken concurrently with Psychology 120.*

**122. Aging (4)**

An introduction to the psychology of aging (from age 20 on). This course is designed to extend the developmental course (101) which focuses primarily on early development. Lectures cover a variety of topics including behavioral (functional changes), physiological changes (mainly associated with the central nervous system), and neuropathological disorders associated with aging. *Prerequisites: Psychology 60 and 101.*

**123. Cognition: Aspects of Methodology (4)**

An introduction to methodological issues and basic research issues important to the empirical study of cognition. Both psychological theory and research applications will be covered. *Prerequisite: department stamp required.*

**124. Introduction to Clinical Psychology (4)**

Introduction to major concepts and models used in psychology assessment and psychotherapeutic intervention. Several modalities of psychotherapy (individual, group, and family) will be reviewed along with research on their efficacy. *Prerequisite: Psychology 163.*

**126. Language Development (4)**

A comprehensive survey of theory, method, and research findings on language development in children ranging from the earliest stages of speech perception and communication at birth to refinements in narrative discourse and conversational fluency through middle childhood and adolescence. Cross listed with CogSci 156. *Prerequisites: upper-division standing and background in developmental psychology and/or linguistics is recommended.*

**127. Methods in Applied Social Psychology (4)**

Emphasizes learning of experimental and quasi-experimental methodology applicable to social problems. Students carry out field research in areas such as the psychology of law (judicial decision making), traffic-related behavior (risk taking), environmental psychology, and other areas of student interest. *Prerequisites: Psychology 104 and 60.*

**128. Practicum in Child Development (6)**

A combined lecture and laboratory course for students in psychology, communication, and human development. Student backgrounds should include a background in general psychology or communication. Students will be expected to spend four hours a week in a supervised practical after school setting at one of the community field sites involving children. Additional time will be devoted to readings and class prep, as well as, six hours a week transcribing field notes and writing a paper on some aspect of the field work experience as it relates to class lectures and readings. *Prerequisite: Psychology 101 or COGN 20 or HDP 1 or consent of instructor. Cross-listed with COMT 116 and HDP 135.*

**129. The Logic of Perception (4)**

This course is concerned with how we perceive the world. The lectures will cover three topics: a) the rich tradition of experimental work on perception that dates back to Helmholtz, b) discussion and criticisms of theories of perception including the view that perception is "intelligent" or "logical", c) recent physiological work on the visual pathways that may give us insights into neural mechanisms underlying perception. *Prerequisite: upper-division standing.*

**130. Delay of Gratification (4)**

This course will review the research on delay of gratification. We will cover what makes it, in general, so tough; what situations make it possible, who can do it, and what the implications of this ability are. *Prerequisite: upper-division standing.*

**131. Personality Theory and Research (4)**

This course serves as an introduction to major theoretical approaches to the study of personality constructs and processes. Research advances in personality will be reviewed, and disturbances in personality development and functioning will be discussed and illustrated. The social learning theory perspective will be emphasized relative to other theoretical frameworks. *Prerequisite: upper-division standing.*

**133. Brain and Cognitive Development (4)**

This course will review human brain development from early gestation through adolescence, and consider relations between neurological development and behavioral milestones. The effects of early brain injury on the development of both the neural and cognitive systems is considered. *Prerequisite: upper-division standing; Psychology 176 strongly recommended.*

**136. Cognitive Development (4)**

An examination of the foundations and growth of mind, discussing the development of perception, imagery, concept formation, memory, and thinking. Emphasis is placed on the representation of knowledge in infancy and early childhood. *Prerequisite: Cognitive Science 101B or Psychology 105 or Psychology 101.*

**137. Sleep and Dreaming (4)**

Psychological and physiological aspects of the human sleep/wake cycle and dreaming, including EEGs, drug effects, circadian rhythms, sleep disorders, and dream interpretation. *Prerequisite: upper-division standing.*

**138. Sound and Music Perception (4)**

Topics include the physiology of the auditory system, perception of pitch, loudness and timbre, localization of sound in space, perception of melodic and temporal patterns, handedness correlates, and musical illusions and paradoxes. There will be a substantial number of sound demonstrations. *Prerequisite: upper-division standing.*

**141. Evolution and Human Nature (4)**

This course will examine the question of whether important aspects of human behavior can be explained as a result of natural selection. The focus will be on sex differences, selfishness and altruism, homicide and violence, and context effects on human reasoning. *Prerequisites: upper-division standing and consent of instructor.*

**143. Control and Analysis of Human Behavior (4)**

An overview of the behavioral approach, including basic principles, self-control, clinical applications, and the design of cultures. *Prerequisite: upper-division psychology majors.*

**144. Memory and Amnesia (4)**

This course will review basic research into the nature of memory. It begins with an examination of historical milestones in the study of memory and then considers research concerned with contemporary models of memory and amnesia. *Prerequisite: upper-division standing.*

**145. Psychology of Language (4)**

Examination of theory and research on language comprehension and production. Focus on brain bases of language, language origin and universal structure, language disorders (aphasia, dyslexia), animal language, linguistic community differences, and the mental processes underlying normal language processing. *Prerequisite: A course in language, cognition, or philosophy of mind recommended.*

**146. Theories of Conditioning and Learning (4)**

Primary emphasis will be on contemporary theoretical accounts of learning, based on research on Pavlovian and Instrumental Conditioning. *Prerequisite: Psychology 103 or equivalent.*

**148. Psychology of Judgment and Decision (4)**

Broadly defined, the field of judgment and decision making examines preferences and subjective probability and how they are combined to arrive at decisions. The course will cover history and current topics.

**149. Social Psychology of Theatre (4)**

This undergraduate seminar will explore the relationship between social psychology and drama, focusing especially on the use of psychological principles in plays (by playwrights) and their performance (by directors, actors, and choreographers). In addition to discussions and student presentations based on assigned readings, there will be videotaping sessions of students' scenework. *Prerequisites: upper-division standing; psychology major, theatre major, or permission of instructor.*

**150. Advanced Abnormal Psychology (4)**

In-depth study of selected psychopathological disorders (e.g., schizophrenia, affective disorders, personality disorders). Top-

ics for discussion will change yearly. Students will gain an understanding of current theoretical research issues in psychopathology. The development of an independent research project will be required. *Prerequisites: A or B in Psychology 163 and consent of instructor.*

#### 151. Test and Measurement (4)

This course provides an introduction to psychological testing presented in three components: 1) psychometrics and statistical methods of test construction; 2) application of psychological tests in industry, clinical practice, and other applied settings; and 3) controversies in the application of psychological tests. *Prerequisite: Psychology 60.*

#### 152. Brainwaves and Thought Processes (4)

The relationships between human cognition and neural activity in terms of event-related brain potentials (ERPs) will be discussed. *Prerequisite: Psychology 105.*

#### 153. Clinical Psychology (4)

Topics to be covered include the major theoretical orientations in clinical psychology and the major types of psychotherapy (behavior modification, individual or group psychotherapy, play therapy, hypnosis, biofeedback and art therapy), legal and ethical issues involved in clinical practice. *Prerequisite: upper-division standing.*

#### 154. Behavior Modification (4)

Extension of learning principles to human behavior. In addition to discussion of the broad implications of a behavioral perspective, topics include methods of applied behavior analysis and applications of behavioral principles to clinical disorders and to normal behavior in various settings. *Prerequisites: Psychology 103 and/or Psychology 120.*

#### 155. Social Psychology and Medicine (4)

Explores areas of health, illness, treatment, and delivery of treatment that may be elucidated by an understanding of psychological concepts and research and considers how the psychological perspective might be enlarged and extended in the medical area. *Prerequisites: Psychology 60 or equivalent and Psychology 104.*

#### 156. Cognitive Development in Infancy (4)

This course examines perception and cognition in the first year of life. The focus is a critical evaluation of different theories of cognitive change in infancy. Methodological issues will be a central concern. *Prerequisites: Psychology 60 and 101.*

#### 159. Physiological Basis of Perception (4)

A survey of sensory and perceptual phenomena with emphasis on the physiological mechanisms underlying them. *Prerequisite: Psychology 102 or consent of instructor.*

#### 160. Groups (4)

What are the causes and consequences of our gregariousness? This course examines the role of groups in buffering stress, validating attitudes, improving efficiency, consolidating power, permitting loafing, rejecting deviates, and insulating its members from unpleasant outside influences. *Prerequisite: upper-division standing.*

#### 162. Psychology and the Law (4)

Research dealing with psychological factors in the legal system will be surveyed. Particular emphasis will be placed on applying psychological theory and methods to the criminal justice system in an attempt to understand the behavior of its participants. *Prerequisites: Psychology 60 and 104.*

#### 163. Abnormal Psychology (4)

This course is a comprehensive survey of the origins, characteristics, and causes of abnormal behavior. Particular attention is given to the biological and environmental causes of abnormality.

#### 166. History of Psychology (4)

Survey of the major trends and personalities in the development of psychological thought. Emphasis will be given to such selected topics as the mind-body problem, nativism vs. empiricism, and the genesis of behaviorism. *Prerequisites: three previous upper-division courses in psychology.*

#### 167. Social and Emotional Development (4)

Lecture course focused on the early social development of the child. Will include topics like attachment, moral development, sex roles, self definition, and peer interaction. *Prerequisites: Psychology 60 and 101.*

#### 168. Psychological Disorders of Childhood (4)

This course explores different forms of psychological deviance in children, including severe psychopathology, neurosis, mental retardation, language disorders, and other behavior problems. Emphasis is placed on symptomatology, assessment, etiological factors, and various treatment modalities. *Prerequisite: upper-division standing.*

#### 169. Brain Damage and Mental Functions (4)

What are the neural mechanisms underlying perception, memory, language, and other mental capacities? What happens to these capacities when different parts of the brain are damaged? What can we learn about the functions of the normal brain by studying patients? *Prerequisite: upper-division standing.*

#### 174. Communication Disorders in Children and Adults (4)

This course will begin neural bases of language use in normal adults, and the neural bases of language and communication development in normal children. It will review recent evidence on the nature of language and communication deficits in several clinical populations of adults (especially aphasia and dementia) and children (including specific language impairment, focal brain injury, retardation, and autism). *Prerequisites: Cognitive Science 10A-B or Psychology 101 or Cognitive Science 101 A-B or Psychology 2 and 3.*

#### 175. Psychology and the Arts (4)

This interdisciplinary course will discuss theoretical ideas and empirical research that relate contemporary psychology (social and cognitive, psychophysiology, motivation and emotion) to issues in various aesthetic and artistic domains, including the visual arts, music, literature, criticism, and the performance arts. *Prerequisites: upper-division standing; psychology major or music major or visual arts major or communications major or literature major or theatre major or permission of instructor.*

#### 176. Functional Neuroanatomy (4)

Introduction to the structure of the nervous system. The course will focus on the anatomy of the human brain and the function of different brain regions. The alteration of normal brain produced by injury or disease will also be discussed. *Prerequisite: upper-division standing.*

#### 178. Organizational Psychology (4)

This course examines human behavior in industrial and organizational settings. Psychological principles are applied to selection, placement, and training. The effectiveness individuals and groups within organizations, including leadership and control, conflict and cooperation, motivation, and organizational structure and design, is examined. *Prerequisite: upper-division standing.*

#### 179. Drugs, Addiction, and Mental Disorder (4)

This course will consider the use, abuse, liability, and psychotherapeutic effects of drugs in humans. Lectures are supplemented by guest lectures from clinical experts in psychology and psychiatry. *Prerequisite: one lower-division psychology course (Psychology 1, 2, 3, or 4) or upper-division standing.*

#### 180. Adolescence (4)

This course will adopt a multidisciplinary approach toward understanding the period of human adolescence. A strong focus on the neurobiological aspects of adolescence will be combined with psychological, anthropological, and sociological considerations. *Prerequisite: Psychology 60.*

#### 181. Drugs and Behavior (4)

Psychological effects, brain mode of action, patterns of use of psychoactive agents, including stimulants, sedative/hypnotics, hallucinogens, marijuana, alcohol, over-the-counter drugs, cognitive enhancers, anti-anxiety agents, antidepressants, and antipsychotics. This course develops basic principles in psychopharmacology while exploring the behavioral effects of drugs and mechanisms of action of drugs. *Prerequisite: junior standing.*

#### 184. Choice and Self Control (4)

This course is an overview of the experimental analysis of choice behavior, with an emphasis on the types of choice involved in self-control. A central interest will be the conditions under which decision-making is optimal. *Prerequisite: upper-division students majoring in psychology, biology, or economics; or consent of instructor.*

#### 185. Communication: Nonverbal and Disfluent (4)

This course will focus on nonverbal behaviors (gestures, facial expressions as well as pulse, skin conductance, and the like) and on speech disfluencies (ums, stutters, etc.) and what they can tell us about communication. *Prerequisite: upper-division standing.*

#### 186. Psychology and Social Policy (4)

This course will examine a number of social policy issues from the psychological point of view. Each social policy issue will be discussed in a descriptive manner and will include (with student input) an array of both pro and con arguments. The psychological (behavioral) assumptions in the pro and con arguments will then be identified and the empirical evidence for these assumptions will be analyzed. *Prerequisites: Psychology 60 and 104.*

#### 188. Impulse Control Disorders (4)

Problems of impulse control are important features of major psychiatric disorders, but also of atypical impulse control disorders, such as pathological gambling, compulsive sex, eating, exercise, shopping, etc. Focus: development, major common features, treatment, and neurobiological basis of impulse control disorders. *Prerequisite: upper-division standing.*

#### 194A-B-C. Honors Thesis (4-4-4)

Weekly research seminar, three-quarter research project under faculty guidance which culminates in senior honors thesis. *Prerequisites: one laboratory course in psychology (Psychology 114 through 127), Psychology 111A and B, and 110, a 3.3 grade-point average, and consent of instructor.*

#### 195. Instruction in Psychology (4)

Introduction to teaching of introductory psychology. Each student will be responsible for and teach a class section in one of the lower-division psychology courses. (P/INP grades only.) Limited to seniors majoring in psychology with consent of instructor. Students will attend the lectures of the lower-division course, meet once a week with a class section and for one hour a week with the instructor. *Prerequisites: junior standing and either a) an A in the course in which the student plans to assist, or b) a grade-point average of B or better in no fewer than three upper-division psychology courses. Consent of instructor. Only counts once toward minor or major.*

#### 198. Directed Group Study in Psychology (2)

Group study under the direction of a faculty member in the Department of Psychology. *Prerequisites: Psychology 101, 102, 103, or 105.*

**199. Independent Study (2-4)**

Independent study or research under direction of a member of the staff. Not counted for credit towards the major. (P/NP grades only.) *Prerequisite: special permission of department.*

**GRADUATE**

**201A-B-C. Quantitative Methods in Psychology (3-3-3)**

An intensive course in statistical methods and the mathematical treatment of data, with special reference to research in psychology. *Prerequisite: restricted to graduate students in psychology.*

**207. Principles of Behavior (3)**

Basic seminar on behavior theory with emphasis on principles of conditioning as the foundation of a general model of behavior.

**209. Topics in Judgment and Decision Making (3)**

This seminar examines issues in the psychology of judgment and decision making. Topics include the heuristics and biases approach. (Over confidence, framing effects, intertemporal choice, and rationality.)

**212. Current Topics in Visual Science (3)**

Each year a different topic in visual science is selected for in-depth review and discussion based on current readings. *Prerequisite: consent of instructor.*

**215. Language Acquisition (4)**

Discussion of the acquisition of language by young children, including such topics as its stages, mechanisms, and relation to non-linguistic development. *Prerequisite: consent of instructor.*

**216. Basic Seminar in Comparative Cognitive Research (3)**

This seminar will review current research and theory in cognitive psychology, in order to characterize group differences in cognitive functioning. Groups chosen are assumed to be not equivalent in theoretically important ways that affect their performance on standard laboratory tasks.

**217A. Proseminar in Developmental Psychology I (3)**

The course examines cognitive development through the school-age period. It begins with an examination of early neurological, sensory, motor and perceptual functions and then focuses on issues in linguistic and cognitive development.

**217B. Proseminar in Developmental Psychology II (3)**

The course examines social and personality development from infancy through early adolescence. The class will first discuss general developmental theory and methods and then topics such as attachment, temperament, self-concept, aggression, family relations, play, and peers.

**218A-B. Cognitive Psychology (3-3)**

A two-quarter survey of basic principles and concepts of cognitive psychology. This course is intended to serve as the basic introduction for first-year students. Basic areas include knowledge, memory, thought, perception, and performance. The areas are taught by those faculty members who work within the specialty. *Prerequisite: graduate status in psychology or consent of instructor.*

**219. Proseminar in Learning and Motivation (3)**

An overview of the experimental and applied analysis of behavior including topics such as the principles of operant and classical conditioning, stimulus control, choice, conditioned reinforcement, aversive control, biological and economic contexts, verbal behavior, and the modification of human behavior in a variety of applied settings.

**220. Proseminar in Social Psychology (3)**

An introduction to social psychology. Psychology and the law, health psychology, attitudes, emotions, person perception and aggression are some of the topics to be covered.

**221. Proseminar in Sensation and Perception (3)**

Fundamentals of vision, audition, and other senses. Emphasis will be upon psychophysical approaches to the study of these sensory modalities, as well as some essential aspects of their neurophysiological bases.

**222. Biological Psychology (3)**

A survey of the functional neuroanatomical, neurodevelopmental, neurophysiological, and pharmacological correlates of psychological phenomena.

**223. Advanced Topics in Vision (4)**

An in-depth analysis of empirical and theoretical issues in a specialized area of vision or visual perception. Emphasis most likely will be on a topic of ongoing vision research at UCSD. *Prerequisite: Psychology 212A or special consent of instructor.*

**226. Color Appearance Models: Cognition and Perception (3)**

This course covers color appearance models (e.g., CIE models, OSA, etc.) and their use in perception and cognition research. Emphasis will be given to the theories underlying color appearance spaces; the derivation and interpretation of corresponding "metrics"; color-difference tolerances; plausible linking propositions for color models and neurophysiology; and the ways these models are used in psychological and psychophysical experimentation.

**227. Cognitive Development (4)**

Selected topics with emphasis on current experimental work. *Prerequisite: consent of instructor.*

**228. Conceptions of Intelligence (3)**

This course surveys major issues in the study of intelligence. Issues to be considered are the structure of intelligence, its heritability, and significance for real-world behavior. Special emphasis will be given to accounts of intelligence based on elementary processes.

**230. Brain, Cognition, and Development (3)**

This course focuses on issues related to early brain and cognitive development, with emphasis on early plasticity and later-alization of function. The course is designed for students in cognitive development with interest in cross-disciplinary issues.

**231. Auditory Perception (3)**

This course will give a comprehensive overview of auditory perception. Topics will include: the nature of sound, the ear, auditory pathways in the brain, perceptual images of sound, grouping mechanisms in sound perception, perception of music, and developmental studies of sound perception.

**232. Human Memory Systems (3)**

This seminar will survey the literature on dissociable human memory systems. Evidence from cognitive, neuropsychological, and neuroimaging approaches will be considered in evaluating explicit-implicit, declarative-procedural, and alternative theoretical frameworks.

**233A-B. Topics in Learning and Motivation (3-3)**

Advanced topics in learning and motivation, with special emphasis on current research. *Prerequisite: Psychology 210.*

**234. Animal and Human Memory (3)**

This course traces the history of research into animal and human short-term memory. Classic models, current viewpoints, and their attendant epistemological presuppositions will be considered. The relationship between empirical analyses of memory in animals and humans will also be reviewed.

**235. Cognitive Psychophysiology (3)**

This seminar will survey the literature on psychophysiological studies of cognitive processes. The emphasis will be on work using event-related brain potentials to study psychological processes underlying perception, thought, or action. *Prerequisite: consent of instructor.*

**236. Substance Abuse (3)**

Theory and research on the development, progression, and resolution of substance use and abuse will be reviewed and evaluated. Normal and abnormal patterns of substance involvement will be contrasted across the life span.

**240. Seminar on Human Memory (3)**

The seminar will deal with current theory and experimental research on basic processes in human memory.

**241. Groups (4)**

This course examines the role of groups in buffering stress, validating attitudes, improving efficiency, consolidating power, permitting loafing, rejecting deviates, and insulating its members from unpleasant outside influence. *Prerequisite: consent of instructor.*

**242A-B-C. Research Topics in Developmental Psychology (4-4-4)**

Advanced seminar concentrating on methods of research and current experimental literature. May be taken by undergraduate senior majors concurrently enrolled in Psychology 194. *Prerequisite: consent of instructor. (S/U grades permitted.)*

**243. Sound and Music Perception (3)**

This course will deal with anatomy and physiology of the ear, central auditory pathways, and neurological disorders of sound and music perception.

**244. Special Topics in Psycholinguistics (4)**

Discussion of the psychological reality of grammatical models, competence versus performance, learnability and innateness in theories of language acquisition, and questions of autonomy of "modularity" of grammatical versus semantic processing. Studies of lexical accessing, sentence comprehension, sentence production, and acquisition will all be considered, as well as some recent work in aphasia.

**245. Aphasia (4)**

Research and theory on language breakdown in brain-damaged adults is surveyed. Topics include an historical overview from linguistics, psycholinguistics, and neuroscience (especially brain imaging techniques). Credit may not be received for both Psychology 245 and Cognitive Science 251.

**246. Learning Theory (3)**

Material will include modern developments in learning theory, based primarily on research with animal subjects. *Prerequisite: consent of instructor.*

**248. Psychology and the Law (3)**

This seminar surveys topics in psychology and the law. Emphasis will be on both applied and basic issues.

**249A-B-C. Advanced Topics in Applied Behavior Analysis (3-3-3)**

Research and discussion on selected topics in applied behavior analysis.

**250. Selected Topics in Psychopathology (3)**

Discussion of research on the major forms of psychopathology (e.g., schizophrenia, affective disorders, personality disorders). Topics will change yearly. The major emphases will be (1) understanding theories of etiology and symptom manifestation; and (2) evaluating research which bears on those theories. *Prerequisite: consent of instructor.*

**251. Advanced Topics in Learning and Motivation (3)**  
Weekly meetings for graduate students actively engaged in research on conditioning. *Prerequisite: consent of instructor.*

**254. Functional Brain Imaging (3)**  
Principles of magnetic resonance imaging (MRI) of the human brain, focusing on recently developed techniques for brain activation on mapping. Includes principles of NMR and imaging, anatomic MRI, and a detailed survey of functional imaging techniques and data analysis.

**256. Advanced Topics in Developmental Psychology (3)**  
Research and discussion on selected topics in developmental psychology. *Prerequisites: consent of instructor.*

**257. Communication: Nonverbal and Disfluent (3)**  
This course will focus on nonverbal behaviors and on speech disfluencies and what they can tell us about communication.

**258. Delay of Gratification (3)**  
This course will review the research on delay of gratification. We will cover what makes it in general so tough, what situations make it possible, who can do it, and what the implications of this ability are. We will draw from research in social, personality, and animal psychology as well as economics.

**259. Social Psychology/Psycho-aesthetics (3)**  
This course will be an intensive examination of social psychology (legal decision-making, emotion, aggressive behavior) and the psychology of visual art and music (psycho-aesthetics).

**260. Cognitive 'Subcultures': Methodologies and Analysis (3)**  
Several methods of systematic data collection (e.g., judged similarity, paired comparisons, direct scaling) and analysis (e.g., consensus modeling, principal components analysis, multidimensional scaling) are explored in a hands-on computer lab and reading seminar. The ways in which these methodologies and data handling techniques bear upon basic research issues in psychology will be illustrated, and differences in data structures arising from qualitative variation in subjects will be explored.

**261. Topics in the History of Psychology (3)**  
The seminar will cover the development of concepts and methods in psychology, particularly during the nineteenth and twentieth centuries. Particular emphasis will be placed on the precursors of currently active areas of research and theory and on the historical and social contexts for these developments. *Prerequisite: completion of first year of graduate work in psychology or consent of instructor.*

**262. Emotion: Theories and Evidence (3)**  
A critical examination of current theories of human emotion from the point of view of contemporary cognitive psychology. Discussion of behavior and physiological research in the light of different theoretical positions. *Prerequisite: second-year graduate standing in psychology or consent of instructor.*

**263. Psychopharmacology (3)**  
This course will explore the basic neuropharmacological mechanism of action of the major classes of drugs, including neuroleptics, stimulants, anti-depressants, minor and major tranquilizers, and sedative hypnotics. It will focus on the use of behavioral techniques for evaluating the neural mechanisms by which these drugs act.

**264A-B-C. Advanced Topics in Language Processes (4-4-4)**  
Research and discussion on selected topics in language processes.

**265. Psychology and Medicine (3)**  
Concentrates on what psychology has to contribute to the understanding of illness, its treatment, and the social context in

which these processes occur. Topics: Psychological factors in the etiology and treatment of illness, doctor-patient roles, and communication. *Prerequisites: open to undergraduates with Psychology 126 or Psychology 127 and consent of instructor.*

**266. Advanced Topics in Psycholinguistics (3)**  
This course will include evaluation and discussion of current research on selected topics in language processing and in aphasia.

**267A-B-C. Advanced Topics in Behavior Medicine (3-3-3)**  
Research and discussion on selected topics in behavior medicine.

**268A-B-C. Advanced Topics in Experimental Psychopathology (3-3-3)**  
Research and discussion on selected topics in experimental psychopathology.

**269A-B-C. Advanced Topics in Sound and Music Perception (3-3-3)**  
Research and discussion on selected topics in sound and music perception.

**270A-B-C. Introduction to Laboratory Experimentation (1-4)**  
A basic laboratory course, designed to introduce first-year graduate students to experimental methods in psychology. The student will select a research topic, do a thorough literature review of the area, design and carry out new, original studies of problems in the selected area, and prepare a final formal report of the study at the end of the spring quarter. This course is required of all first-year graduate students in the department. *Prerequisite: first-year psychology graduate students only.*

**272. Selected Topics in Cognitive Psychology (3)**  
An in-depth analysis of selected empirical and theoretical topics in cognitive psychology. The course will focus on areas where notable progress appears to be taking place in contemporary research.

**280. Seminar in Communication and Information Processing (1)**  
(S/U grades only.)

**296. Research Practicum (1-12)**  
Research in psychology under supervision of individual staff members. (S/U grades only.) (F,W,S)

**298. Library Research (1-12)**  
Reports and surveys of the literature on selected topics. *Prerequisite: graduate students in psychology. (S/U grades only.)* (F,W,S)

**299. Independent Research (1-12)**  
Independent research and thesis research. (S/U grades only.) (F,W,S)

**500. Apprentice Teaching (4)**  
Required teaching practicum for students enrolled in graduate program in psychology. One four-unit course per year for four years. (S/U grades only.)

## Public Policy Analysis Minor

OFFICE: Revelle Commons T100, Room 101,  
Revelle College

### Affiliated Faculty

#### AMES

Massoud T. Simnad, Ph.D.

#### ANTHROPOLOGY

Shirley C. Strum, Ph.D.

#### BIOLOGY

Michael E. Gilpin, Ph.D.

David S. Woodruff, Ph.D.

#### CHEMISTRY AND BIOCHEMISTRY

Mark H. Thiemens, Ph.D.

#### COMMUNICATION

Philip Agre, Ph.D.

Daniel C. Hallin, Ph.D.

Robert B. Horwitz, Ph.D.

#### ECONOMICS

Julian Betts, Ph.D.

Richard T. Carson, Ph.D.

Marjorie Flavin, Ph.D.

Theodore Groves, Ph.D.

Walter P. Heller, Ph.D.

Valerie A. Ramey, Ph.D.

James E. Rauch, Ph.D.

Ross M. Starr, Ph.D.

#### IR/PS

Gordan MacDonald, Ph.D.

#### MATHEMATICS

Ian S. Abramson, Ph.D.

#### POLITICAL SCIENCE

Nathaniel L. Beck, Ph.D.

Amy Bridges, Ph.D.

Gary W. Cox, Ph.D.

Steven P. Erie, Ph.D.

Gary C. Jacobson, Ph.D.

Samuel H. Kernell, Ph.D.

Arthur Lupia, Ph.D.

Mathew D. McCubbins, Ph.D.

Samuel L. Popkin, Ph.D.

#### SIO

Duncan Agnew, Ph.D.

David M. Checkley, Ph.D.

Paul K. Dayton, Ph.D.

Richard B. Deriso, Ph.D.

Lisa A. Levin, Ph.D.  
Jean-Bernard H. Minster, Ph.D.  
Michael L. Mullin, Ph.D.  
V. Ramanathan, Ph.D.  
George Sugihara, Ph.D.  
Martin Wahlen, Ph.D.

#### **SOCIOLOGY**

Lisa Catanzarite, Ph.D.  
Hugh B. Mehan, Ph.D.  
David P. Phillips, Ph.D.  
Akos Rona-Tas, Ph.D.  
Carlos Waisman, Ph.D.  
Kathryn A. Woolard, Ph.D.

There is a great need for policy analysis of science and technology issues. The value of such analysis is greater than ever at a time of significant long-term budget cuts in programs supporting basic research. Are these budget cuts justifiable? If not, how large are economic, scientific, and political damages to the nation, to California, and to San Diego? How can one best determine which research programs have the highest priority?

The important and novel element in the minor is the emphasis on Science and Technology policy as the unifying theme. In this respect, the policy minor is unique in the United States, so far as is known, and it is designed to appeal to students interested in the natural sciences. For example, students who are interested in policy problems of the atmosphere, ecology, energy, the environment, or the ocean would find a useful and appealing sequence of courses in the minor.

The minor is also appealing and valuable for students in the social sciences who want an analytically-based concentration in areas of public policy. In addition to those above, examples include communications policy and population policy. Political science students with an interest in economic policy and economics students with an interest in political economy would also find a home here.

The public policy minor provides students with many of the necessary analytical skills and the institutional background for the understanding of how public policy is made and how it should be made. Research and teaching in the ways of government and the methods of policy evaluation enriches our understanding of national, state, and local policy issue. It also leads to more effective government, as stu-

dents and professors go on to provide governments with greater expertise.

### **The Minor Program**

There are numerous policy courses taught in a variety of departments, and these are now drawn together. Accordingly, faculty from biology, chemistry, communication, economics, engineering, IR/PS, political science, SIO, sociology, and others teach in the program.

The program consists of statistics prerequisites, core courses and policy-oriented elective courses. These courses are offered in the departments listed above. The primary goal of the prerequisite courses is to develop a solid analytical base for the minor. These courses consist of one or two quarters of statistics. The upper-division core sequence is a two-quarter course in policy analysis, with one course in economics and the other in political science. The four additional electives required for a minor are upper-division policy-related courses in the social and natural sciences. Except by petition to the coordinator, two of the courses must be from the policy tools section below, and two must be from the applied policy section listed below. Students may also petition the coordinator to allow courses not listed below to count toward the minor requirements. These courses must be policy-related.

#### **Statistics Prerequisites**

Statistics courses are necessary to provide a solid analytical foundation to policy analysis by allowing students to confront the data in a careful and systematic fashion.

A statistics course covering multiple regression techniques is required. This requirement should typically be met by Political Science 170 or Economics 120A-120B or Mathematics 180A-181A, BIEB 100 and 179, or by petition.

#### **Economics 120A-120B:**

Econometrics: (Economics 120A-B conjoined with Economics 120AH-BH.) Probability and statistics used in economics. 120A covers probability and basic statistical methods. 120B covers regression and related methods. 120C covers more advanced methods and usually requires an independent empirical project. *Prerequisites: Economics 1A-B or 2A-*

*B and Mathematics 1A-B-C or 2A-B-C and Economics 60. Credit not allowed for both Economics. 120A and Mathematics 183.*

**Or**

#### **Mathematics 180A-181A:**

Mathematics 180A: Introduction to Probability. Probability spaces, random variables, independence, conditional probability, distribution, expectation, joint distributions, central-limit theorem. Three lectures. *Prerequisite: Mathematics 20D or 21D.* (Warning: There are duplicate credit restrictions on this course. See section on Duplication of Credit.)

Mathematics 181A: Introduction to Mathematical Statistics. Random samples, linear regression, least squares, testing hypotheses, and estimation. Neyman-Pearson lemma, likelihood ratios. Three lectures, one recitation. *Prerequisites: Mathematics 180A and 20F.* (Warning: There are duplicate credit restrictions on this course. See section on Duplication of Credit.)

**Or**

#### **BIEB 100 and BIEB 179:**

BIEB 100. Biometry. This course provides an introduction to the use of statistics in biological problems. Topics include parametric statistics (t-tests, correlation, regression, ANOVA), non-parametric statistics, and experimental design. Students are introduced to statistical software on the Macintosh computer. Three hours of lecture and two hours of section. *Prerequisite: BILD 3.*

BIEB 179. Conservation Biology Laboratory. Students will utilize, modify, and create computer software to solve conservation biology management problems. Topics included are pedigree analysis, stochastic population dynamics, community structure, and island biogeography. Two hours of lecture and eight hours of lab. *Prerequisite: BIEB 178.* (May be taken concurrently).

**Or**

By petition to the program coordinator, Walter P. Heller, Economics Bldg. 316. email: wheller@ucsd.edu



**CORE COURSES**

The core of policy analysis consists of a framework for identifying, analyzing, and solving social problems through government policy. A description of current institutions and current policy problems is essential. Next, empirical and theoretical analysis is necessary to find the causes of these problems failures. Finally, students of public policy need to know the economic and political tools that can help remedy societal problems and can promote social goals.

Economics 130. Public Policy: Role of economics in public policy. Topics such as funding health care, drug policy, incentives for high technology industries, mass transit versus highway construction, and agriculture subsidies. Term paper usually required. *Prerequisites: Economics 1A-B or 2A-B.*

Political Science 160AA. Introduction to Policy Analysis. This course will explore the process by which the preferences of individuals are converted into public policy. Also included will be an examination of the complexity of policy problems, methods for designing better policies, and a review of tools used by analysts and policy makers. *Prerequisite: Political Science 10 or 11.*

**ELECTIVES**

A public policy minor requires four of the following electives and must include two courses in the policy tools sequence and two courses in the applied policy sequence. No more than two courses in any one department can be counted toward the electives requirement. The intent is to encourage students to acquire additional tools, along with the applications. At the same time, a student with a major in, say, economics is required to gain some breadth in other subjects. Students are reminded that a course counted toward the major cannot also count toward the minor.

**POLICY TOOLS COURSES:**

AMES 110. Thermodynamics

Economics 150. Economics of the Public Sector: Taxation

Economics 151. Economics of the Public Sector: Expenditures

Economics 155. Economics of Voting and Public Choice

Economics 171. Decisions under Uncertainty

Political Science 102B. Politics of American Economic Policy

Political Science 160AB. Introduction to Policy Analysis

SIO 276. Quantitative Theory of Populations and Communities

Sociology A 107. Demographic Methods

Sociology A 108A. Survey Research Design

Sociology A 108B. Quantitative Analysis of Survey Data

**APPLIED POLICY COURSES:**

AMES 118A. Energy: Non-Nuclear Energy Technologies

AMES 118B. Energy: Nuclear Energy Technologies

BIEB 121. Ecology Lab

BIEB 165. Sociobiology Lab

BIEB 176. Conservation and the Human Predicament

BIEB 178. Principles of Conservation Ecology

Chemistry 149A. Environmental Chemistry

Chemistry 149B. Environmental Chemistry

Chemistry 173. Atmospheric Chemistry

Communication/SF 121. National Policies in Global Communications

Communication/SF 122. Multinational Policies in Global Communication

Communication/SF 128. Information Technology: Culture, Society, Politics

Earth Sciences 142. Atmospheric Chemistry and the Biochemical Cycles of Atmospheric Trace Gases

Economics 125. Economics of Population Growth

Economics 131. Economics of the Environment

Economics 132. Energy Economics

Economics 145. Economics of Ocean Resources

IP/Gen 458. International Environmental Policy

Political Science 167A-B. Seminar: Public Policy Analysis

SIO 202. Introduction to Climate and Climate Change

SIO 236. Satellite Remote Sensing

SIO 275A. Benthic Ecology

SIO 275B. Natural History of Coastal Habitats

SOC/C 140. Sociology of Law

SOC/C 141. Crime and Society

SOC/C 144. Forms of Social Control

SOC/C 148. Political Sociology

SOC/C 152. Social Inequality and Public Policy (Same as USP 133.)

**CONCENTRATIONS WITHIN THE MINOR**

Below are some examples of elective course sequences that would allow concentration on particular subfields and would also fulfill the minor's requirements.

Example 1: General Natural Science Majors:  
AMES 110, Economics 171, BIEB 178, and SIO 275A (or 275B)

Example 2: General Social Science Majors:  
Economics 151, PS 160 AB, Economics 111, and Political Science 167

Examples 3: Population Policy:  
SIO 276, Sociology A 107, BIEB 176, and Economics 125

Example 4: Energy Policy:  
AMES 110, Political Science 102B, Economics 132, SIO 202

Example 5: Ocean Policy:  
Political Science 160AB, SIO 276, Economics 145, SIO 275A (or 275B)

Example 6: Environmental Policy:  
Economics 151, SIO 276, BIEB 178, Economics 131

Example 7: Communication Policy:  
Political Science 160AB, Sociology A 108A (or 108B); Communication/SF 121, 122, or 128 (two out of the three)

**Religion, Study of**

OFFICE: 5045 Humanities and Social Sciences Building,  
(619) 534-8849  
religion@ucsd.edu  
Program Director, Arthur Droge  
Program Coordinator, Julia Adame

## Faculty

Nancy Caciola, *History*  
Suzanne Cahill, *History*  
Alain J.-J. Cohen, *Literature*  
Richard S. Cohen, *History*  
Stephen Cox, *Literature*  
Arthur J. Droge, *Literature*  
Page A. duBois, *Literature*  
William C. Fitzgerald, *Literature*  
David Noel Freedman, *History*  
Richard E. Friedman, *Literature*  
David Goodblatt, *History*  
Ramon Gutierrez, *Ethnic Studies*  
Alan Houston, *Political Science*  
Fanny Q. Howe, *Literature*  
S. Nicholas Jolley, *Philosophy*  
David K. Jordan, *Anthropology*  
Benetta W. Jules-Rosette, *Sociology*  
Hasan Kayali, *History*  
Sanford A. Lakoff, *Political Science*  
Edward N. Lee, *Philosophy*  
Tanya M. Luhrmann, *Anthropology*  
Richard P. Madsen, *Sociology*  
John A. Marino, *History*  
Timothy McDaniel, *Sociology*  
Michael E. Meeker, *Anthropology*  
Alden A. Mosshammer, *History*  
Sheldon A. Nodelman, *Visual Arts*  
William H. Propp, *History*  
Fred V. Randel, *Literature*  
Edward Reynolds, *History*  
Gershon Shafir, *Sociology*  
Gary Shiffman, *Political Science*  
Melford E. Spiro, *Anthropology*  
Tracy B. Strong, *Political Science*  
Christena Turner, *Sociology*  
Donald F. Tuzin, *Anthropology*

## Program Description

The program engages in the academic study of religious phenomena; and it studies literature, history, and society in relation to religion. Faculty and students associated with the program give primacy to humanistic and social scientific methods of study that have become established in the academic community during the nineteenth and twentieth centuries. The location of the program in the Arts and Humanities Division and its use of courses from a variety of departments and divisions imply that neither the study of religion nor its data are the privileged possession of a single discipline. The

hallmark of the program is its interdisciplinary and interdepartmental structure. At UCSD, faculty from the departments of Anthropology, History, Literature, Philosophy, Political Science, Sociology, and Visual Arts provide students with the opportunity to examine religious artifacts, texts, institutions, and communities within a particular cultural and historical context and in the context of comparable manifestations within the general history of religions.

A concentration in the Study of Religion aims at fostering a student's understanding of religion as one of the primary expressions of the human condition and as an historically powerful force in the shaping of human cultures. It also seeks to develop a student's appreciation of the difficulties and possibilities inherent in undertaking a critical, disciplined study of religion. The goal is not to fashion "experts" in religion, but rather to use the study of religion in order to develop critical thinking and a more adequate understanding of history and society.

Since the program endorses an interdisciplinary and comparative approach to the study of religious phenomena, lower-division preparation should be wide and varied. Lower-division courses in which religion figures prominently (e.g., *The Making of the Modern World* or the *Revelle College Humanities Program*), as well as courses which focus on textual and contextual analysis and employ the analytical tools and conceptual categories of the human sciences, would all be useful in preparing the student for a major in the Study of Religion. The program strongly encourages foreign language study. The ability to read the languages of original sources and of modern scholarship is highly recommended.

## Major

The major in the Study of Religion consists of twelve upper-division courses, which should include the following:

- three-quarter sequence in the Study of Religion (RELI 110; RELI 111 or 112; and RELI 113 or 114).
- three courses in methodological and/or general comparative studies.
- six courses from the approved course list to be selected in consultation with the program director.

## Minor

The minor in the Study of Religion consists of seven courses, of which five must be upper-division. These seven courses must include the three-quarter sequence in the Study of Religion delineated under the major.

## COURSES

### REQUIRED COURSES

#### RELI 110. The Modern Study of Religion

An introduction to basic strategies of interpretation in the study of religion, with special attention to category formation, theory, and method.

#### RELI 111. Texts and Contexts: Ancient Near Eastern Religions

An introduction to the religions of ancient Mesopotamia, Egypt, Syria-Palestine, and Israel.

#### RELI 112. Texts and Contexts: The Holy Book in Judaism, Christianity, and Islam

An introduction to the scriptures of Judaism, Christianity, and Islam, with the aim of providing a comparative perspective on the "bibles" of Western civilization.

#### RELI 113. Texts and Contexts: South Asian Religions

An introduction to the religions of India, including Hinduism, Buddhism, Jainism, and Sikhism.

#### RELI 114. Texts and Contexts: East Asian Religions

An introduction to the religions of China and Japan, including Confucianism, Taoism, Shinto, and Buddhism.

### APPROVED ELECTIVE COURSES

The following lower- and upper-division courses are offered on a regular basis, although not every course is available every year. Please contact the program coordinator for approved courses in any given quarter. Students may petition other courses, including independent study and Education Abroad Program courses when appropriate.

### LOWER-DIVISION

#### ANTH 1. Introduction to Culture

#### HUM 1. The Foundations of Western Civilization: Israel and Greece

#### HUM 2. Rome, Christianity and the Middle Ages

#### MMW 2. The Great Classical Traditions

#### MMW 3. The Medieval Heritage

#### PHIL 14. Introduction to Philosophy: Metaphysics

#### PHIL 31. History of Philosophy: Ancient Philosophy

#### SOC 1A, B. The Study of Society

UPPER-DIVISION

**Methodological**

- ANGN 113. Theories of Modern Subjectivity
- ANGN 120. Anthropology of Religion
- ANGN 147. Ritual and Symbolism
- ANGN 181. Anthropological Archaeology
- PHIL 130. Metaphysics
- PHIL 185. Philosophy of Religion
- SOCC 156. Sociology of Religion

**General Comparative**

- HISC 162. History of Science and Religion
- LTWL 100. Mythology
- LTWL 133. Religion, Inside Out and Upside Down
- VIS 126F. Western and Non-Western Rituals and Ceremonies

**Religion in Historical Context**

- ANRG 108. Hinduism
- ANRG 150. The Rise and Fall of Ancient Israel
- ANRG 173. Chinese Popular Religion
- HIEU 105. The Early Christian Church
- HIEU 161. Topics in Roman History: Christianity in the Roman Empire
- HINE 104. The Bible and the Near East: The Primary History
- HINE 105. The Bible and the Near East: The Prophets
- HINE 106. The Bible and the Near East: The Writings
- HINE 108. The Middle East Before Islam
- HINE 114. The History of the Islamic Middle East
- HINE 180. Cultures of the Ancient Near East
- HITO 104. Jews and Judaism in the Ancient and Medieval Worlds
- HITO 105. Jews and Judaism in the Modern World
- HITO 107. Introduction to Christianity
- LTEU 100. The Classical Tradition: Myths of Ancient Greeks and Romans
- LTNE 120A. The New Testament and Christian Origins
- LTNE 120B. Paul and the Invention of Christianity
- LTNE 120E. The History of Heresy

**Religion and Society**

- ANRG 170. Traditional Chinese Society
- HIEA 120. Classical Chinese Philosophy and Culture
- HIEU 110. The Rise of Europe
- HIEU 111. Europe in the Middle Ages
- HIEU 125. Reformation Europe
- HIEU 163. Topics in Medieval History: Saints in Social Context
- HINE 118. The Middle East in the Twentieth Century
- HINE 166. Nationalism in the Middle East
- POLI 110A. Citizens and Saints: Political Thought from Plato to Augustine

POLI 110B. Sovereign Subjects in the Modern State: Machiavelli to Rousseau

POLI 110C. Revolution and Reaction: Political Thought from Kant to Nietzsche

SOCC 157. Religion in Contemporary Society

SOCD 158J. Religion and Ethics in China and Japan

SOCD 188B. Chinese Society

SOCD 1880. Dilemmas of Israeli Society

**Religion and Literature**

LTEN 106. Chaucer's Contemporaries

LTEN 118. Milton

LTEN 147. Metamorphoses of the Symbol: Mountains From Moses to Muir

LTEN 149. Themes: New Testament and English and American Literature

LTEU 100. Classical Tradition

LTEU 105. Medieval Studies: Dante

LTNE 100. The Bible and Western Literature

LTNE 102A. The Bible: The Prophetic Books

LTNE 102B. The Bible: The Narrative Books

LTNE 102C. The Bible: The Poetic Books

LTNE 150. Arabic Literature in Translation

LTWL101. What Socrates Knew

PHIL 184. Religious Existentialism

**Religion and the Arts**

THHS 103. Ancient Greek Drama in Modern Version

VIS 120A. Greek Art

VIS 120B. Roman Art

VIS 121B. Castles, Cathedrals and Cities

VIS 121D. The Illuminated Manuscript in the Middle Ages

VIS 122AN. Renaissance Art

VIS 122E. The City in Italy

VIS 123AN. Between Spirit and Flesh: Northern Art of the Early Renaissance

VIS 124BN. Art and the Enlightenment

**Revelle College**

OFFICE: Office of the Provost, Revelle College

**Humanities/Writing Program**

OFFICE: Revelle Commons, T100, Room 101, Revelle College

See Humanities Program for Revelle Writing.

**Revelle Honors Program**

OFFICE: Office of the Provost, Revelle College

Particularly well-prepared students are invited to join a freshman honors program, which includes weekly participation in small faculty seminars (Revelle 20). Acceptance into the Honors Program at admission is automatic for Regents and National Merit Scholars as well as those students entering with a high school GPA of 3.8 or higher and verbal and math SAT scores of 700 or higher. Admission to the program winter quarter is offered to those who achieve a 3.7 GPA in at least fourteen graded units taken at UCSD during the fall quarter. A variety of other perquisites are also awarded. Outstanding students are individually advised to participate in small honors classes in chemistry, mathematics, physics, and social science.

Outstanding seniors are selected for participation in an honors seminar, Revelle 100. At least five outstanding graduating seniors are honored at graduation each year with a monetary honorarium.

An honors banquet is given for the top 200 students (from all class levels) in Revelle each spring.

**Revelle 20. Revelle Honors Seminar (0)**

Weekly seminars with a faculty member (chosen each year by the provost to match the interests of participating students). This seminar will acquaint students with the scholarship and research being conducted by faculty and instill in students a sense of participation in the scholarly life at UCSD. *Prerequisite: by invitation only. Pass/Not Pass grades only. (F,W,S)*

**Revelle 100. Senior Honors Seminar: Science and Civilization (4)**

Beginning with the distinction between science and technology, the course will trace their evolution from earliest times, culminating in an examination of their impact on modern society and of the social concerns about their future course. *Prerequisites: senior standing, 3.5 overall GPA, science major, consent of instructor, Revelle students only. Pass/Not Pass grades only.*

**Revelle 110. Senior Honors Seminar: Thinking About Science (4)**

A seminar for honors students concerning the nature of science and its place in our society. The course will consist of readings and discussions concerning a range of historical, philosophical, and sociological perspectives on science. *Prerequisite: Revelle College senior honors students.*

**Revelle Seminars**

OFFICE: Office of the Provost, Revelle College

Revelle Seminars 90 (1.0 unit credit) are sponsored by Revelle College to promote student/faculty interaction in a small group setting.

**Revelle 90. Undergraduate Seminar (1)**

A seminar intended for exposing undergraduate students, especially freshmen and sophomores, to exciting research programs conducted by the faculty. *Prerequisite: none. Pass/Not Pass grades only. (F.W.S)*

## Russian and Soviet Studies

OFFICE: 7039 Humanities and Social Sciences Building, Muir College

### Faculty

Steven Cassedy, Ph.D., *Professor in Literature*  
 Frantisek Deak, Ph.D., *Professor in Theatre*  
 Robert Edelman, Ph.D., *Professor in History*  
 Susan Larsen, Ph.D., *Assistant Professor in Literature*  
 Timothy McDaniel, Ph.D., *Professor in Sociology*  
 Philip Roeder, Ph.D., *Associate Professor in Political Science*  
 Rebecca Wells, *Lecturer in Literature*

Russian and Soviet Studies is an interdisciplinary program that provides a broad range of courses in the history, language, literature, and social and political life of Russia (before, during, and after the Soviet period). It is designed for students who do not wish to restrict their Russian studies to literature.

### The Minor

The minor consists of six courses, at least three of which must be upper-division. In addition, there must be at least one course each from two of the three following areas: literature, history, and social science. No more than three of the six courses may be language courses. Knowledge of the language is not a requirement for the minor, but it is strongly recommended.

### The Major

The major requires a study of Russian language. It consists of LTRU 1A-B-C (First-Year Russian), LTRU 2A-B-C (Second-Year Russian), or their equivalent, and a minimum of twelve upper-division courses. All students are required to take LTRU 101A-B-C (Advanced Russian), HIEU 134 (History of Russia, Ninth

Century to 1855), HIEU 156 (History of Russia, 1855 to the Present), and LTRU 110A-B-C (Survey of Russian Literature in Translation). In addition, students will take four electives, of which at least two must be from the social sciences (sociology or political science).

## COURSES

### LITERATURE

- LTRU 1A-B-C First-year Russian (4-4-4)
- LTRU 2A-B-C Second-year Russian (4-4-4)
- LTRU 101A-B-C Advanced Russian (4-4-4)
- LTRU 104A-B-C Advanced Practicum in Russian (4-4-4)
- LTRU 110A-B-C Survey of Russian and Soviet Literature in Translation (4-4-4)
  - 110A 1800-1860
  - 110B 1860-1917
  - 110C 1917-present
- LTRU 123 Single Author in Russian Literature (4)
- LTRU 128 Single Author in Soviet Literature (4)
- LTRU 129 Twentieth-Century Russian or Soviet Literature in Translation (4)
- LTRU 130 Genres in Russian Literature (4)
- LTRU 131 Russian Short Fiction (4)
- LTRU 132 Russian Poetry (4)
- LTRU 150 Russian Culture: The Modern Period (4)
- LTRU 198 Directed Group Study (4)
- LTRU 199 Special Studies (2 or 4)

### HISTORY

- HIEU 134 Russia: Ninth Century to 1855 (4)
- HIEU 156 Russia: 1855 to the Present (4)
- HIEU 157 Early Soviet Social History (4)
- HIEU 178 Special Topics in Modern Russian History (4)

### SOCIOLOGY

- Soc/D 188E Soviet Society

### POLITICAL SCIENCE

- POLI 130AA Soviet Politics and After
- POLI 130B The Soviet State and Society
- POLI 130C Seminar: Soviet Politics

## Science Studies

OFFICE: 3008 Humanities and Social Sciences Building, Muir College

Director, Gerald Doppelt

### Professors

Paul M. Churchland, Ph.D., *Philosophy*  
 Gerald D. Doppelt, Ph.D., *Philosophy*  
 Philip S. Kitcher, Ph.D., *Philosophy*  
 Chandra Mukerji, Ph.D., *Communication and Sociology*  
 Andrew Scull, Ph.D., *Sociology*  
 Steven Shapin, Ph.D., *Sociology*  
 Robert S. Westman, Ph.D., *History*

### Associate Professors

Michael Bernstein, Ph.D., *History*  
 Martha Lampland, Ph.D., *Sociology*  
 Sandra D. Mitchell, Ph.D., *Philosophy*

### Assistant Professors

Steven Epstein, Ph.D., *Sociology*  
 Marta E. Hanson, Ph.D., *History*

### Professor Emeritus

Martin J.S. Rudwick, Ph.D., *History*

The Science Studies Program at UCSD is a Ph.D. program committed to working toward a deeper understanding of scientific knowledge by means of studies—theoretically structured and empirically based—of the practice of the sciences, past and present. The program offers students an opportunity to integrate the perspectives developed in the history, sociology, and philosophy of science, while receiving a thorough training at a professional level in one of the component disciplines. Students enrolled in the program choose one of the three disciplines for their major field of specialist studies and are required to complete minor field requirements in the other two. The core of the program, however, is a sequence of two one-quarter seminars, led by faculty from all three participating departments. Science studies students are encouraged to select dissertation topics that offer scope for a cross-disciplinary approach. The Ph.D. will be awarded in "History (Science Studies)," "Sociology (Science Studies)," or "Philosophy (Science Studies)." In special circumstances, students may be permitted to work for the M.A. degree.

**COURSES**

**GRADUATE**

**HIGR 236A-B. Seminar in History of Science (4-4)**

A two-quarter research seminar, comprising intensive study of a specific topic in the history of science. The first quarter will be devoted to readings and discussions; the second chiefly to the writing of individual research papers. The topic varies from year to year, and students may, therefore, repeat the course for credit. (IP grade to be awarded the first quarter; final grade will be given at the end of the second quarter.) *Prerequisite: graduate standing.*

**HIGR 237. Topics in the History of Earth and Ocean Sciences (4)**

Intensive study of specific problems in the history of the ocean sciences and of related earth and atmospheric sciences in the modern period. Topics vary from year to year, and students may therefore repeat the course for credit. *Prerequisite: graduate standing or consent of instructor.*

**HIGR 238, PHIL 209A, SOCG 255A. Introduction to Science Studies (4)**

Study and discussion of classic work in history of science, sociology of science, and philosophy of science, and of work that attempts to develop a unified science studies approach. Required for all students in the Science Studies Program. *Prerequisite: enrollment in Science Studies Program.*

**HIGR 239, PHIL 209B, SOCG 255B. Seminar in Science Studies (4)**

Study and discussion of selected topics in the science studies field. Required for all students in the Science Studies Program. The topic varies from year to year, and students may, therefore, repeat the course for credit. *Prerequisite: enrollment in Science Studies Program.*

**HIGR 240, PHIL 209C, SOCG 255C. Colloquium in Science Studies (4)**

A forum for the presentation and discussion of research in progress in science studies, by graduate students, faculty, and visitors. Required for all students in the Science Studies Program. *Prerequisite: enrollment in the Science Studies Program.*

**HISC 160/260. Historical Approaches to the Study of Science (4)**

This colloquium course will introduce students to the rich variety of ways in which the scientific enterprise is currently being studied historically. Major recent publications on specific topics in the history of science selected to illustrate this diversity will be discussed and analyzed; the topics will range in period from the seventeenth century to the late twentieth, and will deal with all major branches of natural science. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students may be expected to submit a more substantial piece of work. *Prerequisite: consent of instructor; department stamp required.*

**HISC 162/262. Problems in the History of Science and Religion (4)**

Intensive study of specific problems in the relation between science and religion. The problems may range in period from the Renaissance to the twentieth century. Topics vary from year to year. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students may be expected to submit a more substantial piece of work. *Prerequisites: upper-division standing; department stamp required.*

**HISC 163/263. Topics in the History of Life and Earth Sciences (4)**

Intensive study of specific problems in the life sciences and earth sciences, ranging in period from the Renaissance to the twentieth century. Topics will vary from year to year, and students may therefore repeat the course for credit. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students may be expected to submit a more substantial piece of work. *Prerequisite: department stamp required.*

**HISC 164/264. Topics in the History of the Physical Sciences (4)**

Intensive study of specific problems in the physical (including chemical and mathematical) sciences, ranging in period from the Renaissance to the twentieth century. Topics vary from year to year, and students may therefore repeat the course for credit. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students may be expected to submit a more substantial piece of work. *Prerequisites: consent of instructor; department stamp required.*

**HISC 166/266. Topics in the History of the Social Sciences (4)**

Intensive study of specific problems in the history of the social sciences in relation to the natural sciences and mathematics. Topics vary from year to year, and students may therefore repeat the course for credit. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students may be expected to submit a more substantial piece of work. *Prerequisites: consent of instructor; department stamp required.*

**HISC 167/267. Topics in the History of Medicine (4)**

Intensive study of specific problems in the history of medicine. Topics will vary from year to year, and students may therefore repeat the course for credit. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students may be expected to submit a more substantial piece of work. *Prerequisite: department stamp required.*

**Soc. 225. Madness and Society (4)**

An examination of the historical and sociological literatures on the relationship between madness and society, focusing primarily on the United States and Great Britain but with some comparative reference to western Europe.

**Soc. 236. Contemporary Topics in the Sociology of Science (4)**

This seminar will cover current books and theoretical issues in the sociology of science. Topics will vary from year to year. May be repeated three times for credit.

**Soc. 237. Historical Sociology of Science (4)**

In recent years the sociology of science and the history of science have developed increasingly close links and shared projects. Those include the detailed naturalistic study of actual scientific practice, the analysis of the social construction of scientific knowledge in particular social settings, and the examination of relationships between the moral economy of scientific sites and the status of the knowledge produced there. Particular attention will be paid to the identity of peculiarly historical and sociological perspectives. Technical problems concerning the deployment of sociological frameworks in historical study will be addressed. Students will read and assess a range of recent work in which the connection between sociology and history of science is most evident.

**Soc. 238. Relativism and the Sociology of Science (4)**

A critical survey of theoretical and empirical sociological work advocating a relativist perspective on scientific knowledge. Special attention is paid to the characterization of different relativist genres, to the debates between relativism, realism and

rationalism, and to the empirical grounding of relativism in studies of scientific controversy and closure.

**Soc. 277. The Sociology of Technology (4)**

Social theory has been largely uninterested in technology. The major exceptions are to be found in the evolutionary stories concerning "man the tool maker." The aim of the seminar is to review the literature in paleontology, philosophy of technology, and technology on the link between tools and social theory. The idea of the seminar is to test ideas coming from sociology of technology, ethology, and evolutionary scenarios, and anthropology of tool use, in order to make room in social theory for artifacts.

**Phil. 212. Contemporary Topics in the Philosophy of Science (4)**

This seminar will cover current books and theoretical issues in the philosophy of science. Topics will vary from year to year. *Prerequisite: Philosophy 180, or equivalent, or consent of instructor.*

**Science,  
Technology, and  
Public Affairs**

OFFICE: Revelle Commons T100, Room 101, Revelle College

The program offers an opportunity to study the important social policy issues that lie at the intersection of science, technology, and decision making and to develop awareness of the social and political factors that condition technology on the social order. The program will be attractive to students anticipating careers in law, administrative sciences, science, engineering, business, and international affairs. The program will serve as a meeting place for those interested in approaching policy questions from the perspective of the physical and biological sciences and for those in the social sciences having an interest in the scientific and technological component of present social, political, and environment problems.

**COURSES**

**LOWER-DIVISION**

**35. Society and the Sea (4)**

Introduction to the oceans and their relationship to humankind. Selected topics include ocean-related science, engineering, research, economics, and international relations (emphasizing countries of the Pacific Rim); living and non-living resources; coastal zone management; military and social aspects; and the sea in weather and climate. *Prerequisite: none. (F)*

**UPPER-DIVISION**

**181. Elements of International Medicine (4)**

The sociocultural, economic, and geopolitical framework for the study and understanding of medical problems on a world-wide scale, and as basis for international health policy. Global patterns of disease, availability and needs for medical technology, and comparisons between diverse medical education and health care delivery systems abroad with those in the U.S. Students should be able to acquire an understanding of diverse determinants of disease, and of relationships between socio-economic development and health. *Prerequisite: senior or graduate standing. H.Simon (F)*

**199. Special Project (2 or 4)**

Directed study on topics in science, technology and public affairs; especially for Warren College students. (P/NP grades only.) *Prerequisite: senior standing.*

**RELATED COURSES**

Courses in other departments (change somewhat from year to year):

AMES 118A, 118B, 118C, 119

Communication/SF 128

CSE 2

Economics 130

Philosophy 164

Political Science 138D

Political Science 154

Political Science 160AA

Political Science 160AB

Political Science 161

Political Science 167A,B

Sociology 116

Sociology 168E

**Scripps Institution  
of Oceanography**

OFFICE: 22 Old Scripps Bldg., Scripps Institution of Oceanography

**Professors**

- Duncan C. Agnew, Ph.D., *Geophysics*
- Laurence Armi, Ph.D., *Oceanography*
- Gustaf Arrhenius, Ph.D., *Oceanography*
- Farooq Azam, Ph.D., *Marine Biology*
- Jeffrey L. Bada, Ph.D., *Marine Chemistry*
- Wolfgang H. Berger, Ph.D., *Oceanography*
- Michael J. Buckingham, Ph.D., *Oceanography*
- Ronald S. Burton, Ph.D., *Marine Biology*
- Steven C. Cande, Ph.D., *Marine Geophysics*
- Russ E. Davis, Ph.D., *Oceanography*

- Paul K. Dayton, Ph.D., *Oceanography*
- LeRoy M. Dorman, Ph.D., *Geophysics*
- James T. Enright, Ph.D., *Behavioral Physiology*
- D. John Faulkner, Ph.D., *Marine Chemistry*
- William H. Fenical, Ph.D., *Chemistry*
- Carl H. Gibson, Ph.D., *Engineering Physics and Oceanography*
- Joris M. T. M. Gieskes, Ph.D., *Oceanography*
- J. Freeman Gilbert, Ph.D., *Geophysics*
- Robert T. Guza, Ph.D., *Oceanography*
- James W. Hawkins, Ph.D., *Geology*
- Myrl C. Hendershott, Ph.D., *Oceanography*
- Robert R. Hessler, Ph.D., *Biological Oceanography*
- John A. Hildebrand, Ph.D., *Geophysics*
- William S. Hodgkiss, Ph.D., *Electrical Engineering*
- Nicholas D. Holland, Ph.D., *Marine Biology*
- Glenn R. Ierley, Ph.D., *Geophysics*
- Jeremy B.C. Jackson, Ph.D., *Marine Biology and Geology*
- Miriam Kastner, Ph.D., *Earth Sciences*
- Charles D. Keeling, Ph.D., *Oceanography*
- Charles F. Kennel, Ph.D., *Physics, Vice Chancellor of Marine Sciences and Director of Scripps Institution of Oceanography*
- Nancy Knowlton, Ph.D., *Marine Biology*
- William A. Kuperman, Ph.D., *Oceanography*
- Devendra Lal, Ph.D., *Nuclear Geophysics*
- Lisa A. Levin, Ph.D., *Oceanography, and Vice Chair of the Department*
- Peter F. Lonsdale, Ph.D., *Oceanography*
- J. Douglas Macdougall, Ph.D., *Earth Sciences*
- T. Guy Masters, Ph.D., *Geophysics*
- W. Kendall Melville, Ph.D., *Oceanography, and Chair of the Department*
- Jean-Bernard H. Minster, Ph.D., *Geophysics*
- Michael M. Mullin, Ph.D., *Oceanography*
- William A. Newman, Ph.D., *Oceanography*
- Pearn P. Niiler, Ph.D., *Oceanography*
- John A. Orcutt, Ph.D., *Geophysics*
- Robert L. Parker, Ph.D., *Geophysics*
- Jason Phipps Morgan, Ph.D., *Geophysics*
- Robert Pinkel, Ph.D., *Oceanography*
- V. Ramanathan, Ph.D., *Climate and Atmospheric Sciences*
- Dean H. Roemmich, Ph.D., *Oceanography*
- Richard H. Rosenblatt, Ph.D., *Marine Biology*
- Richard L. Salmon, Ph.D., *Oceanography*
- David T. Sandwell, Ph.D., *Geophysics*
- John G. Sclater, Ph.D., *Marine Geophysics*
- Robert E. Shadwick, Ph.D., *Marine Biology*
- Peter M. Shearer, Ph.D., *Geophysics*
- Richard C.J. Somerville, Ph.D., *Meteorology*

- George Sugihara, Ph.D., *Mathematical Ecology*
- Lynne D. Talley, Ph.D., *Oceanography*
- Lisa Tauxe, Ph.D., *Geophysics*
- Victor D. Vacquier, Ph.D., *Marine Biology*
- Martin Wahlen, Ph.D., *Geochemistry*
- Ray F. Weiss, Ph.D., *Geochemistry*
- Clinton D. Winant, Ph.D., *Oceanography*
- William R. Young, Ph.D., *Oceanography*
- George E. Backus, Ph.D., *Geophysics, Emeritus*
- Andrew A. Benson, Ph.D., *Biology, Emeritus*
- Charles S. Cox, Ph.D., *Oceanography, Emeritus*
- Harmon Craig, Ph.D., *Geochemistry and Oceanography, Emeritus*
- Joseph R. Curray, Ph.D., *Geology, Emeritus*
- Seibert Q. Duntley, Sc.D., *Physics, Emeritus*
- Edward A. Frieman, Ph.D., *Physics, Director, Emeritus*
- Edward D. Goldberg, Ph.D., *Chemistry, Emeritus*
- Harold T. Hammel, Ph.D., *Physiology, Emeritus*
- Richard A. Haubrich, Ph.D., *Geophysics, Emeritus*
- Francis T. Haxo, Ph.D., *Biology, Emeritus*
- Douglas L. Inman, Ph.D., *Oceanography, Emeritus*
- Gerald L. Kooyman, Ph.D., *Biology, Emeritus*
- Ralph A. Lewin, Ph.D., Sc.D., *Biology, Emeritus*
- John A. McGowan, Ph.D., *Oceanography, Emeritus*
- Walter H. Munk, Ph.D., *Oceanography, Emeritus*
- William A. Nierenberg, Ph.D., *Geophysics, Director, Emeritus*
- Joseph L. Reid, M.S., *Oceanography, Emeritus*
- George G. Shor, Jr., Ph.D., *Marine Geophysics, Emeritus*
- Fred N. Spiess, Ph.D., *Oceanography, Emeritus*
- Victor Vacquier, M.A., *Geophysics, Emeritus*
- Charles W. Van Atta, Ph.D., *Engineering Physics and Oceanography, Emeritus*
- Benjamin E. Volcani, Ph.D., *Microbiology, Emeritus*
- Kenneth M. Watson, Ph.D. *Physical Oceanography, Emeritus*
- Edward L. Winterer, Ph.D., *Geology, Emeritus*

**Associate Professors**

- Douglas H. Bartlett, Ph.D., *Marine Microbiology*
- Kevin M. Brown, Ph.D., *Geology*
- Paterno R. Castillo, Ph.D., *Geology*
- Paola Cessi, Ph.D., *Oceanography*
- Christopher D. Charles, Ph.D., *Oceanography*
- David M. Checkley, Ph.D., *Oceanography*



Catherine G. Constable, Ph.D., *Geophysics*  
 Horst Felbeck, Dr. rer. nat., *Marine Biology*  
 Peter J. S. Franks, Ph.D., *Oceanography*  
 Margo G. Haygood, Ph.D., *Marine Biology*  
 Mark D. Ohman, Ph.D., *Oceanography*  
 Daniel L. Rudnick, Ph.D., *Oceanography*  
 Bradley T. Werner, Ph.D., *Oceanography*

**Assistant Professors**

David R. Hilton, Ph.D., *Geochemistry*  
 Ralph F. Keeling, Ph.D., *Geochemistry*  
 Brian Palenik, Ph.D., *Marine Biology*  
 Jeffrey P. Severinghaus, Ph.D., *Geochemistry*  
 Dariusz Stramski, Ph.D., *Oceanography*

**Professor-in-Residence**

A. Aristides Yayanos, Ph.D., *Biology*

**Associate Professor-in-Residence**

Andrew G. Dickson, Ph.D., *Marine Chemistry*

**Adjunct Professors**

Jay P. Barlow, Ph.D., *Biological Oceanography*  
 Paul J. Crutzen, Ph.D., *Atmospheric Chemistry*  
 Douglas P. DeMaster, Ph.D., *Oceanography*  
 Richard B. Deriso, Ph.D., *Biological Oceanography*  
 John R. Hunter, Ph.D., *Marine Biology*  
 Michael S. Longuet-Higgins, Ph.D., *Oceanography*  
 William F. Perrin, Ph.D., *Marine Biology*  
 Paul E. Smith, Ph.D., *Biological Oceanography*  
 George N. Somero, Ph.D., *Biology*

**Senior Lecturers**

Jonathan Berger, Ph.D., *Research Geophysicist*  
 Yehuda Bock, Ph.D., *Research Geodesist*  
 Nancy A. Bray, Ph.D., *Research Oceanographer*  
 George F. Carnevale, Ph.D., *Research Oceanographer*  
 Daniel R. Cayan, Ph.D., *Research Meteorologist*  
 Teresa K. Chereskin, Ph.D., *Research Oceanographer*  
 Steven C. Constable, Ph.D., *Research Geophysicist*  
 Jeffrey B. Graham, Ph.D., *Research Biologist*  
 Thomas L. Hayward, Ph.D., *Research Oceanographer*  
 Osmund Holm-Hansen, Ph.D., *Research Biologist*  
 Mark E. Huntley, Ph.D., *Research Biologist*  
 Robert A. Knox, Ph.D., *Research Oceanographer*

John O. Roads, Ph.D., *Research Meteorologist*  
 David P. Rogers, Ph.D., *Research Meteorologist Oceanographer*  
 Kenneth L. Smith, Jr., Ph.D., *Research Biologist*  
 Hubert Staudigel, Ph.D., *Research Geologist*  
 Bradley M. Tebo, Ph.D., *Research Biologist*  
 Spahr C. Webb, Ph.D., *Research Oceanographer*  
 Peter F. Worcester, Ph.D., *Research Oceanographer*  
 Mark A. Zumberge, Ph.D., *Research Geophysicist*

**Lecturers**

Bianca M. Brahamsha, Ph.D., *Assistant Research Biotechnologist*  
 Bruce D. Cornuelle, Ph.D., *Associate Research Oceanographer*  
 Holly E. Given, Ph.D., *Assistant Research Geophysicist*  
 Ralf Goericke, Ph.D., *Assistant Research Biologist*  
 Nicholas E. Graham, Ph.D., *Associate Research Meteorologist*  
 Alistair J. Harding, Ph.D., *Associate Research Geophysicist*  
 Jules S. Jaffe, Ph.D., *Associate Research Oceanographer*  
 John L. Largier, Ph.D., *Associate Research Oceanographer*  
 Michael I. Latz, Ph.D., *Associate Research Biologist*  
 B. Gregory Mitchell, Ph.D., *Associate Research Oceanographer*  
 James H. Swift, Ph.D., *Associate Research Oceanographer*  
 Frank L. Vernon, Ph.D., *Associate Research Geophysicist*  
 Wuchang Wei, Ph.D., *Associate Research Oceanographer*

**Affiliated Faculty**

James R. Arnold, Ph.D., *Professor Emeritus, Chemistry*  
 Hugh Bradner, Ph.D., *Professor Emeritus, AMES*  
 Theodore H. Bullock, Ph.D., *Professor Emeritus, Neurosciences*  
 John W. Miles, Ph.D., *Professor Emeritus, AMES*  
 R. Glenn Northcutt, Ph.D., *Neurosciences*

The graduate department of Scripps Institution of Oceanography offers instruction leading to Ph.D. degrees in oceanography, marine biology, and earth sciences. Although students are

not admitted specifically for an M.S. degree, it is possible to obtain an M.S. on the way to completing the Ph.D. program. A graduate student's work normally will be concentrated in one of the curricular programs within the department: applied ocean science, biological oceanography, climate sciences, geological sciences, geophysics, marine biology, marine chemistry and geochemistry, and physical oceanography.

No undergraduate major is offered in the department though most courses in the department are open to enrollment for qualified undergraduate students with the consent of the instructor. The UCSD Earth Sciences Undergraduate Program offers an earth sciences major leading to a B.S. or a combined B.S./M.S. degree. The interdisciplinary nature of research in marine and earth sciences is emphasized; students are encouraged to take courses from various UCSD departments, and to consider interdisciplinary research projects.

**The Curricular Programs**

**Applied Ocean Science** is an interdepartmental program concerned with man's exploration of the sea. The program combines the interests of faculty members of the Scripps Graduate Department, the UCSD Department of Applied Mechanics and Engineering Sciences, and the UCSD Department of Electrical and Computer Engineering to produce oceanographers knowledgeable about modern engineering and instrumentation, and marine-oriented engineering scientists familiar with the oceans. Instruction and research include the structural, mechanical, material, electrical, and physiological problems of operating within the ocean, and the applied environmental science of the sea. Because many oceanographic disciplines and all forms of engineering may be involved, the curriculum provides maximum flexibility in meeting the needs of individual students. Present research activities within the curricular group include upper-ocean physics and air-sea interaction; remote sensing of the sea surface; ocean bottom microseisms and crustal displacements associated with earthquakes; seismic tomography; bathymetric, magnetic, and gravimetric surveys; marine electromagnetics; remotely-operated, cable-controlled vehicles and stations on the seafloor; ocean optics; signal processing; swath bathy-

metric mapping and high resolution imaging sonar systems; ocean acoustics and acoustical oceanography; turbulent flows and formation of barrier beaches; mechanisms of currents, sand transport, and sediment transport in the surf zone, the shelf, and in submarine canyons.

**Biological Oceanography** is concerned with the interactions of populations of marine organisms with one another and with their physical and chemical environment. Because these interactions are frequently complex, and because the concepts and techniques used are drawn from many fields, biological oceanography is, of necessity, interdisciplinary. Therefore, studies in physical oceanography, marine chemistry, and marine geology, and several biological areas are pertinent.

Research is conducted on space/time scales ranging from short-term interactions between individual organisms (mm., sec.) to interdecadal variation in widely-dispersed populations. The techniques used in these investigations are diverse, and even within one space/time domain can include field observation, experimentation in the laboratory, and mathematical modeling.

Research topics include primary and secondary productivity and nutrient regeneration, fishery biology and management, community ecology of benthic and pelagic organisms, population dynamics, habitat changes and disruptions, systematics and biogeography, population genetics and evolution, and behavior as it affects distribution. Development and testing of new tools (molecular, optical, acoustic), design of sampling programs, and statistical/mathematical analyses of data also are significant activities.

**Climate Sciences** concerns the study of the climate system of the earth with emphasis on the physical, dynamical, and chemical interactions of the atmosphere, ocean, land, ice, and the terrestrial and marine biospheres. The program encompasses changes on seasonal to interannual time scales and those induced by human activities, as well as paleoclimatic changes on time scales from centuries to millions of years. Examples of current research activities include: interannual climate variability; physics and dynamics of El Niño; studies of present and future changes in the chemical composition of the atmosphere in relation to global warming and ozone depletion; effects of

cloud and cloud feedbacks in the climate system; paleoclimate reconstructions from ice cores, banded corals, tree-rings, and deep-sea sediments; the origin of ice ages; air-sea interactions; climate theory; terrestrial and marine ecosystem response to global change.

**Geological Sciences** applies the observational, experimental, and theoretical methods of the basic sciences to understanding the processes that alter Earth's crust, and to determining the long-term history of the lithosphere, hydrosphere, atmosphere, and biosphere. The focus is on the oceanic crust, although research on aspects of continental geology (especially volcanology) also is conducted. Graduate students routinely participate in expeditions at sea, and many doctoral theses evolve from these experiences.

Research areas in geological sciences include global and regional tectonics and volcanism; geomorphology, structure, and deformation of the oceanic crust and continental margins; igneous and metamorphic petrology; composition and evolution of Earth's mantle; marine sedimentation and diagenesis; stratigraphy and paleoceanography; hydrogeology and paleomagnetism.

**Geophysics** emphasizes the application of general principles of mathematics and experimental physics to fundamental problems of the oceans, oceanic and continental lithosphere, and crust and deep interior of the Earth. Research interests of the group include: observational and theoretical studies of electric and magnetic fields in the oceans and on the land; paleomagnetism; theoretical seismology with special emphasis on the structure of the Earth from free-oscillation and body wave studies; broadband observational seismology, including ocean bottom and multichannel seismology; earthquake source mechanisms; the measurements of slow crustal deformations using satellite and observatory methods on continents and in the oceans; marine geodynamics and tectonophysics; gravity measurements; geophysical inverse theory; magnetohydrodynamics of the core of the Earth; geophysical instrumentation for oceanic and continental geophysical measurements; acoustic propagation in the oceans.

**Marine Biology** is the study of marine organisms, their development, and their adaptations. It is concerned with evolutionary,

organismic, genetic, physiological, and biochemical processes in marine organisms, and the relationship between them and their biotic and physical environment. Marine biology encompasses several major areas of modern biology, and is interpreted by understanding the physical and chemical dynamics of the oceans. Faculty research focuses on microbiology, photobiology, high pressure biology, deep-sea biology, developmental biology, genetics, biomechanisms, comparative biochemistry and physiology, behavior, ecology, biogeography, and evolution of marine prokaryotes and eukaryotes. Processes ranging from the fertilization of sea urchin eggs to the role of bacteria in marine food web dynamics are under study in over twenty independent research laboratories.

**Marine Chemistry and Geochemistry** concerns chemical and geochemical processes operating in a broad range of study areas: the oceans, the solid earth, the atmosphere, marine organisms, polar ice sheets, lakes, meteorites, and the solar system.

Areas of advanced study and research include the physical and inorganic chemistry of seawater; ocean circulation and mixing based on chemical and isotopic tracers; marine organic and natural products chemistry; geochemical interactions of sediments with seawater and interstitial waters; geochemistries of volcanic and geothermal phenomena; chemical exchanges between the ocean and the atmosphere; geochemical cycles of carbon, oxygen, sulfur, nitrogen, and other elements; isotopic geochemistry of the solid earth and meteorites; atmospheric trace gas chemistry; paleoatmospheric composition recorded in polar ice cores, corals and sediments; and chemistry of lakes and other freshwater systems.

Studies are typically interdisciplinary and involve integration of chemical concepts with information about the physical, biological, or geological processes that influence natural systems. Students in the marine chemistry and geochemistry curricular group are encouraged to explore these links.

**Physical Oceanography** is the field of study that deals with mechanisms of energy transfer through the sea and across its boundaries, and with the physical interactions of the sea with its surroundings, especially including the influence of the seas on the climate of the atmosphere. Research activities within this curricular group

are both observational and theoretical and include: study of the general circulation of the oceans, including the relations of ocean currents to driving forces and constraints of the ocean basins; fluctuations of currents, and the transport of properties; the mechanisms of transport of energy, momentum, and physical substances within the sea and across its boundaries; properties of wind waves, internal waves, tsunami and planetary waves; the thermodynamic description of the sea as a system not in equilibrium; optical and acoustic properties of the sea; and the influence of surf on near-shore currents and the transport of sediments.

### **Requirements for Admission**

Candidates for admission should have a bachelor's or master's degree in one of the physical, biological, or earth sciences; degrees in mathematics or engineering science are also accepted. A scholastic average of B or better in upper-division courses, or prior graduate study, is required. The student's preparation should include:

- (1) mathematics through differential and integral calculus;
- (2) physics, one year with laboratory (the course should stress the fundamentals of mechanics, electricity, magnetism, optics, and thermodynamics, and should use calculus in its exposition);
- (3) chemistry, one year with laboratory;
- (4) an additional year of physics, chemistry, or mathematics; and
- (5) all applicants are required to submit scores from the general test of the Graduate Record Examinations (GRE) given by the Educational Testing Service of Princeton, New Jersey. Marine biology applicants must also submit scores of the GRE biology (or biochemistry, cell and molecular biology) subject test.

All international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English must take the TOEFL and submit their test scores to the UCSD Office of Graduate Admissions.

Specific additional requirements for admission to the various curricular programs are as follows:

**Applied Ocean Science**—Students are admissible if they have a major in physical science or engineering science, including three years of physics or applicable engineering and three years of mathematics at college level.

**Biological Oceanography**—Two years of chemistry, including general and organic chemistry, and a year of general biology are required. Physical chemistry requiring calculus may be substituted for physics requiring calculus where a more elementary physics course was taken. Zoology or botany may be substituted for general biology. Preparation should also include a course in general geology and at least one course in each of the following categories: systematics (e.g., invertebrate zoology), population biology (e.g., ecology), functional biology (e.g., physiology). In special cases, other advanced courses in mathematics or natural sciences may be substituted. Biological oceanography applicants are encouraged, but not required, to submit scores of the biology subject test of the GRE.

**Climate Sciences**—Students are admissible if they satisfy the requirements of the physical oceanography, geophysics, or marine chemistry and geochemistry curricular programs. Biology and geology majors may also be admissible if the Scripps faculty feel that they have a sufficiently strong background in mathematics and physical science.

**Geological Sciences**—A major in one of the earth sciences and undergraduate physical chemistry and calculus are required. Preparation beyond the minimum requirements in mathematics, physics, and chemistry is strongly recommended.

**Geophysics**—A major in physics or mathematics, or equivalent training, is required.

**Marine Biology**—A major in one of the biological sciences (or equivalent), with basic course work in botany, microbiology, or zoology; two years of chemistry, including organic chemistry, is required. Training in one or more of the following areas is strongly recommended: cellular biology, molecular biology, comparative physiology, genetics, developmental biology, ecology, evolutionary biology, vertebrate and invertebrate zoology, microbiology, and/or botany. Biochemistry and physical chemistry will be expected of students in experimental biology, although the student may, if necessary, enroll in these courses at UCSD after admission.

**Marine Chemistry and Geochemistry**—A major in chemistry, geology, biochemistry, or related field, is required.

**Physical Oceanography**—A major in a physical science, including three years of physics and mathematics, is required.

Special consideration occasionally can be given to candidates with outstanding records who do not meet all required preadmission criteria.

### **Programs of Study**

Programs of study vary widely among the curricular groups, but generally first-year students are expected to enroll in core courses that cover physical, geological, chemical, and biological oceanography and in other courses recommended by the student's faculty adviser. Then, by the end of the first year, students usually select a particular area of focus and choose a major professor. As students advance beyond the first year, they begin to function quite effectively as research assistants, high level technical personnel or, in some cases, as teaching assistants. Furthermore, during their third to fifth year they are working toward writing their dissertations.

The interdisciplinary nature of research in marine and earth sciences is emphasized; students are encouraged to take courses in several programs and departments, and to select research problems of interdisciplinary character. The curricular programs of study are as follows:

**Applied Ocean Science**—Students must: (a) take or demonstrate their knowledge of the following basic courses: SIO 210, 240, 260, 280, and 203 A-B-C, or Math 210 A-B-C, or AMES 294 A-B-C, and (b) attend the Applied Ocean Science Seminar (SIO 208) throughout the entire period of enrollment. Additional course requirements for a field of emphasis in a complementary discipline will be established to meet the needs and interests of each individual student.

**Biological Oceanography**—The student will be expected to be familiar with the material presented in the following courses: SIO 210, 240, 260, 270, 275A or 277, 280, and at least one of SIO 271, 274, 282, 284, or 294. Other course work ordinarily will be recommended by the student's advisory committee, usually including 278 (or equivalent participatory seminar) one quarter of each year, a course in

introductory parametric statistics, and at least one advanced-level course in physical, chemical, or geological oceanography. Participation in an oceanographic cruise (minimum of two weeks' duration) and service as a teaching assistant (one quarter) are required. Individual advisers and/or Doctoral Committees may require foreign languages or computer programming languages of individual candidates.

**Climate Sciences**—The emphasis of this curricular group is on education through interdisciplinary research. All students are responsible for material in the following "core" courses: SIO 202, 210, 218, 260. Students are required to enroll and actively participate in at least two quarters of a seminar course. Students are required to specialize in a specific subdiscipline or track. Additional courses required for this track should be worked out soon after arrival of the student through consultation with his or her advisers. The following pre-approved tracks are offered at this time: (1) atmospheric dynamics and physics, (2) atmospheric chemistry, and (3) paleoclimate studies.

**Geological Sciences**—Students will be responsible for material offered in Essentials of Geology (SIO 248), and participation in the Classics Seminar (SIO 258) during the first two years of graduate studies. The "basic" courses (SIO 210, 240, 260, 280) as well as active participation in research at sea are considered essential for the oceanography degree. Some, or all, of these courses will normally be taken by candidates for the earth sciences degree. Additional courses offered by other curricular programs (e.g. geophysics, marine chemistry and geochemistry) will be selected and scheduled depending on the student's background and interests. In some cases a student's program may include course work in selected subject areas given at other campuses. Normally, students will take a comprehensive departmental examination near the end of their third quarter of residence. The qualifying examination will be given during the second year of study.

**Geophysics**—There is no single course of study appropriate to the geophysics curriculum; instead, the individual interests of the student will permit, in consultation with the adviser, a choice of course work in seismology, geomagnetism, etc, although the content of certain core courses is usually taken during most of the first year. In the summer or early fall quarter

following that year each student will be given written and oral departmental examinations, which are intended to cover the student's formal training. A brief presentation of possible research interests will also be expected at this exam.

**Geological Sciences/Geophysics Track**—For those students whose interests fall between the programs provided by the geological sciences and the geophysics curricular groups, these groups are jointly offering a separate program and departmental examination. Such students would be admitted either to the geological sciences or geophysics curricular group, but could declare their interest in a geological sciences/geophysics track early in their first year. If they did so, they would take a written departmental exam (at the end of spring quarter of their first year) which would be conducted by a committee with members from both curricular groups, and focusing on the student's ability to integrate material relevant to the subject. The expected courses would include the SIO 248 sequence and those geophysics courses appropriate to this specialization.

**Marine Biology**—Entering graduate students will be expected to gain a varied research experience in several laboratories during their first year. In the spring term of their first year at SIO, students will take the departmental examination, at which time they will be expected to demonstrate competence in general biology and in the material covered in the following courses: SIO 210, 260, 280, as well as any other course work recommended by the advisory committee. The exam will also include a written paper and brief oral presentation describing the student's first-year research project. All students are expected to enroll and actively participate in a seminar course during two quarters of each year. Individual advisers and/or doctoral committees may require foreign languages of individual candidates.

**Marine Chemistry and Geochemistry**—Depending upon their personal needs and research interests as determined in consultation with a faculty adviser, students in this curriculum will be expected to take SIO and UCSD courses in some of the following disciplines: marine chemistry, physical oceanography, marine geology, atmospheric chemistry, marine biology, biological oceanography, chemistry, and mathematics.

**Physical Oceanography**—Students in this curricular program will be expected to demonstrate proficiency in the subjects treated by the following courses: SIO 203 A-B-C, 210, 211A-B, 212A-B, 214A, 220, 221A-B. Students must also complete two additional four-unit, second year physical oceanography courses. In addition, there is a breadth requirement consisting of two more four-unit graduate level courses. For the breadth requirement, students might take two of the survey courses in other oceanographic disciplines (e.g. SIO 240, 260, 280). Alternatively, the breadth requirement can be fulfilled by taking two related scientific courses taught at UCSD. Students taking this option should discuss their selection with their adviser. Students are also required to participate in one of the SIO 219 seminar series (theory or observations).

### *Language Requirements*

The department has no formal language requirements. Within the department, some curricular programs may require demonstration of ability to use certain foreign languages pertinent to a student's research. All students must be proficient in English.

### *Departmental and Qualifying Examinations*

Doctoral candidates normally will be required to take a departmental examination not later than early in the second year of study. The examination will be oral and/or written depending on the curricular group. The student will be required to demonstrate, in a quantitative and analytical manner, comprehension of required subject material and of the pertinent interactions of physical, chemical, biological, or geological factors.

When the student has passed the departmental examination, and has completed an appropriate period of additional study, the department will recommend appointment of a doctoral committee which will supervise the student's performance and reporting of his or her research. The doctoral committee must be formed before the student may proceed to the qualifying examination.

The doctoral committee will determine the student's qualifications for independent research by means of a qualifying examination,

which will be administered no later than the end of the third year. The nature of the qualifying examination varies between curricular groups. In biological oceanography, marine biology, geological sciences, physical oceanography, applied ocean science, and climate sciences the student will be expected to describe his or her proposed thesis research and satisfy the committee, in an oral examination, as to mastery of this and related topics. In marine chemistry and geochemistry the student, in an oral examination, is required to present and defend a single research proposition in his or her specialized area. The student also is required to provide a written summary of the research proposition, with references, prior to the examination. In geophysics, the student presents an original research problem, in the form of a written proposition, to the doctoral committee. The student's oral presentation and defense of this proposition completes the examination.

### Dissertation

A requirement for the Ph.D. degree is the submission of a dissertation and a final examination in which the thesis is publicly defended. We encourage students to publish appropriate parts of their theses in the scientific literature. Individual chapters may be published as research articles prior to completion of the dissertation.

### Departmental Ph.D. Time Limit Policies

Students must complete a qualifying examination by the end of three years, and must be advanced to candidacy for the Ph.D. degree by the end of four years. Total university support may not exceed seven years and total registered time at UCSD may not exceed eight years.

### Special Financial Assistance and Fellowships

In addition to teaching assistantships, and graduate student researcher positions, fellowships, traineeships, and other awards available on a campus-wide competitive basis, the department has available a certain number of fellowships and graduate student researcher positions supported from research grants and contracts, or from industrial contributions.

## COURSES

### UPPER-DIVISION

#### 198. Directed Group Study (2-4)

Directed group study on a topic or in a field not included in the regular department curricula, by special arrangement with a faculty member. (P/NP grades only.) *Prerequisite: consent of instructor.* Staff (F,W,S)

#### 199. Special Studies (2 or 4)

Independent reading or research on a problem by special arrangement with a faculty member. (P/NP grades only.) *Prerequisite: consent of instructor.*

### GRADUATE

#### 200A. Computational Ocean Acoustics and Signal Processing I (4)

Overview of ocean acoustics. Acoustics Wave Equation with some analytic solution techniques. Ray Methods. Introduction to Spectral and Normal Modes methods. Introduction to beamforming including matched field processing. Computer programs will be constructed on all subjects covered. *Prerequisites: basic physics and familiarity with differential equations and some linear algebra.* Kuperman (F)

#### 200B. Computational Ocean Acoustics and Signal Processing II (4)

Continuation of SIO 200A. Range dependent propagation models including adiabatic and coupled mode models and parabolic equations. More advanced topics in matched field processing. *Prerequisite: SIO 200A.* Kuperman (W)

#### 200C. Computational Ocean Acoustics and Signal Processing III (4)

Continuation of SIO 200B. Modeling interference such as ambient noise. Time domain methods. Matched field tomography, nonlinear optimization methods, and geophysical inversion. *Prerequisite: SIO 200B.* Kuperman (S)

#### 202. Introduction to Climate and Climate Change (4)

Physical, dynamical, and thermodynamic processes that govern climate with emphasis on the atmosphere and the oceans. Topics will include energy budget of the oceans and the atmosphere, hydrological cycle, the meridional heat transport, and climate forcing and feedbacks that govern decadal to longer-term changes in climate. *Prerequisites: introductory courses in atmospheric sciences and oceanography; familiarity with solutions of linear differential equations.* Ramanathan (S)

#### 203A-B-C. Methods of Applied Analysis (4-4-4)

Methods of analysis with emphasis on physical applications, including: complex analysis, Fourier methods, Sturm-Liouville theory, boundary value problems and Green's function techniques, Frobenius' method, special functions, steepest descents, multiple scales, WKB methods, asymptotic expansions, variational methods, Wiener-Hopf techniques, Galerkin methods. *Prerequisites: Math. 110 and 120A or consent of instructors.* Cessi, Ierley, Young (F,W,S)

#### 204A. Advanced Acoustics I (4)

Boundary value problems in vibrating systems, wave propagation in strings, bars, and plates. Fundamentals of acoustical transducers. *Prerequisite: concurrent registration in ECE 145AL recommended.* Hildebrand (F)

#### 204B. Advanced Acoustics II (4)

Theory of radiation, transmission and scattering of sound with special application to ocean acoustics. *Prerequisite: concurrent registration in ECE 145BL recommended; SIO 204A or consent of instructor.* Buckingham (W)

#### 204C. Advanced Acoustics III (4)

Signal processing in underwater acoustics. Theory and hardware embodiments. *Prerequisite: concurrent registration in ECE 145CL recommended; SIO 204B or consent of instructor.* Buckingham (S)

#### 206. Sediment Transport as a Complex System (4)

Sediment transport and its influence on landforms, geologic deposits, and organisms will be studied through a critical examination of the literature, consideration of the fundamental solid and fluid mechanics, and an appeal to new techniques from complex systems analysis. Examples will be drawn from coastal, fluvial-dominated, and arid environments. *Prerequisites: some background in basic solid and fluid mechanics. (S/U grades permitted.)* Werner (S)

#### 207A. Digital Signal Processing I (4)

Sampling; A/D and D/A conversion, discrete linear system theory, z-transforms; digital filters, recursive and nonrecursive designs, quantization effects; fast Fourier transforms, windowing, high speed correlation and convoluting; discrete random signals; finite word length effects. *Prerequisite: ECE 109, 153 or consent of instructor. (S/U grades permitted.)* Hodgkiss (F)

#### 207B. Digital Signal Processing II (4)

Power spectrum estimation; homomorphic signal processing; applications to: speech, radar/sonar, picture, biomedical, and geophysical data processing. *Prerequisite: SIO 207A or consent of instructor. (S/U grades permitted.)* Hodgkiss (W)

#### 207C. Digital Signal Processing III (4)

Single and multichannel data processing in a time varying environment; adaptive filters; high resolution spectral estimation; linear prediction; adaptive beamforming. *Prerequisite: SIO 207A-B or consent of instructor. (S/U grades permitted.)* Hodgkiss (S)

#### 207D. Array Processing (4)

The coherent processing of data collected from sensors distributed in space for signal enhancement and noise rejection or wavefield directionality estimation. Conventional and adaptive beamforming. Sparse array design techniques. Applications to ocean acoustics and marine geophysics. *Prerequisite: SIO 207A or equivalent. (S/U grades permitted.)* Hodgkiss, Dorman (F)

#### 208. Seminar in Applied Ocean Sciences (1)

Topics in applied ocean sciences. One hour seminar. (S/U grades only.) Staff (F,W,S)

#### 209. Special Topics (1-4)

Within the next few years, lectures on various special subjects will be offered by members of the staff. The emphasis will be on topics that reveal the interdependence of the biological, chemical, geological, and physical processes operating in the oceans. (S/U grades permitted.) Staff (F,W,S)

#### 210. Physical Oceanography (4)

Physical description of the sea; physical properties of seawater, methods and measurements, boundary processes, regional oceanography. *Prerequisites: the mathematics and physics required for admission to the graduate curriculum in the Scripps Institution of Oceanography (see text), or consent of instructor.* Hendershott, Talley (F)

#### 211A-B. Ocean Waves (4-4)

Propagation and dynamics of waves in the ocean including the effects of stratification, rotation, topography, wind, and

nonlinearity. *Prerequisites:* for SIO 211B, SIO 211A and SIO 214A, or consent of instructor. Guza, Hendershott, Melville, Salmon, (W,S)

#### 212A-B. Dynamical Oceanography (4-4)

The equations of motion for rotating stratified flow and their application to large-scale ocean dynamics; the wind-driven circulation, flow over topography, and the dynamics of two-layer models. *Prerequisite:* SIO 214A or consent of instructor. Salmon, Talley (F)

#### 213. Ocean Turbulence and Mixing (4)

Mixing mechanisms, their identification, description, and modeling. Introduction to turbulence, semi-empirical theories, importance of coherent structures, effects of stratification and rotation on turbulent structure, entrainment and mixing. (S/U grades permitted.) Armi (S)

#### 214A. Introduction to Fluid Mechanics (4)

A survey of classical problems in fluid mechanics and approximate techniques of analysis. Topics include conservation equations, straight laminar flows, low and high Reynolds number laminar flow, stability of laminar flows, turbulent flow. *Prerequisite:* partial differential equations. Winant, Melville, Young, Armi (F,W)

#### 214B. Environmental Fluid Dynamics (4)

Single-layer flows with a free surface, two-layer flows including exchange flows in harbors, estuaries, seas, and buildings. Continuously stratified flows with meteorological and oceanographic applications. Topographic effects, plumes, jets, and thermals. *Prerequisite:* introductory graduate level course in fluid mechanics. (S/U grades permitted.) Armi (F)

#### 215. Introduction to Atmospheric Radiative Transfer (4)

Introduces elementary concepts in electromagnetism and quantum mechanics to explain scattering, absorption and emission by gases, aerosols, and clouds. Elegant analytical solutions to the transfer equation will be employed in conjunction with satellite and laboratory measurements to consider phenomena such as the CO<sub>2</sub> greenhouse effect, albedo effect of clouds, color of the skies, and atmospheric radiative cooling. *Prerequisites:* undergraduate courses in physics and differential calculus. Ramanathan (S)

#### 216. Introduction to the Physics of Complex Systems (4)

Emergent complex behavior in nonlinear, dissipative, open dynamical systems will be investigated by studying fundamental properties and their manifestation in examples drawn from the physical and biological sciences. Topics to include fractals, chaos, self-organization, artificial life, and neural networks. *Prerequisites:* basic solid and fluid mechanics, mathematics through PDEs, and computer programming skills. (S/U grades permitted.) Werner (W)

#### 217. Numerical Methods in Geophysical Fluid Dynamics (4)

Useful numerical methods of simulating the large-scale dynamics of oceans and atmospheres: fundamental concepts, classification of problems, introduction to discrete variable methods, stability, convergence, error analysis, elementary properties of finite-difference schemes, implicit methods, spectral methods, nonlinear problems. (Offered in odd-numbered years.) (S/U grades permitted.) Somerville (W)

#### 218. Atmospheric Dynamics and Physics (4)

Thermodynamics and statics of dry and moist air; equations of motion, scale analysis, elementary applications and wave solutions; baroclinic instability theory; atmospheric general circulation and energetics; thermal convection and laboratory analogues to atmospheric motions; turbulence and predictability theory; numerical models for weather forecasting and climate simulation. (Offered in even-numbered years.) (S/U grades permitted.) Somerville (F)

#### 219. Special Topics in Physical Oceanography (1-4)

Example topics are case histories and methods in physical oceanography, theories of the ocean circulation, numerical methods in large-scale ocean and atmospheric models, and natural electromagnetic phenomena in the earth and the oceans. (S/U grades permitted.) Staff (F,W,S)

#### 220. Observations of Large-Scale Ocean Circulation (4)

General circulation of the oceans; tropical, subtropical, and high-latitude current systems of the Atlantic, Indian, and Pacific Oceans and marginal seas; ocean heat flux and thermohaline circulations; observational basis of large-scale dynamics. *Prerequisite:* SIO 210. (S/U grades permitted.) Roemmich (S)

#### 221A. Analysis of Physical Oceanographic Data (A) (4)

Fundamental elements of analysis of geophysical and oceanographic time series, including sampling problems, least squares techniques, spectral analysis, interpretation of series, design of experiments. *Prerequisite:* consent of instructor. Guza, Pinkel (F)

#### 221B. Analysis of Physical Oceanographic Data (B) (4)

Techniques for analysis of physical oceanographic data involving many simultaneous processes including probability densities, sampling errors, spectral analysis, empirical orthogonal functions, correlation, linear estimation, objective mapping. *Prerequisite:* SIO 221A or consent of instructor. (S/U grades permitted.) Davis, Rudnick (W)

#### 223. Geophysical Data Analysis (4)

Design of geophysical experiments and analysis of geophysical measurements, interpretation of geophysical time series; sampling, least squares, spectrum analysis. Staff (W)

#### 224. Internal Constitution of the Earth (4)

An examination of current knowledge about the composition and state of the earth's interior revealed by geophysical observations. Seismic velocity and mass density distributions; equations of state; phase changes; energy balance and temperatures; constraints on composition from extraterrestrial samples and exposed rocks; spherical and aspherical variations of properties. *Prerequisites:* calculus and differential equations, basic chemistry and physics, or consent of instructor. Staff (S)

#### 225. Physics of Earth Materials (4)

Mathematics and physics of continuous media, focusing on geophysical problems. Topics include deformation, stress, conservation laws, elasticity, attenuation, viscoelasticity, fracture mechanics, and porous media. *Prerequisite:* consent of instructor. Staff (F)

#### 226. Introduction to Marine Geophysics (4)

Methods of exploration geophysics with emphasis on those useful at sea. Magnetic and gravitational potential field methods, multi-beam echo sounding reflection and refraction seismology will be covered. Recent papers from the literature will also be read and discussed. *Prerequisites:* differential equations; at least one geology course. (S/U grades permitted.) Dorman, Hildebrand (W)

#### 227A. Introduction to Seismology (4)

Introduction to seismometers and seismograms; stress and strain; potentials and the wave equation; geometrical ray theory and travel times in layered media; representation of seismic sources; WKB and synthetic seismograms; seismic hazards and other applications of seismology. *Prerequisite:* consent of instructor. (S/U grades permitted.) Staff (F)

#### 227B. Advanced Seismology I (4)

Introduction to low-frequency digital data; continuum mechanics and the equations of motion; free oscillation solutions; construction of Earth models; excitation of free-oscillations and source mechanism retrieval; array processing of long-period

data; modelling aspherical structure; surface waves. *Prerequisite:* consent of instructor. (S/U grades permitted.) Staff (W)

#### 227C. Advanced Seismology II (4)

High-frequency wave propagation; methods for computing synthetic seismograms including WKB, reflectivity and finite differences; body-wave spectra; attenuation of body waves; source physics; reflection and refraction seismology; seismic tomography. *Prerequisite:* consent of instructor. (S/U grades permitted.) Staff (S)

#### 229. Gravity and Geomagnetism (4)

Introduction to potential theory, with applications to gravity and geomagnetism. Topics include the geoid, spherical harmonics, Laplace's equation, the Dirichlet problem on a sphere, and Fourier methods. Gravity anomalies and geomagnetic field modeling and sources are discussed; also paleomagnetic observations. *Prerequisites:* advanced calculus, differential equations, complex variables, and familiarity with Maxwell's equations, or consent of instructor. (S/U grades permitted.) C. Constable, Parker (F)

#### 230. Introduction to Inverse Theory (4)

Solution of linear and nonlinear inverse problems in geophysics by optimization techniques such as norm minimization and linear programming. Construction of models by regularization; inference by bounding functionals. Illustrations from gravity, geomagnetism, and seismology. *Prerequisite:* consent of instructor. (S/U grades permitted.) Parker (W)

#### 232. Environmental Geophysics (4)

A field-based course on the geophysical techniques employed in modern environmental surveys for ground water studies, contaminant and hazard assessment, soil and foundation evaluation, and archaeology. Includes shallow seismic, electrical, and ground penetrating radar methods. Seminars describing equipment and procedures will be followed by field trips, and the resulting data reduced and interpreted under supervision. *Prerequisite:* consent of instructor. S. Constable, Harding (S)

#### 234. Geodynamics (4)

A general course on the dynamics and kinematics of the solid earth based on the text of Turcotte and Schubert. Topics include plate tectonics, heat flow, lithospheric cooling, flexure, viscous flow, global gravity, crustal structure, and other related topics. *Prerequisite:* familiarity with partial differential equations and Fourier transforms. (S/U grades permitted.) Sandwell, Phipps Morgan (W)

#### 235. Geodesy (4)

An introduction to the science and technology of determining the Earth's shape and gravity field with emphasis on applying this knowledge to geophysical problems. We will discuss both terrestrial measurement methods and the newer space-geodetic techniques. Additional topics include geometric and gravimetric geodesy, geodetic astronomy, and adjustment procedures, with special attention to the determination of crustal deformation. *Prerequisite:* consent of instructor. (S/U grades permitted.) Agnew, Bock (W)

#### 236. Satellite Remote Sensing (4)

A general course on physical principles of remote sensing based on the text by Rees. Topics include: orbit geometries and platforms; propagation, reflection, and emission of electromagnetic waves; electro-optical systems; passive microwave systems, ranging systems; and scattering techniques such as SAR. *Prerequisite:* consent of instructor. (S/U grades permitted.) Sandwell (F)

#### 239. Special Topics in Geophysics (1-4)

Special course offerings by staff and visiting scientists. Example topics are seismic source theory, geophysical prospecting methods, dislocation theory and seismic mechanisms, tectonic interpretation of geodetic data, and dynamo theory. (S/U grades permitted.) Staff (F,W,S)



**240. Marine Geology (4)**

Introduction to the geomorphology, sedimentation, stratigraphy, vulcanism, structural geology, tectonics, and geological history of the oceans. *Prerequisites: the physics and chemistry required for admission to the graduate curriculum in SIO, and ES 101 or equivalent, or consent of instructor.* Staff (W)

**241. Seminar in Hydrogeology and Tectonics (2)**

Introduction to the role that fluids play in the physical development of active tectonic systems. Discussions will focus on the nature of the processes controlling fluid flow through the Earth's crust and the dynamic interaction of fluid migration and faulting. *Prerequisite: ES 101 or equivalent.* (S/U grades permitted.) Brown (S)

**242. Controversies in Geomorphology (4)**

Conflicting ideas regarding the relation between physical processes which shape the Earth's surface and the resulting landforms are studied (a) through a critical examination of the literature, (b) using visualization of computer simulations, and (c) in two weekend field trips. *Prerequisite: consent of instructor.* (S/U grades only.) Werner (S)

**245A. Interpretation of the Sedimentary Record (4)**

Sediments provide the most complete record of surface conditions on the Earth, including the climates, ocean and atmospheric compositions and circulation patterns, tectonic environments of the past, the history of sea-level fluctuations, and the evolution of life. This course deals with the sedimentary record, emphasizing interpretation of petrologic and stratigraphic evidence based on direct study of sediments in the laboratory and in the field. *Prerequisites: ES 101 and ES 120 or consent of instructor; taken preferably after SIO 253.* Staff (F)

**245B. Low-Temperature Geochemistry (4)**

Geochemistry, diagenesis, and stable isotope variations in sedimentary minerals and rocks, with emphasis on fluid-rock interaction processes important in determining the chemical and isotopic compositions of seawater, sediments, and pore fluids. Offered in alternate years. *Prerequisites: mineralogy, sedimentary petrology, introductory geochemistry and physical chemistry, or consent of instructor.* (S/U grades permitted.) Kastner (W)

**246. Seminar in Marine Geology and Geophysics (2)**

Student seminars on controversial topics relating to the formation and history of the oceanic crust. Will stress a dynamical approach. *Prerequisite: completion of two quarters of SIO 248 or consent of instructor.* (S/U grades permitted.) Cande, Phipps Morgan, Sandwell, Sclater (F,W)

**247. Rock Magnetism and Paleomagnetism (4)**

Rock magnetism and acquisition of magnetic remanence in geological materials as well as laboratory procedures and data analysis (isolating remanence components and statistical approaches). The paleomagnetic literature will be used to illustrate applications in geological and geophysical problems. *Prerequisites: one year each of college-level physics and geology; mathematics through calculus.* (S/U grades permitted.) Tauxe (W)

**248A-B-C-D. Essentials of Geology (4-4-4-4)**

A rigorous, synoptic sequence of courses for entering graduate students covering major aspects of geology with emphasis on marine problems. Geophysics and Tectonics: plate tectonics, geophysics and tectonics of the crust and upper mantle, spreading centers, plate interiors, and continental margins. Geochemistry and Crustal Evolution: formation of the earth and terrestrial planets, chemical differentiation of the earth, magmatic systems in different tectonic settings, isotope and trace element geochemistry of igneous and metamorphic rocks. Marine sediments—distribution and processes: types of sediments present on the seafloor and processes responsible for

the observed distributions in nearshore and shelf environments, continental slope and deep sea. Includes physical and geochemical processes, diagenesis, hydrothermal systems and principles of paleoclimatology. Paleoceanography: the record in the rocks—approaches to the interpretation of the stratigraphic record of marine sediments, in terms of paleoceanography, tectonics, sedimentary processes and biotic evolution. *Prerequisite: bachelor's degree in geology/earth sciences or consent of instructor.* (S/U grades permitted.) Staff (F,W,S)

**249. Special Topics in Marine Geology (1-4)**

Special course offerings by staff and visiting scientists. (S/U grades permitted.) Staff (F,W,S)

**251. Nuclear Geophysics and Oceanography (4)**

Nuclear methods in geophysics and oceanography with emphasis on applications of natural cosmic ray produced nuclides and U, Th series nuclides; their source functions, applications, and mathematical models will be discussed. These methods include trace element geochemistry; mixing and transfer of substances between the atmosphere, hydrosphere, and the lithosphere; secular variations in the carbon cycle, rates of erosion of natural rock and soil surfaces, and biodynamics of phosphorous in the upper layers of the oceans. *Prerequisite: consent of instructor.* Lal (S)

**252. Isotope Geochemistry (4)**

Radioactive and stable isotope studies in geology and geochemistry, including geochronology, isotopes as tracers of magmatic processes, cosmic ray produced isotopes as tracers in the crust and weathering cycle, isotopic evolution of the crust and mantle. Offered in alternate years. Conjoined with ES 144. *Prerequisite: SIO entrance requirements or consent of instructor.* (S/U grades permitted.) Macdougall, Lal (S)

**253. Igneous and Metamorphic Petrology (4)**

Physical, chemical, and mineralogical properties of igneous and metamorphic rocks. Emphasis is on the origin and genetic relationships as interpreted from field occurrences, theoretical studies, and experimental data. Offered in alternate years. *Prerequisites: physical geology; geochemistry, mineralogy, physical chemistry (may be taken concurrently).* Hawkins (S)

**256A. Introduction to Field Geology (4)**

Mapping and interpretation of geologic units and structures in the field. Field observations at the surface are related to theory and extrapolated to three dimensions. Field work is done on weekends in local areas; field data are discussed and evaluated through applicable geologic principles in the laboratory. Conjoined with ES 162A. *Prerequisite: consent of instructor; to be taken concurrently with SIO 256L.* Castillo (W)

**256L. Structural Analysis for Field Geology (2)**

Principles of stratigraphy and structural geology applicable to field geologic studies. Discussion and laboratory exercises. Conjoined with ES 162L. *Prerequisite: consent of instructor; to be taken concurrently with SIO 256A.* Castillo (W)

**257. Seminar in Petrology (4)**

Discussion of current research in petrology and mineralogy. (S/U grades permitted.) Hawkins (W)

**258A-B-C-D. Classics Seminar (1-4)**

A discussion class usually held in conjunction with SIO 248A-B-C-D. Classic papers dealing with topics discussed in 248 will be read and discussed. Normally required of all first- and second-year students in geological sciences. (S/U grades only.) Staff (F,W,S)

**259. Atmospheric Geochemistry (4)**

Topics in this introductory course include: structure and composition of the atmosphere; chemistry and isotopes of natural and man-made carbon-, nitrogen-, and sulfur-bearing trace

gases; ozone and hydroxyl radical; halogenated gases; air-sea exchange; aerosols; climatic effects. (S/U grades permitted.) Wahlen, Weiss (W)

**260. Marine Chemistry (4)**

Chemical description of the sea; the distribution of chemical species in the world oceans, and their relationships to physical, biological, and geological processes. Gieskes, R. Keeling (F)

**261. Energetics and Kinetics in Marine Chemistry (4)**

The consideration of seawater as an electrolyte solution with emphasis upon its structure and physical-chemical properties. Thermodynamic considerations of mixed electrolyte solutions with particular reference to seawater. *Prerequisite: Chem. 202A.* Gieskes, Dickson (S)

**262. Seminar in Marine Natural Products (1)**

Students will give seminars on current research topics in marine natural products chemistry. *Prerequisite: consent of instructors.* (S/U grades only.) Faulkner, Fenical (F,W,S)

**265. Chemical Ecology of Marine Organisms (4)**

An outline of the organic chemicals from marine organisms with special reference to their function in the marine environment. The differences between terrestrial and marine natural products will be stressed. *Prerequisite: basic organic chemistry.* Faulkner, Fenical (W)

**268. Seminar in Geochemistry and Marine Chemistry (1)**

Student seminars on topics related to geochemistry and the chemistry of the marine environment. (S/U grades only.) Staff (W)

**269. Special Topics in Marine Chemistry (1-4)**

Special course offerings by staff and visiting scientists. (S/U grades permitted.) Staff (F,W,S)

**270. Pelagic Ecology (4)**

An analysis of the concepts and theories used to explain the biological events observed in the water column. Alternate years. *Prerequisites: SIO 210, 280, or consent of instructor.* Checkley (F)

**270A. Fisheries Oceanography (4)**

Aspects of marine ecology relevant to the reproduction, survival, and distribution of commercially important marine species. Alternate years only. *Prerequisites: SIO 210 and 280, or consent of instructor.* (S/U grades only.) Mullin (W)

**271. Marine Zooplankton (4)**

Lectures and laboratories treating the morphological, behavioral, and life history variations of the principal phyla of planktonic invertebrates and heterotrophic protists. Constraints of life at low Reynolds numbers; principles of allometry; growth processes of heterotrophic organisms. *Prerequisite: SIO 280 or consent of instructor.* (S/U grades permitted.) Ohman (S)

**272. Biogeography (3)**

A lecture course concerning the origin, development, and perpetuation of distributional patterns with emphasis on benthic marine organisms. Newman (W)

**273. Professional Ethics in Science (2)**

A seminar on the ethics and ethos of scientific research, based on published cases of unethical behavior. Given in alternate years. (S/U grades only.) Dayton, Mullin (W)

**274. Marine Arthropods (5)**

Lectures and laboratories on the natural history, morphology, taxonomy and phylogeny of arthropods with emphasis on marine forms. Alternate years. *Prerequisite: consent of instructor.* Hessler, Newman (W)

**275A. Benthic Ecology (4)**

Evolution and maintenance of benthic communities from the terrestrial margins to the deep sea. Special emphasis will be placed on physical and biological scaling and processes determining patterns of distribution and abundance; interrelationships between community structure and population phenomena, including trophic relationships, reproductive and recruitment patterns, succession, and life history biology. Offered in alternate years with SIO 275B. *Prerequisite: consent of instructor; open to undergraduates.* (S/U grades permitted.) Dayton, Levin (S)

**275B. Natural History of Coastal Habitats (4)**

Two three-hour laboratories per week, three four-six day field trips to sites from Mexico to Monterey Bay. Several one-day field trips to local habitats including lagoons, sand and rock intertidal habitats, areas of marine fossils, and areas with migrating birds. Format of course variable depending on student interests. Alternate years with 275A. *Prerequisites: open to undergraduates with consent of instructor and completion of BIEB 130, Introductory Marine Ecology.* (S/U grades permitted.) Dayton (W)

**276. Quantitative Theory of Populations and Communities (4)**

An introduction to the quantitative tools and conceptual issues underlying the study of the dynamics and structure of ecological systems. *Prerequisite: calculus (three quarters) or consent of instructor.* (S/U grades permitted.) Sugihara (F)

**277. Deep-Sea Biology (4)**

The ecology, zoogeography, taxonomy, and evolution of deep-sea organisms, with emphasis on the benthos. Offered alternate years. *Prerequisite: consent of instructor.* (S/U grades only.) Hessler (S)

**278. Problems in Biological Oceanography (2)**

Presentation of reports, review of literature, and discussion of current research in biological oceanography. Seminar. (S/U grades permitted.) Staff (F,W,S)

**279. Special Topics in Biological Oceanography (1-4)**

(S/U grades permitted.) Staff (F,W,S)

**280. Biological Oceanography (4)**

The biology and ecology of marine plankton, nekton, and benthos. Emphasis will be on processes regulating species, community, and ecosystem patterns and changes, including productivity, trophic relationships and species interactions with the physical, chemical, and geological environment. One or more field trips. *Prerequisite: bachelor's degree in science or consent of instructor.* Franks (F)

**281. Environmental Physiology and Biochemistry of Marine Organisms (4)**

Biochemical mechanisms of adaptation of organisms to the marine environment. Special emphasis is on the effects of pressure, temperature, salinity, oxygen, and light on the physiology and biochemistry. Conjoined with BIBC 130. *Prerequisites: adequate training in biochemistry and biology and consent of instructor.* Felbeck (W)

**282. Phytoplankton Diversity (4)**

Molecular, biochemical, ecological, and evolutionary perspectives on the diversity of eukaryotic and prokaryotic phytoplankton. *Prerequisite: consent of instructor.* Palenik (W)

**284. Invertebrate Zoology (5)**

Invertebrate zoology covering all of the major and minor phyla: phylogeny, anatomy, physiology and natural history. Lecture and laboratory demonstrations. *Prerequisite: consent of instructors; no audits.* Holland, Hessler (W)

**285. Physical-Biological Interactions (4)**

Physical and biological processes affecting growth and patchiness of plankton. Concepts and equations from physical oceanography will be presented and explored in a biological context. Ideas will be treated both theoretically and with examples from the literature. *Prerequisites: introductory calculus and SIO 210, or consent of instructor.* Franks (S)

**286. Critiques and Data Reanalyses (4)**

A case-history approach to critical reading of scientific literature. Examples are drawn from reports on ecologically relevant behavior of marine animals; issues covered include tractability of the problem; design of the experiments; and re-examination of the evidence, with an emphasis on statistical analysis and alternative interpretations of the data. Offered alternate years. *Prerequisites: sound preparation in statistics; consent of instructor.* Enright (F)

**287A. Marine Microbial Ecology (4)**

Recent developments in the study of marine bacteria. Emphasis will be on biochemical and physiological adaptations of marine bacteria to the ocean environment. Bacterial metabolism, growth, and death will also be discussed in the context of trophic interactions and flows of material and energy in marine ecosystems. Molecular biology techniques used in the study of bacterial ecology will also be discussed. *Prerequisite: consent of instructor.* (S/U grades permitted.) Azam (F)

**287B. Microbial Metabolism (4)**

Biochemistry and physiology in relation to metabolic activities and elemental cycles; growth and death of bacteria. *Prerequisite: consent of instructor.* Alternate years. Staff (S)

**292. Scientific Communication (2)**

Forms of scientific communication, practical exercise in scientific writing and short oral communication and in criticism and editing; preparation of illustrations, preparation of proposals; scientific societies and the history of scientific communication. Examples from any field of science, most commonly biology, marine biology, ecology, and neuroscience. *Prerequisite: graduate status in science.* (S/U grades only.) Bullock (F)

**293A-B. Animal Behavior (4-4)**

(A) Ethological approach. Species characteristics behavior, its causation and adaptive significance. Controversies on "innateness," "drives," and related concepts. Ecology in relation to neurophysiology. (B) Control mechanisms: feedback and feed forward in elementary behaviors associated with orientation and assessment of environment; random processes describing the occurrence of behavioral patterns. *Prerequisite: basic knowledge of calculus and statistics recommended.* Staff (F,W)

**294. Biology of Fishes (5)**

The comparative evolution, morphology, physiology, and ecology of fishes. Special emphasis on local and deep-sea and pelagic forms in laboratory. *Prerequisite: graduate standing or consent of instructor.* Rosenblatt (S)

**295. Current Topics in Developmental Biology (4)**

A collection of lectures with some periods devoted to observations of fertilization and embryogenesis. Various topics of current interest in developmental biology will be discussed. *Prerequisite: consent of instructor.* (S/U grades permitted.) Vacquier (F)

**296. Special Topics in Marine Biology (1-5)**

Example topics are reproduction in marine animals, adaptation to marine environments, larval biology, marine fisheries, macromolecular evolution, physical chemical topics in physiology, philosophy of science. (S/U grades permitted.) Staff (F,W,S)

**297. Marine Biology Seminar (1)**

Lectures given by visiting scientists and resident staff and students. (S/U grades only.) Staff (F,W,S)

**298. Special Studies in Marine Sciences (1-4)**

Reading and laboratory study of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases. *Prerequisite: graduate standing.* (S/U grades permitted.) Staff (F,W,S)

**299. Research (1-12)**

(S/U grades permitted.) Staff (F,W,S)

## Social Science

Social Science 60 has been deleted and replaced by Sociology 60. All inquiries should be addressed to the Department of Sociology, Social Science Building, Room 401.

## Sociology

OFFICE: Social Sciences Building, Room 401

### Professors

Harvey S. Goldman, Ph.D.  
Bennetta Jules-Rosette, Ph.D.  
Richard P. Madsen, Ph.D.  
Timothy L. McDaniel, Ph.D., *Academic Senate Distinguished Teaching Award*  
Hugh B. Mehan, Ph.D., *Academic Senate Distinguished Teaching Award*  
Chandra Mukerji, Ph.D.  
David P. Phillips, Ph.D.  
Andrew T. Scull, Ph.D.  
Gershon Shafir, Ph.D.  
Steven Shapin, Ph.D.  
Carlos H. Waisman, Ph.D., *Chair*

### Associate Professors

Richard G. Biernacki, Ph.D.  
Juan Diez Medrano, Ph.D.  
Ivan T. Evans, Ph.D.  
Jeffrey M. Haydu, Ph.D.  
Rebecca E. Klatch, Ph.D.  
Martha Lampland, Ph.D.  
Akos Rona-Tas, Ph.D.  
Christena Turner, Ph.D.  
Kathryn A. Woolard, Ph.D.  
Leon Zamosc, Ph.D.

### Assistant Professors

Lisa Catanzarite, Ph.D.  
Maria Charles, Ph.D.  
Steven Epstein, Ph.D.

Adrian D.S. Johns, Ph.D.  
Ricardo D. Stanton-Salazar, Ph.D.

### Adjunct Professors

Yen Espiritu, Ph.D.  
Michael S. Schudson, Ph.D.  
Mary L. Walshok, Ph.D.

### Emeritus

Bennett M. Berger, Ph.D.  
Rae Lesser Blumberg, Ph.D.  
Aaron V. Cicourel, Ph.D.  
Jack D. Douglas, Ph.D.  
Joseph R. Gusfield, Ph.D.  
Jacqueline P. Wiseman, Ph.D.

## Sociology at UCSD

Sociology studies societies and human groups: their composition, organization, culture and development. It combines scientific and humanistic methods to investigate a subject that is both relevant and broad-ranging from social interaction in everyday life to social changes taking place on a global scale. The Department of Sociology at UCSD offers an innovative program that covers the breadth of the discipline while giving students opportunities to specialize in areas of their choice, to conduct independent research, and to participate in an Honors Program. The department also encourages majors to study abroad and to take courses in other humanities and social science departments in order to expand their perspective on sociological topics.

Students at UCSD can explore a full range of sociological inquiry through courses in such established fields as Third World development, law, culture, social movements, religion, race and ethnic relations, gender roles, medicine, and mental illness. In addition, students have the opportunity to participate in courses found in few other sociology departments, such as the politics of language, ethnographic film, the Holocaust, comparative sex stratification, mass media, and revolutions. The faculty also teach an exceptional array of courses focusing on specific societies or world regions, including Africa, Japan, China, Latin America, eastern Europe, the Soviet Union, and the United States.

Thus sociology is a valuable major for students who want to enter law, medicine, archi-

teature, business, or politics. It also provides a solid liberal arts education for students who plan careers in such fields as criminal justice, public health, urban planning, social welfare, counseling, public administration, international relations, or market research. For students who wish to pursue graduate study in the social sciences for careers in teaching or scholarly research, an undergraduate degree from the Department of Sociology will provide a thorough grounding in recent theoretical and methodological advances in the discipline. A sociology major offers excellent preparation for teaching in the elementary schools. If you are interested in earning a California teaching credential from UCSD, contact the Teacher Education Program for information about the prerequisite and professional preparation requirements. It is recommended that you contact TEP as early as possible in your academic career. Whatever the career choice, the study of sociology can help the student cultivate a critical awareness of social life.

Students interested in majoring or minoring in sociology should stop by the Department of Sociology office, SSB 401, for a brochure on the program and a student handbook. These clarify specific procedures and guidelines, and provide recommendations for areas of specialization within the major, as well as for graduate studies and careers in sociology.

## The Undergraduate Program

### The Major

To receive a B.A. with a major in sociology, students must complete three lower-division and twelve upper-division courses in sociology, including the required courses listed below, and a course in elementary statistics (Social Science 60).

A 2.0 GPA is required in the major, and students must earn at least a C- in each course used for the major. *No courses taken to apply toward the major may be taken on a Pass/Not Pass basis except Sociology 197, 198 or 199.* Only one such special studies course (including internships) may be applied toward the major. These special studies courses must be applied for and approved by the department before the beginning of the quarter in which the student

wishes to enroll, and can only be taken on a Pass/Not Pass basis. See the staff undergraduate coordinator for the necessary application forms and deadlines.

### Lower-Division

Sociology 1A, 1B, 20, and Social Science 60 (Elementary Statistics for the Social Sciences) are required for the major. We strongly recommend that you take Sociology 1A and Sociology 1B in sequence. It is advisable that students complete these required lower-division courses (which should be taken during the freshman or sophomore year) before continuing with their upper-division work.

### Upper-Division

Twelve upper-division courses are necessary for the major—five are courses in required clusters, and the other seven are upper-division electives. The upper-division sociology curriculum is divided into four areas of concentration (clusters) as follows:

#### A. Theory and Method

(courses designated Soc/A)

Theory

100, 101M, 102, 103F, 103T, 120

Methods

103M, 104, 105, 106, 107, 108A, 108B, 109, 109S

#### B. Culture, Language, and Social Interaction

(courses designated Soc/B)

111, 112, 115, 117, 118, 119, 120S, 127, 131, 142, 143, 160, 162, 164J, 166, 167, 172, 174, 177

#### C. Organizations and Institutions

(courses designated Soc/C)

121, 122, 123, 125, 126, 129, 132, 135, 136A, 136B, 139, 140, 141, 144, 148, 148C, 148E, 148I, 148L, 148M, 150L, 151M, 152, 156, 157, 159, 165A/B, 168E, 168J, 168S, 168T, 180

#### D. Comparative and Historical

(courses designated Soc/D)

120W, 133, 151, 158, 158J, 169, 178, 179, 181, 181I, 182, 183S, 184, 185, 186P, 187, 187S, 188A, 188B, 188D, 188E, 188G, 188I, 188J, 188K, 188N, 188O, 189

All students must complete Sociology 100 (students are strongly advised to do so by

the end of their junior year) and *one* method course from the list above. (Method courses are numbered Soc/A 103M to 109S.) *One* course is required in each of the other three areas. Students are encouraged to complete their theory and methods courses early in their program, since theoretical perspectives and skills in methods will enhance their subsequent course work.

In fulfilling the major, students may apply, with the Department of Sociology approval, up to two upper-division courses from the relevant offerings in the Departments of Anthropology, Economics, History, Linguistics, Political Science, Psychology, Urban Studies and Planning, macro and micro areas of the Department of Communication, and the Teacher Education Program. Courses from departments other than these may be taken if the student submits a petition to, and obtains approval from, the Department of Sociology.

### Writing Requirement

Writing skills, including the ability to define precise questions, marshal evidence, and present clear arguments, are indispensable for all students, whatever their academic and career interests. To help students develop these skills, the department asks all new (fall 1991 or later) majors to fulfill a writing requirement. One quarter prior to graduation, students must show the undergraduate coordinator (located in SSB 409) two substantial (ten or more pages) research papers written for courses in their major, for which they received a grade of C- or better. Ideally, this should take place the quarter before graduation when students come to the undergraduate coordinator to make certain they have met all major requirements. The two papers should be brought in at the same time. To give students ample opportunity to complete this requirement, most upper-division sociology classes will either assign a research paper or offer students the option of writing such a paper for course credit.

### Education Abroad Program

Students are able to participate in the UC Education Abroad Program (EAP) or UCSD's Opportunities Abroad Program (OAP) while still making progress toward completing their major. Students considering this option should discuss their plans with the undergraduate adviser prior to going abroad, and courses

taken abroad must be approved by the department. It may be possible to use some related courses outside of the discipline of sociology toward the major. For more information on EAP, see the section of this catalog on the Education Abroad Program. Interested students should contact the Programs Abroad Office in the International Center. To petition particular courses taken abroad, see the undergraduate adviser in the Department of Sociology.

### Recommendations for Transfer Students

If students wish to use courses taken at other institutions towards their major, they must first meet with the staff undergraduate coordinator in the department during designated office hours. (College transcripts, college catalogs, and course syllabi should be brought at the time of appointment.) Students are required to fill out one student petition per transfer course as well as an additional "information sheet" available in the Department of Sociology. Once these petitions are turned in, a determination will be made regarding the transferring of courses into the program.

It is important to note that eight of the twelve upper-division courses in the undergraduate program must be taken in the Department of Sociology at UCSD, unless students obtain special acceptance of additional courses from the chair and the faculty undergraduate adviser.

### The Minor

The minor consists of seven sociology courses: two lower-division and five upper-division. Unless colleges specify specific courses to be taken, the student may choose any two lower-division sociology courses (Soc/L 1A, 1B, 10, 20, or 40) and any five upper-division courses (Soc. 100 to 190). Courses for the minor must be taken for a letter grade only. Special study courses or internships may not be applied toward the minor.

### The Honors Program

The Department of Sociology offers an honors program to those students who have demonstrated excellence in the sociology major. Successful completion of the honors program enables the student to graduate "With Highest

Distinction," "With High Distinction," or "With Distinction," depending upon performance in the program.

### Eligibility

Students may apply to the honors program if they meet the following requirements:

1. junior standing (ninety units completed)
2. GPA of 3.5 or better in the major
3. recommendation of a faculty sponsor familiar with student's work
4. must have completed at least four upper-division sociology courses
5. overall GPA of 3.2 or better
6. must have completed Soc/A 100 and one upper-division methods course prior to the fall quarter when the honors course begins; alternatively, the consent of the honors program director or the undergraduate adviser must be obtained

Interested students may pick up an application from the staff undergraduate coordinator in the Department of Sociology. Completed applications must be in the department office no later than week five of the spring quarter prior to the start of the honors program in the fall.

Students traveling abroad during their junior year should note that the deadline for applications still applies to them and should make arrangements accordingly.

Enrollment in the honors program is limited. Final decisions on acceptance into the program will be made by the presiding faculty member.

### Course Requirement

The student must take Sociology 196A, Advanced Studies in Sociology, and Sociology 196B, Supervised Thesis Research, which will count as two of the twelve upper-division courses required for the major. Each student will choose a faculty adviser to help supervise the thesis research and writing with the honors program director.

Students whose GPA in the major falls below 3.5 or who do not earn at least an A- in the honors seminars will not graduate with distinction, but they may count the two honors courses among the twelve upper-division courses required for the major. Students must maintain a 3.5 GPA in the major and a 3.2 overall GPA until final graduation, in order to

receive honors in the sociology honors program. To graduate "With Highest Distinction" the student must earn an A+; to graduate "With High Distinction" the student must earn an A; and to graduate "With Distinction" the grade must be an A-.

### The Graduate Program

The Department of Sociology at UCSD has long been recognized as a center of qualitative, field-based research. In recent years, it has greatly increased its strength in comparative and historical sociology and in quantitative methods of sociological research. Today members of the department are engaged in a wide variety of research and teaching activities, which fall largely into two broad areas.

1. A number of faculty have research interests in the historical and/or comparative analysis of social institutions, structures, and change. Using methods of comparative historical research and concepts drawn from social theory, individual faculty are engaged in research on, among other things, (1) political sociology, including revolution, social and political movements, and the evolution of the modern state, (2) economic development, including the labor process, stratification and the organization of work, and the development of market economies, (3) collective identities and social relations, including nationalism, gender, race, and ethnicity, and (4) social control and institutionalization. The department is among the most internationally oriented departments of sociology in the world, with specialists in most regions of the world, including Eastern and Western Europe, the Soviet Union and Russia, Japan, China, southern Africa, Latin America, various societies of the Middle East, as well as the United States.

2. Many faculty have research interests in the sociology of culture, broadly conceived. This includes culture and its institutions as a framework for studying society, social theory, politics, and meaning, as well as culture as the expression of social experience. Faculty research interests include political culture and the culture of work; sociology of the arts, literature, and film; popular culture, including the analysis of mass media and communication; sociolinguistics, including the study of medical discourse and

reasoning, education, and socialization; and the sociology of intellectuals, of science, and of knowledge. A rapidly developing strength of the department is the analysis of the role of symbolic and cognitive dimensions of society in larger-scale social change and in collective identity and action.

Further, a number of faculty research interests clearly cross these sub-disciplinary divides, including areas like gender, race and ethnicity, and social theory.

In addition to the general sociology graduate curriculum, the department offers two distinctive programs of study which entering students may wish to consider.

### Admission

New students are admitted in the fall quarter of each academic year. Prospective applicants should submit the official application for admission and awards (same form), one set of official transcripts from each institution attended after high school, official scores from the Graduate Record Examination, application fee, at least three letters of recommendation, and one or more samples of the applicant's own writing, such as term papers. Additionally, foreign applicants must submit official scores from the Test of English as a Foreign Language (TOEFL). Applicants are encouraged to visit the department to talk with faculty and graduate students. The application deadline is January 15.

### Program of Study

Students are required to enroll as full-time graduate students, to carry a minimum enrollment of 12.0 units of graduate level courses each quarter, and to maintain a grade point average of 3.0 or better.

Programs of study are determined in consultation with the graduate advisor, who supervises the work of students until their doctoral committee has been established. In addition to the graduate advisor, first and second year students meet individually with a faculty mentor to review academic progress, establish a coherent program of study, set goals for oral papers, and deal on an informal basis with any difficulties.

Course requirements include the core sequence, taken in the first year, and nine elective seminars, at least seven of which must be in sociology.

### The Core Curriculum Sequence

The first year of the program is devoted to a required sequence of core courses. Entering students go through the sequence as a cohort; as a consequence, all first-year students must enroll in the fall quarter of the first year.

The core curriculum, required of all graduate students, is designed to introduce students to:

1. major sociological theories
2. exemplary works of research undertaken to develop or test theories
3. sociological methods and techniques of research.

Three two-course sequences are required in the first year: Theory I and II, Sociological Analysis I and II, and Statistics I and II. Additionally, students must take a three-quarter sequence of one-unit classes, called Faculty Research Seminar I, II, and III.

### Assessment of Students in the First Year of the Program

At the end of the student's first year in the program, student performance is evaluated by a committee consisting of the graduate adviser and the faculty teaching the core sequences. Students whose performance is satisfactory are allowed to continue the regular course of study; others may be asked to repeat some courses or to do additional course work; others may be asked to withdraw from the program. Evaluations are communicated to students in writing.

### Departmental Reviews

In the spring quarter each year, the Graduate Program Committee will assess the progress of each pre-candidacy student on the basis of evaluations submitted by three faculty members. The committee will establish that the student is in good standing, recommend additional course work, or recommend dismissal. The committee may wish to meet with some students in person to discuss their evaluation.

### The Master's Degree

The department does not accept students for the M.A. degree alone. The master's degree is earned as one of the requirements of the Ph.D. and is based on the quality of the student's

course work. At the end of the second year, students are evaluated by the Graduate Program Committee for the master's degree. At that time, the committee ascertains the student's suitability for doctoral work. Students who have not yet completed all course requirements may ask to delay consideration for the M.A.

In order to obtain the M.A. degree, students must complete satisfactorily both the core sequences and all elective courses. At the beginning of the spring quarter of their second year in the program or at the beginning of the quarter in which they wish to be considered, students must submit to the committee for evaluation, three papers they have written for seminars taught by different faculty. Reviewers assess the quality of the overall record and determine whether it indicates a potential for conducting doctoral research.

The final decision regarding the M.A. degree is based on grades, the three papers, and yearly faculty evaluations. The committee awards three possible grades: Pass, M.A. Only, and Non-pass. M.A. only evaluations are granted the degree but may not continue toward the Ph.D. Students who received Non-pass evaluations are asked to withdraw without a graduate degree.

### *The Field Examination*

Upon completion of the core curriculum and the nine elective seminars, students become eligible to take the Field Examination. This examination must be completed by the end of the student's third year in the program.

The object of the Field Examination is to demonstrate mastery of two established, broad, and distinct fields of sociological inquiry, selected from a list of fields provided by the department. The examination is carried out by a faculty committee composed of no fewer than four departmental faculty, one of whom serves as chair. The choice of fields and the composition of the committee must be approved by the Graduate Program Committee. Faculty from departments other than sociology may be added (or, if necessary, substituted) by petition to the Graduate Program Committee.

The demonstration of mastery has two parts, one written, one oral. The written part consists of two papers, one in each field, and a course syllabus. The papers are critical reviews of the literature in that field, demonstrating a grasp of

key issues and debates, and of the broad, conceptual history of the field. These reviews are based on a bibliography drawn up by the student in consultation with relevant committee members and other faculty in each field. Field papers are limited to 40 pages each, exclusive of notes and bibliography. The bibliography in each field should include at least 20–30 books or article equivalents. The two bibliographies may not significantly overlap, either in literature surveyed or in specific titles. In addition to the two papers, the student must submit to the examining committee a syllabus for a general, upper-division course in one of the two fields.

The oral part lasts two hours and covers both fields. It is given by the examining committee, sitting as a whole, and is based on the bibliographies, papers, and course syllabus submitted by the student.

Following the oral examination, the committee grades the student, basing the grade on both the written and the oral components of the examination. Possible grades are High Pass, Pass, Conditional Pass, and No Pass. High Pass recognizes exceptional performance. Conditional Pass indicates that the committee has passed the student pending the completion of additional work. Students receiving a grade of No Pass will have an opportunity to retake the examination, should they so desire, no later than the end of the subsequent quarter. Students electing not to retake the examination or receiving a grade of No Pass a second time will be asked to withdraw from the graduate program.

More detailed guidelines to the Field Examination are available from the Graduate Office in the Department of Sociology.

### *The Dissertation Prospectus and Hearing*

The central intellectual activity leading to the award of the Ph.D. degree is the doctoral dissertation: an original contribution to knowledge, based on substantial, original research on a topic of intellectual significance within the field of sociology.

Following successful completion of the Field Examination, the student establishes a doctoral committee to supervise dissertation research. This is a five-person committee, including three faculty from within the department and two from other departments within the university.

Committee members are chosen by the student and approved by the department chair. The student asks one of the department members to serve as chair. The composition of this committee may or may not overlap with the committee that carried out the Field Examination.

By the end of the spring quarter of the fourth year in the department, the student must have a dissertation prospectus approved by his or her doctoral committee. The dissertation prospectus is a document that (1) specifies the dissertation research topic; (2) places it in the context of the relevant literature; (3) specifies its significance; (4) specifies and justifies the research methods to be used; (5) establishes the feasibility of the research; and (6) indicates the anticipated steps leading to completion.

Following submission of the dissertation prospectus, the student must defend it at a hearing before the doctoral committee. The purpose of the hearing is to certify that the prospectus is significant and feasible, that the research design is appropriate, and that the student is prepared to carry it out successfully. Based on the written prospectus and the hearing, the committee may choose to approve the prospectus or ask for revisions and resubmission. The prospectus hearing serves, in effect, as a qualifying examination, and approval of the dissertation prospectus is the final step to advancement to candidacy for the Ph.D. degree.

### *The Doctoral Dissertation*

Upon approval of the dissertation prospectus, the student proceeds with dissertation research. Students are expected to consult with committee members as the research progresses and to keep the committee chair advised of progress made.

Once the dissertation is substantially completed and committee members have had the opportunity to review drafts of the written work, the committee meets, with or without the student present, to consider the progress made and to identify concerns, changes to be made, or further work to be done. Once the committee members are substantially satisfied with the written work, the student, in consultation with the committee, schedules the oral defense of the dissertation. By university regulation, this defense is open to the public.



The final version of the dissertation must be approved by each member of the doctoral committee. Having obtained this approval and successfully defended the dissertation in oral examination, the student is eligible to receive the Ph.D. degree. The final version of the dissertation is then filed with the university librarian via the Office of Graduate Studies and Research. Acceptance of the dissertation by the university librarian is the final step in completing all requirements for the Ph.D.

### **Departmental Ph.D. Time Limit Policies**

Students must be advanced to candidacy by the end of four years. Normative time is six years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

### **Specialized Programs of Study**

#### **Concentration in Comparative Institutional and Cultural Transformations**

This concentration is a specialization within the standard graduate curriculum in sociology. The primary concerns of the Concentration are (1) the study of institutional change in contemporary and historical perspective, and (2) the study of gender, class, ethnic, national, transnational, and other collective identities. The relationship between institutional change and collective identity receives particular attention. The distinctive requirements of this concentration are noted in the Program of Study section below.

This concentration has its own set of requirements to be completed in addition to existing departmental requirements:

1. During their time in the program, students will take courses dealing with comparative economic institutions, comparative political institutions, and collective identities.
2. Two of the nine elective seminars required by the sociology doctoral program must include intensive study of the history or culture of a particular country or group of countries.
3. Students attend a year-long, non-credit seminar, meeting three times per quarter,

in which faculty and students present work in progress.

4. Students must demonstrate competence in a language other than English.
5. Students are expected to write doctoral dissertations dealing with changes in institutions and/or collective identities.
6. It is expected that most dissertations completed under this program will involve a field work or archival research component requiring at least six months of work in a setting other than the university.

#### **Science Studies Program**

The Graduate Program in Science Studies is a joint program of study bringing together faculty and students from the Departments of Sociology, History, and Philosophy.

Students in the program pursue a cross-disciplinary curriculum leading to dissertation research in the sociology of science, broadly conceived. Sociology faculty affiliated with this program have research interests across the broad spectrum of science studies, from the philosophy and history of science to the organization of scientific discovery and the culture of scientific work.

The requirements of the Science Studies Program are substantially the same as for the standard graduate program in sociology; however, there are some distinct curricular requirements in the first two years of the program, as well as some distinct emphases in the Qualifying Examination. A more detailed description of the Science Studies Program can be obtained by writing to: University of California, San Diego, Science Studies Program, 9500 Gilman Drive, Dept. 0104, La Jolla, CA 92093-0104.

## **COURSES**

### **LOWER-DIVISION**

#### **Soc/L 1A. The Study of Society (4)**

An introduction to the organizing themes and ideas, empirical concerns, and analytical approaches of the discipline of sociology. The course focuses on both classical and contemporary views of modern society, on the nature of community, and on inequality, with special attention to class, race, and gender. Materials include both theoretical statements and case studies. (This is a required course for the sociology major. It is normally offered fall quarter.)

#### **Soc/L 1B. The Study of Society (4)**

A continuation of Sociology/L 1A. The focus here is on socialization processes, culture, social reproduction and social control, and collective action. As in 1A, materials include both theoretical statements and case studies. While 1B may be taken as an independent course, it is recommended that students take 1A and 1B in sequence, as the latter builds on the former. (This is a required course for the sociology major. It is normally offered winter quarter.)

#### **Soc/L 10. American Society: Social Structure and Culture in the United States (4)**

An introduction to American society in historical, comparative, and contemporary perspectives. Topics will include American cultural traditions; industrialization; class structure; the welfare state; ethnic, racial, and gender relations; the changing position of religion; social movements; and political trends.

#### **Soc/L 20. Social Change in the Modern World (4)**

A survey of the major economic, political, and social forces that have shaped the contemporary world. The course will provide an introduction to theories of social change, as well as prepare the student for upper-division work in comparative-historical sociology. (This is a required course for the sociology major.)

#### **Soc/L 40. Sociology of Health Care Issues (4)**

Designed as a broad introduction to medicine as a social institution and its relationship to other institutions as well as its relation to society. It will make use of both micro and macro sociological work in this area and introduce students to sociological perspectives of contemporary health care issues.

#### **Soc/L 90. Undergraduate Seminar (1)**

This seminar will focus on a variety of current issues and special areas in the field of sociology, and will be focused in particular on students of freshman status. Content will vary from year to year. (P/NP grades only.) Prerequisite: freshman status.

### **CLUSTER A: THEORY AND METHODS**

#### **Theory**

#### **Soc/A 100. Classical Sociological Theory (4)**

Major figures and schools in sociology from the early nineteenth century onwards, including Marx, Tocqueville, Durkheim, and Weber. The objective of the course is to provide students with a background in classical social theory, and to show its relevance to contemporary sociology. Prerequisite: upper-division standing. (This is a required course for the sociology major.)

#### **Soc/A 101M. Marxism, Culture, and Politics (4)**

This course examines the writings of Marx and Engels and developments in Marxist theory since Marx (e.g., Lenin and Gramsci). It will consider philosophical presuppositions and historical contexts as well as a variety of issues in political, social, and economic theory. Prerequisite: upper-division standing.

#### **Soc/A 102. Contemporary Sociological Theory (4)**

An analysis of leading theories in sociology with an emphasis on contemporary perspectives. Theoretical approaches include functionalism, Marxism, systems analysis, and interpretive sociology. Prerequisite: upper-division standing.

#### **Soc/A 103F. Feminist Criticism and Social Theory (4)**

This course will examine recent contributions to social theory from feminist critics and scholars. Theoretical writings will be paired with empirical studies illustrating the development and application of these ideas. The central concern of these investigations will be to reconcile new theories of subjectivity and

multiple social worlds with classical understandings of society as a coherent body of practices. *Prerequisite: upper-division standing.*

**Soc/A 103T. Special Topics in Theory (4)**

Readings and discussion of particular theoretical issues in sociology. Topics will vary from year to year, depending on the current research of regular faculty or visiting faculty. Issues may include the study of a specific problem in social theory; the analysis of a particular theorist or school. *Prerequisite: upper-division standing.*

**Soc/A 120. Mind, Self, and Society (4)**

Freud's theory and its implications for the study of society. The first part of the course will focus on Freud's own theoretical project, examining first his theory of the mind; then his more comprehensive theory of personality and personality development; then his ventures into the analysis of culture, politics, and society. The second part will move on to consider the broader significance of his theory for understanding human nature and the social order; it may take into account subsequent developments in psychoanalysis, attempts by other thinkers to use and develop Freud's developments in psychoanalysis, attempts by other thinkers to use and develop Freud's ideas, alternative approaches, etc. *Prerequisite: upper-division standing.*

**Methods**

**Soc/A 103M. Computer Applications to Data Management in Sociology (4)**

The course aim is development of student skills in computer management and analysis of sociological data. This is pursued through practical experience with data produced by sociologically directed research. Students will be expected to develop competency in the analysis of such data sets, primarily by developing an extensive acquaintance with the MINI-TAB or SPSS-X statistical and data management language. *Prerequisite: upper-division standing. Will satisfy method requirement in Cluster A.*

**Soc/A 104. Field Research: Methods of Participant Observation (4)**

A basic course on the relations between sociological theory and field research. There is a strong emphasis on the theory and methods of participant observation, including a consideration of the problems of entry into field settings, recording observations, description and analysis of field data, and ethical problems in field work. Students will write a paper using these field methods. *Prerequisite: upper-division standing. Will satisfy method requirement in Cluster A.*

**Soc/A 105. Ethnographic Film (6.0)**

Ethnographic recording of field data in written and audiovisual formats. Critical assessment of ethnographies in terms of styles, format, and approaches. Midterm paper and final ethnographic videotape. *Prerequisite: Soc/L 1A, 1B, or consent of instructor. Will satisfy method requirement in Cluster A.*

**Soc/A 106. Comparative and Historical Methods (4)**

A broad-based consideration of the use of historical materials in sociological analysis, especially as this facilitates empirically oriented studies across different societies and through time, and their application in student research projects. *Prerequisite: upper-division standing. Will satisfy method requirement in Cluster A.*

**Soc/A 107. Demographic Methods (4)**

This course will teach students 1) how to measure and analyze mortality, fertility, and migration rates; 2) how these rates vary by sex, race, age, and marital status, etc.; and 3) some possible social explanations for these variations. *Prerequisite: upper-division standing. Will satisfy method requirement in Cluster A.*

**Soc/A 108A. Survey Research Design (4)**

This course covers the translation of research goals into a research design, including probability sampling, questionnaire construction, data collection (including interviewing techniques), data processing, coding, and preliminary tabulation of data. Statistical methods of analysis will be limited primarily to percentaging. *Prerequisite: upper-division standing. Will satisfy method requirement in Cluster A.*

**Soc/A 108B. Quantitative Analysis of Survey Data (4)**

This course examines the quantitative analysis of survey research data through computer-based student participation in the research process. Emphasis will be placed on index and scale construction and on univariate, bivariate, and multivariate types of analysis, including some standard descriptive and inferential statistics. *Prerequisite: upper-division standing. Will satisfy method requirement in Cluster A.*

**Soc/A 109. Analysis of Sociological Data (4)**

Students learn to test their own sociological research hypotheses using data from recent American and International social surveys and state-of-the-art computer software. The course covers application of the classical scientific method, interpretation of statistical results, and clear presentation of research findings. It is also designed to make students more informed consumers of sociological data. *Prerequisite: Social Science 60 or consent of instructor. Will satisfy method requirement for Cluster A.*

**Soc/A 109S. Special Topics in Methods (4)**

Readings and discussions of particular methodological issues in sociology. Topics will vary from year to year, depending on the current research of regular faculty or visiting faculty. *Prerequisite: upper-division standing. Will satisfy method requirement in Cluster A.*

**CLUSTER B: CULTURE, LANGUAGE, AND SOCIAL INTERACTION**

**Soc/B 111. Individual and Society (4)**

This course will cover the classic confrontation between the individual and the society, and its recent compression into social psychology. We will explore the historical change in this relation through the writings of nineteenth-century social philosophers, twentieth-century psychologists and sociologists, and several literary figures. *Prerequisite: upper-division standing.*

**Soc/B 112. Social Psychology (4)**

This course will deal with human behavior and personality development as affected by social group life. Major theories will be compared. The interaction dynamics of such substantive areas as socialization, normative and deviant behavior, learning and achievement, the social construction of the self, and the social identities will be considered. *Prerequisite: upper-division standing.*

**Soc/B 115. Language and Society (4)**

Explores relationships between forms of language and other aspects of social life focusing primarily on the United States. Emphasis on language and social identity, and language and power in everyday life and social institutions. *Prerequisite: upper-division standing.*

**Soc/B 117. Language, Culture, and Education (4)**

(Same as TEP 117.) The mutual influence of language, culture, and education will be explored; explanations of students' school successes and failures that employ linguistic and cultural variables will be considered; bilingualism; cultural transmission through education. *Prerequisite: upper-division standing.*

**Soc/B 118. Sociology of Gender (4)**

An analysis of the social, biological, and psychological components of becoming a man or a woman. The course will survey

a wide range of information in an attempt to specify what is distinctively social about gender roles and identities; i.e., to understand how a most basic part of the "self"—womanhood or manhood—is socially defined and socially learned behavior. *Prerequisite: upper-division standing.*

**Soc/B 119. Sociology of Sexuality and Sexual Identities (4)**

Introduction both to the sociological study of sexuality and to sociological perspectives in gay/lesbian studies. Examines the social construction of sexual meanings, identities, movements, and controversies; the relation of sexuality to other institutions; and the intersection of sexuality with gender, class, and race. *Prerequisite: upper-division standing.*

**Soc/B 120S. Special Topics in Culture, Language, and Social Interaction (4)**

This course will examine key issues in culture, language, and social interaction. Content will vary from year to year. *Prerequisite: upper-division standing.*

**Soc/B 127. Language, Identity and Community (4)**

This course examines the role of language in defining and marking social identity in minority and bilingual communities. This course considers the tension individuals experience between forces of status and community solidarity, the way that different societal arrangements can alter that tension, and the way it affects the meaning of language choices and the fates of minority languages and their speakers. *Prerequisite: upper-division standing.*

**Soc/B 130. Interdisciplinary Approaches to Lesbian, Gay, Bisexual and Transgender Studies (4)**

Introduction to the interdisciplinary examination of human sexuality and, especially, lesbian, gay, bisexual, and transgender identities and desires. Juxtaposes perspectives from the humanities, social sciences, and natural sciences, and introduces recent queer theory, to understand sexuality in relation to phenomena such as government, family, culture, medicine, race, gender, and class. *Prerequisite: upper-division standing.*

**Soc/B 131. Sociology of Youth (4)**

Chronological age and social status; analysis of social processes bearing upon the socialization of children and adolescents. The emergence of "youth cultures," generational succession as a cultural problem. *Prerequisite: upper-division standing.*

**Soc/B 142. Social Deviance (4)**

This course studies the major forms of behavior seen as rule violations by large segments of our society and analyzes the major theories trying to explain them, as well as processes of rule making, rule enforcing, techniques of neutralization, stigmatization and status degradation, and rule change. *Prerequisite: upper-division standing.*

**Soc/B 143. Suicide (4)**

Traditional and modern theories of suicide will be reviewed and tested. The study of suicide will be treated as one method for investigating the influence of society on the individual. *Prerequisite: upper-division standing.*

**Soc/B 145. Violence and Society (4)**

Focusing on American history, this course explores violence in the light of three major themes: struggles over citizenship and nationhood; the drawing and maintenance of racial, ethnic, and gender boundaries; and the persistence of notions of "masculinity" and its relation to violence. *Prerequisite: upper-division standing.*

**Soc/B 160. Sociology of Culture (4)**

This course will examine the concept of culture, its "dis-integration" in the twentieth century, and the repercussions on the integration of the individual. We will look at this process

from a variety of perspectives, each focusing on one cultural fragment (e.g., knowledge, literature, religion) and all suggesting various means to reunify culture and consequently the individual. *Prerequisite: upper-division standing.*

**Soc/B 162. Popular Culture (4)**

An overview of the historical development of popular culture from the early modern period to the present. Also a review of major theories explaining how popular culture reflects and/or affects patterns of social behavior. *Prerequisite: upper-division standing.*

**Soc/B 164J. Persuasion and Society (4)**

(Same as Com/Cul 174.) What is the role of messages intentionally designed to be persuasive in society? How are these messages crafted and what impact do they have? Topics will vary, but will typically include commercial advertising, public information campaigns, propaganda, public relations, and schooling. The course integrates research from sociology, social psychology, rhetoric, and communication. *Prerequisite: upper-division standing or consent of instructor.*

**Soc/B 166. Sociology of Knowledge (4)**

This course provides a general introduction to the development of the sociology of knowledge, and will explore questions concerning social determination of consciousness as well as theoretical ways to articulate a critique of ideology. *Prerequisite: upper-division standing.*

**Soc/B 167. Intellectuals and Social Problems (4)**

Sociological analysis of the intelligentsia: types of intellectual theories concerning their social role; research on the social sources of intellectual work in politics, literature, art, and science; historical considerations of intellectual milieu; international comparisons of intellectuals. *Prerequisite: upper-division standing.*

**Soc/B 172. Films and Society (4)**

An analysis of films and how they portray various aspects of American society and culture. *Prerequisite: upper-division standing.*

**Soc/B 174. Sociology of Literature (4)**

Literature will be discussed in the context of the ideas of national and regional culture, "historical situations" and "social order." Other issues to be studied are literary men and women as spokespersons and as rebels, literary movements and social conditions, and literary works as social documents. *Prerequisite: upper-division standing.*

**Soc/B 177. Sociology of Drama (4)**

This course will explore the sociological insights that can be obtained from reading examples of Western drama. Students will read selected examples of drama from ancient Greek tragedy to postmodernism. *Prerequisite: upper-division standing.*

**CLUSTER C: SOCIAL ORGANIZATION AND INSTITUTIONS**

**Soc/C 121. Economy and Society (4)**

An examination of a central concern of classical social theory; the relationship between economy and society, with special attention (theoretically and empirically) on the problem of the origins of modern capitalism. The course will investigate the role of technology and economic institutions in society; the influence of culture and politics on economic exchange, production, and consumption; the process of rationalization and the social division of labor; contemporary economic problems and the welfare state. *Prerequisite: upper-division standing.*

**Soc/C 122. Sociology of Organization (4)**

This course examines the fundamental traits of modern organizations. Both formal and informal organizational structures

are examined, with special emphasis on their macro-structural determinants as well as the behavior of people within those structures. *Prerequisite: upper-division standing.*

**Soc/C 123. Sociology of Work (4)**

A comparative analysis of work in contemporary industrial economies. Topics include: the division of labor in manufacturing and the changing structure of the working class, social and political consequences of skill and wage differentials, bureaucratization and determinants of job satisfaction, trade unions and their strategies, industrial conflict, labor movements, and the relationships between unions and political parties. *Prerequisite: upper-division standing.*

**Soc/C 125. Minorities in the Schooling Process (4)**

Using a survey format, the course will examine and critique various themes, principles, theories, and research concerning ethnic minorities in public education. The focus will be on Mexican-origin and African American students in public schools, grades K-12. *Prerequisite: upper-division standing.*

**Soc/C 126. Social Organization of Education (4)**

(Same as TEP 126.) The social organization of education in the U.S. and other societies; the functions of education for individuals and society; the structure of schools; educational decision making; educational testing; socialization and education; formal and informal education; cultural transmission. *Prerequisite: upper-division standing.*

**Soc/C 129. The Family (4)**

An examination of the family as an institution in modern and premodern societies. This course will begin with a study of the principles of kinship and then investigate the relationship of the family to social structure and social change. *Prerequisite: upper-division standing.*

**Soc/C 132. Gender and Work (4)**

Examination and analysis of empirical research and theoretical perspectives on gender and work. Special attention to occupational segregation. Other topics include: the interplay between work and family; gender, work and poverty; gender and work in the Third World. *Prerequisite: upper-division standing.*

**Soc/C 135. Medical Sociology (4)**

An inquiry into the roles of culture and social structure in mediating the health and illness experiences of individuals and groups. Topics include the social construction of illness, the relationships between patients and health professionals, and the organization of medical work. *Prerequisite: upper-division standing.*

**Soc/C 136A. Sociology of Mental Illness: An Historical Approach (4)**

An examination of the social, cultural, and political factors involved in the identification and treatment of mental illness. This course will emphasize historical material, focusing on the eighteenth, nineteenth, and early twentieth centuries. Developments in England as well as the United States will be examined from an historical perspective. *Prerequisite: upper-division standing.*

**Soc/C 136B. Sociology of Mental Illness in Contemporary Society (4)**

This course will focus on recent developments in the mental illness sector and on the contemporary sociological literature on mental illness. Developments in England as well as the United States will be examined. *Prerequisite: upper-division standing.*

**Soc/C 139. Social Inequality: Class, Race, and Gender (4)**

Massive inequality in wealth, power, and prestige is ever-present in industrial societies. In this course, causes and con-

sequences of class, gender, racial and ethnic inequality ("stratification") will be considered through examination of classical and modern social science theory and research. *Prerequisite: upper-division standing.*

**Soc/C 140. Sociology of Law (4)**

This course analyzes the functions of law in society, the social sources of legal change, social conditions affecting the administration of justice, and the role of social science in jurisprudence. *Prerequisite: upper-division standing.*

**Soc/C 141. Crime and Society (4)**

A study of the social origins of criminal law, the administration of justice, causes and patterns of criminal behavior, and the prevention and control of crime, including individual rehabilitation and institutional change, and the politics of legal, police, and correctional reform. *Prerequisite: upper-division standing.*

**Soc/C 144. Forms of Social Control (4)**

The organization, development, and mission of social control agencies in the nineteenth and twentieth centuries, with emphasis on crime and madness; agency occupations (police, psychiatrists, correctional work, etc.); theories of control movements. *Prerequisite: upper-division standing.*

**Soc/C 148. Political Sociology (4)**

Course focuses on the interaction between state and society. It discusses central concepts of political sociology (social cleavages, mobilization, the state, legitimacy), institutional characteristics, causes, and consequences of contemporary political regimes (liberal democracies, authoritarianism, communism), and processes of political change. *Prerequisite: upper-division standing.*

**Soc/C 148C. Power, Culture, and Social Revolt (4)**

This course will focus on the problem of how power is meaningfully constructed and contended by examining cases of social revolt and everyday resistance. Clarifying the concepts of hegemony and ideology will be a central concern of the course. *Prerequisite: upper-division standing.*

**Soc/C 148E. Ethnicity, Nationalism, and Politics (4)**

The sources and evolution of romantic nationalism, great power nationalism, fascism, national liberation, ethnic pride, and religious fundamentalist movements. We will focus on the recent upsurge of nationalist movements in the Soviet Union, Eastern Europe, the Middle East, but also in developed Western societies. *Prerequisite: upper-division standing.*

**Soc/C 148I. Collective Identity and Group Formation (4)**

Examines the genesis and transformation of collective identities, with particular emphasis on ethnicity. Topics include the political economy of group formation and classification, the relationship between culture and identity, and between identity and collective action. *Prerequisite: upper-division standing.*

**Soc/C 148L. Inequality and Jobs (4)**

Some people do much better than others in the world of work. Causes and consequences of this inequality will be examined: How do characteristics of individuals (e.g., class, gender, race, education, talent) and characteristics of jobs affect market outcomes? *Prerequisite: upper-division standing.*

**Soc/C 148M. Labor Market Inequality in Los Angeles and the Border Region (4)**

(Same as USP 136.) Focus on the changing labor force and occupational structure of Los Angeles and the Mexican border. We apply theoretical work to recent changes, with special attention to immigrant and minority employment, economic restructuring and changes in the international division of labor. *Prerequisite: upper-division standing or consent of instructor.*

**Soc/C 150L. The Politics of Language and Ethnicity (4)**

This course examines language politics and ethnolinguistic conflicts from a comparative, sociolinguistic perspective. It considers the nature of language variation, of ethnicity, and of political action in case studies from North America, Europe, Asia, Africa, and/or Latin America. *Prerequisite: upper-division standing.*

**Soc/C 151M. Chicanos in American Society (4)**

Survey of contemporary sociological issues affecting Mexican-origin people in the United States. Lectures and reading will be oriented toward providing a greater understanding of how key institutions in society allocate opportunities and institutional resources to different social groups. *Prerequisite: upper-division standing.*

**Soc/C 152. Social Inequality and Public Policy (4)**

(Same as USP 133.) Primary focus on understanding and analyzing poverty and public policy. Analysis of how current debates and public policy initiatives mesh with alternative social scientific explorations of poverty. *Prerequisite: upper-division standing.*

**Soc/C 156. Sociology of Religion (4)**

Diverse sociological explanations of religious ideas and religious behavior. The social consequences of different kinds of religious beliefs and religious organizations. The influence of religion upon concepts of history, the natural world, human nature, and the social order. The significance of such notions as "sacred peoples" and "sacred places." The religious-like character of certain political movements and certain sociocultural attitudes. *Prerequisite: upper-division standing.*

**Soc/C 157. Religion in Contemporary Society (4)**

Sacred texts, religious experiences, and ritual settings are explored from the perspective of sociological analysis. The types and dynamic of religious sects and institutions are examined. African and contemporary U.S. religious data provide resources for lecture and comparative analysis. *Prerequisite: upper-division standing.*

**Soc/C 159. Special Topics in Social Organizations and Institutions (4)**

Readings and discussion of particular substantive issues and research in the sociology of organizations and institutions—including such areas as population, economy, education, family, medicine, law, politics, and religion. Topics will vary from year to year. *Prerequisite: upper-division standing.*

**Soc/C 165A-B. American News Media (4-4)**

History, politics, social organization, and ideology of the American news media. 165A surveys the development of the news media as an institution, from earliest newspapers to modern mass news media. 165B deals with special topics, including the nature of television news, with methods of news media research, and requires a research paper. *Prerequisite: Soc/L 1A or consent of instructor; Soc/C 165B requires Soc/C 165A.*

**Soc/C 168E. Sociology of Science (4)**

A survey of theoretical and empirical studies concerning the workings of the scientific community and its relations with the wider society. Special attention will be given to the institutionalization of the scientific role and to the social constitution of scientific knowledge. *Prerequisite: upper-division standing.*

**Soc/C 168J. Scientific and Technological Controversies in Contemporary American Society (4)**

The course will introduce the students to the basic tools of sociology of science and technology; how can science in action be followed? How can scientific controversies be mapped and analyzed? How can we analyze the technical artifacts we live with? *Prerequisite: upper-division standing.*

**Soc/C 168S. The Making of the Scientist (4)**

A social, historical, and sociological survey of the development of the scientist's role from the Renaissance to the early twentieth century, assessing changing historical connections between scientists' views of nature and the status perceived value of the scientific role. *Prerequisite: upper-division standing.*

**Soc/C 168T. Sociology of Technology (4)**

An introduction to classic and recent sociological perspectives on technology, giving special attention to the relations between technology and science, technology and work, and technology and politics. *Prerequisite: upper-division standing.*

**Soc/C 180. Social Movements and Social Protest (4)**

An examination of the nature of protests and violence, particularly as they occur in the context of larger social movements. The course will further examine those generic facets of social movements having to do with their genesis, characteristic forms of development, relationship to established political configurations, and gradual fading away. *Prerequisite: upper-division standing.*

**CLUSTER D: COMPARATIVE AND HISTORICAL SOCIOLOGY****Soc/D 120W. Gender and Development (4)**

The purpose of this course is to examine the status of women in various parts of the world. Several cultures will be compared. Attention will be paid to the influence of cultural, sociopolitical, and economic factors on gender inequality. Women's roles in society, the community, and the family will be discussed. *Prerequisite: upper-division standing.*

**Soc/D 120XL. Foreign Language Discussion Section (1)**

Students will exercise language skills to read and discuss materials in Soc/D 120W. *Prerequisite: must be coregistered with Soc/D 120W.*

**Soc/D 133. Comparative Sex Stratification (4)**

Utilizing a new theory of factors affecting female status, we examine topics including women in evolutionary perspective. Third World women and modernization; women's changing position in the USSR, Israeli kibbutz, and especially the United States and the political economy of sex stratification. *Prerequisite: upper-division standing.*

**Soc/D 133XL. Foreign Language Discussion Section (4)**

Students will exercise advanced foreign language skills to discuss materials in the correspondingly numbered English language foreign area course. This section is taught by the course professor, has no final and does not affect the grade in parent course (Soc/D 133).

**Soc/D 151. Comparative Race and Ethnic Relations (4)**

An historical and comparative analysis of race and ethnic relations in various national settings, with emphasis on the United States. The course will analyze the origins of ethnic stratification systems, their maintenance, the adaptation of minority communities, and the role of reform and revolutionary movements and government policies in promoting civil rights and social change. *Prerequisite: upper-division standing.*

**Soc/D 158. Islam in the Modern World (4)**

The role of Islam in the society, culture, and politics of the Muslim people during the nineteenth and twentieth centuries; attempts by Muslim thinkers to accommodate or reject rival ideologies (such as nationalism and socialism); and a critical review of the relationship between Islam and the West. *Prerequisite: upper-division standing or consent of instructor.*

**Soc/D 158J. Religion and Ethics in China and Japan (4)**

This course examines religious traditions of China and Japan. It explores the relationship between religious ideas and practices on the one hand, and issues of social and individual ethics and morality on the other. *Prerequisite: upper-division standing.*

**Soc/D 169. Citizenship, Community, and Culture (4)**

Will survey the alternative views on the construction of the modern citizen and alternative views of society. *Prerequisite: upper-division standing.*

**Soc/D 178. The Holocaust (4)**

The study of the unique and universal aspects of the Holocaust. Special attention will be paid to the nature of discrimination and racism, those aspects of modernity that make genocide possible, the relationship among the perpetrators, the victims and the bystanders, and the teaching, memory, and denial of the Holocaust. *Prerequisite: upper-division standing.*

**Soc/D 179. Social Change (4)**

Course focuses on the development of capitalism as a worldwide process, with emphasis on its social and political consequences. Topics include: precapitalist societies, the rise of capitalism in the West, and the social and political responses to its expansion elsewhere. *Prerequisite: upper-division standing.*

**Soc/D 181. Modern Western Society (4)**

This course examines the nature and dynamics of modern Western society in the context of the historical process by which this type of society has emerged over the last several centuries. The aim of the course is to help students think about what kind of society they live in, what makes it the way it is, and how it shapes their lives. *Prerequisite: upper-division standing.*

**Soc/D 181I. The Sociology of Indian-White Relations (4)**

(Same as Ethn 115) Examines historical and contemporary relations between Native American societies and the United States. Pays particular attention to transformation in Indian collective identities, political power, and collective action, and to current political and economic issues. *Prerequisite: upper-division standing.*

**Soc/D 182. Revolutions (4)**

An historical and comparative analysis of a selected set of modern political revolutions. Review and criticism of social class interpretations of revolutions. The role of revolutions in redefining the moral terms of social life. *Prerequisite: upper-division standing.*

**Soc/D 183S. Post-Communist Societies (4)**

Theories of social transformation will be applied to the fundamental changes taking place in eastern Europe, the Soviet Union, China, and socialist countries in the Third World. Through comparing different countries, the course will discuss the causes and consequences of social, economic, and political change. *Prerequisite: upper-division standing.*

**Soc/D 184. Societal Evolution and Economic Development (4)**

This course will examine agricultural societies at different evolutionary levels of technological and societal complexity, ranging from hunting-gathering bands with incipient agriculture to traditional agrarian empires. We shall explore the impact of change, modernization, and the world economy on contemporary rural societies, especially Third World underdeveloped areas. *Prerequisite: upper-division standing.*

**Soc/D 185. Sociology of Development (4)**

Course examines conditions in the developing world since WWII. Viewing social development as more than a matter of

sheer economic growth, course focuses on social changes and on the satisfaction of human needs. Emphasis is placed on the connections between historical/global contexts and various development strategies. *Prerequisite: upper-division standing.*

**Soc/D 185XL. Foreign Language Discussion Section (1)**

Students will exercise advanced foreign language skills to discuss materials in Spanish in the correspondingly numbered English language foreign area course. This section is taught by the course instructor/professor; has no final exam and does not affect grade in parent course. *Prerequisite: must be coregistered with Soc/D 185.*

**Soc/D 186P. Peasants and Farmers in Society (4)**

Peasants are still a majority of the population in many developing areas of the world. With modernization, they have undergone processes of rapid transformation, taken part in social and national revolutions, and have become a target group in the developmental policies of state and international institutions. This course will explore conceptual issues in the economic and social characterization of the peasantry, the ways in which peasant groups are incorporated in broader societies, and some recent themes in peasant culture and political participation. *Prerequisite: upper-division standing.*

**Soc/D 187. African Societies through Film (4)**

Exploration of contemporary African urbanization and social change via film, including 1) transitional African communities, 2) social change in Africa, 3) Western vs. African filmmakers' cultural codes. Ideological and ethnographic representations, aesthetics, social relations, and market demand for African films are analyzed. *Prerequisite: upper-division standing.*

**Soc/D 187S. The Sixties (4)**

A sociological examination of the era of the 1960s in America, its social and political movements, its cultural expressions, and debates over its significance, including those reflected in video documentaries. Comparisons will also be drawn with events in other countries. *Prerequisites: upper-division standing.*

**Soc/D 188A. Community and Social Change in Africa (4)**

The process of social change in African communities, with emphasis on changing ways of seeing the world and the effects of religion and political philosophies of social change. The methods and data used in various village and community studies in Africa will be critically examined. *Prerequisite: upper-division standing.*

**Soc/D 188B. Chinese Society (4)**

The social structure of the People's Republic of China since 1949, including a consideration of social organization at various levels: the economy, the policy, the community, and kinship institutions. *Prerequisite: upper-division standing.*

**Soc/D 188D. Latin America: Society and Politics (4)**

Course focuses on the different types of social structures and political systems in Latin America. Topics include positions in the world economy, varieties of class structure and ethnic cleavages, political regimes, mobilization and legitimacy, class alignments, reform and revolution. *Prerequisite: upper-division standing.*

**Soc/D 188E. Soviet Society (4)**

Social change in the USSR since 1917. The attempt to create the world's first socialist society will be examined through a consideration of changing patterns of culture, politics, economics, and ethnic relations. *Prerequisite: upper-division standing.*

**Soc/D 188G. Policemen, Businessmen, and Students: Japanese Organizational Cultures (4)**

This course examines Japanese cultural values and social relations in the context of contemporary organizations. The focus will be on the integration of individuals into organizations and on the integration of organizations into society. *Prerequisite: upper-division standing.*

**Soc/D 188I. Eastern European Societies (4)**

This course focuses on Eastern European societies. The topics to be covered include the transition from feudalism to capitalism, the rise of the modern state, nationalism, ethnicity, leftist and rightist revolutionary movements, and the transition to socialism. *Prerequisite: upper-division standing.*

**Soc/D 188J. Change in Modern South Africa (4)**

Why does the authoritarian racial state in South Africa remain so resilient despite the growing commitment to transform it? The course portrays racial domination as a system of powerful but unstable interests rooted in South Africa's racially repressive labor market. *Prerequisite: upper-division standing.*

**Soc/D 188K. American Society (4)**

Comparative and historical perspectives on U.S. society. The course highlights "American exceptionalism: did America follow a special historical path, different from comparable nations in its social relations, politics, and culture? Specific topics include class relations, race, religion, and social policy. *Prerequisite: upper-division standing.*

**Soc/D 188N. Modern Jewish Societies (4)**

The contradictory impact of civil emancipation, economic modernization, and religious reformation on the traditional Jewish society in Western and Eastern Europe. An examination of the various Jewish responses to modernity. The resurgence of anti-semitism and the Holocaust. The dual centers of Jewish life in the U.S. and Israel. *Prerequisite: upper-division standing.*

**Soc/D 188O. Dilemmas of Israeli Society (4)**

The history of Jewish settlement in Palestine and the Israeli-Palestinian conflict. Analysis of the cleavages between secular and religious, Eastern European and Middle Eastern, Jewish and Arab citizens. The peace process, the settlers, and Israeli integration into the Middle East. *Prerequisite: upper-division standing.*

**Soc/D 188XL. Foreign Language Discussion Section (1)**

Students will exercise advanced foreign language skills to discuss materials in the correspondingly numbered English language foreign area course. *Prerequisite: must be coregistered with parent course.*

**Soc/D 189. Special Topics in Comparative-Historical Sociology (4)**

Readings and discussion in selected areas of comparative and historical macro-sociology. Topics may include the analysis of a particular research problem, the study of a specific society or of cross-national institutions, and the review of different theoretical perspectives. Contents will vary from year to year. *Prerequisite: upper-division standing.*

**CLUSTER E: INDEPENDENT RESEARCH AND HONORS PROGRAM**

**Soc/E 190. Senior Seminar (4)**

A research seminar in special topics of interest to available staff; provides majors and minors in sociology with research experience in close cooperation with faculty. *Prerequisite: senior standing.*

**Soc/E 196A. Honors Seminar: Advanced Studies in Sociology (4)**

This seminar will permit honors students to explore advanced issues in the field of sociology. It will also provide honors students the opportunity to develop a senior thesis proposal on a topic of their choice and begin preliminary work on the honors thesis under faculty supervision. *Prerequisite: acceptance into Department of Sociology Honors Program.*

**Soc/E 196B. Honors Seminar: Supervised Thesis Research (4)**

This seminar will provide honors candidates the opportunity to complete research on and preparation of a senior honors thesis under close faculty supervision. *Prerequisite: completion of Soc/E 196A.*

**Soc/E 197. Instructional Assistance and Research in Field Methods (4)**

While fulfilling apprentice-level instructional tasks as peer advisers in the Field Research Methods course (Soc/A 104), students will conduct their own research on selected issues/problems faced by field researchers. Instructional and research activities will be closely supervised by the course instructor. *Prerequisites: 3.5 in sociology, having excelled in Soc/A 104 (A or A+ grade); consent of course instructor; approval of sociology department chair.*

**Soc/E 198. Directed Group Study (4)**

Group study of specific topics under the direction of an interested faculty member. Enrollment will be limited to a small group of students who have developed their topic and secured appropriate approval from the departmental committee on independent and group studies. These studies are to be conducted only in areas not covered in regular sociology courses. *Prerequisites: junior standing and departmental approval required.*

**Soc/E 199. Independent Study (2 or 4)**

Tutorial: individual study under the direction of an interested faculty member in an area not covered by the present course offerings. Approval must be secured from the departmental committee on independent studies. *Prerequisites: junior standing and departmental approval required.*

**GRADUATE**

**Soc/G 201A. Classical Sociological Theory I (4)**

A discussion of major themes in the work of Tocqueville and Marx. *Prerequisite: graduate standing in sociology.*

**Soc/G 201B. Classical Sociological Theory II (4)**

A discussion of major themes in the work of Weber and Durkheim. *Prerequisite: graduate standing in sociology.*

**Soc/G 202. Contemporary Sociological Theory (4)**

An analysis of major works in, or influencing, contemporary sociological theory in Europe and America. *Prerequisite: graduate standing in sociology.*

**Soc/G 203. Field Methods (4)**

Research will be conducted in field settings. The primary focus will be on mastering the problems and technical skills associated with the conduct of ethnographic and participant observational studies. *Prerequisite: graduate standing in sociology.*

**Soc/G 204. Text and Discourse Analysis (4)**

Techniques of gathering and analyzing transcripts of naturally occurring conversations, interviews, discourse in institutional settings, public political discourse, and text of historical materials. *Prerequisite: graduate standing in sociology.*

**Soc/G 205. Survey and Demographic Methods I (4)**

This course covers some of the elementary techniques used 1) to select random samples, 2) to detect statistical patterns in the sample data, and 3) to determine whether any patterns found in sample data are statistically significant. The course also stresses the benefits and drawbacks of survey and demographic data and some common ways in which these data are used incorrectly. *Prerequisite: graduate standing in sociology.*



**Soc/G 206. Survey and Demographic Methods II (4)**

The course covers some of the more advanced techniques used 1) to select random samples, 2) to detect statistical patterns in the sample data, and 3) to determine whether any patterns found in sample data are statistically significant. The course also stresses the benefits and drawbacks of survey and demographic data and some common ways in which these data are used incorrectly. *Prerequisite: graduate standing in sociology.*

**Soc/G 207. Comparative-Historical Methods (4)**

A broad-based consideration of the use of historical materials in sociological analysis, especially as this facilitates empirically oriented studies across different societies and through time. *Prerequisite: graduate standing in sociology.*

**Soc/G 208A-B-C. Faculty Research Seminar I, II, and III (1-1-1)**

An introduction for entering graduate students to the range and variety of research and scholarly interests of the department's faculty. Through this introduction students will be better able to relate their own research interests and professional objectives to the ongoing work of faculty. *Prerequisite: graduate standing in sociology. (SU grades only.)*

**Soc/G 209A-B. Sociological Analysis (4-4)**

Students are introduced to exemplary models of sociological research. Exemplars of participant observation, text and discourse analysis, and historical analysis will be the focus of attention. Issues in gathering materials, analyzing data, interpreting results, reporting findings will be discussed. *Prerequisite: graduate standing in sociology.*

**Soc/G 212. Social Stratification (4)**

The causes and effects of social ranking in various societies. Theories of stratification; the dynamics of informal social grouping; determinants of institutional power, and the nature of struggles for power; the distribution of wealth and its causes; the dynamics of social mobility; the effects of stratification on life-styles, culture, and deviance. *Prerequisite: graduate standing in sociology.*

**Soc/G 213. Popular Culture (4)**

The purpose of the course is two-fold: 1) to introduce students to a variety of theoretical perspectives on issues central to studies of popular culture, and 2) to survey disciplines outside of the field of sociology that have been contributing to the enormous intellectual growth of popular culture studies. In the first half of the course, the class will discuss a range of selected readings devoted to the role of class, gender, politics, and language in popular culture. In the second half, the class will read a set of books from anthropology, literature, psychology, history, and American studies that help to illustrate the broad interdisciplinary nature of popular culture studies.

**Soc/G 216. Sociology of Culture (4)**

The history of the concept of culture; cultural pluralism in advanced industrialized societies; the differentiation of cultural institutions; cultural policy and social structure; culture as a property of social groups; conflict and accommodation over efforts to change and sustain traditional culture.

**Soc/G 217. Globalization, Culture, and Everyday Life (4)**

This course explores the cultural, economic, and political processes which constitute globalization. Particular emphasis will be placed on understanding how consciousness and daily life practices are formed and transformed in a globalizing world. *Prerequisite: graduate standing in sociology.*

**Soc/G 221. Current Perspectives on the Sociology and Philosophy of Science (4)**

This graduate seminar will systematically address the two related and symmetric questions: how can we label in philosophical terms the various brands of modern sociologies of science? How can we empirically define in sociological terms the various schools of contemporary philosophy of science?

**Soc/G 222. Social Movements (4)**

An examination of theories accounting for the causes and consequences of social movements, including a discussion of the strengths and weaknesses of such theories for understanding historically specific revolutions, rebellions, and violent and non-violent forms of protest in various parts of the world.

**Soc/G 223. Identity and Action (4)**

This seminar is about collective identity and the role it plays in collective action. Central topics include processes of group formation; the dynamics of collective identity; culture and identity; collective memory. Readings include both theoretical and case materials. *Prerequisite: graduate standing.*

**Soc/G 225. Madness and Society (4)**

An examination of the historical and sociological literatures on the relationship between madness and society, focusing primarily on the United States and Great Britain, but with some comparative reference to Western Europe.

**Soc/G 226. Political Sociology (4)**

This course discusses the relationship between state and society in a comparative perspective. The focus is on the interaction among states, domestic economic elites, and external economic and political processes in the determination of different developmental paths. Analytically, it includes topics such as characteristics and functions of the state in different types of society throughout history (with an emphasis on the varieties of capitalist and socialist state), the autonomy of the state and its causes in different settings, and developmental and predatory consequences of state activity. Readings will include both theoretical and empirical materials, the latter dealing mostly with nineteenth- and twentieth-century Europe and twentieth-century Latin America.

**Soc/G 227. Ethnographic Film (6)**

Ethnographic recording of field data in written and audiovisual formats. Critical assessment of ethnographies in terms of styles, formats, and approaches. *Prerequisites: graduate standing/Soc/L 1A, 1B or consent of instructor.*

**Soc/G 236. Contemporary Topics in the Sociology of Science (4)**

This seminar will cover current books and theoretical issues in the sociology of science. Topics will vary from year to year. This course may be repeated for credit.

**Soc/G 238. Survey of the Sociology of Scientific Knowledge (4)**

An introduction to enduring topics in the sociology of scientific knowledge and to resources for addressing them. Attention is drawn to problems of accounting for scientific order and change recurrent debates over proper method for sociological accounts of science.

**Soc/G 239. Race/Ethnicity, Gender and Labor Markets (4)**

Exploration and analysis of the operation of race/ethnicity and gender in the U.S. labor market. Emphasis on understanding inequality in: labor force participation, unemployment, wage inequities, and occupational locations.

**Soc/G 243. Sociology of Social Control (4)**

An examination of the sociological literature on social control, looking at theoretical developments over time, and examining the contemporary literature dealing with social control in historical and comparative perspective.

**Soc/G 245. Graduate Seminar in Gender and Work (4)**

Examination and analysis of empirical research and alternative theoretical perspectives on gender and work. Special attention to occupational segregation. Other topics include the interplay between work and family; gender, work and poverty; gender and work in the third world. *Prerequisite: graduate standing in sociology.*

**Soc/G 248. Latin American Societies: Social Classes and State Policies in a Comparative Perspective (4)**

(Same as IP/GEN 474.) Focuses on class structures, political mobilization, and government policies (economic and social policies in particular) in selected South American countries. Special attention will be given to the interaction between domestic and external economic and political processes. *Prerequisite: graduate standing.*

**Soc/G 251. The Politics of Representation (4)**

We examine how power is expressed through discourse, including situations in which significant contests over the meaning of events have been waged, the discourse strategies used to achieve the preferred definition of such situations, and the conventions which emerge from these contests.

**Soc/G 255A. Introduction to Science Studies (4)**

(Same as Phil. 209A and HIGR 238.) Study and discussion of classic work in history of science, sociology of science, and philosophy of science, and of work that attempts to develop a unified science studies approach. Required for all students in the Science Studies Program. *Prerequisite: enrollment in Science Studies Program.*

**Soc/G 255B. Seminar in Science Studies (4)**

(Same as Phil. 209B and HIGR 239.) Study and discussion of selected topics in the science studies field. Required for all students in the Science Studies Program. *Prerequisite: enrollment in Science Studies Program.*

**Soc/G 255C. Colloquium in Science Studies (4)**

(Same as Phil. 209C and HIGR 240.) A forum for the presentation and discussion of research in progress in science studies, by graduate students, faculty, and visitors. Required of all students in the Science Studies Program. *Prerequisite: enrollment in the Science Studies Program.*

**Soc/G 260. Sociology of Religion (4)**

The seminar will examine in detail one or two major issues in the anthropology of religion, as for example a theoretical problem like secularization and social change or a more substantive one like shamanism. Students will be notified in advance regarding the seminar topic. *Prerequisite: graduate standing in sociology.*

**Soc/G 261. Nationalism and Its Discontents (4)**

The rise and spread of nationalist movements, their preconditions, carrier groups, and ideologies from the French Revolution through the disintegration of the USSR. A survey of the major theoretical frameworks and an examination of their blind spots and exaggerations. *Prerequisite: graduate standing.*

**Soc/G 263. Graduate Seminar in the Sociology of Art (4)**

This seminar explores the production and interpretation of art forms in cross-cultural context. Processes of symbolic and economic exchange in art worlds will be examined from sociological and semiotic perspectives. Contemporary and popular art forms will be analyzed as types of cultural reproduction. *Prerequisite: graduate standing in sociology.*

**Soc/G 265. Comparative Social Policy (4)**

(Same as IP/Gen 453/253.) A macrosociological perspective with an empirical focus on social security, health, welfare, and labor market policies. Examines different national contexts to understand the variety of policy forms, factors that support alternative policy choices, and the role of both public and private sectors. *Prerequisite: graduate standing or consent of instructor.*

**Soc/G 266. Dissertation Seminar (2)**

Year-long seminar for presentation and discussion of dissertation work in progress. *Prerequisite: graduate standing in sociology.*



## Spanish Literature

See Literature.

## Subject A

For information about satisfying the Subject A requirement, especially prior to enrollment, please refer to "Subject A: English Composition" in the catalog section, "Academic Regulations."

Students who have not satisfied the Subject A requirement before enrolling at UCSD must satisfy the requirement by achieving a grade of C or better in SDCC 1 (English Composition-Subject A) and by passing the Subject A Exit Examination given at the end of SDCC 1. That examination is administered by the Subject A Program office. Students must enroll in SDCC 1 (or ESL) during the first quarter of residence at UCSD. SDCC 1 is a Mesa College course taught at UCSD as part of a cooperative program with the San Diego Community College District.

Under Academic Senate regulations, SDCC 1 cannot be counted towards graduation requirements; however, the course units do count as workload credit towards the minimum progress requirement and eligibility for financial assistance.

For further information about the Subject A requirement or the Proficiency Test, please visit the Subject A Program office, 3232 Literature Building, or call (619) 534-6177.

## Teacher Education Program

OFFICE: Building 517A, Roosevelt College

### Professors

Michael Cole, Ph.D., *Professor of Psychology and Communication*  
 Hugh Mehan, Ph.D., *Professor of Sociology, Program Co-Director; Academic Senate Distinguished Teaching Award*

### Soc/G 267. Sociology of Gender (4)

Course examines social construction of gender focusing on recent contributions to the field, including micro- and macro-level topics, i.e., social psychological issues in the development of gender, gender stratification in the labor force, gender and social protest, feminist methodologies. *Prerequisite: graduate standing.*

### Soc/G 269. The Citizenship Debates (4)

Will examine the controversies surrounding the construction of the modern citizen and the good society of the liberal outlook, and their alternatives in the communitarian, social-democratic, nationalist, feminist, and multiculturalist perspectives. *Prerequisite: graduate standing in sociology.*

### Soc/G 270. The Sociology of Education (4)

A consideration of the major theories of schooling and society, including functionalist, conflict, critical and interactional; selected topics in the sociology of education will be addressed in a given quarter, including the debate over inequality, social selection, cultural reproduction and the transition of knowledge, the cognitive and economic consequences of education. Major research methods will be discussed and critiqued. *Prerequisite: graduate standing in sociology.*

### Soc/G 272. Sociology of Language and Culture (4)

Examination of different models of the relationship among social, cultural, and linguistic structures. Focus on selected problems, e.g., language ideology, discursive construction of social relations; language in institutions of power, gender or ethnic relations; intercultural communication. *Prerequisite: graduate standing.*

### Soc/G 275. Computer Analysis of Large Data Sets (4)

Students will learn skills needed to create, modify, store, transmit, and analyze large data sets on mainframe and on personal computers. UNIX, DOS, and SPSS-X will be emphasized, with other computer skills taught as needed.

### Soc/G 276. Theories of Social Transformation (4)

The course surveys comparative theories of large-scale, historical transformations and the role of human agency in epochal change. Substantive issues examined include transitions to a market economy, the emergence of democracy, the demise of racial states, the collapse of communist regimes, and the fall of authoritarian dictatorships. *Prerequisite: graduate standing.*

### Soc/G 280. Sociological Writing (4)

This seminar involves (1) reading and discussion on how to write sociology with clarity, precision, and rhetorical force, and (2) close, line-by-line criticism and editing of student papers. At the beginning of the quarter, each student must submit a paper he or she has recently written. At the end of the quarter, it will have been re-written in light of the discussion of it in the seminar.

### Soc/G 282. Immigration and Citizen (4)

Alternative theories of the relations of immigrants and host societies, and an examination on the debates on, and dynamic of, immigration expansion and restriction. Comparison of the bearing of liberal, communitarian, and ethnic citizenship discourses on the inclusion and exclusion of immigrants and their descendants. *Prerequisite: graduate standing in sociology.*

### Soc/G 290. Graduate Seminar (4)

A research seminar in special topics of interest to available staff, provides majors and minors in sociology with research experience in close cooperation with faculty. (S/U grades permitted.) *Prerequisite: graduate standing in sociology.*

### Soc/G 298. Independent Study (1-8)

Tutorial individual guides study and/or independent research in an area not covered by present course offerings. (S/U grades only.) *Prerequisite: graduate standing in sociology.*

### Soc/G 299. Thesis Research (1-12)

Open to graduate students engaged in thesis research. (S/U grades only.) *Prerequisite: graduate standing in sociology.*

### Soc/G 500. Apprentice Teaching (2-4)

Supervised teaching in lower-division contact classes, supplemented by seminar on methods in teaching sociology. (S/U grades only.) *Prerequisite: graduate standing in sociology.*

## Space Science and Engineering

OFFICE: Revelle Commons T100, Room 101, Revelle College

The space science and engineering minor is a focused set of six upper-division courses open to students with junior standing in one of the following departments: AMES, chemistry, CSE, ECE, or physics. Other students with suitable chemistry, physics, and mathematics preparation may also pursue the minor.

The minor has three objectives. It is designed to offer an appropriate preparation for careers in space research and technology, with transcript notation of such a concentration of use to students. The minor can help balance strongly focussed departmental offerings with a broader interdisciplinary approach that can foster interdepartmental activities beneficial to students. Finally such a minor contributes to the preservation and renewal of the broad, interdisciplinary style which has distinguished UCSD from other leading research universities.

### Curriculum

The minor consists of two required courses, Space Science (AMES 144A) and Space Engineering (AMES 144B), plus four electives to be chosen from a list of courses with the approval of an adviser. The present list of electives includes:

- AMES 137, Aerospace Structural Analysis
- Chem. 170, Cosmochemistry
- ECE 120, Solar System Physics
- ECE 166, Microwave Systems and Circuits (extensive prerequisites, lab component)
- Physics 160, Stellar Astrophysics
- Physics 161, Galaxy and The Interstellar Medium
- Physics 162, Galaxies and Cosmology

### Associate Professors

Barbara Tomlinson, Ph.D., *Associate Professor of Literature*

Kathryn A. Woolard, Ph.D., *Associate Professor of Sociology*

### Assistant Professors

Ricardo Stanton Salazar, Ph.D., *Assistant Professor of Sociology*

Olga Vasquez, Ph.D., *Assistant Professor of Communication*

### Lecturers SOE

Tom Humphries, Ph.D., *Lecturer, Teacher Education*

Paula F. Levin, Ph.D., *Graduate Adviser and Lecturer, Teacher Education*

Randall Souviney, Ph.D., *Program Co-Director, Senior Lecturer, Teacher Education*

### Lecturers

Bobbie Allen, M.A., *Lecturer, Supervisor, Teacher Education*

Joan Commons, M.A., *Lecturer, Supervisor, Teacher Education*

Winfield Cooper, Ph.D., *Lecturer, Supervisor, Teacher Education*

Cheryl Forbes, M.A., *Lecturer, Supervisor, Teacher Education*

Caren Holtzman, M.A., *Lecturer, Supervisor, Teacher Education*

Beatrice Pita, Ph.D., *Lecturer, Literature*

José Alfonso Smith, M.S., *Lecturer, Supervisor, Teacher Education*

Daryl Stermon, M.A., *Lecturer, Supervisor, Teacher Education*

Patrick Velasquez, Ph.D., *Director, OASIS, Lecturer, Supervisor, Teacher Education*

Irene Villanueva, Ph.D., *Lecturer, Supervisor, Teacher Education*

The Teacher Education Program (TEP) at UCSD offers the California Multiple Subject Teaching Credential for elementary school teachers, the Single Subject Credential in English, mathematics, biology, chemistry, geosciences, and physics for secondary school teachers, the Master of Arts in teaching and learning with an emphasis in curriculum design, the Master of Arts in deaf education and a minor in education. All TEP credentials have the Cross-cultural, Language and Academic Development (CLAD) emphasis, and the option of

the Bilingual Cross-cultural, Language and Academic Development (BCLAD) in Spanish.

A primary focus of the Teacher Education Program is multicultural education. We require candidates to master the subject matter that they will teach and develop a repertoire of teaching practices which use their students' cultural knowledge and language as educational resources.

Teacher candidates in both the Multiple Subject and Single Subject credential programs can complete a preliminary or a professional clear credential at UCSD.

### Admissions Process

The admissions process for the Multiple Subject and Single Subject Credential programs is similar: (1) Students complete the prerequisites to the credential program (please contact the TEP Office for more information on the prerequisite program) and (2) students apply for admission to the Professional Preparation component of the credential program. The application deadline for the Multiple Subject and Single Subject Credential Programs is **April 1**, to start work in the following academic year. The application deadline for the multiple subject prerequisite component offered as a summer intensive option is **March 1**.

Applicants interested in financial aid should complete the FAFSA application by March 2, and contact Graduate Student Financial Services at (619) 534-3807.

Each applicant is carefully reviewed for admission by a committee composed of faculty and local public school educators, including TEP graduates. The selection committee ensures that applicants have completed the requirements for admission described below and evaluates each applicant on the basis of the following criteria:

1. A strong interest in multicultural approaches to education; a strong desire to improve the quality of American education; a strong desire to develop self-activated learners;
2. Experience working with children in educational environments, especially with students from diverse backgrounds;
3. Participation in public service activities;
4. Academic excellence in their undergraduate and graduate studies.

More information about the entire application process is available in an instruction packet available from the TEP office. Students are encouraged to contact TEP as soon as they are interested in pursuing a teaching career.

### The Multiple Subject Credential Program (for teaching grades K-6)

#### Prerequisites

The Multiple Subject Credential Program prepares students to teach in grades K through 6 in California public schools. Before admission to the Multiple Subject Credential Teaching Program, students must complete the following requirements.

#### Bachelors Degree

A B.A. or B.S. from UCSD or a B.A. or B.S. from another University of California campus, or a B.A. or B.S. from another university with a major field of study equivalent to one offered at UCSD is required. Some majors are *not* acceptable, including business, education, liberal studies, marketing and recreation. A 3.0 cumulative GPA is required.

#### Subject Matter Preparation

This requirement is satisfied by *either* (a) passing the Multiple Subject Assessment for Teachers (MSAT) test *or* (b) completing the subject matter program for the multiple subject credential. (Please contact the TEP office for more information about the subject matter program.)

#### The California Basic Educational Skills Test (CBEST)

This requirement is satisfied by passing the CBEST. Contact the TEP office for information about test dates.

#### U.S. Constitution Requirement

This requirement is satisfied by *either* (a) completing a course studying the provisions and principles of the U.S. Constitution *or* (b) passing the U.S. Constitution Exam offered through University Extension or the County Office of Education. (Contact the TEP office for information about test dates).

### Educational Foundations Courses

Students must complete the following courses with grades of B or higher:

**Practicum in Learning.** TEP 128 A-B-C (*Practicum in Learning*). TEP 130 (*Public Service: Practicum in Learning*) may substitute for TEP 128A with instructor approval.

**Child Development.** One of the following courses or its equivalent: TEP 115 (*Child Development and Education*), TEP 114 (*Cognitive Development and Interactive Computing Environments*), ANGN 180 (*The Culture of Children*), HDP 1 (*Introduction to Human Development*), Cog Sci 154 (*Communication Disorders in Children and Adults*), Com/HIP 116 (*Practicum in Child Development*), Psychology 7 (*General Psychology: Developmental Psychology*), Psychology 101 (*Introduction to Developmental Psychology*), or TEP 116 (*The Psychology of Teaching and Structure of Information for Human Learning*). TEP 115 is recommended.

**Language and Culture.** One of the following courses or its equivalent: Soc./TEP 117 (*Language, Culture, and Education*), or Com/HIP 122A or 122B (*Communication and the Community*), Com/HIP 114 (*Bilingual Communication*), Ethnic Studies 140 (*Language and American Ethnicity*), or Ethnic Studies 141 (*Language and Culture*).

**The Social Organization of Schools.** One of the following courses or its equivalent: Soc./TEP 126 (*Social Organization of Education*) or TEP 125 (*History, Politics and Theory of Bilingual Education*), or Soc. 125 (*Minorities in the Schooling Process*) or Soc. 150L (*The Politics of Language and Ethnicity*). (BCLAD students must take TEP 125.)

### Sensitivity to Second Language Learning and Acquisition

This requirement can be fulfilled by either (a) completing nine quarter units of course work at the college level (or equivalent) in a language which is not the applicant's native language or (b) completion of three years of secondary school course work in a language other than English. The course work must be taken in grades 9-12, with at least a B average or (c) demonstrating an equivalent experience in a second language situation. "Equivalent experience" is defined as a prolonged period in which

the applicant lived in a country where the language spoken was not native and where the applicant was continuously required to speak that language (e.g. the Peace Corps), an extended experience in the applicant's native country where she/he was immersed in a multilingual community or the applicant was raised as a native speaker in a multilingual community. (Contact the TEP office for more information).

### Additional Prerequisites for the BCLAD Emphasis in Spanish

The BCLAD Emphasis Credential is designed for students who can teach in Spanish and English. In addition to the requirements for admission to the CLAD credential described above, students interested in applying for admission to the BCLAD program must demonstrate:

**Spanish Language Fluency:** This requirement is satisfied by (a) completing two Spanish literature courses, at least one of which must be upper division in either Latin American or Chicano literature and b) completing the Spanish Language Assessment with an FSI score of at least 3. (Contact TEP in January prior to your application to schedule this test).

**Cultural Knowledge.** This requirement is satisfied by completing one history course and one culture course about Chicano or Latin American topics.

### Professional Preparation

After students complete the prerequisites described above, they apply to the program, as described above. Upon acceptance, teacher candidates complete the professional preparation activities which lead to the award of the Multiple Subject credential.

The professional preparation component of the Multiple Subject credential consists of five courses and fifteen weeks of student teaching in elementary school classrooms.

The professional preparation courses are:

TEP 150: *Multicultural Education*

TEP 151: *Teaching the English Language Learner*

TEP 161 ABC: *Innovative Instructional Practices*

Pre-Student Teaching is offered in winter as TEP 190 (3.0 units). Student Teaching is offered in winter and spring quarters as TEP 169A, 169B (9.0-9.0 units)(*Practicum in Student Teaching*).

### Additional Requirements for BCLAD Candidates

Students pursuing the BCLAD emphasis in Spanish must also take TEP 152A-B (*Bilingual Instructional Practices*). Furthermore, BCLAD candidates will be placed in bilingual student teaching situations.

A typical student schedule for the professional preparation program is shown in Table 1:

**Table 1: Schedule of Professional Preparation Activities for the Multiple Subject Credential**

FALL	WINTER	SPRING
TEP 150 (4)	TEP 161B (6)	TEP 161C (2)
TEP 151 (4)	TEP 169A (9)	TEP 169B (9)
TEP 161A (6)	TEP 190 (3)	
TEP 180 (4)		
<i>TEP 180 can be taken before</i>		
<b>BCLAD candidates:</b>		
TEP 152A (2)	TEP 152B (2)	

**Single Subject Credential Program**  
**English, Mathematics,**  
**Biology, Chemistry,**  
**Geosciences, and Physics**  
**(for teaching grades 7-12)**

### Prerequisites

Before admission to the professional preparation component, students must complete the following requirements:

### Bachelor's Degree

B.A. or B.S. with a major field of study in the area corresponding to the credential subject:

**English:** majors equivalent to UCSD literature or linguistics majors; all English majors.

**Mathematics:** all mathematics majors; majors equivalent to any UCSD engineering major or computer science major.

**Biology, Chemistry, Geosciences, or Physics:** all majors in the natural sciences.

A 3.0 cumulative GPA is required.

### Subject Matter Preparation

This requirement is satisfied by either (a) completing the appropriate sections of the PRAXIS National Teachers Exam Specialty Area

exam and the Single Subject Assessments for Teaching Exam Specialty Area or b) completing the subject matter preparation program for the appropriate single subject credential (contact the TEP office for course lists for the subject matter programs).

### ***The California Basic Educational Skills Test (CBEST)***

This requirement is satisfied by passing the CBEST. Contact the TEP office for more information.

### ***U.S. Constitution Requirement***

This requirement is satisfied by either (a) completing a course which covers the provisions and principles of the U.S. Constitution or (b) passing the U.S. Constitution Exam offered through University Extension or the County Office of Education. (Contact the TEP office for information about test dates and course lists).

### ***Educational Foundations Courses***

Students must complete the following courses with grades of B or higher:

**Practicum in Learning.** TEP 129 A-B-C (*Pre-Internship Practicum in Learning*). (Enrollment in TEP 129C is limited to those students concurrently applying to the Internship Program, chemical education majors, and math education majors.)

**Teaching and Learning.** One of the following courses or its equivalent: TEP 116 (*The Psychology of Teaching and Structure of Information for Human Learning*) [TEP 116 should be taken concurrently with either TEP 129A, B or C.], or TEP 114 (*Cognitive Development and Interactive Computing Environments*), TEP 115 (*Child Development and Education*), ANGN 180 (*The Culture of Children*), Cog Sci 154 (*Communication Disorders in Children and Adults*) Com/HIP 116 (*Practicum in Child Development*), Human Development Program 1 (*Introduction to Human Development*), Psychology 7 (*General Psychology: Developmental Psychology*), or Psychology 101 (*Introduction to Developmental Psychology*). TEP 114 is recommended.

**Language and Culture.** One of the following courses or its equivalent: Soc./TEP 117 (*Language, Culture and Education*) or Com/HIP 122A or 122B (*Communication and the Community*)

or Com/HIP 114 (*Bilingual Communication*), Ethnic Studies 140 (*Language and American Ethnicity*), or Ethnic Studies 141 (*Language and Culture*).

**The Social Organization of Schooling.** One of the following courses or its equivalent: Soc./TEP 126 (*Social Organization of Education*) or TEP 125 (*History, Politics and Theory of Bilingual Education*), or Soc. 125 (*Minorities in the Schooling Process*) or Soc./C 150L (*The Politics of Language and Ethnicity*). (BCLAD students must take TEP 125.)

**Teaching Practices for Equitable Education.** TEP 153. (Take concurrently with TEP 129C.)

**Research Practicum.** TEP 190. (Take concurrently with TEP 129C for two units.)

### ***Sensitivity to Second Language Learning and Acquisition***

This requirement can be fulfilled by either (a) completing nine quarter units of course work at the college level (or equivalent) in a language which is not the applicant's native language or (b) completion of three years of secondary school course work in a language other than English. The course work must be taken in grades 9–12, with at least a B average or (c) demonstrating an equivalent experience in a second language situation. "Equivalent experience" is defined as a prolonged period in which the applicant lived in a country where the language spoken was not native and where the applicant was continuously required to speak that language (e.g. the Peace Corps), an extended experience in the applicant's native country where she/he was immersed in a multilingual community or the applicant was raised as a native speaker in a multilingual community. (Contact the TEP office for more information).

### ***Additional Prerequisites for the BCLAD Emphasis in Spanish***

The BCLAD Emphasis Credential is designed for students who can teach in Spanish and English. In addition to the requirements for admission to the CLAD credential described above, students interested in applying for admission to the BCLAD program must demonstrate:

**Spanish Language Fluency:** This requirement is satisfied by (a) completing two Spanish literature courses, at least one of which must be upper division in either Latin American or Chicano literature and b) completing the Spanish Language Assessment with an FSI score of at least 3. (Contact TEP in January prior to your application to schedule this test).

**Cultural Knowledge.** This requirement is satisfied by completing one history course and one culture course about Chicano or Latin American topics.

### ***Professional Preparation***

The professional preparation component of the Single Subject Programs consists of four courses and one academic year of teaching in public school classrooms.

### ***Internship and Student Teaching Programs***

Those admitted to the Single Subject Credential Program are eligible to be interviewed in June, July, and August for a paid internship for the following school year, in a local middle or high school. Availability of internship positions is **not** guaranteed, though TEP attempts to facilitate internship positions for all Single Subject students. Students who do not receive an internship position will do their practicum as student teachers instead. Interns are responsible for teaching English, mathematics, biology, chemistry, geosciences, or physics courses under the guidance of a TEP supervisor and an on-site adviser. Interns, who are generally hired for part-time teaching loads, receive a salary from the school district commensurate with the number of courses they teach.

### ***Professional Preparation Courses***

Once students are selected, they are provided an intensive program of professional preparation, including a full-time summer program of teaching methods courses and seminars offered throughout the academic year which address classroom management techniques and strategies for dealing with concrete teaching and learning situations.

The professional preparation program for the Single Subject Credential consists of the following three courses (BCLAD—five courses), in

addition to TEP 179ABC (8-8-8 units) *Internship Field Experience*, for a total of 36 quarter units (BCLAD—40 units).

- TEP 151 Teaching the English Language Learner
- TEP 173\* Secondary English Teaching Practices
- TEP 174\* Secondary Mathematics Teaching Practices
- TEP 175\* Secondary Science Teaching Practices
- TEP 176 Writing, Reading and Language Instruction

\*Students may only take TEP 173, or 174 or 175.

A typical student schedule for the Single Subject Professional Preparation Program is shown in Table 2.

**Table 2: The Professional Preparation Program for the Single Subject Credential**

Summer	Fall	Winter	Spring
TEP 173 (4) or 174 or 175	TEP 179A (8)	TEP 179B (8) TEP 151 (4)	TEP 179C (8)
TEP 176 (4)			
TEP 180 (4)			

**For BCLAD Candidates:**

TEP 152B (2) TEP 152A (2)

**Professional Clear Credentials**

Completing the professional preparation sequence in Multiple or Single Subject described above entitles a teacher to teach in public schools in California for five years with a "Preliminary" credential. To teach past this time, teachers must complete additional courses, which lead to the award of a "Professional Clear" credential. Students may take this course work while they are completing the requirements for the "Preliminary" credential.

The courses required for the "Professional Clear" credential are:

- TEP 180: *Computer Applications in Teaching and Learning*
- TEP 181: *Health Education*
- TEP 182: *Inclusive Educational Practices*

Above course work must be taken during the internship year (TEP 180, TEP 181: summer, TEP 182: spring)

**Undergraduate Minor**

The Teacher Education Program offers a *Minor in Teacher Education*, which students fulfill with one of the two following courses of study.

1. *The Education Foundations Sequence* is required of all students who wish to apply for admission to the graduate credential program at UCSD, and is described above.
2. *The Cultural Context of Teaching and Learning Sequence* is intended for students who are not applying to the graduate credential program at UCSD. Courses are focused on the following two areas:

- a. Teaching and Learning (at least three courses)

Three (or more) courses from the "Education Foundations Sequence" above.

Other TEP courses may be approved by the TEP office.

- b. Cultural Context (no more than three courses)

Courses to be included in this section focus on issues of difference, discrimination, or equity along lines of gender, ethnicity, physical attributes, sexual orientation, etc. Students develop their own course of study with the assistance of a TEP adviser. Suggested departments to review for course offerings are: ARTS—Music, Theater, Visual Arts; HUMANITIES—History, Literature, Philosophy; SOCIAL SCIENCES—Anthropology, Communication, Ethnic Studies, Political Science, and Sociology.

**Please note:** Students entering UCSD January 1998, or thereafter, who declare a minor must complete twenty-eight units, of which at least twenty units must be upper-division. Students entering UCSD prior to January 1998 are required to complete twenty-four units of which a minimum of twelve units must be upper-division. Grades of C– or better are required. If applying to the TEP credential program, grades of B or better are required in the TEP courses.

**The Master of Arts in Teaching and Learning: Emphasis in Curriculum Design**

The M.A. in teaching and learning at UCSD offers professional educators in elementary and

secondary schools an extensive overview of principles of educational research and curriculum design.

A key feature of the M.A. program is the integration of research and practice. M.A. students remain full-time K–12 teachers for the duration of the program. They design, implement, and evaluate curricular innovations in their own classrooms. The culmination of the M.A. work is a thesis describing the rationale, development, and effectiveness of these innovations.

**Examples of M.A. Research Projects**

The topics of the M.A. theses in past years are varied, and have included: multimedia approaches to secondary biology instruction; the place of mathematics in middle school physics; writing revision among emergent writers; ecology project participation in the upper elementary grades; activities which link home and school experiences in the content areas of reading and writing, mathematics, science and social studies; improvement of the integration of curriculum and assessment; motivation and art; and embedding ESL in native-language instruction.

Since the program's inception in 1988, 115 students have earned M.A. degrees in teaching and learning with an emphasis in curriculum design. Of these, sixty-five came from the ranks of elementary teachers, forty-eight worked as secondary teachers, and two taught at the post-secondary level.

**The M.A. Course of Study (Teaching and Learning: Emphasis in Curriculum Design)**

The M.A. program requirements consist of 40 quarter units of course work, including the master's thesis. Courses are usually offered for 4.0 quarter units of credit, and are typically offered one night per week, from 5:00-8:00 pm. Core course work comprises twenty-eight units, with the remaining twelve units consisting of elective course work. Up to eight quarter units of non-methods post baccalaureate work in education may be transferred via petition toward the elective course requirements.

### First Summer (mid June–late August)

TEP 231 or 232 (offered alternating summers)

Each summer includes an intensive course in innovative instructional theory and practices. Specific topic changes each year. Examples include: portfolio and authentic assessment; telecommunications in the classroom; collaborative learning; and research on child development and learning.

TEP 290

Introductory course to research on teaching practice.

### Fall, Winter, and Spring:

TEP 230ABC

Three-quarter seminar providing an extensive overview of curriculum design principles, and application of educational research to classroom practice.

TEP 233AB

Graduate seminar series in which UCSD faculty present their research on educational topics. (Fall, Winter only)

TEP 290

Intensive work with faculty adviser (Spring only)

### Second Summer (early July–late August)

TEP 231 or 232 (see above)

TEP 295

Completion of M.A. thesis writing.

Admission to the M.A. program in teaching and learning at UCSD is competitive. Factors considered by the selection committee include:

- teaching experience
- professional development activities
- experience and interest in curriculum design
- academic record

**The Master of Arts in Teaching and Learning: Emphasis in American Sign Language-English Bilingual Education of Deaf Children and the California Deaf and Hard of Hearing Specialist Teaching Credential and the Multiple Subject Teaching Credential with BCLAD Emphasis**

TEP also offers a master of arts program for candidates who wish to teach deaf and hard-of-hearing children using bilingual, multicultural approaches. The first stage of study in this two-year master's program prepares the candidate for a California deaf and hard-of-hearing specialist teaching credential and a multiple subject teaching credential with bilingual, cross-cultural language and academic development emphasis. The second stage of the program engages the student in educational research and thesis preparation in bilingual education and curriculum for the education of deaf children. This integration of research and practice is central to the goal of program to develop teachers as researchers. In keeping with its aim of training teachers who will be able to meet the needs of deaf and hard-of-hearing children from various language and cultural backgrounds. TEP requires fluency in ASL for acceptance into the program. TEP's teacher training program is designed to prepare teachers to work in various types of school settings from residential school classrooms to local public school classrooms for deaf and hard-of-hearing children.

### Prerequisite Course of Study Education Foundations Sequence

Prior to admittance to the credential and master's study, prerequisite students (or UCSD undergraduates pursuing the minor in teacher education) complete the following five courses offered during the first summer.

TEP 128A & B & (C\*): *Practicum in Learning*

\* UCSD undergraduates must take 128C if taking 128 sequence during regular academic year—fall, winter, spring

TEP 115: *Child Development*

TEP 117: *Language, Culture and Education*

TEP 126: *Social Organization of Education*

### *Program of study for the Deaf and Hard-of-Hearing Specialist Credential, the Multiple Subject Teaching Credential with BCLAD Emphasis and the Master of Arts in Teaching and Learning.*

After completion of the prerequisite component, students complete a program of study resulting in the California deaf and hard-of-hearing specialist credential and multiple subject teaching credential with BCLAD emphasis at the elementary level.

This program of study consists of courses in bilingual education theory, methods, and applications to deaf education in addition to intensive classroom practice. During the second year of study the focus is on designing, implementing and evaluating a research project. This integration of research and practice is central to the goal of the M.A. program to develop teachers as researchers.

A typical program of study includes:

#### YEAR 1

##### Fall

TEP 161A: *Innovative Instructional Practices*

TEP 142A: *ASL-English Bilingual Education Practices*

TEP 150: *Multicultural Education*

COM 121: *Voice: Deaf People in America*

##### Winter

TEP 161B: *Innovative Instructional practices*

TEP 142B: *ASL English Bilingual Education Practices*

TEP 169A: *Practicum in Student Teaching*

##### Spring

TEP 180: *Computer Applications in Teaching and Learning*

TEP 182: *Inclusive Educational Practices*

TEP 241: *Advanced Topics in Deaf Education*

#### YEAR 2

##### Fall

TEP 151: *Teaching the English Language Learner*



TEP 181: *Health Education*

TEP 233A: *Topics in Education Research and Design*

TEP 240A: *Research in ASL-English Bilingual Education*

### Winter

TEP 233B: *Topics in Education Research and Design*

TEP 240B: *Research in ASL-English Bilingual Education*

TEP 290: *Research Practicum*

### Spring

TEP 149: *Education Specialist Student Teaching*

TEP 240C: *Research in ASL-English Bilingual Education*

### Admission Requirements

Candidates will apply to graduate admission to the prerequisite component of this program. Upon satisfactory completion of the prerequisite component, students will advance to the professional component and master's component which require two years of study. The following are the minimum eligibility requirements to for admission to the graduate prerequisite component. Applications are available beginning in January. **Application deadline is March 1.**

- A bachelor's degree with a 3.0 cumulative GPA
- Official Graduate Record Exam (GRE) scores
- Subject matter competence
- The California Basic Educational Skills Test (CBEST)
- Completion of a course including the provisions and principles of the U.S. Constitution, or passage of the appropriate exam
- Fluency in American Sign Language
- Knowledge and experience of the social and cultural life of deaf people
- A desire to teach deaf children of varying language and cultural backgrounds

Admission to graduate standing at UCSD requires a minimum cumulative GPA of 3.0 for any prior graduate work, and for the bachelor's degree. Official scores from the GRE verbal,

analytic, and quantitative sections are also required.

Applications are available from the Teacher Education Program office (619-534-1680) in January, and are due March 1 prior to the summer for which you are seeking admission.

## COURSES

The following courses are offered by the TEP faculty. Students are advised to consult with a TEP adviser to determine which courses satisfy credential requirements. Undergraduate students may enroll in graduate seminars with the consent of instructor.

### LOWER-DIVISION

#### Human Development Program (HDP) 1. Introduction to Human Development (4)

This course introduces students to the central issues in the basic areas in human development. The course will explain relationships between biological, cognitive, social and cultural aspects of development.

#### Psychology 7. General Psychology: Developmental Psychology (4)

This course is an introduction to the cognitive and social changes that take place over the course of a lifetime. This course introduces influential theories of child development, such as those of Freud and Piaget, together with recent criticisms of those theories.

### UPPER-DIVISION

#### ANGN 180. The Culture of Children (4)

This course explores the interrelationships of cultural, psychological, and social aspects of socialization and enculturation with respect to contemporary views of child development in psychological anthropology. Emphasis is given to examining the cultural world of children's experience.

#### Cognitive Science 154. Communication Disorders in Children and Adults (4)

The course will begin with neural bases of language use in normal adults, and the neural bases of language and communication development in normal children. It will review recent evidence on the nature of language and communication deficits in several clinical populations of adults (especially aphasia and dementia) and children (including specific language impairment, focal brain injury, retardation, and autism). (Credit may not be received for both Psychology 174 and Cognitive Science 154.) *Prerequisites: Cognitive Science 10, 11 or Psychology 101 or Cognitive Science 101AB or Psychology 101AB or Psychology 145 or Psychology 105 or Psychology 2 and 3.*

#### Com/HIP 114. Bilingual Communication (4)

This course is designed to introduce students to the multiple settings in which bilingualism is the mode of communication. Students will examine how such settings are socially constructed and culturally-based. Readings on language policy, bilingual education, and linguistic minorities, as well as, field

activities will constitute the bulk of the course. *Prerequisite: Com/HIP 100 or consent of instructor.*

#### Com/HIP 116. Practicum in Child Development (6)

Combined lecture-laboratory course for students in Psychology and Communication. Students will spend three hours per week in lecture, six hours per week in field settings where they work with children, five hours per week reading, and four hours per week lab prep time. *Prerequisite: upper-division standing.*

#### Com/HIP 122A-B. Communication and the Community (4-4)

This course will prepare students to conduct research in a variety of community settings on the institutional and media-derived patterns of communication that affect people's everyday lives. *Prerequisite: Com/HIP 100 or consent of instructor.* (W,S) Staff

#### Com/HIP 124. Voice: Deaf People in America (4)

The relationship between small groups and dominant culture is studied by exploring the world of deaf people who have for the past twenty years begun to speak as a cultural group. Issues of language, communication, self-representation, and social structure are examined. *Prerequisite: Com/HIP 100 or consent of the instructor.*

#### Ethnic Studies 140. Language and American Ethnicity (4)

This course examines the intersection of language and ethnicity in the United States, focusing on the social and political impact of bilingualism, ethnically based English dialects, and standard and nonstandard English.

#### Ethnic Studies 141. Language and Culture (4)

A critical review of conceptions of language and how they have been deployed in constructing images of culture, race, ethnicity, gender, sexuality, and class. Topics include cultural and linguistic relativism, structuralism, symbolic and cognitive approaches, ethnomethodology, sociolinguistics, ethnography of speaking, performance, and ethnopoetics.

#### Psychology 101. Introduction to Developmental Psychology (4)

A lecture course on a variety of topics in the development of the child, including the development of perception, cognition, language, and sex differences. *Prerequisite: Psych. 60.*

#### Soc/C 125. Minorities in the Schooling Process (4)

Using a survey format, the course will examine and critique various themes, principles, theories, and research concerning ethnic minorities in public education. The focus will be on Mexican-origin and African-American students in public schools, grades K-12. *Prerequisite: upper-division standing.*

#### Soc/C 150L. The Politics of Language and Ethnicity/c (4)

Examines ethnolinguistic conflicts and language policies, comparing cases internationally. Addresses interpersonal as well as macrosocial politics, and emphasizes the relationship of policy to actual language use. Topics include nature of language variations and of ethnicity.

#### TEP 109. Teaching Physical Education (4)

This course is designed to assist future elementary teachers and recreation fitness leaders develop quality physical education programs for children. Instruction focuses on theory and practice of movement activities that are physically and emotionally safe, health promoting, and developmentally appropriate. (S)

#### TEP 114. Cognitive Development and Interactive Computing Environments (4)

Learning and development considered as an evolving interplay between "internal representations" and "external representations" of the world, with special attention devoted to the design, history, and educational implications of computer-based tools and learning environments. *Prerequisite: TEP 180 or consent of instructor.* (W)

**TEP 115. Child Development and Education (4)**

This course introduces prospective teachers to the cognitive, social and emotional development of children, including developmental learning theory, the teaching/learning process, maturation, and cross-cultural variation in development. Implications for classroom practice are drawn. *Prerequisite: approval of instructor.* (W)

**TEP 116. The Psychology of Teaching and Structures of Information for Human Learning (0-4)**

College students tutoring college students. Curriculum: basic applied learning principles, specifying objectives, planning and designing instruction, testing, evaluation, interpersonal communication skills, study skills. Objectives will be assessed by project completion and practicum feedback. The course is not project completion and practicum feedback. This course is not creditable toward professional preparation requirements for the multiple subject credential. *Prerequisite: departmental approval (consent of instructor) – department stamp restriction.* (F,W,S)

**TEP 117. Language, Culture, and Education (4)**

(Same as Soc/B 117) The mutual influence of language, culture, and education. Explanations of students' school success and failure that employ linguistic and cultural variables, bilingualism, and cultural transmission through education are explored. (F,W,Su)

**TEP 123. Educational Reform (4)**

Students will examine the facts and the myths that surround the discussion and debates about educational reform in the U.S. as well as the historical and sociocultural context for the controversy in a class with a mix of lecture, discussion and student presentations.

**TEP 125. History, Politics, and Theory of Bilingual Education (4)**

(Same as Soc/C 126) This course provides a historical overview and models of bilingual education in the United States. Students will examine sociocultural, theoretical, and policy issues associated with native language and second-language instruction, and legal requirements for public bilingual program. *Prerequisites: TEP 128A and 128B or 129A and 129B, or consent of instructor. Speaking, writing, and reading knowledge of Spanish is required.* (S)

**TEP 126. Social Organization of Education (4)**

(Same as Soc/C 126) The social organization of education in the U. S. and other societies; the functions of education for individuals and society; the structure of schools; educational decision-making; educational testing; socialization and education; formal and informal education; cultural transmission. (W,S,Su)

**TEP 127A-B-C. Practicum in Interactive Computing (4-4-4)**

The course focuses on interactional computing in teaching/learning. Course work concentrates on interactive computing, application to teaching, learning, bilingualism, and communication. Concurrent with course work, students are assigned to a school or community field site implementing interactive computing. Students will write research reports integrating course work and field experience. (F,W,S)

**TEP 128A-B-C. Practicum in Learning (6-6-6)**

Students are assigned as classroom teaching assistants (CTAs) in San Diego county public elementary schools. Concurrent course work concerns theories of teaching and learning, multicultural education, and the community context of learning. TEP 128A emphasizes the community context; TEP 128B emphasizes the social organization of schools; and TEP 128C emphasizes the teaching-learning process. *Prerequisite: department stamp required.* (F,W,S)

**TEP 129A-B-C. Pre-Internship Practicum in Learning (6-6-6)**

This course series focuses on the teaching/learning process in secondary school. UCSD students are assigned to tutor stu-

dents and perform other classroom duties under the supervision of participating teachers in local schools. The UCSD student will provide instruction in science, mathematics, or English for a minimum of 40 hours per quarter. Weekly lectures on theories of learning, classroom observation, and the social organization of public schools are also required. *Prerequisites: department stamp and instructor's signature for TEP 129ABC. Must have successfully completed 129A for 129B, and 129A-B for 129C.* (F,W,S)

**TEP 130. Public Service: Practicum in Learning (6)**

The relationship between teaching and learning; the relationship between school and community; social and political organization of the schools; philosophical, sociological and political issues which relate to the U. S. educational system, and the academic achievement of children are examined. Field and academic work focus on culturally diverse children in San Diego schools. *Prerequisite: department stamp required.* (F,W,S)

**TEP 131A-B-C. Practicum in Public Service (2-2-2)**

Students in this course will be placed in local schools to serve as mentors to culturally and linguistically diverse students. The field experience and seminar will emphasize the mentor/child relationship, teaching and learning process, and community service. Students will complete a minimum of forty hours of field work, actively participate in a weekly seminar, write a weekly classroom journal, and cooperatively plan and present a school-based project with their assigned child at a university sponsored community event. *Prerequisites: TEP 130 and department stamp required.* (F,W,S)

**TEP 135. Fifth Dimension for Elementary Schools (4)**

Students will participate in classrooms which are integrating the Fifth Dimension model of collaborative, exploratory learning using computers. Students spend four hours per week in a supervised classroom setting at Torrey Pines Elementary School. Outside work will include readings and class prep, as well as responding to children's written inquiries, writing weekly field notes, and writing a paper on some aspect of the field work experience as it relates to class lectures and readings.

**TEP 142A. ASL-English Bilingual Education Practices (4)**

Students will examine the history, current theory, philosophy, legislation, and trends in deaf education. Methods of first- and second-language development, communication, and literacy skills for deaf and hard-of-hearing children will be introduced. (F)

**TEP 142B. ASL-English Bilingual Education Practices (4)**

Students will investigate formal and informal assessment techniques used for deaf and hard-of-hearing children, bilingual/multicultural education practices across the curriculum, effective learning environments and approaches for educating and interacting with families and communities. (W)

**TEP 149. Education Specialist Student Teaching (9)**

Credential candidate performs student teaching in participating schools under the supervision of cooperating teachers. The practicum provides practical experience and diversified responsibilities. (S)

**TEP 150. Multicultural Education (4)**

The purpose of this course is to help prospective elementary and secondary teachers organize their classrooms to make education equitable for all students. Ways to utilize the talents and skills that students from diverse cultural backgrounds bring to school as resources for classroom instruction will be suggested. The discussion will be organized along three dimensions: (1) the ecology or environment of the classroom, (2) the discourse of the classroom, and (3) curriculum content. Included in the ecological category are such issues as grouping, seating arrangements, and visual displays. Included in the discourse category are teachers' instructional strategies, turn-taking pro-

cedures and non-verbal cues. Included in the curricular content category are issues of inclusion/exclusion, perspective, and relevance in math and science. *Prerequisite: TE79 or TE80 major code.* (F)

**TEP 151. Teaching the English Language Learner (4)**

Students will examine the principles of second language acquisition and approaches to bilingual education. They will develop a repertoire of strategies for teaching in elementary or secondary content areas. *Prerequisite: TE79 or TE80 major code.* (F,W)

**TEP 152A. Bilingual Instructional Practices (2)**

History and models of bilingual education; socio-cultural issues associated with second language instruction, legal requirements for public school bilingual programs, native language and ESL teaching methods. First course in a two course sequence. *Prerequisite: TE79 or TE80 major code.* (F)

**TEP 152B. Bilingual Instructional Practices (2)**

History and models of bilingual education; socio-cultural issues associated with second language instruction, legal requirements for public school bilingual programs, native language and ESL teaching methods. *Prerequisite: TE79 or TE80 major code.* (Su,W)

**TEP 153. Teaching Practices for Equitable Education (2)**

The purpose of this course is to help prospective secondary teachers organize their classrooms to make education equitable for all students. Successful practices that have enabled all students to achieve to the best of their abilities will be discussed. *Prerequisite: concurrent enrollment in TEP 129C or instructor consent.* (S)

**TEP 161A. Innovative Instructional Practices (6)**

First course in a three course sequence. It provides pedagogical methods for multiple subject teaching. Diverse subject areas (math, science, fine arts, P.E., and social studies) are integrated into a single intercurricular course of study by emphasizing activity/inquiry techniques of instruction. *Prerequisite: TE79 major code.* (F)

**TEP 161B. Innovative Instructional Practices (6)**

Second course in a three course sequence. It provides pedagogical methods for multiple subject teaching. Diverse subject areas (language arts and English-as-a-second-language) are integrated into a single intercurricular course of study by emphasizing activity/inquiry techniques of instruction. *Prerequisites: TEP 161A and TE79 major code.* (W)

**TEP 161C. Innovative Instructional Practices (2)**

Last course in a three course sequence. It provides pedagogical methods for multiple subject teaching. General teaching methods are integrated into a single intercurricular course of study by emphasizing activity/inquiry techniques of instruction. *Prerequisites: TEP 161B and TE79 major code.* (S)

**TEP 169A-B. Practicum in Student Teaching (9-9)**

Credential candidates student teach in participating schools under the supervision of cooperating teachers. The practicum provides practical experience and diversified responsibilities. *Prerequisite: TE79 major code.* (W,S)

**TEP 173. Secondary English Teaching Practices (4)**

The course introduces prospective secondary teachers to principles and strategies of teaching English language arts. Topics include: writing processes, reading processes, integrated language arts, assessment, the second language learner, the classroom community, the California English Language Arts Framework. *Prerequisite: TE80 major code or consent of instructor.* (Su)

**TEP 174. Secondary Mathematics Teaching Practices (4)**

Mathematics teaching techniques including, curriculum design,

California Model Curriculum Standards, instructional methods, computer applications, selection and use of textbooks, student assessment, lesson planning, and classroom organization. Professional matters including curriculum planning, professional organizations, para-professionals, professional ethics, education law, and parent involvement are addressed. *Prerequisite: affirmed credential candidate or approval of instructor. (Su)*

#### TEP 175. Secondary Science Teaching Practices (4)

Science teaching techniques, including science curriculum design, California Model Curriculum Standards, instructional methods, computer applications, selection and use of textbooks, student assessment, lesson planning, and classroom organization. Professional matters including curriculum planning, professional organizations, para-professionals, professional ethics, education law, and parent involvement are addressed. *Prerequisite: affirmed credential candidate or approval of instructor. (Su)*

#### TEP 176. Language and Learning Instruction (4)

This course satisfies the California Commission on Teacher Credentialing requirement for preparation in reading theory and methods for all credential candidates. Theories of reading development, integration of the language arts, reading and writing in the content areas, teaching methods, and literature. *Prerequisite: TE79 or TE80 major code. (Su)*

#### TEP 179A-B-C. Internship Field Experience (8-8-8)

Each candidate works for a period of one year under the guidance of an on-site teacher and university supervisor. The internship offers the prospective teacher extensive experience organizing and implementing lessons under actual classroom conditions. *Prerequisite: affirmed credential candidate or approval of instructor; TE80 major code. (F,W,S)*

#### TEP 180. Computer Applications in Teaching and Learning (4)

Microcomputers are viewed as a component of interactive communication media. Students learn to use microcomputers and computer networks in course work through hands-on experience. The possible impact of these new media on the teaching-learning process is explored. The course assumes a basic familiarity with social science concepts and the logic of social science inquiry. *Prerequisite: upper-division standing or consent of instructor. (F,S,Su)*

#### TEP 181. Health Education (4)

This course satisfies the Commission on Teacher Credentialing requirement for Health Education. Topics include: physical education, substance abuse, sex education, cardio-pulmonary resuscitation, nutrition, and first aid. *Prerequisite: TE79 or TE80 major code. (F,Su)*

#### TEP 182. Inclusive Educational Practices (4)

This course satisfies the Commission on Teacher Credentialing requirement for Special Education. Topics include: teaching methods for accommodating special-needs students in the regular classroom, developing an Individual Education Plan, characteristics of special-needs students, lesson planning to accommodate individual differences, and legislated mandates. *Prerequisite: TE79 or TE80 major code. (S)*

#### TEP 183. Current Issues in Teaching and Learning (4)

This course addresses curricula and teaching practices in the K-12 schools. Specific course topics will be developed in cooperation with local school faculty working with TEP on preservice, staff development, and research activities. General issues will include second language acquisition, uses of technology in schools, language arts, mathematics and science instruction, integrated curriculum, and alternative assessment. *Prerequisite: TE79 or TE80 major code. (Su)*

#### TEP 190. Research Practicum (1-6)

Supervised research studies with individual topics selected according to students' special interests. Students will develop

a research proposal and begin to gather and analyze data. *Prerequisite: consent of instructor. (F,W,S)*

#### TEP 195. Apprentice Teaching (4)

Advanced TEP students are prepared in effective methods of supervising the preparation of UCSD students serving as para-professionals in elementary school classrooms. Topics covered include: classroom management, interpersonal relations, supervision techniques, multicultural education, politics in the school, and curriculum development. Each student serves as a discussion leader, and conducts at least two workshops. *Prerequisites: department stamp required and TE79 or TE80 major code.*

#### TEP 198. Directed Group Study (4-2)

Directed group study, guided reading, and study involving research and analysis of activities and services in multicultural education, bilingual education, the teaching-learning process, and other areas that are not covered by the present curriculum. *Prerequisite: consent of instructor.*

#### TEP 199. Special Studies (4)

Individual guided reading and study involving research and analysis of activities and services in multicultural education, bilingual education, the teaching-learning process, and other areas that are not covered by the present curriculum. *Prerequisite: consent of instructor.*

## GRADUATE

#### Lit/Writing 272. Research on Composition and Written Discourse (4)

This course will survey current research on composing and written discourse and direct students in research projects involving the analysis of writing. Emphasis will be placed on research which can contribute to a theoretical understanding of the writing process. *Prerequisite: consent of instructor.*

#### Lit/Writing 273. Practicum on Research in Composing and Written Discourse (4)

In this course students will design and carry out research studies. Emphasis will be placed on research which can contribute to a theoretical understanding of the writing process.

#### Psychology 211. Piagetian Theory (3)

Seminar on selected topics in Piaget's theory of cognitive development. *Prerequisite: consent of instructor.*

#### Psychology 216. Basic Seminar in Comparative Cognitive Research (4)

This seminar will review current research and theory in cognitive psychology in order to characterize group differences in cognitive functioning.

#### Psychology 259A-B-C. Advanced Seminar in Comparative Cognitive Research (3-3-3)

An examination of the major theories and relevant data concerning the way in which culturally organized experience influences the nature of thinking. Particular attention will be paid to understanding the presumed relations between culture and thought.

#### Sociology 241. Cognitive and Linguistic Aspects of Social Structure (4)

Introduction to topics in speech act theory, cognitive approaches to story grammars, and the analysis of conversational or discourse material as they apply to the study of social interaction and organizational structures.

#### Sociology 242. Advanced Topics in Cognitive and Linguistic Aspects of Social Structure (4-4)

An advanced seminar dealing with field and quasi-experimental methods for studying discourse and textual materials. Stu-

dents are expected to conduct their own field research in natural or organizational settings.

#### Sociology 270. The Sociology of Education (4)

A consideration of the major theories of schooling and society, including functionalist, conflict, critical, and interactional; selected topics in the sociology of education will be addressed in a given quarter, including: the debate over inequality, social selection, cultural reproduction and the transition of knowledge, the cognitive and economic consequences of education. Major research methods will be discussed and critiqued.

#### Sociology 271. Seminar in Classroom Interaction (4)

Sociolinguistic principles are applied to the study of classroom interaction. Research methods, including media methods, that are applicable to interaction in general, educational settings in particular, are discussed and applied. Videotape from actual school settings form the basis of discussion. Student projects will be based on videotape of students' own classrooms, whenever possible.

#### TEP 230A-B-C. Research on Curriculum Design (4-4-4)

A year-long course sequence which provides an extensive overview of curriculum design principles appropriate for K-12 instruction. Consensus and model building methods will be discussed using case studies of curriculum research and development projects appropriate for various subject areas and grade levels. Participants will design, implement, and evaluate a curriculum project in their own classrooms. *Prerequisite: must be TE76 major or consent of instructor. (F,W,S)*

#### TEP 231. Advanced Instructional Practices (4)

Selected advanced topics in K-12 instructional practices in various subject areas. Techniques for teaching higher-level cognitive processes and advanced applications of computers and other technology will be stressed. Participants will conduct a field study of promising teaching practices appropriate to their grade level(s) and subject area(s) of instruction. *Prerequisite: must be TE76 major or consent of instructor. (Su)*

#### TEP 232. Special Topics in Education (4)

This course explores topical issues in education. It focuses on recent developments which have broad implications for research and practice in teaching and learning. Course topics will vary each time the course is offered. *Prerequisite: must be TE76 major or consent of instructor. (Su)*

#### TEP 233A-B. Topics in Education Research and Design (2-2)

Current topics and issues in education and educational research methodology, including action research, participant observation, ethnography, and survey research. *Prerequisite: must be TE76 major or consent of instructor.*

#### TEP 240A-B-C. Research in ASL English Bilingual Education (4-4-4)

A three-course sequence in which participants conduct an overview of research and design and conduct a study related to bilingual, bicultural education for deaf children. *Prerequisite: must be TE81 major or consent of instructor. (F,W,S)*

#### TEP 241. Advanced Topics in Deaf Education (4)

Topics in human development and education that relate to deaf and hard-of-hearing children and the relationship between home, community/culture, and classroom. *Prerequisite: must be TE81 major or consent of instructor. (S)*

#### TEP 290. Research Practicum (1-6)

Supervised research studies with individual topics selected according to students' special interests. Students will develop a research proposal appropriate for M.A. thesis, begin to gather and analyze data. *Prerequisites: M.A. candidate and consent of instructor. (S/U grades only.)*

**TEP 295. M.A. Thesis (4)**

The student will work on the M.A. thesis under the direction of the students' thesis committee chair. *Prerequisites: M.A. candidate and consent of committee chair. (S/U grades only.)*

**TEP 297. Directed Group Study (1-6)**

Study and analysis of specific topics under the guidance of a faculty member. Offered for repeated registration. *Prerequisite: consent of instructor.*

**TEP 298. Independent Study (1-6)**

Individual guided study and/or independent research in an area not covered by present course offerings. Offered for repeated registration. *Prerequisite: consent of instructor.*

## Theatre and Dance

Temporary Administrative/Faculty Offices Academic year 1998-99: Sequoyah Hall, Marshall College

### Professors

Andrei Belgrader, M.F.A.  
Andrei Both, M.F.A.  
Eric Christmas, *Emeritus*  
Frantisek Deak, Ph.D., *Dean*  
Floyd Gaffney, Ph.D., *Emeritus*  
Jorge Huerta, Ph.D.  
Walt Jones, M.F.A., *Chair*  
Marianne McDonald, Ph.D.  
Chris Parry  
Adele Shank, M.A.  
Theodore Shank, Ph.D., *Emeritus*  
Arthur Wagner, Ph.D., *Emeritus*  
Les Waters, B.A.  
James Winker, M.F.A., *Academic Senate Distinguished Teaching Award*

### Associate Professors

James Carmody, Ph.D.  
Mary Corrigan, M.A., *Emeritus*  
Tony Curiel, M.A.  
Allan Havis, M.F.A.  
Luther James, *Emeritus*  
John Rouse, Ph.D.  
Jonathan Saville, Ph.D., *Emeritus*

### Senior Lecturers with Security of Employment

Steven Adler, M.F.A.  
Margaret Marshall, M.F.A.

### Lecturers with Security of Employment

Ursula Meyer, M.F.A.  
Charles Oates, M.F.A.  
Patricia A. Rincon, M.F.A.

### Lecturers

Eva Barnes, M.F.A.  
Jean Isaacs, B.A.  
Ron Ranson, M.F.A.  
Alicia E. Rincon, M.F.A.  
Judith A. Sharp, B.S.  
Linda Vickerman, D.M.A.  
Kristin Arcidiacono, B.F.A.  
Sandra Foster-King, M.F.A.  
Todd Salovey, M.F.A.  
Amy Scholl, M.F.A.

### The Undergraduate Program

The theatre curriculum of the Department of Theatre and Dance is based on the belief that a good undergraduate education in theatre should provide the student with a solid background in dramatic literature and the aesthetics and history of theatrical performance as well as exposure to the different artistic components of theatrical art-performance, playwriting, and design. Finally, such an education should incorporate participation in the production process itself.

In addition to providing an integrated program for students desiring a theatre major, the curriculum provides (1) a sequence of courses to fulfill the fine arts and/or humanities requirements for Muir College; (2) courses fulfilling Warren College program of concentration requirements; (3) courses to fulfill Revelle, Thurgood Marshall, and Eleanor Roosevelt's fine arts requirements; and (4) elective courses for the general student desiring experiences in theatre.

### The Theatre Major

The theatre major provides students with a solid artistic and academic background. The required lower-division courses equip the student with the skills and knowledge necessary for more advanced study in each of the areas of study. The major is structured so that it can respond both to the needs of students who seek a broad-based "liberal arts" education in

theatre or to the needs of students who plan to pursue their studies at the graduate level with the aim of acquiring either an M.F.A. or Ph.D. degree. Students should meet with the department's undergraduate adviser as soon as practical (but no later than the quarter in which they declare a theatre major) in order to plan an appropriate individual course of study.

At least 50 percent of all required course work in theatre must be taken at UCSD. Transferred units from other institutions or study abroad must be petitioned to the Department of Theatre and Dance. Units of theatre practicum (THPR), or their equivalent, completed elsewhere *do not* satisfy the department's requirements. All required courses must be taken for a letter grade with the exception of majors seminar. No theatre department course for which a student earns a grade lower than C- can be counted as satisfying any of the department's graduation requirements.

The requirements for the major are:

### LOWER-DIVISION REQUIREMENTS

- One course from:  
THPR 1 Practicum-Scenery  
THPR 2 Practicum-Costume  
THPR 3 Practicum-Lighting  
THPR 4 Practicum-Stage Management  
**Note:** Students must complete the THPR requirement within one year of declaring a theatre major.
- Each of the following:  
THHS 1 History of Theatre 1: Classical to Renaissance  
THHS 2 History of Theatre 2: Neoclassicism to Realism  
THHS 3 History of Theatre 3: Symbolism to Postmodernism  
**Note:** THHS 1 or THHS 2 or THHS 3 must be completed before taking any upper-division classes in history and theory.
- Each of the area threshold classes:  
Performance Area-  
a) THAC 1 (Introduction to Acting )  
Design Area-  
a) THDE 1 (Introduction to Design)  
Playwriting Area-  
a) THPW 1 (Introduction to Playwriting)  
**Note:** The threshold classes listed above must be completed before taking any upper-division courses in each area.

**UPPER-DIVISION REQUIREMENTS**

4. One upper-division four-unit acting course
5. One upper-division four-unit design course
6. One upper-division four-unit directing course
7. One upper-division four-unit playwriting course
8. One upper-division four-unit stage management course
9. Three upper-division four-unit history courses
10. Four upper-division theatre electives (four-units each)
11. One one-unit upper-division majors seminar

**Note:** THGE 197, 198, and 199 may not be used as upper-division electives by theatre majors.

***The Theatre Minor***

Students should plan their minors and have them approved by the faculty undergraduate adviser prior to their junior year. Courses may not be taken on a Pass/Not Pass basis.

The following are minor requirements for students admitted to UCSD in winter quarter 1998 and later. Students admitted to UCSD prior to winter quarter 1998 must see the department adviser to confirm minor requirements.

**LOWER-DIVISION REQUIREMENTS**

1. One course from:
  - THPR 1 Practicum—Scenery
  - THPR 2 Practicum—Costume
  - THPR 3 Practicum—Lighting
  - THPR 4 Practicum—Stage Management

**Note:** Students must complete the THPR requirement within one year of declaring a theatre minor.
2. At least one course from:
  - THHS 1 History of Theatre 1—Classical to Renaissance
  - THHS 2 History of Theatre 2—Neoclassicism to Realism
  - THHS 3 History of Theatre 3—Symbolism to Postmodernism

**Note:** THHS 1 or THHS 2 or THHS 3 must be completed before taking any upper-division classes in history and theory.

THAC 1 Introduction to Acting

**Note:** THAC 1 must be completed before taking any upper-division classes in acting.

THDE 1 Introduction to Design

**Note:** THDE 1 must be completed before taking any upper-division classes in design.

THPW 1 Introduction to Playwriting

**Note:** THPW 1 must be completed before taking any upper-division classes in playwriting.

**UPPER-DIVISION REQUIREMENTS**

3. Any five, four-unit, upper-division theatre courses.

***Performance and Production Opportunities in Theatre*****PRODUCTIONS**

Undergraduates may audition for all shows produced in the department. Undergraduates are frequently cast in these productions and have often played substantial roles. In addition, the department produces a faculty-directed undergraduate production in the mainstage and in studio theatres.

**CABARET**

Additional opportunities exist for graduate and undergraduate students to produce and/or perform in plays and other events in the department's Studio Theatre.

***Undergraduate Audition Policy***

Each quarter, open auditions will be held for all shows being produced in the subsequent quarter. All undergraduates who have completed THAC 1 (Introduction to Acting) are eligible to audition. (This prerequisite is subject to revision.) Complete information about the schedule as well as the format of auditions may be obtained in the department office.

**Dance****Dance Faculty**

Kristin Archidiacono, B.F.A., International University, *Musical Theatre, Tap*

Maria Caligagan, Boston Ballet, Lecturer, *Ballet*  
Tony Caligagan, Alvin Ailey II Dance Company, Lecturer, *Jazz*

Sandra Foster-King, M.F.A., University of California, Irvine, Lecturer, *African Jazz*

Jean Isaacs, B.A., Wheaton College, Lecturer, *Modern Dance, Choreography*

Christina Jones-Stewart, New York University, Lecturer, *Modern African*

Margaret Marshall, M.F.A., University of California, Irvine, Senior Lecturer With Security of Employment, *Ballet, Jazz, Modern Dance, Dance History, Choreography, Movement Analysis*

John Malashock, B.F.A., *Southern Methodist University*

Nina Martin, New York University, *Contact Improvisation, Modern*

Alicia Rincon, M.F.A., United States International University, Lecturer, *Jazz*

Patricia Rincon, M.F.A., United States International University, Lecturer With Security of Employment, *Modern Dance, Jazz, Dance History, Choreography*

Tonnie Sammartano, *San Diego Dance Theatre*

Judith Sharp, B.F.A., Urbana, Lecturer, *Ballet*

Ann Marie Welsh, Ph.D., University of Rochester, Lecturer, *Theatre Dance History and Criticism*

***Dance Major***

University-trained dancers should have a solid academic base on which to build their dance technique. Theories and principles of dance as a creative art enrich and develop the trained dancer. Through instruction in choreography, dance history, and criticism, dance moves from a display of technical skills to a creative endeavor. The dance major will enhance creative expression by providing choreographic and performance opportunities generated by academic instruction.

The dance major concentrates on the principles of composition and choreography, movement education, dance history and theory, and the process of performance. The goal is to develop an aesthetic awareness of dance as an art form by providing solid kinesthetic training as a foundation for creative expression.

**PLACEMENT AND PROFICIENCY**

The technical command of the body and the expansion of a vocabulary of movement are

essential to the dancer's creative expression. Upon completion of a dance movement course, students who demonstrate the performance level necessary for the next level of work will advance. Students who do not demonstrate the appropriate performance level will be expected to continue at the same level until they qualify for advancement.

Students wishing to enter the major or minor in dance must audition during classes in spring for placement in the appropriate movement class for fall. Freshman and transfer students may audition the first week of classes in fall quarter.

**LOWER-DIVISION REQUIREMENTS**

1. One course from: (four to six units)  
 THPR 1 Practicum–Scenery  
 THPR 2 Practicum–Costume  
 THPR 3 Practicum–Lighting  
 THPR 4 Practicum–Stage Management  
**Note:** Students must complete the THPR requirement within one year of declaring a dance major.
2. Choose one of the following: (four units)  
 THAC 1 Introduction to Acting **or**  
 THAC 101 Acting 1
3. THDA 25 - Music for Dancers: (four units)  
**Note:** This course will not be offered every year.

**UPPER-DIVISION REQUIREMENTS**

4. THDA 160 Dance Movement Analysis and Injury Prevention Techniques: (four units)  
**Note:** This course will not be offered every year.
5. THDE 121 Theatre Production: Lighting (four units)  
**Note:** This course will not be offered every year.
6. Three choreography courses (four units each):  
 THDA 141 Principles of Choreography  
 THDA 142 Choreography and Performance  
 THDA 143 Choreography for Dramatic Text
7. Four history and theory courses (four units each). Choose from the following:  
 THDA 151 Dance History–Ballet  
 THDA 152 Dance History–Modern Dance  
 THDA 153 Dance History–Jazz Dance and Related Ethnic Studies

- THDA 159 Dance Criticism and Aesthetics  
 THHS 114 American Musical Theatre
8. Three advanced movement courses (four units each) in one of the following areas of emphasis:  
 THDA 102A, B or C; or 103A, B, or C Ballet  
 THDA 111A, B, or C; or 112A, B, or C Modern  
 THDA 121 A, B, or C; or 122A, B, or C Jazz
  9. One advanced movement course (four units) **outside** the area of emphasis selected in #8.
- Total lower-division units ..... 12–14  
 Total upper-division units ..... 52  
 Total dance major units ..... 64–66

**DEPARTMENTAL DEGREE CHECK**

Departmental degree checks are completed upon request by the undergraduate staff adviser. A degree check monitors your progress toward fulfillment of the dance major or minor. It is suggested that you request a degree check at least twice per year and *particularly the quarter before graduation*. Stop by the Theatre and Dance Department office to inquire about a degree check for your major. Remember *you must also complete a degree check with your provost office prior to graduation*. The provost office degree check will monitor all university and college requirements, such as GPA, units, residency requirements, P/NP limits, college general-education requirements, etc.

**Major courses may not be taken on a P/NP basis.**

*The Dance Minor*

The dance minor consists of courses which concentrate on the principles of composition and choreography, the history of dance, and the process of performance. Dancers receive extensive training in one or more idioms (ballet, modern dance, and jazz dance). The dancer's training also includes participation in compositional workshops and productions, including historical and contemporary performance experiences. Students should plan their minors and have them approved by the faculty undergraduate adviser prior to their junior year.

**Minor courses may not be taken on a Pass/Not Pass basis.**

Students admitted in winter quarter 1998\* will follow these dance minor requirements. Students admitted prior to winter quarter

1998, must see the Department of Theatre and Dance to confirm their minor requirements.

**DANCE MINOR REQUIREMENTS**

**Lower-Division Dance Requirements (four to six units)**

1. One of THPR 1, 2, 3 or 4

**Upper-Division Dance Requirements (four units each)**

2. One of THDA 140, 141, 142 or 143  
 One of THDA 151, 152, 153, or 159  
 (Dance History–Ballet, Modern, Jazz/Ethnic, Criticism and Aesthetics)

**Dance Minor Movement Requirements (sixteen units total)**

A prerequisite for entrance into the dance minor is technical ability above the beginning level in ballet, jazz, or modern. The student's level is determined by audition and, depending on his or her technical ability, the student will be placed at the intermediate or advanced level. Students wishing to enter the major or minor without intermediate (level II) proficiency must take beginning (level 1) courses (up to two years) or until they pass the audition into level II.

Students wishing to enter the major or minor in dance must audition during classes in spring for placement in the appropriate movement class for fall. Freshman and transfer students may audition the first week of classes in fall quarter.

Of the total credits earned, only sixteen units from those listed in the movement courses (see below) may be applied toward the dance minor. Students must include at least one movement course other than their main idiom.

3. Choose a total of sixteen units from a combination of the following list of movement courses. (**Note:** Levels II, III, or IV courses may be repeated once for credit)  
 THDA 101A, B or C Ballet II (intermediate, two units each)  
 THDA 102A, B or C Ballet III (advanced 1, four units each)  
 THDA 103A, B or C Ballet IV (advanced 2, four units each)  
 THDA 110A, B or C Modern II (intermediate, two units each)



THDA 111A, B or C Modern III (advanced 1, four units each)

THDA 112A B or C Modern IV (advanced 2, four units each)

THDA 120A, B or C Jazz II (intermediate, two units each)

THDA 121A, B or C Jazz III (advanced 1, four units each)

THDA 122A, B or C Jazz IV (advanced 2, four units each)

Total lower-division core units ..... 4-6

Total upper-division core units ..... 8

Total movement units ..... 16

(only movement courses from the above list may be used)

**Total Dance Minor Units** ..... 28-30

## Dance Performance Opportunities

### TWO ANNUAL CONCERTS

The work of selected students is presented at a formal concert each spring. A concert of choreographic works by faculty and guest artists is presented each winter.

### UCSD DANCE REPERTORY

This repertory is open to dance students through auditions. The company will perform lecture-demonstrations, performances, and teach master classes in the community or at other UC campuses.

### DANCE PEDAGOGY (in development)

This is open to dance students through auditions. The students will teach lecture-demonstrations, performance aspects and master classes in San Diego recreation centers or at K-12 campuses throughout San Diego County and surrounding area.

### PROFESSIONAL COMPANY INTERNSHIP

Dance students may apply for positions as interns. These internships provide qualified students an opportunity to work with, observe, and perform in professional companies. Internship possibilities include work with Patricia Rincon Dance Collective, California Ballet Co., San Diego Dance Institute, San Diego Dance Theatre, and other San Diego Area professional dance companies.

## SPECIAL COURSE

### TH/GE 195 - Instructional Assistance

Being a teaching assistant (TA) is an excellent opportunity for students to gain teaching experience. Assistant teaching for a dance faculty member is also an invaluable contact and may be important when applying for graduate school. Contact the theatre and dance department undergraduate staff adviser the quarter before you would like to TA to inquire if you are eligible.

## Dance Courses

### TH/DA-DANCE

#### TH/DA 1. Ballet, Level I Beginning (2-2-2)

An introduction to classical ballet principles, technique, and terminology. Develops the body for strength, flexibility, coordination, and artistic interpretation. Emphasis on developing a foundation in classical movement for continuation of ballet training. Historical origin of ballet will be discussed along with an introduction to the kinesiological principles of movement. *Prerequisite: none.*

#### TH/DA 2. Modern Dance I, Beginning (2-2-2)

Introduction to modern dance as a means of visual communication. Pattern variations analyzed in time, space, design, and kinetic sense. Movement exploration includes improvisation and composition. *Prerequisite: none.*

#### TH/DA 3. Jazz Dance I, Beginning (2-2-2)

Emphasis on technical skills, terminology, contemporary compositions, and introduction to the history of jazz dance. Explores specific rhythmic exercises, isolations, turns, locomotor combinations to a broad base of musical styles and variations. *Prerequisite: none.*

#### TH/DA 11A. Theatrical Tap (2)

The study of theatrical tap dance. Various styles of tap—such as classical, rhythm and musical theatre will be introduced. Emphasis on rhythm, coordination, timing, and theatrical style. Includes basic through intermediate tap movement. *Prerequisite: none.*

#### TH/DA 11B. Theatrical Tap (2)

The further study of various styles of theatrical tap dance. Includes more intricate rhythms such as turns, pull-backs, pick-ups, and wings. More complex rhythm variations and choreographic composition will be introduced. *Prerequisite: THDA 11A or consent of instructor.*

#### TH/DA 11C. Theatrical Tap (2)

Includes more complicated rhythms and advanced principles of dance composition for the theatre. Improves on musical interpretation, performance quality and style. Will focus on individual performance and choreography. *Prerequisites: THDA 11A and THDA 11B or consent of instructor.*

#### TH/DA 15. Musical Theatre Dance A (2)

The study of American social and theatrical dances from the 1900s to the 1930s. Historical trends in musical theatre will be discussed with the use of film and text. Stresses choreography and musical analysis and introduces basic tap dance rhythms. *Prerequisite: none.*

#### TH/DA 16. Musical Theatre Dance B (2)

A continuation of the exploration of the historical development of musical theatre character dance forms covering the 1930s through the 1960s. Emphasizes composition and movement techniques of this rich period of pioneers and stylists. Choreography for film will be introduced. *Prerequisite: none.*

#### TH/DA 17. Musical Theatre Dance C (2)

Integrates the historical and contemporary trends of Musical Theatre Dance from the 1960's to present. Emphasis on the impact and development of dance techniques used in video, film and theatre and on advanced clarification of performance and choreographic skills. *Prerequisite: none.*

#### TH/DA 20. Dance Workshop (2)

The study of aesthetic examination of major choreographic works. Emphasis will be on formulating the creative process into a complete dance form. *Prerequisite: consent of instructor.*

#### TH/DA 25. Music for Dancers (4)

A course designed to teach the fundamentals of all forms of music to dance students. Topics include identifying rhythm, instrumentation, vocabulary, and the orchestration of time in space. Historical and contemporary forms will be analyzed utilizing both live and recorded music. *Prerequisite: none.*

#### TH/DA 101ABC. Ballet II-Intermediate (2-2-2)

Continued studio work in ballet technique and terminology. Emphasis on increasing strength, flexibility and balance, and interpretation of classical musical phrasing. Includes concepts of anatomy and physiology in relationship to ballet. *THDA 1 is prerequisite for THDA 101A. THDA 101A is prerequisite for THDA 101B and THDA 101B is prerequisite for THDA 101C or consent of instructor.*

#### TH/DA 102ABC. Ballet III-Advanced 1 (4-4-4)

Further emphasis on techniques, projection, terminology, and introduction to point work. Introduces historical ballet choreographic variations. Individual and group composition will be presented and aesthetic criticism applied. Text, film, and video used in depicting the historical evolution of ballet. *THDA 101C is a prerequisite for THDA 102A. THDA 102A is prerequisite for THDA 102B and THDA 102B is prerequisite for THDA 102C or consent of instructor.*

#### TH/DA 103ABC. Ballet IV-Advanced 2 (4-4-4)

Designed for students with advanced training and includes point work, pas de deux, classical and contemporary variations, and repertory works. Emphasis on increasing composition and performing skills. The aesthetics for ballet in Western and Non-Western cultures will be discussed. *THDA 102C is a prerequisite for THDA 103A. THDA 103A is prerequisite for THDA 103B and THDA 103B is prerequisite for THDA 103C or consent of instructor.*

#### TH/DA 110ABC. Modern Dance II-Intermediate (2-2-2)

Further development of movement as an expressive medium. Introduces the principles and elements of modern dance and their relationship to other art forms. Discussion of modern dance pioneers. *THDA 2 is a prerequisite for THDA 110A. THDA 110A is a prerequisite for THDA 110B and THDA 110B is prerequisite for THDA 110C or consent of instructor.*

#### TH/DA 111ABC. Modern Dance III-Advanced 1 (4-4-4)

Emphasis is on the development of modern dance as an expressive art concept. Individual and group choreography will be explored and aesthetic concepts. Incorporates applied physiological principles of human movement. Discussion of modern and post-modern trends using text, video, and film. *THDA 110C is a prerequisite for THDA 111A. THDA 111A is a prerequisite for THDA 111B and THDA 111B is prerequisite for THDA 111C or consent of instructor.*

#### TH/DA 112ABC. Modern Dance IV-Advanced 2 (4-4-4)

A continuation of advanced exploration of dance as an expression of artistic and social communication. Contemporary and historical choreographic styles will be reviewed. Advanced principles of composition and dance aesthetics will be discussed. *THDA 111C is a prerequisite for THDA 112A. THDA 112A is a prerequisite for THDA 112B and THDA 112B is prerequisite for THDA 112C or consent of instructor.*

**TH/DA 120ABC. Jazz Dance II—Intermediate (2-2-2)**

Further development of technical skills, terminology, and intermediate rhythmic patterns. Emphasis includes historical and current trends, and general concepts of anatomy and physiology in relationship to movement. Theories of spatial forms and structure will be discussed. *THDA 3 is a prerequisite for THDA 120A. THDA 120A is a prerequisite for THDA 120B and THDA 120B is prerequisite for THDA 120C or consent of instructor.*

**TH/DA 121ABC. Jazz Dance III—Advanced 1 (4)**

Techniques of body control, with a final performance focus. Development of movement theory as related to the performer. Application of constructive criticism to the performer utilizing small group and solo choreography. Includes discussions of jazz dance and its effect of social-cultural and human behavior. *THDA 120C is a prerequisite for THDA 121A. THDA 121A is a prerequisite for THDA 121B and THDA 121B is prerequisite for THDA 121C or consent of instructor.*

**TH/DA 122ABC. Jazz Dance IV—Advanced 2 (4-4-4)**

Extensive study in the development of movement theory as related to the performer. Includes lectures on choreographic principles, compositional forms, constructive criticism, and the history of jazz as an American art form. *THDA 121C is a prerequisite for THDA 122A. THDA 122A is a prerequisite for THDA 122B and THDA 122B is a prerequisite for THDA 122C or consent of instructor.*

**TH/DA 130A. Studies in Performance—Winter Faculty and Student Dance Concert (2-4)**

The in-depth study of a major dance production. Admission by audition only. *Corequisite: students must be concurrently enrolled in any level of THDA 1, 2, 3, 101, 102, 103, 110, 111, 112, 120 or 121.*

**TH/DA 130B. Studies in Performance—Spring Student Dance Concert (2-4)**

The in-depth study of a major dance production; including choreography and/or performance. Admission by audition only. *Corequisite: students must be concurrently enrolled in any level of THDA 1, 2, 3, 101, 102, 103, 110, 111, 112, 120 or 121. Prerequisite: choreographers must also either have completed or be currently enrolled in THDA 141, 142, or 143.*

**TH/DA 131. Dance Repertory (2)**

The study and aesthetic examination of major choreographic works created by dance faculty of the department or distinguished guest artists. Audition is required.

**TH/DA 132. Dances Of The World (4)**

Course designed for in-depth study of the dance of a particular culture—Afro-Cuban, Spanish Balinese, Japanese, Latin, etc. Specific topic will vary from quarter to quarter.

**TH/DA 140. Dance Improvisation (4)**

Participants will learn improvisation methods as related to the aesthetic awareness of movement. Students will explore both structured and unstructured improvisation skills to expand their awareness of movement choices in time, space, and energy. *Prerequisite: none.*

**TH/DA 141. Principles of Choreography (4)**

Presents the concepts and elements of dance creation through studies, readings, discussions, and examination of theories. This course is the foundation of the fundamentals of dance composition. *Prerequisite: none.*

**TH/DA 142. Choreography And Performance (4)**

Theories and techniques of advanced choreographic problems exploring a range of performance options including multi-media collaborations using video, text, lighting, props, masks, dance/music improvisations, and environmental choreography and performance. *Prerequisite: none.*

**TH/DA 143. Choreography for Dramatic Text (4)**

Choreography problems in movement style and purpose will be explored through analysis of both historical and contemporary dramatic text. Emphasis will be placed on dance as a complement to verbal communication and a medium for non-verbal communication. *Prerequisite: THDA 1 or THDA 2 or THDA 3, or above, and THAC 1, or consent of instructor.*

**TH/DA 151. Dance History—Ballet (4)**

A study of ballet as a reflection of history from its origins and aesthetic development to its choreographic diversity of today. *Prerequisite: none.*

**TH/DA 152. Dance History—Modern (4)**

A study of modern dance as a reflection of history from its origins and aesthetic developments to its choreographic diversity of today. Reflections of the significant reactions of modern dance to social, economical, and cultural changes will be included. *Prerequisite: none.*

**TH/DA 153. Dance History—Jazz Dance and Related Ethnic Studies (4)**

A study of jazz dance and other related ethnic dance cultures as a reflection of history from their origins and aesthetic development to their choreographic intentions of today. Evidence of artistic fluctuation in social, economical, and cultural diversity will be included. *Prerequisite: none.*

**TH/DA 159. Dance Criticism and Aesthetics (4)**

A historical analysis of aesthetic concepts related to dance and comparable visual arts. Critical writings on dance as a visual art will be studied from the renaissance to the present. *Prerequisite: upper-division standing or consent of instructor.*

**TH/DA 160. Dance Movement Analysis and Injury Prevention Techniques (4)**

This course is designed to provide the dancer with a muscular skeletal understanding of dance education. Analytic studies will concentrate on kinesthetic functions, training practices, nutrition, distribution of dance injuries, and results of poor training. *Prerequisite: upper-division standing or consent of instructor.*

**TH/DA 197. Field Studies In Dance (1-12)**

Designed for advanced students, this course significantly extends their knowledge of the theatre and dance through intensive participation in the creative work of a major professional theatre or dance company under the guidance of artists resident in those theatres or companies. Students will submit regular written evaluations each week of their ongoing field study. *Prerequisites: upper-division standing and consent of instructor required. (e.g., "San Diego Dance Institute")*

2. 3.7 GPA or better in the major
3. 3.5 GPA or better overall, which students *must maintain* until final graduation
4. Completion of at least four upper-division theatre courses
5. Recommendation of a faculty sponsor who is familiar with the student's work

**Guidelines**

Application to the Honors Program may be made upon completion of ninety units or no later than the fifth week of the quarter preceding the final two quarters before graduation. The Undergraduate Committee will consider the application and, if approved, the student and the principal adviser will have the responsibility of proposing an Honors Thesis Committee to the Undergraduate Committee for final approval.

Students are required to take THGE 196A, Honors Studies in Theatre, and 196B, Honors Thesis in Theatre, *in addition* to the thirteen upper-division required courses for the major. THGE 196A and B are to be taken consecutively and may not be taken concurrently.

**The Graduate Program—  
M.F.A. in Theatre**

The Department of Theatre and Dance has set an ambitious goal for its M.F.A. program: the training of artists who will shape the future direction of the theatre.

The curriculum for all students involves studio classes and seminars. These are integrated with a progressive sequence of work on productions and with a professional residency at the La Jolla Playhouse.

The M.F.A. program at UCSD is built around the master-apprentice system of training. All the faculty are active professionals who teach at UCSD because of a shared commitment to training young artists. Instruction takes place not just in the classroom, but in theatres around the country where faculty, with students as assistants, are involved in professional productions, including those at the La Jolla Playhouse.

Students graduating from the M.F.A. program at UCSD should be prepared to take positions in the professional theatre in the

**Honors Program**

The department offers a special program of advanced study for outstanding undergraduates majoring in theatre. Successful completion of the Honors Program enables the student to graduate "With Highest Distinction" (A+), "With High Distinction" (A), or "With Distinction" (A-), depending upon performance in the program.

**Eligibility**

1. Junior standing (ninety units or more completed)

United States and abroad. Students are now working in New York, in resident theatres, in the film and television industry, and in European repertory theatres. M.F.A. candidates in acting, design, directing, playwriting, and stage management will complete at least ninety quarter-units of academic work during their tenure in the program.

### *Ph.D. in Theatre and Drama\**

The UCSD Department of Theatre and Dance and the Department of Drama at UC Irvine will begin to recruit students for the new Joint Doctoral Program in Theatre and Drama in the fall of 1998 for admission in fall of 1999.

Within the context of the program's twin focus on theory and history, an innovative structure permits each student to pursue a custom designed curriculum that draws from a rich variety of seminars in faculty research areas that include: Greek classical theatre; Shakespeare; neo-classical, modern, and contemporary French theatre; modern and contemporary German theatre; modernist and postmodernist theatre and performance; U.S. Latino theatre; and theory.

Interested students are encouraged to request detailed information about the program and application materials, which will be available from either department in September, 1998.

\*Pending final approval

## COURSES

**Note:** For changes in major requirements and in course offerings implemented after publication, inquire at the office of the Department of Theatre and Dance.

The subject codes are:

- THAC Acting
- THDA Dance
- THDE Design
- THDR Directing, Stage Management
- THGE General
- THHS History and Theory
- THPR Practicum
- THPW Playwriting

### TH/AC Acting

#### TH/AC 1. Introduction to Acting (4)

A beginning course in the fundamentals of acting: establishing a working vocabulary and acquiring the basic skills of the acting process. Through exercises, compositions and improvisations, the student actor explores the imagination as the actor's primary resource, and the basic approach to text through action. *Prerequisite: none.*

#### TH/AC 101. Acting I (4)

This course focuses on beginning scene study with an emphasis on exploring action/objective and the given circumstances of a selected text. *Prerequisite: THAC 1 or consent of instructor.*

#### TH/AC 102. Acting II (4)

Further study in the application of the given circumstances to a text and the development of characterization. The final stages of this course will be selection and preparation of audition material. *Prerequisite: THAC 101 or consent of instructor.*

#### TH/AC 104. Classical Text (4)

Studies of the heightened realities of poetic drama. Verse analysis, research methods and how to approach a classical dialogue. *Prerequisite: consent of instructor.*

#### TH/AC 107. Improvisation for the Theatre (4)

Improvisation for the theatre explores improvisation techniques as an alternative and unique approach to acting. Students should have a performance background, and should have taken THAC 1.

#### TH/AC 108. Advanced Topics (4)

Advanced topics in acting, such as Avant Garde Drama, Commedia or Beckett, for students who possess basic acting techniques. *Prerequisite: consent of instructor.*

#### TH/AC 109. Singing for the Actor (4)

This course introduces basic skills of breathing, placement, diction, musicianship, harmony, interpretation, and presentation needed by actors for roles requiring singing. Through a combination of group and individual coaching in class, students will prepare a program of short solo and ensemble pieces for a finals-week presentation. *Prerequisite: THAC 1 and audition.*

#### TH/AC 111. Freeing the Voice (4)

Intensive workshop for actors and directors designed to "free the voice," with special emphasis on characterization and vocal flexibility in a wide range of dramatic texts. This proven method combines experimental and didactic learning with selected exercises, texts, tapes, films, and total time commitment. *Prerequisite: none.*

#### TH/AC 115. Movement for Actors (4)

An exploration of the wide array of physical skills necessary for the actor. Using techniques derived from mime, clowning, sports, acrobatics, and improvisation, students will investigate their individual physical potential as well as their sense of creativity and imagination. *Prerequisite: none.*

#### TH/AC 120. Ensemble (4)

An intensive theatre practicum designed to generate theatre created by an ensemble with particular emphasis upon the analysis of text. Students will explore and analyze the script and its author. Ensemble segments include black theatre, Chicano theatre, feminist theatre, and commedia dell'arte. A maximum of four units may be used for major credit. (Cross-listed with Ethnic Studies 146A.) *Prerequisites: consent of instructor and department stamp.*

#### TH/AC 122. Ensemble: Undergraduate Production (4)

An intensive theatre practicum involving creating a theatre production. Includes text analysis and explorations of the direct-

ing and acting processes, as well as technical support, and performance. Department stamp required. Audition may be required. A maximum of four units may be used for major credit.

#### TH/AC 123. Advanced Studies in Performance (4)

Participation in a fully staged season production for the Department of Theatre. Admission by audition only. A maximum of four units may be used for major credit.

#### TH/AC 126. Acting-Directing Process (4)

A studio class that investigates the relationship between the actor and the director. Working alongside directors, students learn how to animate the writers and directors vision on stage through status exercises and scene work whilst expanding their skills in the acting process. *Prerequisite: THDR 108.*

### TH/DE Theatre Design

#### TH/DE 1. Introduction to Design for the Theatre (4)

A survey of contemporary and historical concepts and practices in the visual arts of the theatre; studies in text analysis, studio processes and technical production; elementary work in design criticism, scale model making, and costume design. A course serving as an introduction to theatre design and production.

#### TH/DE 101. Theatre Process—Scenery (4)

This hands-on course develops craft skills and a process for theatrical scenic design including script analysis, research, sketches, simple drafting, scale model making, and critical analysis of class projects. *Prerequisite: THDE 1 or THPR 1 or consent of instructor.*

#### TH/DE 111. Theatre Process—Costumes (4)

The process of the costume designer from script analysis, research visualization of ideas, through the process of costume design. Lecture and demonstration labs parallel lecture material. This course is intended for those interested in a basic understanding of the costumer's process. No previous drawing or painting skills required. *Prerequisite: THDE 1.*

#### TH/DE 121. Theatre Process—Lighting (4)

One of three survey classes in theatre process. This course aims to develop basic skills in lighting design through practical projects. Lab work and lecture. These emphasize collaboration, manipulating light and color, and developing craft skills. *Prerequisite: THDE 1 or THPR 3 or consent of instructor.*

#### TH/DE 131. Special Topics in Theatre Design (4)

A course designed to expose the theatre design student to a variety of specialized topics that will vary from quarter to quarter. *Prerequisite: THDE 1 or consent of instructor.*

#### TH/DE 190. Major Project in Design/Theatre Production (4)

For the advanced design/production student. Concentration on a particularly challenging design or theatre production assignment, including such areas as assistant designer (scenery, lighting, or costumes), technical director, master cutter, or master electrician. May be repeated one time for credit. A maximum of eight units of major project study, regardless of area (Design, Directing, Stage Management or Playwriting) may be used to fulfill major requirements. *Prerequisite: admission by consent of instructor only. See department for Special Projects Application.*

### TH/DR Directing/Choreography/Stage Management

#### TH/DR 101. Stage Management (4)

Discussion and research into the duties, responsibilities, and roles of a stage manager. Work to include studies in script

analysis, communication, rehearsal procedures, performance skills, and style and concept approach to theatre. THGE 1 and THDE 1 recommended.

**TH/DR 108. Text Analysis for Actors and Directors (4)**

This is an introductory class in the process of understanding the play script. The class will focus on analyzing the story and the underlying dramatic structure in terms of dramatic action. Objectives, actions, choices, given circumstances, and character will be examined. *Prerequisite: upper-division standing or consent of instructor.*

**TH/DR 111. Directing-Acting Process (4)**

A studio class that investigates the fundamental skills a director needs to work with actors. Working with actors, students learn how to animate the text on stage through status exercises and scene work as they develop their skills in text work, staging, and dramatic story telling. *Prerequisite: THDR 108.*

**TH/DR 190. Major Project in Directing (4)**

For the advanced student in directing. Intensive concentration on the full realization of a dramatic text from research and analysis through rehearsal and into performance. A maximum of eight units of major project study, regardless of area (Design, Directing, Stage Management or Playwriting) may be used to fulfill major requirements. See department for application. *Prerequisites: THDR 108, 111, and consent of instructor.*

**TH/DR 191. Major Project in Stage Management (4)**

For the advanced student in stage management. Intensive concentration on the full realization of a dramatic text, from research and analysis through rehearsal and final performance. A maximum of eight units of major project study regardless of area (Design, Directing, Stage Management or Playwriting) may be used to fulfill major requirements. See department for application. *Prerequisites: THPR 4, THPR 104, THDR 101, and consent of instructor.*

**TH/GE Theatre General**

**TH/GE 1. Introduction to Theatre (4)**

An introduction to fundamental concepts in drama and performance. Students will attend performances and learn about how the theatre functions as an art and as an industry in today's world. *Prerequisite: none.*

**TH/GE 10. Theatre and Film (4)**

Theatre and Film analyzes the essential differences between theatrical and cinematic approaches to drama. Through selected play/film combinations, the course looks at how the director uses actors and the visual languages of the stage and screen to guide and stimulate the audience's responses. *Prerequisite: none.*

**TH/GE 11. Great Performances on Film (4)**

Course examines major accomplishments in screen acting, from the work of Charlie Chaplin and Orson Welles to that of present day stars. Analysis of the script, the details of the production, the craft of the actor, and how these come together to produce the art of cinematic performance. *Prerequisite: none.*

**TH/GE 12. Great Films of Great Plays (4)**

Examination of selected contemporary films based upon important plays. Involves viewing films, reading plays upon which they were based, and discussion of the transition of themes and artistic choices made in translation from one media to another. *Prerequisite: none.*

**TH/GE 25. Public Speaking (4)**

This course is designed to establish a clear understanding of the fundamentals of effective oral communication. The methodologies explore the integration of relaxation, concentration, organization, and clear voice and diction as applied to various public speaking modes. *Prerequisite: none.*

**TH/GE 27. User-Friendly Shakespeare (4)**

Do you get a puzzled or pained expression on your face when people mention Shakespeare? Try a congenial introduction to the world's greatest playwright from the perspective of performance. Film, live performance, and illuminating facts confront the so-called difficulties in an appreciation of the Bard. *Prerequisite: none.*

**TH/GE 90. Undergraduate Seminar (1)**

Discussion of various theatre topics.

**TH/GE 100. Major Seminar (2)**

Discussion of various aspects of the contemporary theatre along with issues it faces. A secondary aim is to offer an introduction to the Department of Theatre and Dance, its aesthetic and goals. To be taught by the department chair in the fall quarter each year. Guest speakers from the faculty and the profession. Minors also encouraged to enroll. Open to all interested undergraduates.

**TH/GE 101. Apprenticeship/La Jolla Playhouse (4)**

Professional production experience with performance training. In addition to conservatory class work, apprentices are with a production for the entire rehearsal and performance process. Assignments from two to eleven weeks, May-August depending on availability. This course does not satisfy any theatre major or minor requirements. *Prerequisites: audition/interview, upper-division standing, resume, and three letters of recommendation.*

**TH/GE 102. Conservatory/La Jolla Playhouse (12)**

Concentrated studies in acting, scene study, text analysis, voice, speech, and movement. Taught by theatre professionals from the La Jolla Playhouse and the UCSD Department of Theatre and Dance. Eight-week program, Tuesday-Friday, 9:00 a.m.-5:00 p.m., concluding with a workshop presentation. This course does not satisfy any theatre major or minor requirements. *Prerequisites: audition/interview, upper-division standing, or consent of instructor.*

**TH/GE 120. Contemporary Film: Dramatizing Our World (4)**

An examination of eight to ten selected films (mostly American) from the '80s and '90s as explorations of aspects of contemporary life. The class will concentrate on the ways in which selected filmmakers use film as a dramatic medium to address some of the complex issues facing contemporary society. Particular attention will be paid to comedies, thrillers, and romances. Students will be required to see some films in current release. *Prerequisites: none.*

**TH/GE 121. Broadway Goes Hollywood: Great American Movie Musicals (12)**

This class examines that quintessentially American art form, the musical film. We will trace its origins from the Broadway stage via Hollywood in the 1920s through the great years during the studio heydays of the '30s through the '60s, as well as examine the musical film's current status. Examples are *The Jazz Singer*, *Jesus Christ Superstar*, and others. *Prerequisite: upper-division standing or consent of instructor.*

**TH/GE 123. Mary Poppins Meets Bladerunner (4)**

A lecture class that examines significant historical and contemporary art direction/scenic design that effectively supports film narration in a unique manner. Highlights and video clips accompany each feature film presentation. (THDE 1 recommended) *Prerequisite: upper-division standing.*

**TH/GE 124. Cult Films: Weirdly Dramatic (4)**

A select survey of eight to ten exceptional off-beat, frequently low-budget films from the last six years that have attained "cult" status. The mix includes Tod Browning's "Freaks" (1932) to John Water's "Pink Flamingos" (1973). Aspects of bad taste, cinematic irony, and theatrical invention will be highlighted. *Prerequisite: upper-division standing.*

**TH/GE 125. Topics in Theatre and Film (4)**

An in-depth exposure to an important individual artist or subject in theatre and/or film. Topics vary from quarter to quarter. *Prerequisite: upper-division standing or consent of instructor.*

**TH/GE 130. Let There Be Light! (4)**

An adventure-theory class investigating the power of light and color used in art, architecture, theatre, film, television and exploring its impact on students' lives. *Prerequisite: none.*

**TH/GE 133. Styles, Ideas, and Visual Expression (4)**

An exploration of fundamental ways of seeing and thinking about the performance space. A special emphasis on the manipulation of image, sound, text, and message, in visual arts, theatre, opera, rock video clips, commercials, etc. The design process as it reflects ideas, styles, attitudes, and ways of seeing and thinking. *Prerequisite: none.*

**TH/GE 195. Instructional Assistance (2 or 4)**

Assist with instruction in undergraduate theatre courses. Full description of duties will appear on the "Application for Instructional Assistance."

**TH/GE 196A. Honors Studies in Theatre (4)**

This course will allow theatre honors students to explore advanced issues in the field of theatre. It will also provide honors students the opportunity to develop an honors thesis on the topic of their choice and begin preliminary work under faculty supervision. Department stamp required. Can be taken for a letter grade only. Other requirements are junior standing (ninety, plus units); 3.5 GPA up to graduation; 3.7 GPA in major; must have completed at least four upper-division theatre courses; recommendation of faculty member familiar with student's work.

**TH/GE 196B. Honors Thesis in Theatre (4)**

This course will provide honors candidates an opportunity to complete the research on and preparation of an honors thesis under close faculty supervision. Can be taken for a letter grade only. Other requirements are junior standing (ninety, plus units); 3.5 GPA overall up to point of graduation; 3.7 GPA in major; must have completed at least four upper-division theatre courses; recommendation of a faculty member familiar with student's work. Department stamp required.

**TH/GE 197. Field Studies (1-12)**

Designed for advanced students, this course significantly extends their knowledge of the theatre through intensive participation in the creative work of a major professional theatre, television, or film company under the guidance of artists resident in those theatres or companies. Students will submit regular written evaluations each week of their ongoing field study.

**TH/GE 198. Directed Group Studies (0-2-4)**

Group studies, readings, projects, and discussions in theatre history, problems of production and performance, and similarly appropriate subjects.

**TH/HS Theatre History**

**TH/HS 1. History of Theatre 1: Classical to Renaissance (4)**

An introduction to the plays, players, and places of Greek, Roman, and Renaissance theatre. Playwrights include Aeschylus, Sophocles, Euripides, Plautus, Shakespeare, Marlowe, Cervantes, and Lupe de Vega. Emphasis will be on the plays in performance, as dramatic literature that lived for specific audiences in particular times and places. *Prerequisite: none.*

**TH/HS 2. History of Theatre 2: Neoclassicism to Realism (4)**

An introduction to the plays, players, and places of 17th, 18th, and 19th-century theatre. The course tracks the development of theatrical realism in acting, design, and playwriting. Playwrights include Molière, Racine, Sheridan, Goethe, Beaumarchais, Ibsen, and Chekov. Emphasis will be on the plays

in performance, as dramatic literature that lived for specific audiences in particular times and places. *Prerequisite: none.*

**TH/HS 3. History of Theatre 3: Symbolism to Postmodernism (4)**

An introduction to the plays, players, and places of twentieth-century European and American theatre. Playwrights include Jarry, Pirandello, Brecht, O'Neill, Genet, Beckett, Baraka, Shange, Fornes, and Hwang. Emphasis will be on the plays in performance, as dramatic literature that lives for specific audiences in particular times and places. *Prerequisite: none.*

**TH/HS 101. Topics in Dramatic Literature and Theatre History (4)**

An in-depth exposure to an important individual writer or subject in dramatic literature and/or theatre history. Topics vary from quarter to quarter. Recent courses have included Modern French Drama, and the History of Russian Theatre. *Prerequisite: THHS 1 or 2 or 3 or consent of instructor.* May be taken four times for credit.

**TH/HS 102. Masters of Theatre (4)**

Focus on the artists of seminal importance in the theatre. Consideration will be given to theory and practice of the artist, with emphasis on theatrical realizations that can be reconstructed by integrated research. Examples of recent courses include Molière, Fugard, and Strindberg. *Prerequisite: THHS 1 or THHS 2 or THHS 3 or consent of instructor.*

**TH/HS 103. Ancient Greek Drama in Modern Version (4)**

Ancient Greek plays still ask questions that need to be asked. Studies ancient myths as they reappear in contemporary films, on stage, and in opera. Includes analysis of media techniques in examining ancient Greek drama in its living form. *Prerequisite: THHS 1 or 2 or 3 or consent of instructor.*

**TH/HS 109. African Heritage in Contemporary Drama: African, Caribbean, and African-American (4)**

This course is designed to introduce students to African, Caribbean, and African-American theatre/playwrights. Students will discover classwork to be intensive rather than exhaustive. Each play will be examined for sources of dramatic power, type of world presented, relationships to audience, uses of language, uses of art as politics. (Cross-listed with Ethnic Studies 177.) *Prerequisite: THHS 5 or consent of instructor.*

**TH/HS 110. Chicano Dramatic Literature (4)**

Focusing on the contemporary evolution of Chicano dramatic literature, course will analyze playwrights and theatre groups that express the Chicano experience in the United States, examining relevant "actos," plays, and documentaries for their contributions to the developing Chicano theatre movement. (Cross-listed with Ethnic Studies 132.) *Prerequisite: THHS 1 or 2 or 3 or consent of instructor.*

**TH/HS 111. Hispanic-American Dramatic Literature (4)**

Course examines the plays of leading Cuban-American, Puerto-Rican, and Chicano playwrights in an effort to understand the experience of these Hispanic-American groups in the United States. (Cross-listed with Ethnic Studies 133.) *Prerequisite: THHS 1 or 2 or 3 or consent of instructor.*

**TH/HS 114. American Musical Theatre (4)**

The class will explore this vital and unique theatre form by examining its origins, evolution components, and innovators. Special emphasis is placed on the process of adaptation and the roles of the director and choreographer. *Prerequisite: THHS 1 or 2 or 3 or consent of instructor.*

**TH/HS 115. History and Theory of Directing (4)**

Evolution of directing theory from 1850 to the present with reference to the work of internationally influential directors

such as Saxe-Meiningen, Antoine, Stanislavski, Meyerhold, Brecht, and Brook, among others. *Prerequisite: upper-division standing or consent of instructor.*

**TH/HS 116. Old Myths in New Films (4)**

Course includes Kurosawa, Herzog, Neil Jordan, and other moderns, showing how their films derive from classics and myths, drawing on Asian, Irish, and Ancient Greek traditions. Nothing new under the sun, but art makes it so! *Prerequisite: upper-division standing or consent of instructor.*

**TH/PR Practicum**

**TH/PR 1. Practicum—Scenery (4-6)**

A production performance oriented course that introduces fundamentals of scenery constructed and its theatrical operation. Laboratory format allows students to work through the scenery production process culminating in a crew assignment for a fully mounted theatrical production. *Prerequisite: department stamp required.*

**TH/PR 2. Practicum—Costume (4-6)**

A production performance oriented course that introduces fundamentals of costume construction and its integration into theatre operations. Laboratory format allows students to work through the costume production process culminating in a crew assignment for a fully mounted theatrical performance. *Prerequisite: department stamp required.*

**TH/PR 3. Practicum—Lighting (4-6)**

A production performance oriented course that introduces fundamentals of stage lighting or sound and its technical operation. Laboratory format allows a student to work through the lighting or sound production process culminating in a crew assignment for a fully mounted theatrical production. *Prerequisite: department stamp required.*

**TH/PR 4. Practicum—Stage Management (4-6)**

A production performance oriented course that introduces fundamentals of stage management. Laboratory format allows students to work through entire production process culminating in a fully mounted theatrical production. *Prerequisite: department stamp required.*

**TH/PR 104. Advanced Practicum in Stage Management (4-6)**

A production performance oriented course that continues the development of stage management skills and introduces greater responsibilities in the laboratory format. Students serve as either assistant stage managers on mainstage productions or stage managers on studio projects. *Prerequisites: THPR 4, THDR 101, and consent of instructor.*

**TH/PW Playwriting**

**TH/PW 1. Introduction to Playwriting (4)**

A workshop designed to liberate the dramatic imagination. Through exercises in developing character and dramatic action students learn how to build a short play from a beginning idea, to a scenario, the writing of dialogue, to the completion of a first draft.

**TH/PW 101. Playwriting Workshop (4)**

A workshop where students present their plays at various stages of development for group analysis and discussion. Students write a one-act play which culminates in a reading. Also includes writing exercises designed to stimulate imagination and develop writing techniques. *Prerequisite: THPW 1 or consent of instructor.*

**TH/PW 104. Screenwriting (4)**

Basic principles of screenwriting using scenario composition, plot points, character study, story conflict, with emphasis on

visual action and strong dramatic movement. *Prerequisite: THPW 1.*

**TH/PW 190. Major Project in Playwriting/Screenwriting (4)**

For the advanced student in playwriting/screenwriting. This intensive concentration in the study of playwriting and/or screenwriting will culminate in the creation of a substantial length play. A maximum of eight units of major project study, regardless of area (Design, Directing, Stage Management, Playwriting) may be used to fulfill major requirements. Applicants must have completed the playwriting sequence, THPW 1, 101, and/or consent of instructor. See department for application form.

**GRADUATE**

**200. Dynamics (1)**

A daily program of physical, vocal, and speech exercises designed to prepare the student to move in a focused way into specific class areas with minimum amount of warm-up time. The exercises work on development of flexibility, strength, and coordination throughout the body. Strong emphasis is placed on physical and mental centering within a structured and disciplined approach to preparation.

**201. Stage Combat (2)**

A study of the dramatic elements of stage violence, and practical work in developing the physical skills necessary to fully realize violent moments on the stage. At the core of the study is the process from text to convincing theatrical action. Physical work revolves around basic principles of energy, focus, and center inherent in unarmed and weapons combat.

**202. Joint Stock (3)**

The process of collaborative creation from idea to performance. *Prerequisite: graduate standing.*

**204A. Text Analysis (4)**

Topics to be covered will include: (1) concept of poetic language; lexical and syntactic analysis of dialogue; (2) the semantic context of dialogue; (3) thematic structure, from motive to themes; (4) the concept of dramatic character or hero; (5) dramatic narrative; (6) the material of drama; the relationship of myth and ritual to drama; (7) analysis versus interpretation; (8) practical applications. *Prerequisite: graduate standing.*

**204B. Performance Analysis (4)**

Semiotic analysis of historically significant and/or contemporary theatrical performances: research methodologies; problems of documentation; scenic writing and the dramatic text; the cultural context of mise-en-scène. *Prerequisite: graduate standing.*

**205. Improvisation for the Theatre (3)**

A course designed to introduce improvisational techniques to professional acting students. A variety of approaches to the art of improvisation will be presented and practiced, both serious and comic. Small and large group improvisations will be offered for participation. *Prerequisite: graduate standing.*

**206. Faculty Directed Production (1-8)**

Faculty directed production, from the rehearsal process through public performance. All participants will enroll in the same section, the number of units depending upon degree of involvement. *Prerequisite: graduate standing.*

**207. Production (2)**

The collaborative process from the rehearsal process through public performance. All participants will enroll in the same section, the same number of units.



**208. Contemporary Performance (2)**

An introduction to performances, ideas, and individuals in contemporary theatre. Work outside of class involves reading, viewing of videotapes, and the preparation of performance compositions. Intended for all first-year graduate students in theatre.

**209. Commedia and Comic Techniques (2)**

A course designed to provide actors with tools, both physical and verbal, to play comedy. Included will be commedia del arte techniques, clown work, masks, circus techniques, mime, and scene work from comic scripts. *Prerequisite: graduate standing.*

**210A. Acting Process I (3)**

Actors focus on the nature of the acting process using exercises to stimulate imagination. Later work includes action and characterization using imaging and improvisational techniques to explore text and character. Directors work as actors and as directors of information-getting exercises and myth exploration.

**210B. Acting Process I (3)**

The first four weeks are devoted to intensive rehearsal with faculty or guest director ending in public performance. Classes are suspended during rehearsals and instructors work with the production. The remainder of the quarter focuses on facial masks, physical characterization, and improvisation ending in a cabaret improvisation competition.

**210C. Acting Process I (3)**

Text analysis of a realistic play ending in a public performance of scenes from that play.

**211A-B-C. Speech for the Actor I (1-1-1)**

Introduction of the principles of phonetics and articulation. Constant study and drill to prepare the actor for standard speech and flexibility. *Prerequisite: graduate standing.*

**213-A-B-C. Movement for Theatre I (2-2-2)**

An intensive studio course in the art of movement as a basis for theatre performance. Theory and practice of energy flow, weight, spatial focus, time consumption, and the shape factor. (S/U grades only.) *Prerequisites: 213A for B, 213B for C.*

**214A-B-C. Voice for Theatre I (2-2-2)**

Voice exercises designed to "free the voice" with emphasis on diaphragmatic breathing, articulation exercises, and singing exercises. Course designed to broaden pitch, range, projection, and to expand the full range of potential characterizations. (S/U grades only.) *Prerequisites: 214A for B; 214B for C.*

**215. Stage Makeup (1)**

Course moves from fundamentals of makeup for the theatre (historical styles, development of makeup media) to special effects derived from various materials, facial structure and basic makeup design, color and light in makeup, basic application theory and technique. *Prerequisite: graduate standing.*

**216. Singing for the Actor I (1)**

Vocal technique for the musical theatre. Exercises, scales, sight reading, ensemble work, preparation of individual pieces. *Prerequisite: graduate standing.*

**217. New Plays Workshop (1-4)**

A weekly workshop with actors, directors, writers, and dramaturgs. Course will focus on the development of stage readings of new works by the playwriting students. *Prerequisite: graduate standing.*

**218. Introduction to Directing (1-4)**

An introduction to the fundamental tools and resources of the director by the examination of scene work from four plays. This course is designed for students not in the directing program. *Prerequisite: graduate standing.*

**219. Directing Process Studio (2/4)**

Preparation, presentation, and discussion of representative scenes from various periods of dramatic literature. *Prerequisite: graduate standing.*

**220A-B. Acting Process II: Classical Text (3-3)**

An intensive studio examination of problems and potentials associated with the theatrical realization of the classical text.

**221A-B. Speech for the Actor II (2-2)**

Advanced work in phonetics and articulation. Intensive study of stage dialects to prepare actor for variety of roles. *Prerequisite: graduate standing.*

**223A-B. Movement for Theatre II (2-2)**

An advanced course in the art of movement for the theatre, building on the knowledge gained in Theatre 213. (S/U grades only.) *Prerequisite: 223A for B.*

**224A-B. Voice for Theatre II (2-2)**

Advanced voice training designed to help the actor fuse voice, emotion, and body into a fully realized reflection of the text. (S/U grades only.) *Prerequisite: 224A for B.*

**225A-B. Singing for the Actor II (1)**

Continuing vocal technique for the musical theatre. More complicated musical material investigated and prepared. *Prerequisite: graduate standing.*

**226. Hispanic-American Theatre History (4)**

A study of the major Hispanic-American theatrical movements, from the early Spanish colonial religious drama of the southwest to the current Hispanic-American theatre movement. Course work will focus on prominent figures as well as representative plays of the periods studied. *Prerequisites: Theatre 42, 43, 44, and consent of instructor.*

**227. Directing Assistantship (6-12)**

Assisting faculty with productions off-campus. Perform research necessary for project. Assist with casting. Participate in design meetings. Observe and participate in rehearsal. Direct, if delegated to do so. *Prerequisite: graduate standing.*

**228. Designing Assistantship (6-12)**

Assisting faculty with productions off-campus. To draft some or all of the project design. To perform research, either visual, historical or technical. To create and maintain all production plans and paperwork records from pre-production through opening night. To organize the staff for focus and work calls. *Prerequisite: graduate standing.*

**229. Theatre Externship (9-12)**

Selected professional opportunities in repertory and commercial theatre, designed to engage the student in particular creative responsibilities under the guidance of master artist-teachers.

**230. Acting Process III: Actors' Studio (3)**

An advanced studio for graduate actors and directors, this work will explore a single text from the modern theatre under the direction of a master teacher-artist. Concentration will be on multiple possible modes of encountering a text, varieties of interpretation and performance realization, and the development of a theatre ensemble.

**233. Acting for the Camera (1)**

This course is designed to aid the actor in the transition from stage to film work. Examination of film production and its physical characteristics and the acting style needed for work in film and television. Students will rehearse and perform in simulated studio setting.

**234. Voice for Theatre III (1-2)**

A one-quarter course devoted exclusively to intensive development of the actor's vocal capability to master a variety of musi-

cal theatre scores. Concentration on extending the vocal range, sight reading, textual and musical analysis, and musical characterization.

**235. Singing for the Actor III (1)**

Continuing vocal technique for the musical theatre. More complicated musical material investigated and prepared. *Prerequisite: graduate standing.*

**238. Speech for the Actor III (1)**

Continuing advanced work in phonetics and articulation. Intensive study of stage dialects to prepare actor for variety of roles. *Prerequisite: graduate standing.*

**239. Movement for Theatre III (1)**

An advanced course in the art of movement for the theatre, building on the knowledge gained in Theatre 223A and B. *Prerequisite: graduate standing.*

**240. Directing Seminar (1-6)**

A seminar focusing on the current directing projects of all graduate directing students. Depending upon individual student needs, the work may include play selection, historical or sociological research, and discussion of emerging directorial concepts, the rehearsal process, and post-production evaluation. *Prerequisite: graduate standing.*

**241. Directing—Site Specific (2-4)**

A course designed to create theatre performance in non-theatrical settings. This will be done by using theatrical text in non-traditional settings or text specifically created for individual sites. *Prerequisite: graduate standing.*

**244. Dramatic Structure (2-4)**

Analysis of fundamentals of dramatic structure; plotting, thematic structure, structure of action at the level of scene. Study of well-structured plays in several styles. Practical exercises in constructing plays effectively, along with theoretical considerations. *Prerequisite: graduate standing.*

**245. Directing Practicum (2-4)**

Students enrolled in this course will work on productions in the function of a director. This will include staging, creative interpretation, blocking, etc. *Prerequisite: graduate standing.*

**249. TheatreForum Workshop (2)**

A workshop focusing on the editing of *TheatreForum*, involving evaluation of submitted articles and the comparative study of competing theatre and performance journals. Students participate actively in all aspects of the editing and production of *Theatre Forum*. *Prerequisite: graduate standing.*

**250. Playwriting Seminar (4)**

A seminar focusing on the current playwriting project of all graduate playwriting students. Work for each quarter is individually determined according to student needs, but may include exploration of an inception idea, development of a scenario or other structural work, and writing dialogue. Students present work to be discussed in class. May include group or individual playwriting exercises. *Prerequisite: graduate standing.*

**251. Playwriting Practicum (3-6)**

Creative writing project developing original scripts from outline to the final play. Plays may vary depending on the quarter, but will include writing of a realistic one-act, a nonrealistic one-act, a one-act documentary or dramatization of fiction, a full-length play. *Prerequisite: graduate standing.*

**252. Dramaturgy Seminar (2-3)**

The seminar will deal with all dramaturgical issues pertaining to departmental productions: production research, textual analysis, translation, adaptation, rehearsal process, and critique. Concurrently with the dramaturgy issues of the given



year, the seminar will discuss possible choices of plays for future production seasons. *Prerequisite: graduate standing.*

**253. Dramaturgy Practicum (1-6)**

Students enrolled in this course will work on productions in the function of a dramaturg. This will entail preparation of texts, research, participation at rehearsals, etc. *Prerequisite: graduate standing.*

**255. Restaging the Classics (4)**

A series of detailed dramaturgic and scenographic examinations of influential reinterpretations of classic dramatic texts. The seminar will investigate selected texts from the dual perspectives of historic and contemporary theatre practice. *Prerequisite: graduate standing.*

**256. Contemporary Plays (2)**

A guided reading course focusing exclusively on very recent plays in an attempt to become aware of what is being written now. Plays chosen will be primarily American. Course may be repeated for credit.

**257. Screenwriting (4)**

Students will develop the concept for an original piece for television or film and will write the screenplay. Student work will be discussed in seminar at each phase of the development. *Prerequisites: graduate standing and 250.*

**258. Dramatization and Adaptation (4)**

Seminar will deal with dramatization and adaptation of literary texts for the purpose of theatrical production. The class will study some significant examples of such practice from the past, and, subsequently, students will develop their own projects of dramatization, adaptation, or modernization of texts. *Prerequisite: graduate standing.*

**260. Theatrical Modernism: Nineteenth to Twentieth Century (4)**

Topics to be covered include: radicalism of realism; symbolist theatre and the origins of the avant-garde; the new director as an artist; new structures of representation; painters and the modern theatre; from modernism to postmodernism. *Prerequisite: graduate standing.*

**261. Theatre and Drama in Ancient Greece (4)**

This class will deal mainly with the fifth-century theatre, drama, and related subjects of mythology and philosophy of art. *Prerequisite: graduate standing.*

**262. Seminar in Drama, 1650-1900**

Investigation of major dramatic texts from Neoclassicism to Realism. *Prerequisite: graduate standing.*

**263. Seminar in Drama, 1900-present**

Investigation of major dramatic texts from the modern and contemporary theatre. *Prerequisite: graduate standing.*

**265. Black Dramatists in the Diaspora (4)**

The course will examine a number of works from Black Africa and others of Black African descent in various parts of the world. The most vital, energetic and significant contributors on the international scene, Soyinka, Walcott, Wilson, Baraka, and Nascimento, are among those represented.

**268. Latin American Dramatic Literature (4)**

This seminar will focus on representative contemporary Latin American plays in Spanish as well as in English translation. Students will analyze the plays and dramatists from the perspective of a dynamic social, cultural, and political process. *Prerequisite: graduate standing.*

**269. U.S.-Latino Dramatic Literature (4)**

Depending upon quarter offered, seminar will focus on representative plays from one of the U.S. Latino communities (i.e., Chicano, Colombian, Cuban, or Puerto Rican playwrights in the U.S.) Students will analyze plays and dramatists from the

perspective of a dynamic social, cultural, and political process. *Prerequisite: graduate standing.*

**270A-B-C. Design Studio I: (4)**

This course will focus on beginning-level problems in theatre design, including text analysis, research, conceptualization, and visual expression. Students will work on individual projects in lighting, costume, and scenic design. The course will include group critiques of completed designs and works in progress. 270A: Scenic Design (fall); 270B: Costume Design (winter); 270C: Lighting Design (spring). *Prerequisite: graduate standing.*

**271. Design Seminar (2)**

A seminar focusing on all aspects of the design profession, including current projects of graduate design students. The work may also include portfolio presentations, research presentations, and guest lecturers. *Prerequisite: graduate standing.*

**274. Advanced Scenic Design (4)**

This course explores advanced problems in scenic design through development and critique of creative class projects and production works-in-progress. *Prerequisite: graduate standing.*

**275. Advanced Lighting Design (4)**

Creative projects and topics in Lighting Design to develop the student's techniques and professional practices. Work to include studies in design research, concepts, psychophysical considerations, collaboration, professional procedures and systems, paperwork, and organization. Various scales of production projects will be addressed by the student for presentation and critique, and may be theoretical or productions in the departmental calendar. *Prerequisite: second- or third-year graduate standing.*

**276. Advanced Costume Design (4)**

Projects in costume design, emphasizing script analysis, research, conceptualization, and visual expression. Studio work includes costume rendering in various media for specific plays. *Prerequisite: graduate standing.*

**278. Special Topics in Theatre Design: (1-6)**

A course designed to expose the theatre design student to a variety of specialized topics, including millinery, pattern drafting and draping, scenic painting, model making, figure drawing, drafting, fitting, rendering. Topics will vary from quarter to quarter. *Prerequisite: graduate standing.*

**279. Design Practicum (2)**

This course covers the artistic, aesthetic and practical aspects of the designers work as they develop and execute the design toward a fully realized production. *Prerequisite: graduate standing.*

**280. Stage Management (1-4)**

Discussion and research into the duties, responsibilities, and roles of a stage manager. Work to include studies in script analysis, communication, rehearsal procedures, performance skills, and style and concept approach to theatre. *Prerequisite: graduate standing.*

**281. Stage Management 2 (4)**

A continuation of the introductory stage management course, to further explore the stage manager's process, focusing on the technical rehearsal period through the closing of a show. *Prerequisites: graduate standing and 280.*

**286. Special Topics in Stage Management (1-6)**

A course for MFA students in stage management. Topics will focus on various aspects of theatre administration, and advanced stage management including: Non-profit Theatre, Commercial Theatre, Advanced Problems, Venues, Musicals/Dance, Production Management, Theatre Development, Business Problems, and Theatre Marketing. *Prerequisite: graduate standing.*

**288. Stage Management Seminar (1-12)**

A weekly seminar in which all graduate stage managers participate. Includes discussions of problems encountered on current productions, paperwork, methodology, and production approaches. *Prerequisite: graduate standing.*

**295. Acting Practicum (2)**

This course covers the artistic, aesthetic, and practical aspects of the actors work as they develop and execute the character/role towards a fully realized production. *Prerequisite: graduate standing.*

**296. Stage Management Practicum (4-12)**

Taken each term by all graduate stage management students. The class focuses on the development of knowledge and skills necessary for the contemporary stage manager. Seminar format is augmented by lab work that may include departmental productions. *Prerequisite: graduate standing.*

**297. Thesis Research (2-12)**

Thesis research for M.F.A. degree. (S/U grades only.) *Prerequisite: graduate standing.*

**298. Special Projects (0-4)**

Advanced seminar and research projects in theatre. (S/U grades only.)

**299. Thesis Project (2-12)**

Specific projects in theatre individually determined to meet the developing needs, interests, and abilities of M.F.A. candidates. (S/U grades only.)

**500. Apprentice Teaching (2)**

This course, designed to meet the needs of the graduate students who serve as teaching assistants, includes analysis of texts and materials, discussion of teaching techniques, conducting discussion sections, formulation of topics and questions for papers and examinations, and grading papers and examinations under the supervision of the instructor assigned to the course. Participation in the undergraduate teaching program is required for the M.F.A. degree. The amount of teaching required is equivalent to the duties expected of a 25 percent teaching assistant for one quarter. Enrollment for two units in this course documents the requirement.

## Third World Studies

OFFICE: 3313 Literature Building,  
Warren College, (619) 822-0377

### Professors

Carlos Blanco-Aguinaga, Ph.D., *Spanish and Latin American Literature, Emeritus*  
Jaime Concha, Ph.D., *Spanish and Latin American Literature*  
Edward Reynolds, Ph.D., *African History*  
Rosaura Sanchez, Ph.D., *Spanish and Latin American Literature, Linguistics*  
William Tay, Ph.D., *Chinese Literature*

### Associate Professors

Robert Cancel, Ph.D., *African and Caribbean Literature, Coordinator of Third World Studies*

Ann L. Craig, Ph.D., *Political Science*

Michael P. Monteon, Ph.D., *Latin American History*

Vicente L. Rafael, Ph.D., *Communication: Southeast Asian and Philippine Culture*

Marta E. Sanchez, Ph.D., *Latin American Literature*

Carlos Waisman, Ph.D., *Sociology*

Winnie Woodhull, Ph.D., *Literature*

### Assistant Professor

Suzanne Brenner, Ph.D., *Anthropology*

Rosemary George, Ph.D., *Literature*

Max Parra, Ph.D., *Mexican Literature*

Oumelbanine Zhiri, Ph.D., *Literature*

### Adjunct Professor

Leften S. Stavrianos, Ph.D., *History*

The Third World Studies Program has three main objectives:

1. To provide an understanding of the Third World and its relationships to the West. In order to understand these relationships, it is necessary to study the historical context out of which the present relationships developed. For example, besides trying to understand what kind of society existed in Meso-America when the Spaniards arrived in 1520, the student must also have an understanding of the historical development in Europe which resulted in Spain's decision to seek wider trade abroad. There is insistence on both the similarities and differences which Third World societies have among themselves and the similarities and differences with Western societies.
2. To provide an interdisciplinary approach to the study of the Third World. The program is not conceived as being exclusively historically oriented nor as being predominantly a social science program, but rather one that integrates both the social sciences and the humanities.
3. To provide an understanding of the shifting economic and political nature of the countries designated as belonging to the "Third World," especially in light of the dramatic

political and economic changes worldwide in the late 1980s and 1990s. To this end, our Third World Studies courses will, where appropriate, address and contextualize the history of the term "Third World" and its current applications in scholarship and the broader international media.

### The Major Program

Students interested in Third World studies may focus on a theme, problem, or geohistorical area. A Third World studies program of study must be interdisciplinary. Students must choose course offerings from at least three disciplines (anthropology, economics, history, literature, political science, sociology, etc.).

A Third World studies major requires a minimum of twelve upper-division courses plus three lower-division courses from the Third World studies sequence (TWS 21, 22, 23, 24, 25, or 26). Students at Eleanor Roosevelt College may substitute up to two courses, Making of the Modern World 4 and 5, for two of the three course lower-division sequence, but must take at least one course in the TWS 21-26 sequence. Selection of a specific concentration, discipline, or department should be determined in consultation with a Third World studies faculty member or program adviser.

Students majoring and minoring in Third World Studies are encouraged to experience their areas first-hand by studying abroad in any number of ways. Most convenient depending on the area, is the University of California's Education Abroad Program, whereby students can gain U.C. credit for study at foreign universities. This is especially convenient for students who cannot find sufficient courses at UCSD pertaining to such regions as the Caribbean and the Indian Subcontinent. Moreover, Latin America, Asia, and Africa coursework is available in these regions through the Education Abroad Program and various programs available through other U.S. universities.

### Double Major

Students interested in Third World studies as a double major must have at least ten upper-division courses that are unique to each departmental major. The courses required for Third World studies may cover one or more disci-

plines. Courses may focus on a theme or problem or on a geo-historical area. The remaining two courses may overlap with the other major requirements. Approval from both departments is required for overlaps. Students should consult a Third World studies faculty member or program adviser for approval of a major program.

### Minor

A student may minor in Third World studies by selecting two courses from the lower-division Third World studies sequence (TWS 21, 22, 23, 24, 25, or 26) and five upper-division courses in disciplines dealing with the Third World.

Third World studies faculty members offer courses in the Departments of Anthropology, Communication, Literature, Political Science, Sociology, History, and in the Third World Studies Program. Appropriate courses in other departments may also be considered. Students should consult departmental and program listings for Third World area offerings.

## COURSES

See listings also under the Departments of Anthropology, Communication, History, Literature, Political Science, and Sociology for other Third World area offerings.

### LOWER-DIVISION

**21-22-23-24-25-26. Third World Literatures (4-4-4-4-4)**  
An introduction to the cultures of various Third World countries through close reading of selected literary texts. TWS 21 focuses on African literature, TWS 22 deals with Latin American literature, TWS 23 examines Chinese literature, TWS 24 examines Caribbean literature, TWS 25 examines Middle Eastern literature, and TWS 26 examines literature of the Indian Subcontinent. Topics will vary each quarter. (F,W,S)

### UPPER-DIVISION

**132. Literature and Third World Societies (4)**  
This course will investigate novelistic and dramatic treatments of European society in the era of nineteenth-century imperialism, Third World societies under the impact of colonialism, and the position of national minorities inside the United States to the present day. Attention will center on the interplay between the aesthetic merits and social-historical-philosophical content of the works read.

**135. Bilingualism: Research and Field Studies (4)**

A study of sociolinguistic findings on bilingualism throughout the world and an evaluation of bilingual education theories. The students will also engage in surveys of local communities to assess bilingualism and educational needs of bilingual communities. *Prerequisite: upper-division standing.*

**190. Undergraduate Seminars (4)**

Seminars will be organized on the basis of topics with readings, discussions, and papers. Specific subjects to be covered will change each quarter depending on particular interest of instructors or students. May be repeated for credit.

**197. Field Work (4)**

In an attempt to explore and study some unique processes and aspects of community life, students will engage in research in field settings. Topics to be researched may vary, but in each case the course will provide skills for carrying out these studies.

**198. Directed Group Studies (2 or 4)**

Directed group study on a topic or in a field not included in the regular department curriculum, by special arrangement with a faculty member. *Prerequisite: upper-division standing.*

**199. Independent Study (2 or 4)**

Tutorial, individual guided reading and research projects (to be arranged between student and instructor) in an area not normally covered in courses currently being offered in the department. (P/NP grades only.) *Prerequisites: upper-division standing and consent of instructor.* (F,W,S)

Third World Studies offerings in other departments:

**Anthropology: Regional**

104. Traditional African Societies and Culture

117. Gender across Cultures

133. Politics and Modernity: Urban Cultures in Latin America

134. The Cultures of Mexico

137. Societies and Cultures of Melanesia

162. Peoples of the Middle East

170. Traditional Chinese Society

171. Chinese Familism

173. Chinese Popular Religion

182. Ethnography of Island Southeast Asia

**Communication**

Com/Cul 179. Colonialism and Culture

**History**

HILA 100. Latin America-Colonial Transformations

HILA 101. Latin America: The Construction of Independence 1810-1898

HILA 102. Latin America in the Twentieth Century

HILA 105. South America: Labor, Coercion, and Society in the Nineteenth Century

HILA 107. State and Society in Nineteenth- and Twentieth-Century Latin America

HILA 110. Progress and Poverty in South America: 1820-1930

HILA 111. Progress and Poverty in South America: 1930-Present

HILA 112. Economic and Social History of the Andean Region

HILA 113. Lord and Peasants in Latin America

HILA 114. Social History of Colonial Latin America

HILA 115. The Latin American City: A History

HILA 116. Encounter of Two Worlds: Early Colonial Latin America

HILA 117. Indians, Blacks, and Whites: Family Relations in Latin America

HILA 120. History of Argentina

HILA 121. History of Brazil

HILA 122. Cuba: From Colony to Socialist Republic

HILA 123. The Incas and Their Ancestors

HILA 131. A History of Mexico

HILA 132. A History of Contemporary Mexico

HILA 160. Topics in Latin American Colonial History, 1500-1820

HILA 161. History of Women in Latin America

HILA 162. Special Topics in Latin American History

HILA 164. Political Economy of Argentina

HILA 166. Colloquium-Cuba: From Colony to Socialist Republic

HILA 172. Machismo and Matriarchy: Latin American Social Structure

HIAF 110. History of Africa to 1880

HIAF 111. Modern Africa since 1880

HIAF 120. History of South Africa

HIAF 130. African Society and the Slave Trade

HIAF 140. Economic History of Africa

HIAF 160. Special Topics in the Economic History of Africa

HIAF 161. Special Topics in African History

HIEA 113. The Fifteen-Year War in Asia and the Pacific

HIEA 123. Food in Chinese History

HIEA 130. History of the Modern Chinese Revolution: 1800-1911

HIEA 131. History of the Modern Chinese Revolution: 1911-1949

HIEA 132. History of the People's Republic of China

HIEA 163. Cinema and Society in Twentieth-Century China

HIEA 165. The Chinese Village in Transition: 1930-1956

HINE 166. Nationalism in the Middle East

**Literature****English**

135. Twentieth-Century Literature from the Indian Subcontinent

188. Contemporary Caribbean Literature

**General**

130. Novel and History in the Third World

132. African Oral Literature

133. Introduction to Literature and Film of Modern Africa

136. Latin American Literature in Translation

137. Mexican Literature in Translation

140A. Classical Chinese Literature in Translation

140B. Modern Chinese Literature in Translation

140C. Contemporary Chinese Literature in Translation

**Spanish**

130B. Development of Latin American Literature

131. Spanish American Literature: The Colonial Period

132. Spanish American Literature: Nineteenth Century

133. Spanish American Literature: Twentieth Century

134. Argentine Literature

135. Mexican Literature

136. Peruvian Literature

137. Caribbean Literature

140. Spanish-American Novel

141. Spanish-American Poetry

142. Spanish-American Short Story

143. Spanish-American Essay

144. Spanish-American Theatre

163. Spanish Language in America

172. Indigenista Themes in Spanish-American Literature

173. Spanish American Literary History

**Music**

126. Introduction to Oral Music

**Philosophy**

177. Philosophy and Literature

**Political Science**

112B. Politics, Philosophy, and Social Science Methodology

130B. Politics in the People's Republic of China

130D. Seminar: Chinese Politics

130G. Vietnam: The Politics of the Village

130H. Vietnam: The Politics of Intervention

133B. Political Economy of the East Asian Newly Industrialized Countries

134AA-AB. Comparative Politics of Latin America

134B. Politics in Mexico

134C. Politics in Mexico: Research Seminar

134D. Selected Topics in Latin American Politics

134G. Politics in the Andes

134I. Politics in the Southern Cone of Latin America

134J. Labor and Politics in Latin America

134N. Politics in Central America

134P. Organizing Women in Latin America

134Q. Organization, Resistance, and Protest in Latin America

135A. Ethnic Conflict in the Third World

136A. African Politics

138A. The Political Economy of Urbanization

138B. Politics in Rural Inequality

- 144AA-AB. Politics in the International Economic Order
- 144B. Comparative Responses to International Economic Crises
- 144D. Political Dimensions of International Finance
- 145B. Conflict and Cooperation in International Politics
- 146A. The U.S. and Latin America: Political and Economic Relations
- 146BA-BB. Seminar on Mexico and U.S.-Mexican Relations
- 146C. U.S.-Latin American Relations and the International Political Economy
- 146D. Political Parties in Latin America
- 150A. Seminar: The Political Economy of International Labor Migration
- 196A-B-C. Fieldwork in U.S.-Mexican Studies

### Sociology D: Comparative and Historical

- 133. Comparative Sex Stratification
- 151. Comparative Race and Ethnic Relations
- 158. Islam in the Modern World
- 158J. Religion and Ethics in China and Japan
- 179. Social Change
- 185. Political Economy of Development and Underdevelopment
- 186. Peasants and Farmers in Society
- 187. African Society through Film
- 188A. Community and Social Change in Africa
- 188B. Chinese Society
- 188D. Latin America: Society and Politics
- 188H. Middle Eastern Societies
- 188J. Change in Modern South Africa

Students wishing to include additional related courses from these and other departments should consult a Third World studies adviser.

## Thurgood Marshall College

### Honors Program and Special Courses

OFFICE: Provost, Thurgood Marshall College Administration Building

The Thurgood Marshall College Honors Program is designed to address one of the greatest responsibilities and challenges of public higher education: the education of students of exceptionally high academic achievement. The program provides the organization and the

environment within which students are encouraged to pursue individual excellence.

Honors activities and events are designed to introduce Thurgood Marshall students to the excitement of pioneering research and innovative scholarship in all disciplines at UCSD and to create opportunities for discussion on public issues with locally and nationally known figures. Participation in these activities is an excellent way for students to meet faculty, expand their horizons, and plan for future coursework.

The honors seminar is an exciting component of the honors program. It is offered every quarter and is open to all class levels of honors students. Students participating in the honors seminar also are invited to participate in the Price Public Affairs Forum, which invites leading public figures to speak on important issues of great interest. Also, each quarter, honors students enjoy a relaxed and informal evening with the provost at his home.

To qualify for the honors program, incoming freshmen must have achieved an evaluated high school GPA of 3.8 or better, and mathematical SAT score of 650 and verbal SAT score of 710 or higher. Continuing UCSD and transfer students are eligible upon successful completion of at least 12 graded units with a 3.7 or better cumulative GPA. All honors students must maintain a 3.50 or better cumulative GPA.

Thurgood Marshall College annually recognizes superior achievement. The Provost Award is presented at commencement to a graduating senior who is recognized for outstanding academic achievement and breadth of scholarship. In addition, students may be eligible for universitywide and departmental honors, Provost Honors, Thurgood Marshall College Honors, Phi Beta Kappa membership, and participation in small honors classes in science.

### COURSES

**10. Thurgood Marshall College Methods of Inquiry (2)**  
In this course, students learn analytical thinking strategies routinely used by professional scholars. Each student applies strategies from the materials presented in lectures and reading assignments to his or her current course work. *Prerequisite: concurrent enrollment in two lecture courses. (P/INP only.)*

**15. Introduction to Public Service in America (4)**  
This course is designed to study, discuss, and analyze the history and current role of public service in the United States. Students will be introduced to the different roles held by the three sectors of the American economic structure (government,

business, and non-profit/public service) with opportunity to provide a critical analysis of those roles within American society.

**20. Thurgood Marshall College Honors Seminar (1)**  
Weekly seminar conducted by UCSD faculty and distinguished guest lecturers on topics related to the core curriculum: diversity, justice, and imagination. (P/INP only.)

**90. Undergraduate Seminar (1)**  
These seminars are designed to expose undergraduate students, especially freshmen and sophomores, to exciting research conducted by UCSD faculty. *Prerequisite: none. (P/INP only.)*

## Urban Studies and Planning

OFFICE: Social Science Building, Room 315, North Campus

### Professors

- Amy Bridges, Ph.D., *Political Science, Director of Urban Studies and Planning Program*
- Robert F. Engle, Ph.D., *Economics*
- Ramon A. Gutierrez, Ph.D., *Ethnic Studies*
- Robert M. Kaplan, Ph.D., *Family and Preventive Medicine*
- George Lipsitz, Ph.D., *Ethnic Studies*
- Hugh G. Mehan, Ph.D., *Sociology/Teacher Education Program*
- Michael E. Parrish, Ph.D., *History*

### Associate Professors

- Steven P. Erie, Ph.D., *Political Science*
- Ivan T. Evans, Ph.D., *Sociology*
- Richard G. Kronick, Ph.D., *Family and Preventive Medicine*

### Assistant Professors

- Lisa M. Catanzarite, Ph.D., *Sociology*
- Jonathan Holloway, Ph.D., *Ethnic Studies*
- Becky Nicolaidis, Ph.D., *History*
- Steven Raphael, Ph.D., *Economics*
- Leland T. Saito, Ph.D., *Ethnic Studies*

### Supervisor of Field Studies

Keith Pezzoli, Ph.D.

### Lecturer

Barbara L. Brody, M.P.H., *Clinical Professor, Family and Preventive Medicine*

### The Urban Studies and Planning Program

The great majority of U.S. citizens, and a growing proportion of people throughout the world, live in cities. Cities provide the environment in which people work, learn, play, and make decisions together. Local governments make critical interventions in the quality of life. At the same time, the cities of the world are increasingly linked in a global economic system, making diverse contributions to the international division of labor.

Urban studies and planning is an interdisciplinary program providing students with a variety of perspectives for understanding the development, growth, and culture of cities and the communities within them. Course work introduces students to the ways different disciplines understand cities and the societies of which they are a part. Upper-division requirements educate students about the parameters within which urban choices are made. Upper-division electives broaden students' social education and introduce students to policy and planning issues.

One of the outstanding features of the Urban Studies and Planning Program is the upper-division research requirement. During a two-quarter sequence designed to be taken in the fall and winter of the senior year, all USP majors are guided through a research internship and writing process. The upper-division field studies sequence allows students to work on specific policy projects in the San Diego region. Eligible students may choose to enroll in USP 190 in the spring to write an honors thesis. The honors option is an opportunity to do advanced research and writing that builds on work already completed in the senior sequence.

Urban studies and planning is an undergraduate community of students with diverse interests and goals. After graduation some majors pursue graduate work in social science disciplines. Others pursue graduate study in public policy, law, planning, or architecture. Urban studies has always also attracted students interested in medicine and public health issues, who continue to study in these areas at schools of medicine or public health. Urban studies and planning is not designed as a training program in local government, planning, or urban design. It provides students with a solid

liberal arts background for graduate study or for professional work in a number of fields. Many students find employment opportunities through their field work placement. More generally, graduates of urban studies and planning will have the analytic skills to think clearly and act creatively about the problems and prospects of the urban environment.

### The Urban Studies and Planning Major

A bachelor of arts degree in urban studies and planning will be given to students who satisfactorily complete the general-education requirements of Muir, Revelle, Marshall, Warren, or Roosevelt College in addition to the urban studies and planning courses described below. The undergraduate program in urban studies and planning requires a three-quarter lower-division sequence in urban studies; Political Science 30; and twelve courses in upper-division urban studies and planning including Political Science 160AA. *Students are encouraged to complete the lower-division prerequisites before they enroll in the upper-division courses.*

In accordance with campus academic regulations, courses used to satisfy the major cannot be applied toward a minor, although some overlap is allowed for double majors. All lower-division and upper-division requirements must be taken for a letter grade. A 2.0 grade-point average is required in the major, and students must earn at least C- in each course used for the major. Transfer students should see the urban studies and planning adviser to determine whether courses taken elsewhere satisfy USP program requirements. No more than one special studies course, USP 198 or USP 199, will be accepted to count towards the major.

#### Lower-Division Requirements

Students majoring in urban studies and planning must complete the introductory sequence USP 1, 2, 3, and Political Science 30.

#### Upper-Division Requirements

The upper-division requirements in urban studies and planning are:

1. three foundation courses
2. Political Science 160AA. Introduction to Policy Analysis

3. six upper-division courses, of which at least three and not more than four are from the social science list
4. senior sequence of field work and internship

#### FOUNDATION COURSES

Foundation courses provide the conceptual tools for the major. Students are to choose three of:

USP 102. *Urban Economics (Economics 135)* (4)

USP 103. *U.S. Cities in the Twentieth Century (HIUS 148)* (4)  
(Can substitute USP 103 with USP 165/HIUS 147.)

USP 107. *Urban Politics (Political Science 102E)* (4)

USP 129. *Research Methods: Studying Racial and Ethnic Communities (Ethnic Studies 190)* (4)

#### SENIOR SEQUENCE REQUIREMENT

In their senior year, all students must complete the senior sequence, USP 186 Field Work in the fall, and USP 187 Internship in the winter. These courses must be taken IN ORDER. The sequence develops each student's ability to: (1) critically review others' research, (2) formulate interesting research questions of their own, (3) design an original research project and investigative strategy, (4) conduct research, and (5) analyze, interpret, and write up findings. The final requirement of USP 186 is a research proposal. By the end of USP 187 each student must complete a Senior Research Project.

Because the senior sequence includes an internship, no other internship or field placement will be counted towards the major.

USP 186. *Urban Fieldwork Seminar* (6)

USP 187. *Urban Studies Internship* (6)

#### HONORS IN URBAN STUDIES AND PLANNING

Candidates for Honors in Urban Studies and Planning are required to take USP 190 Senior Seminar, in which students write a senior thesis. Prerequisites for enrolling in USP 190 are a minimum 3.5 GPA in the major, senior standing, USP 186 and 187, and consent of instructor. Majors who plan to write a senior thesis in USP 190 must declare their intent in USP 186.

USP 190. *Senior Honors Seminar* (4)

#### SOCIAL SCIENCE REQUIREMENT

Students must choose at least three and not more than four courses to complete their upper-division social science requirement. Courses accepted for this requirement include:

USP 102/Economics 135. Urban Economics  
 USP 103/History (HIUS) 148. American Cities of the Twentieth Century  
 USP 107/Political Science 102E. Urban Politics  
 USP 129/Ethnic Studies 190. Research Methods: Studying Racial and Ethnic Communities  
 USP 133/Sociology C/152. Social Inequality and Public Policy  
 USP 135B. Black Politics and Protest Since 1941  
 USP 136/Sociology C/148M. Labor Market Inequality and Public Policy  
 USP 158/ANRG 118. City and Society in Anthropological Theory  
 USP 165/History (HIUS) 147. History of American Suburbs  
 Economics 116. Economic Development  
 Economics 130. Public Policy  
 Economics 134. Regional Economics  
 Economics 139. Labor Economics  
 Economics 150. Economics of the Public Sector: Taxation  
 Economics 151. Economics of the Public Sector: Expenditures  
 Economics 152. Topics in Public Economics  
 Economics 155. Economics of Voting and Public Choice  
 Economics 179. Decisions in the Public Sector  
 Ethnic Studies 102. Racial Inequality in America: A Comparative Historical Analysis  
 Ethnic Studies 105. Ethnic Diversity and the City  
 Ethnic Studies 106. Ethnoracial Transformations of U.S. Communities  
 Ethnic Studies 121. Contemporary Asian-American History  
 Ethnic Studies 123. Asian-American Politics  
 Ethnic Studies 131/History (HIUS) 159. Social and Economic History of the Southwest II  
 Ethnic Studies 151. Ethnic Politics in America  
 Ethnic Studies 182/History (HIUS) 165. Segregation, Freedom Movements, and the Crisis of the Twentieth Century  
 Ethnic Studies 184. Black Intellectuals in the Twentieth Century  
 History (HIEU) 124. The City in Italy  
 History (HILA) 115. Latin American City, a History  
 History (HILA) 121. History of Brazil  
 History (HIUS) 114. California History  
 History (HIUS) 117. History of Los Angeles  
 History (HIUS) 137. The Built Environment in the Twentieth Century  
 History (HIUS) 140/Economics 158A. Economic History of the United States I  
 History (HIUS) 141/Economics 158B. Economic History of the United States II  
 History (HIUS) 154. Western Environmental History  
 History (HIUS) 155/Environment 110. Environmental Law  
 History (HIUS) 180. Immigration and Ethnicity in Modern American Society  
 Political Science 100G. American Politics and Public Policy

Political Science 100H. Race and Ethnicity in American Politics  
 Political Science 102J. Advanced Topics in Urban Politics  
 Political Science 103A. California Government and Politics  
 Political Science 117. Violence and Social Order  
 Political Science 160AB. Introduction to Policy Analysis  
 Psychology 104. Introduction to Social Psychology  
 Psychology 186. Psychology and Social Policy  
 Sociology A/100. Classical Sociological Theory  
 Sociology B/112. Social Psychology  
 Sociology C/121. Economy and Society  
 Sociology C/122. Sociology of Organization  
 Sociology C/123. Sociology of Work  
 Sociology C/125. Minorities in the Schooling Process  
 Sociology C/132. Gender and Work  
 Sociology C/136B. Sociology of Mental Illness in Contemporary Society  
 Sociology C/141. Crime and Society  
 Sociology C/144. Forms of Social Control  
 Sociology C/148. Political Sociology  
 Sociology C/148C. Power, Culture, and Social Revolt  
 Sociology C/148E. Ethnicity, Nationalism, and Politics  
 Sociology C/148I. Collective Identity and Group Formation  
 Sociology C/148L. Inequality and Jobs  
 Sociology C/151M. Chicanos in American Society  
 Sociology C/159. Special Topics in Social Organizations and Institutions  
 Sociology C/180. Social Movements and Social Protest  
 Sociology D/151. Comparative Race and Ethnic Relations  
 Sociology D/179. Social Change.  
 Sociology D/184. Societal Evolution and Economic Development

**POLICY AND PLANNING REQUIREMENT**

Students must choose three courses to fulfill their upper-division policy and planning requirement. Courses accepted for this requirement include:

USP 124. Land Use Planning  
 USP 133/Sociology C/152. Social Inequality and Public Policy  
 USP 139. Women and the Built Environment  
 USP 143. U.S. Health Care System  
 USP 144. Environmental and Preventive Health Issues  
 USP 145. Aging—Social and Health Policy Issues  
 USP 147. Case Studies in Health Care Programs/Poor and Underserved Populations  
 USP 170. Planning Theory & Practice  
 USP 171. Sustainable Development

USP 172. Practical Urban Land Use Problem  
 USP 173. History of Urban Planning and Design  
 USP 179. The Form of Design: Creation and Image Practice  
 Anthropology (ANBI) 132/Biology (BIEB) 176. Conservation and the Human Predicament  
 Economics 130. Public Policy  
 Economics 131. Economics of the Environment  
 Economics 133. Housing Policy  
 Economics 138A-B. Economics of Health  
 Economics 180. Real Estate Finance  
 Envi 110. Environmental Law  
 Philosophy 163. Bio-Medical Ethics  
 Philosophy 165. Professional Ethics  
 Political Science 150A. Immigration Policy and Politics  
 Political Science 150B. Immigration Policy and Politics: Research Seminar  
 Political Science 160AB. Introduction to Policy Analysis  
 Political Science 162. Environmental Policy  
 Political Science 166F. The American Welfare State  
 Sociology B/117. Language, Culture, and Education  
 Sociology C/126. Social Organization of Education  
 Sociology C/135. Medical Sociology  
 Sociology C/136A. Sociology of Mental Illness: An Historical Approach  
 Sociology C/136B. Sociology of Mental Illness in Contemporary Society  
 Sociology C/141. Crime and Society  
 TEP 130. Public Service: Practicum in Learning

**The Minor Program**

The urban studies and planning minor consists of seven courses in urban studies and planning, selected with the prior approval of a faculty adviser. Students who wish to minor in urban studies may do so by taking any two courses from among the lower-division sequence and the foundation courses, and five upper-division courses from among those that serve the USP major. All courses must be taken for a letter grade and students must earn at least C- in each course used for the minor.

**COURSES**

**LOWER-DIVISION**

1. Comparative Urbanization (4)  
 Historical and comparative survey of cities throughout the world. Ecological, social, economic, technological, and cultural



determinants of city location, form, growth, and decline. Urbanization movement following the Industrial Revolution. Role of the city as a force of culture and civilization.

## 2. Urban World System (4)

Examines cities and the environment in a global context. Emphasizes how the world's economy and the earth's ecology are increasingly interdependent. Focuses on biophysical and ethicosocial concerns rooted in the contemporary division of labor among cities, Third World industrialization, and the post-industrial transformation of U.S. cities.

## 3. The City and Social Theory (4)

An introduction to the sociological study of cities, focusing on urban society in the United States. Students in the course will examine theoretical approaches to the study of urban life; social stratification in the city; urban social and cultural systems—ethnic communities, suburbia, family life in the city, religion, art, and leisure.

## UPPER-DIVISION

### 102. Urban Economics (4)

(Same as Economics 135.) Urban economic problems and public policies to deal with them. *Prerequisite:* Economics 1A-B or 2A-B.

### 103. American Cities in the Twentieth Century (4)

(Same as HIUS 148.) This course surveys changes in U.S. cities since about 1900. Case studies of individual cities illustrate the social, political, and environmental consequences of rapid urban expansion, as well as the ways in which "urban problems" have been understood historically. *Prerequisite:* upper-division standing or consent of instructor.

### 107. Urban Politics (4)

(Same as Political Science 102E.) This survey course focuses upon the following six topics: the evolution of urban politics since the mid-nineteenth century; the urban fiscal crisis; federal/urban relationships; the "new" politics; urban power structure and leadership; and selected contemporary policy issues such as downtown redevelopment, poverty, and race.

### 124. Land Use Planning (4)

Introduction to land use planning in the United States: zoning and subdivision, regulation, growth management, farmland preservation, environmental protection, and comprehensive planning. *Prerequisite:* upper-division standing or consent of instructor.

### 129. Research Methods: Studying Racial and Ethnic Communities (4)

(Same as ETHN 190.) The course offers students the basic research methods with which to study ethnic and racial communities. The various topics to be explored include human and physical geography, transportation, employment, economic structure, cultural values, housing, health, education, and intergroup relations. *Prerequisite:* upper-division standing or consent of instructor.

### 133. Social Inequality and Public Policy (4)

(Same as SOC C/152.) Primary focus on understanding and analyzing poverty and public policy. Analysis of how current debates and public policy initiatives mesh with alternative social scientific explanations of poverty. *Prerequisite:* upper-division standing.

### 135B. Black Politics and Protest Since 1941 (4)

Discussion of black social, political, and intellectual experiences since the publication of Richard Wright's *Native Son*. Close examination of blacks' involvement in and relationships to Second World War, Cold War, Civil Rights Movement, Black Power Movement, Reagan Revolution, and Underclass Debate. *Prerequisite:* upper-division standing or consent of instructor.

### 136. Labor Market Inequality in Los Angeles and the Border Region

(Same as SOC C/148M.) Focus on the changing labor force and occupational structure of Los Angeles and the Mexican border. We apply theoretical work to recent changes, with special attention to immigrant and minority employment, economic restructuring, and changes in the international division of labor. *Prerequisite:* upper-division standing or consent of instructor.

### 139. Women and the Built Environment (4)

This course provides a historical and contemporary overview of the ways that women have shaped the built environment through design, policy, and community work. Lectures and readings will also consider how traditional planning and design strategies impact women's lives. *Prerequisite:* upper-division standing.

### 143. The U.S. Health Care System (4)

This course will provide an overview of the organization of health care within the context of the community with emphasis on the political, social, and cultural influences. It is concerned with the structure, objectives, and trends of major health and health-related programs in the United States to include sponsorship, financing, training and utilization of health personnel. *Prerequisite:* upper-division standing or consent of instructor. (W)

### 144. Environmental and Preventive Health Issues (4)

This course will analyze needs of populations, highlighting current major public health problems such as chronic and communicable diseases, environmental hazards of diseases, psychiatric problems and additional diseases, new social mores affecting health maintenance, consumer health awareness and health practices, special needs of economically and socially disadvantaged populations. The focus is on selected areas of public and environmental health, namely: epidemiology, preventive services in family health, communicable and chronic disease control, and occupational health. *Prerequisite:* upper-division standing or consent of instructor. (F)

### 145. Aging—Social and Health Policy Issues (4)

This course will provide a brief introduction to the nature and problems of aging, with emphasis on socioeconomic and health status; determinants of priorities of social and health policies will be examined through analysis of the structure and organization of selected programs for the elderly. Field visits will constitute part of the course. *Prerequisite:* upper-division standing. (S) (Not offered in 1998–99.)

### 147. Case Studies in Health Care Programs/Poor and Underserved Population (4)

The purpose of this course is to identify the special health needs of low income and underserved populations and to review their status of care, factors influencing the incidence of disease and health problems, and political and legislative measures related to access and the provision of care. Selected current programs and policies that address the health care needs of selected underserved populations such as working poor, inner city populations, recent immigrants, and persons with severe disabling mental illnesses will be studied. Offered in alternate years. *Prerequisite:* upper-division standing or consent of instructor. (S)

### 158. City and Society in Anthropological Theory (4)

Although cities are fundamental sites of emergent social and cultural forms, the anthropological study of urban society remains problematic. The course addresses this problem, examining issues of complexity, revolution, nation, utopia, and modernity related to city life and social theory. *Prerequisite:* upper-division standing.

### 165. History of the American Suburb (?)

(Same as HIUS 147.) This seminar explores the development of suburbs in America, from the early nineteenth-century to the contemporary era. Topics include suburban formation, class, ethnic and racial dimensions, government influences, social life, and cultural responses to suburbia. The class will explore in-

fluences, social life, and cultural responses to suburbia. The class will explore competing theories of suburbanization as it surveys the major literature. *Prerequisite:* upper-division standing.

### 170. Planning Theory and Practice (4)

Examines urban and regional planning theory and practice from an ecological, historical, and comparative perspective. Focuses on contributions of political ecology, utopianism, anarchism, bioregionalism, economics, and ethics. Identifies current planning strategies that aim to link economy, ecology, and community in sustainable development. *Prerequisite:* upper-division standing.

### 171. Sustainable Development (4)

Sustainable development is a concept invoked by an increasingly wide range of scholars, activists, and organizations dedicated to promoting environmentally sound approaches to economic development. This course critically examines the diverse, often contradictory, interests in sustainability. It provides a transdisciplinary overview of emergent theories and practices. *Prerequisite:* upper-division standing.

### 172. Practical Urban Land Use Problems (4)

A course on the relationship between American legal institutions and land use policy issues, with special attention to the problems of urban areas and the conflict between private rights and the public interest. Among the topics covered are the legal aspects of zoning, redevelopment, transportation, and the protection of the natural environment. *Prerequisite:* upper-division standing.

### 173. History of Urban Planning and Design (4)

The analysis of the evolution of city designs over time; study of the forces that influence the form and content of a city: why cities change; comparison of urban planning and architecture in Europe and the United States. *Prerequisite:* upper-division standing.

### 179. The Form of Design: Image, Creation, and Practice (4)

Our physical surroundings are shaped by design, from lightbulbs and corporate logos to chairs, buildings, parks, streets, and cities. This course seeks to find the intention in everyday objects and the aesthetic in those that go beyond function. Working from simple to complex elements, a series of case studies illuminates a design process, the designed object, and the role of the designer. Lectures and projects will encourage the development of visual literacy and critical skills through hands-on design explorations.

### 186. Urban Field Work Seminar (6)

Introduces students to the theory and practice of social research. Examines the structuring of inquiry and observation, including nonobtrusive measures, interviews, and participant observations. Introduces techniques for logging data, including field notes and filing systems. The requirements of the course include both archival and field research assignments. During the second half of USP 186, students must complete five weeks (fifty hours) of the ten week (100 hour) internship requirement of the senior sequence. *Prerequisites:* USP major and senior status.

### 187. Urban Studies Internships (6)

Students during the first five weeks of USP 187 continue the internship begun in USP 186, spending ten hours per week as interns with a local public or private agency of their choice. The course provides a framework in which students examine the theoretical as well as practical aspect of their internship's experience. The final requirement calls for a senior research project. *Prerequisite:* USP 186.

### 190. Senior Honors Seminar (4)

Each student enrolled will be required to write an honors essay, a substantial research paper on a current urban policy

issue, under the supervision of a member of the faculty. Most often the essay will be based on their previous fieldwork courses and internship. This essay and other written exercises, as well as class participation, will be the basis of the final grade for the course. The seminar will rotate from year to year among the faculty in urban studies and planning. *Prerequisites: USP 186, USP 187, major GPA 3.5, and permission of instructor.*

**194. Research Seminar in Washington, D.C. (4)**

(Same as Communication 194, Political Science 194) Course attached to six-unit internship taken by students participating in the UCDC program. Involves weekly seminar meetings with faculty and teaching assistant and a substantial research paper. *Prerequisite: department approval. Participating in UCDC program.*

**195. Teaching Apprentice—Undergraduate (2-4)**

Introduction to teaching activities associated with course. Responsibilities include preparing reading materials assigned by the instructor, attending course lectures, meeting at least one hour per week with the instructor, assisting instructor in grading, and preparing a summary report to the instructor. *Prerequisites: consent of instructor and an A in the course in which the student plans to assist.*

**198. Directed Group Study (2-4)**

Directed group study on a topic or in a field not included in the regular departmental curriculum by special arrangement with a faculty member. *Prerequisites: upper-division standing and consent of instructor.*

**199. Independent Study (2-4)**

Reading and research programs and field-study projects to be arranged between student and instructor, depending on the student's needs and the instructor's advice in terms of these needs. *Prerequisites: upper-division standing and consent of instructor.*

## Visual Arts

OFFICE: 216 Mandeville Center for the Arts

**Professors**

- David Antin, M.A., *Professor Emeritus*
- Eleanor Antin, B.A.
- Harold Cohen, *Diploma of Fine Arts, Professor Emeritus*
- Steve Fagin, M.A.
- Manny Farber, *Professor Emeritus*
- Jean-Pierre Gorin, *Licence de Philosophie*
- Helen Mayer Harrison, M.A., *Professor Emeritus*
- Newton Harrison, M.F.A., *Professor Emeritus*
- Louis Hock, M.F.A.
- Madlyn M. Kahr, Ph.D., *Professor Emeritus*
- Allan Kaprow, M.A., *Professor Emeritus*
- Fred Lonidier, M.F.A.
- Kim MacConnel, M.F.A.
- Babette Mangolte
- Sheldon Nodelman, Ph.D.
- Patricia Patterson
- Faith Ringgold, M.A.

- Jerome Rothenberg, M.A.
- Italo Scanga, M.A.
- Ernest Silva, M.F.A.
- Jehanne Teilhet-Fisk, Ph.D., *Professor Emeritus*

**Associate Professors**

- Jack Greenstein, Ph.D.
- Standish Lawder, Ph.D., *Professor Emeritus*
- Susan Smith, Ph.D.
- Phel Steinmetz, *Academic Senate Distinguished Teaching Award*
- John Welchman, Ph.D.

**Assistant Professors**

- Sheldon Brown, M.F.A.
- Thomas Allen Harris, B.A.
- Adriene Jenik, M.F.A.
- Lev Manovich, Ph.D.
- Elizabeth Newsome, Ph.D.
- Mary Vidal, Ph.D.

**Lecturer**

- Claudio Fenner-Lopez, M.A., *Lecturer SOE Emeritus*

The Department of Visual Arts offers courses in painting, drawing, sculpture, performance, computing for the arts, film, video, photography, and art history/criticism (including that of film and video). A bachelor's degree from this department provides students with a solid liberal arts background and is preparatory training for careers as artists, art historians, filmmakers, video artists, photographers, and art critics. It also provides students the initial skills required for teaching and work in museums, television, and the commercial film and photography industries.

By its composition, the Department of Visual Arts is biased in the direction of actively producing artists and critics whose presence at the center of the contemporary art world necessitates reconsideration and reevaluation of artistic productions, their information structure, and significance. Consequently, a flexible introductory program of historically based courses has been devised mainly to provide the student an opportunity to concentrate on areas involving significantly different aesthetic and communication structures. A series of studio courses, in which painting and sculpture are included, is presented to bring the student into direct contact with the real contingencies compelling redistribution of aesthetic attitudes and reinterpretation of genres. Because of the exploratory

nature of our program, the department is prepared to emphasize new media that would traditionally be considered to have scant relation to the visual arts. Thus courses in theatrical events, linguistic structures, etc., are provided. In this context, theoretical courses with a media orientation, as in film, video, photography, or computing, are offered also.

The Department of Visual Arts is located in the Mandeville Center for the Arts. In addition, faculty and graduate students have offices/studios/research spaces in the Visual Arts Facility located in Eleanor Roosevelt College. Facilities and equipment are available to undergraduates in both the Mandeville Center and at the campus-wide Media Center, providing the opportunity to study painting, drawing, photography, computing in the arts, 16mm film, performance, sculpture, and video. Facilities at the Media Center include portable video recording equipment, video and audio editing suites, and production studios. The department also has the in-house capacity to process and print black and white 16mm film. Additional film equipment available includes an animation stand, optical printer, two sound-mixing studios, and numerous film editing suites. Courses in computing in the arts take place in the Silicon Graphics/Mac lab located at the Visual Arts Facility.

The University Art Gallery displays a continually changing series of exhibitions, and the Mandeville Annex Gallery, located on the lower level, is directed by visual arts undergraduate students. A gallery and performance space, located in the Visual Arts Facility, are directed by graduate students.

**The Undergraduate Program**

**College Requirements**

The Department of Visual Arts teaches courses applicable toward the Muir and Warren general-education requirements, the Marshall humanities requirement, the Eleanor Roosevelt and Revelle fine arts requirements. Optional minors may be taken within any college.

**Minor in Visual Arts**

The Department of Visual Arts offers minors in seven areas of study: studio painting/drawing/sculpture, photography, computing, European art history, Non-Western art history,

media history/criticism and film/video. A minor consists of six specific courses of which at least three must be upper-division. Effective January 1, 1998, a minor will consist of seven specific courses, of which at least five must be upper-division. Because the requirements differ for each minor, prospective visual arts minors should consult with the departmental adviser for a complete list of appropriate classes acceptable for the minor.

Students are advised to begin their program in the second year; otherwise, they cannot be guaranteed enough classes to complete the minor.

### ***Education Abroad Program***

Students are often able to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP) while still making progress toward completing their major. Students considering this option should discuss their plans with the director of Undergraduate Studies before going abroad, and courses taken abroad must be approved by the department. More information on EAP/OAP is detailed in the Education Abroad Program of the *UCSD General Catalog*. Interested students should contact the Program Abroad Office in the International Center.

### ***Residency Requirements***

A minimum of two-thirds of the course work completed for the major must be taken as a registered student at UCSD. Students who transfer to UCSD in their second or third year may petition to substitute courses taken at other colleges and universities for lower-division requirements.

Visual Arts 111, *Structure of Art*, is a required course for all students, including transfer students.

**Note:** Rarely are transfer credits accepted toward fulfilling upper-division requirements in any of the three majors but courses of comparable content will be considered by petition.

### ***Honors Programs***

The department offers honors programs in art history, in media and in studio for outstanding students.

The **art history** honors program will provide outstanding students with pre-professional

experience. It consists of an issue-oriented seminar followed by a directed group study and will result in an exhibition with catalogue, a scholarly conference with a mock publication and/or series of research papers. Students who meet the criteria may, with permission of the art history faculty adviser or the art history honors seminar instructor, enroll in the art history honors program during the last quarter of their junior year or as a senior. This program is open to juniors and seniors who meet eligibility requirements: minimum GPA of 3.5 (3.3 overall), completion of all lower-division art history requirements, completion of all upper-division art history distribution requirements, and completion of Art Historical Methods (VIS 112) and at least one additional art history seminar. The level of distinction will be determined by the faculty committee on the basis of work in the honors seminar and on the research project.

The **media** honors program will help students develop high quality professional portfolios. The honors thesis project sequence of individual studies runs the length of an academic year to provide sufficient time for ideas to develop and critically-aware work to be produced. Students may arrange to work with different faculty advisers each term or may engage a single adviser for the year. To be eligible for the honors thesis sequence, taken during the last quarter of their junior year or as a senior, students must have at least a 3.5 GPA in the major and have approval of all the advisers with whom they will work. At the end of the spring quarter, all involved media faculty will meet to critique the overall quality of the final thesis work to determine level of distinction.

Through exhibition, verbal and written presentations and course work, the **studio** honors program is intended to give the student as strong a technical, critical, and theoretical base as possible. The program is open to juniors and seniors with a minimum 3.5 GPA in the major (3.0 overall), who have completed all lower-division studio requirements and all upper-division groups I, II, III, and IV (subgroup A) requirements.

Students interested in participating in an honors program should consult with the departmental adviser.

### ***Major Requirements***

Twenty courses are required in studio and media and eighteen courses in art history for the attainment of the bachelor of arts degree. A minimum of twelve of these courses must be upper-division, however, some majors may require more upper-division courses.

All courses taken to satisfy major requirements must be taken for a letter grade, and only grades of C- or better will be accepted in the visual arts major.

### ***Studio Major***

The studio major is aimed at producing a theoretically based, highly productive group of artists. Lower-division courses are structured to expose students to a variety of ideas in and about the visual arts. Introductory skills are taught, but their development will occur at the upper-division level in conjunction with the student's increasing awareness of the range of theoretical possibilities in the field. The curriculum includes courses in drawing, painting, sculpture, performance, photography, video, 16mm film, many offerings in art history/criticism, as well as new courses in digital imaging and electronics.

#### **Group I: Lower-Division**

##### ***Foundation Level***

Five courses required:

- 1 Introduction to Art Making: Two-Dimensional Practices
- 2 Introduction to Art Making: Motion and Time Based Art
- 3 Introduction to Art Making: Three-Dimensional Practices
- 22 Formations of Modern Art

Choose one from:

- 20 Introduction to Art History
- 21 Introduction to Non-Western Art
- 84 History of Film

#### **Group II: Upper-Division**

##### ***Entry Level***

Five courses required:

- 111 *Structure of Art*

**Note:** Required for all Visual Arts majors. VIS 111 can be taken at the same time as any "A" series classes or VIS 40, 60 or 70N. VIS 40, 60, or 70N can be taken to fulfill Group II upper-division studio.

Choose four from:

- 40 Introduction to Computing in the Arts
- 60 Introduction to Photography
- 70N Introduction to Media
- 104A Performing the Self
- 105A Drawing: Representing the Subject
- 106A Painting: Image Making
- 107A Sculpture: Making the Object

**Group III: Upper-Division  
Intermediate Level**

Two courses required:

- 104BN Verbal Performance
- 105B Drawing: Practices and Genre
- 106B Painting: Practices and Genre
- 107B Sculpture: Practices and Genre
- 140 Digital Imaging: Image and Interactivity
- 147A Electronic Technologies for Art I

**Group IV: Upper-Division  
Advanced Level**

Five courses required:

**Group A:**

Choose two from:

- 104CN Personal Narrative
- 105C Drawing: Portfolio Projects
- 106C Painting: Portfolio Projects
- 107CN Sculpture: Portfolio Projects
- 147B Electronic Technologies for the Art II

**Group B:**

Group A must be completed before Group B can be taken.

Choose three from:

- 108 Advanced Projects in Art
- 110A Contemporary Issues and Practices
- 110B New Genres/New and Old Technologies
- 110C Proposals, Plans, Presentations
- 110D Visual Narrative/Tableau
- 110E Art in Public Places/Site Specific Art
- 110F Installation: Cross-Disciplinary Projects
- 110G The Natural and Altered Environment
- 110H Image and Text Art
- 110I Performing for the Camera
- 110J Ritual Performance
- 110K Installation Performance
- 130 Special Projects in Visual Arts

**Group V: Upper-Division  
Non-Studio**

Three courses required:

Upper-division art history, film history, and theory/criticism courses such as:

- 113CN\* History of Criticism III: Contemporary (1950–present)
- 117B\* Theories of Representation
- 117D\* Portraiture
- 124CN Nineteenth Century Art
- 125A Twentieth Century Art
- 125BN Contemporary Art
- 125CN Histories and Contexts of Conceptual Art
- 125E\* History of Performance
- 125F\* Western and Non-Western Rituals and Ceremonies
- 152 Film in Social Context
- 154 Hard Look at the Movies
- 157 Video History and Criticism
- 158 Histories of Photography
- 159 History of Art and Technology

\*seminar

**Honors Program in Studio**

- 110M Studio Honors I
- 110N Studio Honors II

The Studio Honors I and the attached Studio Honors II count as one course towards the fulfillment of a Group IV requirement.

**Art History/Theory/Criticism  
Major**

The major in art history, theory, and criticism is designed both for students who desire a broadly based education in the humanities and for those who plan to pursue a career in an art-related profession. In both cases, the foundation for study is proficiency in the languages of artistic expression. Through the study of art history, students learn to treat works of art as manifestations of human belief, thought, and experience in Western and non-Western societies from prehistory to the present day. Courses in criticism review the theoretical approaches which are used to understand artistic achievement. By combining art historical and critical study, the program promotes in the student an awareness of the cultural traditions which have shaped his or her intellectual outlook and provides a framework for informed judgment on

the crucial issues of meaning and expression in contemporary society.

Majors are encouraged to take relevant courses in allied disciplines such as history, communication, anthropology, and literature, and in such area programs as classics and Italian studies. In addition, students who plan to apply to graduate schools are strongly advised to develop proficiency in one or more foreign languages, as is dictated by their area of specialization.

**FOUNDATION LEVEL—  
LOWER-DIVISION**

5 courses required

- 20 Introduction to Art History
- 21 Introduction to Non-Western Art
- 22 Formations of Modern Art
- 23 Information Technologies in Art History

Choose one from:

- 1, 2, 3 Introduction to Art-Making
- 60 Introduction to Photography
- 70N Introduction to Media

**ADVANCED LEVEL—  
UPPER-DIVISION**

13 courses required

**GROUP I—Required Courses**

Two courses

These two courses are required for all art history and criticism majors:

- 111 Structure of Art\*
- 112 Art Historical Methods

**Note:** Majors must complete VIS 112 by the end of their junior year and are strongly advised to do so earlier.

\* Required of all Visual Arts majors.

**GROUP II—DISTRIBUTIONAL  
REQUIREMENT**

Five courses

Choose one course from each of the following areas:

**A. Pre-Modern: Ancient and Medieval**

- 120A Greek Art
- 120B Roman Art
- 120C Late Antique Art
- 120D Prehistoric Art
- 121AN The Idea of Medieval Art

- 121B Castles, Cathedrals and Cities
- 121C\* Art and Gender in the Middle Ages and Renaissance
- 121D\* The Illuminated Manuscript in the Middle Ages
- 128AN Topics in Pre-Modern Art History
- 129AN\* Special Problems in Pre-Modern Art History

**B. Early Modern: Renaissance and Baroque**

- 122AN Renaissance Art
- 122BN Vision, Belief and Civic Virtue: Italian Art of the Early Renaissance
- 122CN Defining High Renaissance Art
- 122D Michelangelo
- 122E\* The City in Italy
- 123AN Between Spirit and Flesh: Northern Art of the Early Renaissance
- 123BN\* Jan van Eyck
- 123CN\* Early Print Culture: The First Media Revolution
- 124AN Baroque Art
- 128BN Topics in Early Modern Art History
- 129BN\* Special Problems in Early Modern Art History

**C. Modern**

- 124BN Art and the Enlightenment
- 124CN Nineteenth Century Art
- 125A Twentieth Century Art
- 125BN Contemporary Art
- 125CN Histories and Contexts of Conceptual Art
- 125DN\* Marcel Duchamp
- 125E\* History of Performance
- 128CN Topics in Modern Art History
- 129CN\* Special Problems in Modern Art History
- 158 Histories of Photography
- 159 History of Art and Technology

**D. Non-Western**

- 126AN Pre-Columbian Art of Ancient Mexico and Central America
- 126BN The Art and Civilization of the Ancient Maya
- 126CN Art of the North American Indians
- 126DN African and Afro-American Art
- 126E Oceanic Art
- 126F\* Western and Non-Western Rituals and Ceremonies
- 126G\* Problems in Mesoamerican Art History
- 126H\* Problems in Ancient Mayan Iconography and Inscriptions

- 128DN Topics in Non-Western Art History
- 129DN\* Special Problems in Non-Western Art History

**E. Theory**

- 113AN\* History of Criticism I: Early Modern
- 113BN\* History of Criticism II: Early Twentieth Century (1900–1950)
- 113CN\* History of Criticism III: Contemporary (1950–Present)
- 114 Art Criticism
- 117A\* Narrative Structures
- 117B\* Theories of Representation
- 117C\* Art in Time: The Historical Dimension
- 117D\* Portraiture
- 117E\* Problems in Ethnoaesthetics
- 128EN Topics in Art Theory and Criticism
- 129EN\* Special Problems in Art Theory and Criticism

Students must take at least two upper-division seminars in addition to VIS 112 and to the course taken in fulfillment of the distribution requirement for Theory. These two additional seminars may be taken in fulfillment of Pre-Modern, Early Modern, Modern and Non-Western or as open electives.

Art history majors cannot enroll in more than one upper-division seminar without having completed Information Technologies in Art History (VIS 23) and Art Historical Methods (VIS 112).

**GROUP III—ELECTIVES**

*Six courses*

- 150 History and Art of the Silent Cinema
- 151 History of Experimental Film
- 152 Film in Social Context
- 153 The Genre Series
- 154 Hard Look at the Movies
- 155 The Director Series
- 157 Video History and Criticism

Students are required to take six upper-division courses in addition to VIS 111, VIS 112 and those used to fulfill the distribution requirements. At least three of these must be courses in art history or theory. For the remaining three, choose from the following:

- Any upper-division art history course (s) in history or theory;
- any upper-division course(s) in media history and criticism;
- up to two upper-division courses in studio or media production; or

- with permission of art history faculty adviser, one upper-division course in a related department or program such as anthropology, history, literature, or women's studies.

**Media Major**

With a visual arts foundation, the program is designed for students who want to become creative videomakers, filmmakers, photographers, and computer artists, encouraging the hybridity of media. The curriculum combines hands-on experience of making with practical and theoretical criticism, provides historical, social, and aesthetic backgrounds for the understanding of modern media, and emphasizes creativity, versatility, and intelligence over technical specializations. It should allow students to go on to more specialized graduate programs in the media arts, to seek careers in film, television, computing, or photography, or to develop as independent artists. All media majors should see the Visual Arts Undergraduate Adviser upon entrance into UCSD.

**FOUNDATION LEVEL—  
LOWER-DIVISION**

*Six courses required*

**Group A**

- 1 or 2 or 3 Introduction to Art Making
- 22 Formations of Modern Art
- 84 History of Film

**Group B**

- 40 Introduction to Computing in the Arts
- 60 Introduction to Photography
- 70N Introduction to Media

All six courses listed under Groups A and B above are required. VIS 70N is prerequisite for use of the Media Center facilities; no further production courses may be taken until VIS 70N is completed.

**INTERMEDIATE LEVEL—  
UPPER-DIVISION**

*Nine courses required*

**Group A**

*Six courses required*

- 111 Structure of Art
- 174 Media Sketchbook

Both VIS 111 and VIS 174 are required and prerequisite to further study. Additionally, all courses from one of the following emphases are required.

**Computing Emphasis**

*Three courses plus one from photography or film/video*

- 140 Digital Imaging: Image and Interactivity
- and
- 141A/B Computer Programming for the Arts I and II
- or
- 145A Digital Media II: Time, Movement, Sound
- 145B Digital Media II

**Photography Emphasis**

*Two courses plus two from computing or film/video*

- 164 Photographic Strategies
- 165 Camera Techniques

**Film and Video Emphasis**

*Three courses plus one from computing or photography*

- 172 Studio Video
- 176 Introduction to Filmmaking
- 177 Scripting and Editing Strategies

**Note:** Enrollment in production courses is limited to two per quarter. Production courses are numbered VIS 109, 131, 132, 140, 141A-B, 145A-B, VIS 147A-B, 149, 164-166, 172-177 and 180A-187.

**Group B—History, Criticism, and Theory**

*Three courses required*

- 113BN History of Criticism II: Early Twentieth Century (1900–1950)
- 113CN History of Criticism III: Contemporary (1950–Present)
- 117B Theories of Representation
- 150 History and Art of the Silent Cinema
- 151 History of Experimental Film
- 152 Film in Social Context
- 153 The Genre Series
- 154 Hard Look at the Movies
- 155 The Director Series
- 157 Video History and Criticism
- 158 Histories of Photography
- 159 History of Art and Technology

**Note:** Any art history courses in Pre-Modern, Early Modern, Modern and Theory may be taken to fulfill the Group B requirement.

VIS 158 is required for all students with a photography emphasis.

VIS 159 is required for all students with a computing emphasis.

**ADVANCED LEVEL—UPPER DIVISION**

*Five courses required*

180A/B Generating the Narrative I and II

Both of the above are required; VIS 180A must be taken before VIS 180B. Additionally, three electives must be taken.

**Electives**

*Three courses required*

**Computing Emphasis**

- 147A/B Electronic Technologies for Art I and II
- 149 Seminar in Contemporary Computer Topics

**Photography Electives**

- 166 Advanced Camera Techniques

**Film and Video Electives**

- 181 Sound and Lighting
- 182 Advanced Editing
- 186 Advanced Filmmaking Strategies
- 187 Animation

VIS180A/B must be completed before any of the following four courses may be taken; instructor approval is required to enroll:

- 109 Advanced Projects in Media
- 131 Special Projects in Media
- 132 Installation Production and Studio
- 197 Media Honors Thesis

**Interdisciplinary Computing and the Arts**

The interdisciplinary computing and the arts major (ICAM) with emphasis in either visual arts or music is detailed under computing and the arts in the *UCSD General Catalog*. Interested students should contact the respective departmental adviser for additional information.

**Master of Fine Arts Program**

The program is designed to provide intensive professional training for the student who proposes to pursue a career within the field of art—including art making, criticism, theory. The scope of the UCSD program includes painting, sculpture, performance, environmental art, photography, film, video, and computer media. The program is unique in that the course of study provides for and encourages student mobility within this range of traditional and media-based components. It also offers opportunities for collaborative work.

The educational path of students is focused around their particular interests in art. The department seeks to provide an integrated and comprehensive introduction to the possibilities of contemporary art production, the intellectual structures which underlie them, and the “world view” which they entail. All art-making activities are considered serious intellectual endeavors, and all students in the program find themselves confronted by the need to develop their intellectual and critical abilities in the working out of their artistic positions. A body of theory-oriented courses is required. Therefore, we have no craft-oriented programs or facilities; nor do we have any courses in art education or art therapy. The courses offered are intended to develop in the student a coherent and informed understanding of the past and recent developments in art and art theory. The program also provides for establishing a confident grasp of contemporary technological possibilities, including those involved in film, photography, and the electronic media.

The program includes formal education in lecture and seminar courses as well as study groups, studio meetings, and quarterly departmental critiques. Course work is intended to place art making in critical and intellectual context but doesn't underestimate the central importance of the student's own work. In fact, this aspect of the student's activity is expected to be self-motivated and forms the core around which the program of study operates and makes sense.

No two students will necessarily follow the same path through the degree program, and the constitution of individual programs will depend upon the analysis of their individual needs and interests, worked out by students in collaboration with their faculty advisers.



## Admission Requirements

**Grade-Point Average**—An overall GPA of 3.00 and a 3.50 in a student's undergraduate major is required.

**Art History**—Students are expected to have had at least four semester courses or six quarter courses in art history and/or film history/criticism at the undergraduate level. Those who have a broader art history background will have a better chance of being awarded teaching assistantships. Students without this requirement can be admitted, but they may be expected to make up the six courses in excess of the seventy-two units required for the degree. If there are questions concerning this requirement, check with the department.

**Statement**—Students are required to submit an essay of approximately three pages on the direction of their work and its relationship to contemporary art. This essay should be critical in nature, refer explicitly to the student's own work, and may refer to other artists, recent events in art history, and issues in domains other than art that have bearing on the student's process, thought, and work.

**Work**—Students are asked to submit documentation of their best work in a suitable format such as slides, videotape, film, diskettes, CD-ROMs, photographs, etc. These will be returned upon review of the application. It is necessary to include a self-addressed, stamped envelope for return of work.

## Regular University Admission Policies

Please note that no application will be processed until all required information has been received. Students should submit applications with the application fee to the graduate admissions office on or before Monday, February 1, 1999. Portfolio, statement, letters of recommendation, and official transcripts should be sent directly to the department.

## Requirements for the Degree

The M.F.A. is considered the terminal degree in studio work, and is a two to three-year program. The following requirements must be completed in order to receive the M.F.A.:

**First Year Review**—This review takes place in the third quarter in residence. Students make a formal presentation of their work to a faculty

committee; this includes a position paper and an oral examination. This presentation is considered a departmental examination, and if at its conclusion the student's work is judged to be inadequate, the student may be dismissed regardless of GPA, or may be reviewed again in the fourth quarter.

Seventy-two units of course work, including a three-unit apprentice teaching course, are required. Students may select twenty-four of these units (six courses) from upper-division course offerings. (See listings in this catalog.) Specific information on course distribution requirements can be obtained from the department.

## The M.F.A. Final Presentation

**Presentation of Work**—During the last quarter in residence, each student is required to present to the public a coherent exhibition or screening of his or her work.

**Oral Examination**—A committee of three Department of Visual Arts faculty members and one tenured faculty member from another department will administer an oral examination to each student covering the student's work and its relationship to the field of art.

**Thesis**—Students are required to submit some form of written work for the M.F.A. degree. Four options are available:

1. **Catalog**—The student would design and have printed an actual catalog. This would include a critical essay of approximately 1,500 words.
2. **Critical paper**—The student would write a critical paper of 3,000 words analyzing his or her process and the relationship of his or her work to recent art history, with references to contemporary styles and specific artists.
3. **Analytical essay on some phase of art**—Students who have focused on both art production and art criticism would write a 3,000 word critical essay on any current art position. A brief discussion (750 words) of the student's work would also be included.
4. **Critical thesis**—Students whose emphasis is essentially criticism and who do not present an M.F.A. exhibition would write a forty- to fifty-page thesis—the topic to be decided by the student and his or her adviser.

Applications and additional information can be obtained from the office of the Department of Visual Arts.

## COURSES

**Note:** The following list of courses represents all visual arts offerings; not all courses are offered each year.

### LOWER-DIVISION

#### 1. Introduction to Art-Making: Two-Dimensional Practices (4)

An introduction to the concepts and techniques of art making with specific reference to the artists and issues of the twentieth century. Lectures and studio classes will examine the nature of images in relation to various themes. Drawing, painting, found objects, and texts will be employed. *Prerequisite: none.* This course is offered only one time each year.

#### 2. Introduction to Art Making: Motion and Time Based Art (4)

An introduction to the process of art making utilizing the transaction between people, objects, and situations. Includes both critical reflection on relevant aspects of avant-garde art of the last two decades (Duchamp, Cage, Rauschenberg, Gertrude Stein, conceptual art, happenings, etc.) and practical experience in a variety of artistic exercises. This course is offered only one time each year.

#### 3. Introduction to Art-Making: Three-Dimensional Practices (4)

An introduction to art making that uses as its base the idea of the "conceptual." The lecture exists as a bank of knowledge about various art world and non-art world conceptual plays. The studio section attempts to incorporate these ideas into individual and group projects using any "material." This course is offered only one time each year.

#### 20. Introduction to Art History (4)

This course examines history of Western art and architecture through such defining issues as the respective roles of tradition and innovation in the production and appreciation of art; the relation of art to its broader intellectual and historical contexts; and the changing concepts of the monument, the artist, meaning, style, and "art" itself. Representative examples will be selected from different periods, ranging from Antiquity to Modern. Content will vary with the instructor. *Prerequisite: none.*

#### 21. Introduction to Non-Western Art (4)

This course offers a comparative and thematic approach to the artistic achievements and cultural productions of societies with widely divergent structure and political organization from the ancient kingdoms and empires of Central America and Asia to the tribes of Africa and the chiefdoms of Native American and Oceanic peoples. Topics vary with the interests and expertise of the instructor. *Prerequisite: none.*

#### 22. Formations of Modern Art (4)

Wide-ranging survey introducing the key aspects of modern art and criticism in the nineteenth and twentieth centuries, including Neo-Classicism, Romanticism, Realism, Impressionism, Post-Impressionism, Symbolism, Fauvism, Cubism, Dada and Surrealism, Abstract Expressionism, Minimalism, Earth Art and Conceptual Art. *Prerequisite: none.*

#### 23. Information Technologies in Art History (4)

This seminar introduces fundamentals of art historical practice such as descriptive and analytical writing, compiling annotated bibliographies with traditional and online resources, defining research topics and writing project proposals. *Prerequisite: none.*

**Note:** Prerequisite for VIS 112 and highly recommended for all other seminars. Must be taken within a year of declaring major or transferring into the art history program.

**40. Introduction to Computing in the Arts (4)**

(Cross-listed with ICAM 40.) An introduction to the conceptual uses and historical precedents for the use of computers in art making. Preparation for further study in the computer arts area by providing overview of theoretical issues related to the use of computers by artists. Introduces the students to the program's computer facilities and teaches them basic computer skills. *Prerequisite:* none. Materials fee required.

**60. Introduction to Photography (4)**

An in-depth exploration of the camera, combining darkroom techniques in black and white, and color photography. Emphasis is placed on developing reliable control of the fundamental materials and procedures through lectures, field, and lab experience. Basic discussion of image making included. Materials fee required.

**70N. Introduction to Media (6)**

Operating as both a lecture and production course, this introductory class provides a technical foundation and theoretical context for all subsequent production-oriented film and video studies. In the laboratory, the student will learn the basic skills necessary to initiate video production. Completion of Visual Arts 70N is necessary to obtain a media card. *Prerequisite:* none. Materials fee required.

**84. History of Film (4)**

A survey of the history and the art of the cinema. The course will stress the origins of cinema and the contributions of the earliest filmmakers, including those of Europe, Russia, and the United States. Materials fee required. This course is offered only one time each year.

**90. Undergraduate Seminar (1)**

This seminar will introduce undergraduate students, especially freshmen and sophomores, to a variety of issues and topics organized around the research interests of faculty members.

**UPPER-DIVISION**

**104A. Performing the Self (4)**

Using autobiography, dream, confession, fantasy, or other means to invent one's self in a new way, or to evoke the variety of selves in our imagination, the course experiments with and explores the rich possibilities available to the contemporary artist in his or her own persona. *Prerequisites:* two from VIS 1, 2, 3 and either 22 or 111.

**104BN. Verbal Performance (4)**

The course is designed to introduce the student to the part played by language in contemporary performance art. Monologues, musically derived sound poetry, vocalizations, verbally inscribed installations, and the uses of language and voice in film and video are some of the areas explored. *Prerequisite:* VIS 104A.

**104CN. Personal Narrative (4)**

The course will explore primary experiential materials to more fully understand the relationship of voice, style, language, and personality, to issues of memory, identity, self-awareness, and desire. Instructor and student will discuss student work as well as published personal narrative. *Prerequisite:* VIS 104BN.

**105A. Drawing: Representing the Subject (4)**

A studio course in beginning drawing covering basic drawing and composition. These concepts will be introduced by the use of models, still life, landscapes, and conceptual projects. *Prerequisites:* two from VIS 1, 2, 3 and either 22 or 111.

**105B. Drawing: Practices and Genre (4)**

A continuation of VIS 105A. A studio course in which the student will investigate a wider variety of technical and conceptual issues involved in contemporary art practice related to drawing. *Prerequisite:* VIS 105A.

**105C. Drawing: Portfolio Projects (4)**

A studio course in drawing, emphasizing individual creative problems. Class projects, discussions and critiques will focus on issues related to intention, subject matter and context. *Prerequisite:* VIS 105B.

**106A. Painting: Image Making (4)**

A studio course focusing on problems inherent in painting—transferring information and ideas onto a two-dimensional surface, color, composition, as well as manual and technical procedures. These concepts will be explored through the use of models, still life, and landscapes. *Prerequisites:* two from VIS 1, 2, 3 and either 22 or 111.

**106B. Painting: Practices and Genre (4)**

A continuation of VIS 106A. A studio course in which the student will investigate a wider variety of technical and conceptual issues involved in contemporary art practice related to painting. *Prerequisite:* VIS 106A.

**106C. Painting: Portfolio Projects (4)**

A studio course in painting emphasizing individual creative problems. Class projects, discussions, and critiques will focus on issues related to intention, subject matter, and context. *Prerequisite:* VIS 106B.

**107A. Sculpture: Making the Object (4)**

A studio course focusing on the problems involved in transferring ideas and information into three-dimensions. Course will explore materials and construction as dictated by the intended object. Specific problems to be investigated will be determined by the individual professor. *Prerequisites:* two from VIS 1, 2, 3 and either 22 or 111.

**107B. Sculpture: Practices and Genre (4)**

A studio course in which the student will investigate a wider variety of technical and conceptual issues as well as materials involved in contemporary art practice related to sculpture. *Prerequisite:* VIS 107A.

**107CN. Sculpture: Portfolio Projects (4)**

A studio course in sculpture emphasizing individual creative problems. Class projects, discussions, and critiques will focus on issues related to intention, subject matter, and context. *Prerequisite:* VIS 107B.

**108. Advanced Projects in Art (4)**

A studio course for serious art students at the advanced level. Stress will be placed on individual creative problems. Specific orientation of this course will vary with the instructor. Topics may include film, video, photography, painting, performance, etc. May be repeated twice for credit. *Prerequisite:* consent of instructor.

**109. Advanced Projects in Media (4)**

A production course for serious upper-division media students. Individual or group projects will be completed over one or two quarters. A specific project organized by the student(s) will be realized during this course, with the instructor acting as a close adviser and critic. Formal concept papers or scripts must be completed and approved by the instructor prior to enrollment. May be repeated twice for credit. *Prerequisite:* consent of instructor.

**110A. Contemporary Issues and Practices (4)**

An examination of contemporary studio art practice. The course is divided among research, discussion and projects. Field trips to galleries and discussions with artists will combine with the students moving their work into a dialogue with the issues

raised. *Prerequisites:* two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.

**110B. New Genre/New and Old Technologies (4)**

Advances the idea of different materials, methods, and practices raised at the intermediate level in drawing, painting, and sculpture, and explores and utilizes new and traditional media in studio production of work. Emphasis on multiple media, combining traditional and electronic media, as well as different genres, in an attempt to create new directions for the student's ideas. *Prerequisites:* two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.

**110C. Proposals, Plans, Presentations (4)**

Explores the use of the maquette, or sketch, in the process of developing, proposing and planning visual works in various media for public projects, site specific works, grants, exhibition proposals, etc. The student will work on synthesizing ideas and representing them in alternate forms that deal with conception, fabrication and presentation. *Prerequisites:* two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.

**110D. Visual Narrative/Tableau (4)**

Examination and use of multi-media in exploring narrative issues in art making. The identification of subject leads to the determination of choice or mix of media and construction of narrative. Traditional studio practice surrounding narrative painting and sculpture, forms such as comic drawing or story boards, and the use of photo, video, and computing. *Prerequisites:* two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.

**110E. Art in Public Places/Site Specific Art (4)**

The course attempts to take painting and sculpture, as well as related media, out of the studio/gallery and into the public sphere by examining the contemporary history of public artworks with traditional and non-traditional site-specific work. The course will focus on production as well as critical discussion and writing. *Prerequisites:* two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.

**110F. Installation: Cross-Disciplinary Projects (4)**

Attempts to expand the idea contained in a singular work, or object, into the use of multiple objects, images, and media that redefines the idea as well as the space for which it is intended. Examination of historic, modern, and contemporary works would be brought into discussion of project development and execution. *Prerequisites:* two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.

**110G. The Natural and Altered Environment (4)**

Explores the natural and altered environment as a basis for subject as well as placement of work pertaining to the environment. *Prerequisites:* two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.

**110H. Image and Text Art (4)**

Devoted to the study and practice of the multiple ways in which writing and other forms of visible language have been incorporated into contemporary and traditional artworks, including artists' books, collaging and poster art, visual and concrete poetry, typographical experiments, and calligraphies. *Prerequisites:* two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.

**110I. Performing for the Camera (4)**

The dematerialization of the performer into a media based image—video, film, slides, still photographs, using the camera as a spy, a co-conspirator, a friend or a foe—employing time lags, spatial derangement, image deconstruction, along with narrative, text, history, to invent time based pieces that break new ground while being firmly rooted in an understanding of the rich body of work done in this area over the last three decades. *Prerequisites:* two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.

**110J. Ritual Performance (4)**

The course will explore forms of art making that use dream and myth, body art, dance, social drama, happenings, story telling, and enactments of contemporary and traditional forms of performance art that involve a crossing of the lines between different arts and genres. *Prerequisites: two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.*

**110K. Installation Performance (4)**

The artist as performer working with materials, objects, props, technology, to create multi-layered, experimental, interesting three-dimensional art spaces in which the artist's body, voice, actions, or memory, moves through, enlivens, or haunts the physical space. *Prerequisites: two from VIS 104CN, 105C, 106C, 107CN and 147B or consent of instructor.*

**110M. Studio Honors I (4)**

An advanced studio course intended for the productive, motivated, and self-disciplined student with a clear and unified body of work. The intent is to help refine and expand the student's work and ideas towards an exhibition and verbal written position. *Prerequisite: consent of the instructor.*  
**Note:** The Studio Honors I and the attached Studio Honors II count as one course toward the fulfillment of a Group IV requirement.

**110N. Studio Honors II (4)**

The second advanced studio course in the Honors Program in Studio, the successful completion of which will lead towards an honors degree in the studio major. The course builds on the critical and technical issues raised in Studio Honors I. *Prerequisite: VIS 110M.*

**111. The Structure of Art (4)**

This course will address the structure of signification in art. We will consider the modes of signification in a wide range of representational and nonrepresentational artworks from architecture through drawing, painting, sculpture, photography, video, and film to performance. Examples will be selected from various places and epochs. This course is required for transfer students. This course is offered during winter quarter only.

**112. Art Historical Methods (4)**

A critical review of the principal strategies of investigation in past and present art-historical practice, a scrutiny of their contexts and underlying assumptions, and a look at alternative possibilities. The various traditions for formal and iconographic analysis as well as the categories of historical description will be studied. Required for all art history and criticism majors. *Prerequisites: VIS 23 and one upper-division art history course; two recommended.*

**113AN. History of Criticism I: Early Modern (4)**

Introducing Classical, Medieval, and Renaissance theories of the image, we concentrate on developments in the eighteenth and nineteenth centuries: Neo-Classicism, Romanticism, Realism, and Symbolism. *Prerequisite: none; VIS 112 or two upper-division courses in art history strongly recommended.*

**113BN. History of Criticism II: Early Twentieth Century (1900-1950) (4)**

The principal theories of art and criticism from Symbolism until 1945: formalism and modernism, abstraction, Surrealism, Marxism, and social art histories, phenomenology, existentialism. *Prerequisite: none; VIS 112 or two upper-division courses in art history strongly recommended.*

**113CN. History of Criticism III: Contemporary (1950-Present) (4)**

Recent approaches to the image in art history and visual culture: structuralism, semiotics, psychoanalysis, post-structuralism, post-modernism, feminism, post-colonialism, cultural studies. *Prerequisite: none; VIS 112 or two upper-division courses in art history strongly recommended.*

**114. Art Criticism (4)**

This course is intended to develop critical approaches to contemporary art. It will investigate contemporary forms of art criticism, stressing both traditional and alternate points of view. Outside field trips and critical writings will be assigned. May be repeated once for credit. *Prerequisite: none; one upper-division modern art history course recommended.*

**117A. Narrative Structures (4)**

How can a fixed image represent events in time? The strategies of storytelling and their consequences for the meaning of works of art will be investigated. Content of the course will vary. May be repeated twice for credit with permission of the instructor. *Prerequisite: none; VIS 112 or two upper-division courses in art history strongly recommended.*

**117B. Theories of Representation (4)**

A discussion of major Western theories of representation with a critique of their applicability to art. Material is drawn from a wide variety of historical periods from Antiquity to Modern. Emphasis is given to theories special significance for art history, but some attention is given to representation theories in other contexts. Readings may include selections from such modern theorists as Peirce, Panofsky, Gombrich, Bernheimer, Barfield, Barthes, Goodman, Foucault, Bryson, Summers, and Mitchell and from classic texts by Plato, Aristotle, John of Damascus, Alberti, and Leonardo. *Prerequisite: none; one or more upper-division courses in art history strongly recommended.*  
**Note:** Majors must have taken VIS 23.

**117C. Art in Time: The Historical Dimensions (4)**

How does a work of art live in time? What connects it with art past, present, and future? Where does tradition and innovation intersect? Why is past art always an issue for contemporary practice? This seminar considers these and other questions as well as different theoretical models for understanding art's historical dimension. Specific issues and readings may vary from year to year. *Prerequisite: none; VIS 112 or two upper-division courses in art history strongly recommended.*

**117D. Portraiture (4)**

Portraiture appeals to the human interest in human beings. This seminar explores how portraits from different periods (potentially ancient through modern) reflect cultural ideas about citizens even as they purport to convey actual appearances. Content may vary with instructor. *Prerequisite: none; VIS 112 or two upper-division courses in art history strongly recommended.*

**117E. Problems in Ethnoaesthetics (4)**

This seminar will address and critique various approaches to studying the art of non-Western societies with respect to their own aesthetic and cultural systems. Students are encouraged to explore comparative philosophies of art and test paradigms of Western aesthetic scholarship. *Prerequisite: none; VIS 21 or 112 or two upper-division courses in art history strongly recommended.*

**120A. Greek Art (4)**

Greek classical civilization was a turning point in the history of humanity. Within a new kind of society, the idea of the individual as free and responsible was forged, and with it the invention of history, philosophy, tragedy, and science. The arts which expressed this cultural explosion were no less revolutionary. The achievements of Greek art in architecture, sculpture, and painting will be examined from their beginnings in the archaic period, to their epoch-making fulfillment in the classical decades of the fifth century B.C., to their diffusion over the entire ancient world in the age of Alexander and his successors. *Prerequisite: none; VIS 20 recommended.*

**120B. Roman Art (4)**

Roman art was the "modern art" of antiquity. Out of their Italic tradition and the great inheritance of Greek classic and

Hellenistic art, the Romans forged a new language of form to meet the needs of a vast empire, a complex and tumultuous society, and a sophisticated, intellectually diverse culture. An unprecedented architecture of shaped space used new materials and revolutionary engineering techniques in boldly functional ways for purposes of psychological control and symbolic assertion. Sculpture in the round and in relief was pictorialized to gain spatial effects and immediacy of presence, and an extraordinary art of portraiture investigated the psychology while asserting the status claims of the individual. Extreme shifts of style, from the classicism of the age of Augustus to the expressionism of the third century A.D., are characteristic of this period. The new modes of architecture, sculpture, and painting, whether in the service of the rhetoric of state power or of the individual quest for meaning, were passed on to the medieval and ultimately to the modern West. *Prerequisite: none; VIS 20 recommended.*

**120C. Late Antique Art (4)**

During the later centuries of the Roman Empire, the ancient world underwent a profound crisis. Beset by barbarian invasions, torn by internal conflict and drastic social change, inflamed with religious passion which was to lead to a transformed vision of the individual, the world, and the divine, this momentous age saw the conversion of the Roman world to Christianity, the transfer of power from Rome to Constantinople, and the creation of a new society and culture. Out of this ferment, during the centuries from Constantine to Justinian, there emerged new art forms fit to represent the new vision of an otherworldly reality: a vaulted architecture of diaphanous space, a new art of mosaic which dissolved surfaces in light, a figural language both abstractly symbolic and urgently expressive. The great creative epoch transformed the heritage of classical Greco-Roman art and laid the foundations of the art of the Christian West and Moslem East for the next thousand years. *Prerequisite: none; VIS 20 or 120B recommended.*

**120D. Prehistoric Art (4)**

Tens of thousands of years before the dawn of history, the hunting peoples of Ice Age Europe invented the first language of visual images. Their painted cave sanctuaries, such as Lascaux and Altamira, are dazzling in their expressive vitality and mystifying in meaning. This course links cave art with what is known about contemporary conditions of nature, society, and human life. *Prerequisite: none; VIS 20 recommended.*

**121AN. The Idea of Medieval Art (4)**

This course introduces the art and architecture of Western Europe from the fourth through the thirteenth centuries. A leading theme is the changing idea of what "medieval" has come to mean, from the coining of the terms "Middle Ages" and "Dark Ages" by Renaissance humanists, to the Romantic fascination with Gothic ruins, and finally to the fantasy medievalisms of twentieth century popular culture and current approaches to medieval art in art historical scholarship. *Prerequisite: none; VIS 20 recommended.*

**121B. Castles, Cathedrals and Cities (4)**

Art production in Western Europe from the twelfth through the fourteenth centuries flowed from three principal centers of creative activity—the castle, the cathedral, and the city—which gave visible form to the interests and values of competing segments of medieval society. This course explores the art and architecture of these three centers in the context of the rituals of chivalry, church, and civic life that made a dazzling spectacle of art and life in the High Middle Ages. *Prerequisite: none; VIS 20 recommended.*

**121C. Art and Gender in the Middle Ages and Renaissance (4)**

This seminar explores how different representational traditions involving women and men reflected but also contributed to the formation of period beliefs about gender difference. It also

considers the differential roles of women and men as producers and patrons of art and period expectations and practices involving male and female spectatorship. Specific content may vary from year to year. *Prerequisite: none; VIS 112 or two upper-division courses in art history strongly recommended.*

**121D. The Illuminated Manuscript in the Middle Ages (4)**  
This seminar charts the changing pictorial problematics presented by the illuminated manuscript from its origins in late antiquity to the disintegration of the manuscript tradition under the impact of the first printed books. Works such as the *Book of Kells* and the *Tres Riches Heures of the Duke of Berry*, among the most brilliant achievements of Western painting, are among those considered. *Prerequisite: none; VIS 112 or two upper-division courses in art history strongly recommended.*

**122AN. Renaissance Art (4)**  
Italian artists and critics of the fourteenth through sixteenth centuries were convinced that they were participating in a revival of the arts unparalleled since Antiquity. Focusing primarily on Italy, this course traces the emergence in painting, sculpture and architecture, of an art based on natural philosophy, optical principles, and humanist values, which embodied the highest intellectual achievement and deepest spiritual beliefs of the age. Artists treated include Giotto, Donatello, Masaccio, Brunelleschi, Jan van Eyck, Mantegna, Botticelli, Leonardo da Vinci, Michelangelo, Raphael, Bramante, Durer, and Titian. *Prerequisite: none; VIS 20 recommended.*

**122BN. Vision, Belief and Civic Virtue: Italian Art of the Early Renaissance (4)**  
Spurred by a renewed interest in Antiquity, a coterie of artists working with Donatello and Brunelleschi in Florence forged a new language of art that defined the character and possibilities for painting, sculpture, and architecture for centuries to come. This lecture course analyzes the contributions of artists such as Masaccio, Mantegna, Alberti, Piero della Francesca, Bellini, and Botticelli to emergence of the artist as intellectual, the conceptualization of the statue and the monument, the development of pictorial perspective, the theorization of artist practice, and the expanded role of images in urban and religious life. *Prerequisite: none; VIS 20 or 122AN recommended.*

**122CN. Defining High Renaissance Art (4)**  
Since the sixteenth century, the names of Leonardo da Vinci, Raphael and Bramante have conjured up images of the highest artistic achievement. This course shows the intellectual concerns common to the artist and scientific productions of Leonardo help illuminate the distinctive character of the art of two of his greatest contemporaries. *Prerequisite: none; VIS 20, 122AN, or 122BN recommended.*

**122D. Michelangelo (4)**  
This course offers new approaches to understanding Michelangelo's greatest creations. By considering how each work relates to the setting for which it was intended, by regarding critical literature and artistic borrowings as evidence about the works, and by studying the thought of the spiritual reformers who counseled Michelangelo, new interpretations emerge which show the artist to be a deeply religious man who invested his works with both public and private meanings. *Prerequisite: one upper-division course in Renaissance art; VIS 112 or 122CN recommended.*

**122E. The City in Italy (4).**  
(Cross-listed with HIEU 124.) Each Italian city takes pride in having a style and history all its own. This lecture course, usually taught in conjunction with the history department's HIEU 124, considers various approaches to and models for understanding the social, political, economic, and artistic fabric of such renowned medieval and Renaissance cities as Rome, Florence, Venice, Naples, Milan, and Siena. Content varies from year to year. May be repeated three times for credit. *Prerequisite: none; VIS 20 or 122AN recommended.*

*site: none; an upper-division course in Pre-Modern or Early Modern art history or Pre-Modern or Early Modern European history is strongly recommended. Note: May be used to fulfill the seminar requirement for art history majors.*

**123AN. Between Spirit and Flesh: Northern Art of the Early Renaissance (4)**  
The art of the Early Renaissance in Northern Europe is marked by what appears to be striking conflict: on the one hand, a new love of nature and of the pleasures of court society; and on the other, an intensified spirituality and focus on personal devotion. This course explores these provocative cross-currents in works by master painters like Jan van Eyck and Hieronymous Bosch as well as in lesser known mass-produced objects of everyday use. *Prerequisite: none; VIS 20, 121AN, and/or 122AN recommended.*

**123BN. Jan van Eyck (4)**  
Intensive study of the career of Jan van Eyck, whose magical paintings have always fascinated viewers with their microscopically detailed naturalism and subtly disguised spiritual meanings. Masterpieces such as the "Arnolfini Wedding" are emphasized. *Prerequisite: none; VIS 112 or two upper-division courses in art history recommended.*

**123CN. Early Print Culture: The First Media Revolution (4)**  
During the fifteenth century, two inventions—printed pictures and books printed with moveable type—revolutionized both Western art making and information technologies. This seminar considers the conditions that made possible this "first media revolution," its immediate impact and its continuing resonances in early modern visual culture. *Prerequisite: none; VIS 112 or two upper-division courses in art history recommended.*

**124AN. Baroque Art (4)**  
This course discusses the achievement of such major artists as Caravaggio, Gentileschi, Bernini, Borromini, Rubens, Rembrandt, Velasquez, and Vermeer within a culture marked by increasing intellectual specialization, the entrenchment of modern national boundaries, the co-existence of rival religious organizations, the formations of artistic academies, and the rise of an art market serving the flourishing middle-class. *Prerequisite: none; VIS 20 recommended.*

**124BN. Art and the Enlightenment (4)**  
Eighteenth century artists and critics were convinced that art could be a force to improve society. This course places Rococo and Neo-Classical artists such as Watteau, Fragonard, Tiepolo, Hogarth, Reynolds, Vigee Lebrun, Blake and David, within the context of art academies, colonialism, the Grand Tour, Enlightenment conceptualizations of history and nature, and the American and French Revolutions. *Prerequisite: none; VIS 20 or 22 recommended.*

**124CN. Nineteenth Century Art (4)**  
A critical survey discussing the crisis of the Enlightenment, Romanticism, Realism and Naturalism, Academic Art and History Painting, representations of the New World, the Pre-Raphaelites, Impressionism, international Symbolism, Post-Impressionism, and the beginnings of Modernism. *Prerequisite: none; VIS 20 or 22 recommended.*

**125A. Twentieth Century Art (4)**  
A critical survey outlining the major avant-gardes after 1900: Fauvism, Cubism, Metaphysical Painting, Futurism, Dada, Surrealism, Neo-Plasticism, Purism, the Soviet avant-garde, Socialist Realism, and American art before Abstract Expressionism. *Prerequisite: none; VIS 20 or 22 recommended.*

**125BN. Contemporary Art (4)**  
Art after Abstract Expressionism: Happenings, Post-painterly Abstraction, Minimalism, Performance, Earth Art, Conceptual Art, Neo-Expressionism, Post-Conceptualism and development

in the 1990s, including non-Western contexts. We also explore the relation of these tendencies to Postmodernism, Feminism and ideas of Postcoloniality. *Prerequisite: none; VIS 20 or 22 recommended.*

**125CN. Histories and Contexts of Conceptual Art (4)**  
A detailed exploration of the history, theories and social contexts of the Conceptual Art movement from mid-1960s to the 1980s. Artists/theorists discussed include Duchamp, Kosuth, Weiner, Baldessari, Barry, Piper, Darboven, Huebler, Art and Language, Beuys, Holzer, and Neo-Conceptualism. *Prerequisite: none; VIS 20 or 22 recommended.*

**125DN. Marcel Duchamp (4)**  
A critical examination of the work of one of the most radical twentieth century artists. In Duchamp's four dimensional perspective, the ideas of art-object, artist, and art itself are deconstructed. *The Large Glass and Etant Donnees . . .* are the twin foci of an *oeuvre* without boundaries in which many twentieth-century avant-garde devices such as chance techniques, conceptual art, and the fashioning of fictive identities, are invented. *Prerequisite: none.*

**125E. History of Performance Art (4)**  
The novel, perplexing, outrageous, and witty modes of performance by such contemporary artists as Acconci, Anderson, Antin, Beuys, Jonas, Kaprow, and Lacy will be examined in the critical framework of earlier twentieth-century experiments in music, theater, and dance as well as in the visual arts. The movements of futurism, dada and surrealism, the Russian avant-garde, the Bauhaus, abstract expressionism, and happenings provide antecedents for performance art. So do the fields of anthropology, sociology, and psychology as well as the theater practices and theories of Artaud, Brecht, Piscator, Meyerhold, and Stanislavsky, and the experimental dance of Duncan, Wigman, Laban, Graham, Cunningham, and Rainer. *Prerequisite: none.*

**126AN. Pre-Columbian Art of Ancient Mexico and Central America (4)**  
An introduction to the cities and monuments of the ancient civilizations which flourished in Mexico and Central America before the Spanish Conquest. This course will cover the major cultures of Mesoamerica, including the Olmec, Aztec, and neighboring groups. *Prerequisite: none; VIS 21 recommended.*

**126BN. The Art and Civilization of the Ancient Maya (4)**  
This course offers a history of Maya society from its formative stages to the eve of the Spanish Conquest through an investigation of its art and archeology. Special attention is given to its unique calendar and writing systems. *Prerequisite: none; VIS 21 recommended.*

**126CN. Art of the North American Indians (4)**  
This course discusses the artistic legacy and cultural diversity of the ancient, historic, and surviving Native American people of the United States and Canada. *Prerequisite: none; VIS 21 recommended.*

**126DN. African and Afro-American Art (4)**  
The dynamic, expressive arts of selected West African societies and their subsequent survival and transformation in the New World will be studied. Emphasis will be placed on Afro-American modes of art and ceremony in the United States, Haiti, Brazil, and Suriname. *Prerequisite: none; VIS 21 recommended.*

**126E. Oceanic Art (4)**  
An examination of the relation of art to ritual life, mythology, and social organization in the native Polynesian and Melanesian cultures of Hawaii, New Guinea, the Solomon Islands, and Australia. *Prerequisite: none; VIS 21 recommended.*

**126F. Western and Non-Western Rituals and Ceremonies (4)**

This course will examine the process of image-making within specific ceremonies and/or rituals. Selected ceremonies from West Africa, Melanesia, Nepal, and the United States, including both Christian and non-Christian imagery, will be considered. Performance art and masquerade will be analyzed within a non-Western framework. *Prerequisite: none; VIS 21 recommended.*

**126G. Problems in Mesoamerican Art History (4)**

Topics of this seminar will address special problems or areas of research related to the major civilizations of ancient Mexico and Central America. Course offerings will vary in order to focus upon particular themes, subjects, or interpretive problems. *Prerequisite: none; VIS 21 recommended.*

**126H. Problems in Ancient Maya Iconography and Inscriptions (4)**

This seminar focuses upon the art, architecture, and inscriptions of the ancient Maya. Topics will vary within a range of problems that concern hieroglyphic writing, architecture, and visual symbols the Maya elite used to mediate their social, political, and spiritual worlds. *Prerequisite: none; VIS 21 recommended.*

**128AN-EN. Topics in Art History and Theory**

These lecture courses are on topics of special interest to visiting and permanent faculty. Topics vary from term to term and with instructor and many will not be repeated. These courses fulfill upper-division distribution requirements. As the courses under this heading will be offered less frequently than those of the regular curriculum, students are urged to check for availability and descriptions of these supplementary courses in the annual catalogue listings. Like the courses listed under VIS 129, below, the letters following the course number designate the general area in which the courses fall. Students may take courses with the same number but of different content, with consent of instructor and/or program adviser. May be repeated three times for credit. *Prerequisite: none; courses in art history recommended.*

**128AN. Topics in Pre-Modern Art History (4)**

A lecture course on a topic of special interest in ancient or medieval art.

**128BN. Topics in Early Modern Art History (4)**

A lecture course on a topic of special interest in Renaissance or Baroque art.

**128CN. Topics in Modern Art History (4)**

A lecture course on a topic of special interest on Modern or Contemporary art.

**128DN. Topics in Non-Western Art History (4)**

A lecture course on a topic of special interest in Pre-Columbian, Native American, Oceanic, Asian, or African art.

**128EN. Topics in Art Theory and Criticism (4)**

A lecture course on a topic of special interest in art theory, art criticism, or the history of literature on art.

**129AN-EN. Special Problems in Art Criticism and Theory (4)**

These seminar courses provide the opportunity for in-depth study of a particular work, artist, subject, period, or issue. Courses offered under this heading may reflect the current research interests of the instructor or treat a controversial theme in the field of art history and criticism. Active student research and classroom participation are expected. Enrollment is limited and preference will be given to majors. The letters following 129 in the course number designate the particular area of art history or theory concerned. Students may take courses with the same number but of different content more than once for credit, with consent of the instructor and/or the program

adviser. May be repeated three times for credit. *Prerequisite: VIS 112 or two upper-division courses in art history.*

**129AN. Special Problems in Pre-Modern Art History (4)**

A seminar on an advanced topic of special interest in ancient or medieval art.

**129BN. Special Problems in Early Modern Art History (4)**

A seminar on an advanced topic of special interest in Renaissance or Baroque art.

**129CN. Special Problems in Modern Art History (4)**

A seminar on an advanced topic of special interest in Modern or Contemporary art.

**129DN. Special Problems in Non-Western Art History (4)**

A seminar on an advanced topic of special interest in Pre-Columbian, native American, oceanic, Asian, or African art.

**129EN. Special Problems in Art Theory and Criticism (4)**

A seminar on an advanced topic of special interest in art theory, art criticism, or the history of literature on art.

**129G. Art History Honors Seminar (4)**

This research seminar, centered on a series of critical, thematic, theoretical, and/or historical issues that cut across subdisciplinary specializations, provides outstanding advanced students with the opportunity to undertake graduate-level research. The first part of a two-part sequence completed by Art History Honors Directed Group Study (VIS 129H). *Prerequisite: consent of instructor or art history faculty adviser. Note: The Art History Honors Seminar and the attached Art History Honors Directed Group Study counts as one course towards the fulfillment of the Group III requirement.*

**129H. Art History Honors Directed Group Study (4)**

The second part of the honors program sequence, this course provides a forum for students engaged in research and writing to develop their ideas with the help of a faculty adviser and in conjunction with similarly engaged students. *Prerequisite: consent of instructor or art history faculty adviser.*

**130. Special Projects in Visual Arts (4)**

Specific content will vary each quarter. Areas will cover expertise of visiting faculty. May be repeated twice for credit. *Prerequisite: consent of instructor.*

**131. Special Projects in Media (4)**

Specific content will vary each quarter. Areas will cover expertise of visiting faculty. May be repeated twice for credit. *Prerequisite: consent of instructor.*

**132. Installation Production and Studio (4)**

The artist transformation of physical space often incorporates many media simultaneously: drawing, painting, sculpture, photography, film, video, computing, and performance. Through discussions and readings, the class will examine the issues and aesthetics of installation art making. Using media familiar to them, students will produce several projects. May be repeated once for credit. *Prerequisites: VIS 1 or 2 or 3, 22 and 111. Note: Open to all upper-division studio and media majors.*

**140. Digital Imaging: Image and Interactivity (4)**

(Cross-listed with ICAM 101.) This introduction to the digital image involves images, texts, and interactive display, and operates both within a computer mediated space (i.e., Web site) and in physical space (i.e., artist book). Interactive narrative and computer programming are explored. *Prerequisite: VIS 40. Note: Materials fee required.*

**141A. Computer Programming for the Arts I (4)**

The use of computer programming as a tool and conceptual framework for art making will be explored. The course will use Silicon Graphics workstations to teach fundamental aspects of using the C programming language and the UNIX operating system to create computer graphics, audio, and text-based

works. *Prerequisites: VIS 40, 111, 140, and 174. Note: Materials fee required.*

**141B. Computer Programming for the Arts II (4)**

Continuation of VIS 141A, where students extend their programming capabilities to include such areas as image processing, multimedia, and interactive 3-D graphics programming contextualized by a further exploration of topics in algorithmic and procedural modeling. *Prerequisite: VIS 141A. Note: Materials fee required.*

**145A. Digital Media I: Time, Movement, Sound (4)**

(Cross-listed with ICAM 102.) As an exploration of time dependent media components, this course will deal with the creation and manipulation of digital sound as well as moving images and their integration in multimedia work. Use of computer programming to control time is emphasized. *Prerequisite: VIS 40 and 140. Note: Materials fee required.*

**145B. Digital Media II (4)**

Second course in the sequence where students will implement projects under direction of faculty. Projects will involve interactive narrative media and can include such things as Internet-based publishing (i.e., web site), distributable media (i.e., CD-ROM), or computer-based interactive environment (i.e., virtual reality). *Prerequisite: VIS 145A. Note: Materials fee required.*

**147A. Electronic Technologies for Art I (4)**

Develop artworks and installations that utilize digital electronics. Techniques in digital electronic construction and computer interfacing for interactive control of sound, lighting and electromechanics. Students will construct devices which can responsively adapt artworks to conditions involving viewer participation, space activation, and machine intelligence. *Prerequisite: VIS 1. Note: Purchase of components kit required.*

**147B. Electronic Technologies for Art II (4)**

A continuation of the electronics curriculum where students will design programmable microcontroller systems for creating artworks that are able to respond to complex sets of input conditions, perform algorithmic and procedural processing and generate real time output. *Prerequisite: VIS 147A. Purchase of components kit required.*

**149. Seminar in Contemporary Computer Topics (4)**

(Cross-listed with ICAM 130.) Treats selected topics drawn from a broad variety of subjects relevant to computer-based art and music making, such as computer methods for making art and music, the design of interactive systems, spatialization of visual and musical elements, and critical studies. Topics will vary. May be repeated five times for credit. *Prerequisites: VIS 140 and ICAM 110; VIS 145A or ICAM 103 recommended. Note: Materials fee required.*

**150. History and Art of the Silent Cinema (4)**

An investigation of silent films from early cinema (so called "primitive cinema") to the development of a classical style of filmmaking in the late teens and twenties. The course will explore issues of spectatorship, analyze differences between American and European cinema, and link thematic and economic histories with cultural studies, with an emphasis on the interaction between film and other visual arts of the period in Europe, Russia, and the United States. Materials fee required. *Prerequisite: VIS 84 or consent of instructor.*

**151. History of the Experimental Film (4)**

An inquiry into a specialized alternative history of film, consisting of experimental works made outside the conventions of the movie industry and which in their style and nature are closer to modernist painting, poetry, etc., than to the mainstream theatrical cinema. Works by such film artists as Man Ray, Salvador Dali, Maya Deren, Stan Brakhage, and Michael Snow will be examined in depth. Materials fee required. *Prerequisite: VIS 84 or consent of instructor.*



**152. Film in Social Context (4)**

This collection of courses gathers, under one cover, films that are strongly marked by period, geography, and the culture within which they received their dominating local quality. These courses pay particular attention to the stamp of place—climate, dress, habitation, language, music, politics—as well as the filmic moves that helped color such works as environmental. The series takes in the following subjects: Third World films, the Munich films (the new wave of Germans who made their first features in Munich following 1967), Japanese movies, films of the American thirties and their relationship to current thought, American Westerns, Ethnographic Film, Brazil's Cinema Novo, etc. Specific topics to be covered will vary with the instructor. May be repeated twice for credit. Materials fee required. *Prerequisite: VIS 84 or consent of instructor.*

**153. The Genre Series (4)**

A group of related courses exploring the conventions within such generic and mythic forms as the cowboy, shamus, chorus girls, and vampire films. May be repeated twice for credit. Materials fee required. *Prerequisite: none; VIS 84 recommended.*

**154. Hard Look at the Movies (4)**

Examines a choice of films, selected along different lines of analysis, coherent within the particular premise of the course. Films are selected from different periods and genres among Hollywood, European, and Third World films. May be repeated once for credit. Materials fee required. *Prerequisite: VIS 84 or consent of instructor.*

**155. The Director Series (4)**

A course that describes the experiences, looks, and structure of director-dominated films. A different director will be studied each quarter. The student will be required to attend the lecture in the course and to meet with the instructor at least once each week. May be repeated three times for credit. Materials fee required. *Prerequisite: VIS 84 or consent of instructor.*

**156. Film Analysis of the Visuals (2)**

An examination of a selection of films along difference lines of analysis to be taken with VIS 84, 150, 151, 152, 153, 154, and 155. This course will specialize in the study of the visuals of film with specific topics selected by the instructor and varying each quarter. Film analysis will cover a wide range of films, from silent, alternative experimental, films dominated by social context and place in history to special genre and director-dominated films. May be repeated twice for credit. *Prerequisites: none; VIS 84, 150, 151, 152, 153, 154, or 155 recommended. Note:* May not be taken in lieu of a course for majors. Pass/Not Pass grades only.

**157. Video History and Criticism (4)**

A lecture course that examines video as an art form, its relationship to the development from television and other art forms, and surveys current work in the medium. Materials fee required. *Prerequisites: VIS 22, 84, and 111.*

**158. Histories of Photography (4)**

Photography is so ubiquitous a part of our culture that it seems to defy any simple historical definition. Accordingly, this course presents a doubled account of the medium; it explores both the historical and cultural specificity of a singular photography as well as some of the multitude of photographs that inhabit our world. Will examine a number of the most important photographic themes from the past 200 years. *Prerequisite: none.*

**159. History of Art and Technology (4)**

(Cross-listed with ICAM 150.) Aims to provide historical context for computer arts by examining the interaction between the arts, media technologies, and sciences in different historical periods. Topics vary (e.g., Renaissance perspective, futurism and technology, and computer art of the 1950s and 1960s). *Prerequisite: none. Note:* Materials fee required.

**164. Photographic Strategies (4)**

An introduction to the aesthetic problems in photography. Portfolio required for admission. Materials fee required. *Prerequisites: VIS 60 and consent of instructor.*

**165. Camera Techniques (4)**

An intermediate course involving refined control over different films, developers, papers, and other photographic techniques. Portfolio required for admission. Materials fee required. *Prerequisites: VIS 60 and consent of instructor.*

**166. Advanced Camera Techniques (4)**

An advanced-level course involving new techniques and processes as well as refined control over different films, developers, papers, and other photographic materials. Portfolio required for admission. Materials fee required. *Prerequisites: VIS 60, 165, 167, and consent of instructor.*

**172. Studio Video (4)**

A production course of video as a creative medium and the video studio as a production and post-production tool. Covers lighting, studio sound, the switcher and special effects, directing and editing in the controlled environment of the video studio. *Prerequisites: VIS 60, 70N, 111, and 174.*

**174. Media Sketchbook (4)**

Video medium is used in this class both as a production technology and also as a device to explore the fundamental character of filmmaking and time-based computer art practices. Students perform all aspects of production with particular attention to developing ideas and building analytical and critical skills. *Prerequisites: VIS 1 or 2 or 3, 22, 40, 60, 70N, and 84.*

**176. Introduction to Filmmaking (4)**

Designed as an introduction to filmmaking, this course provides a technical foundation as well as a creative and theoretical context to 16mm film production. The student learns the use of motion picture camera (Bell & Howell, Bolex and Arriflex S), use of lightmeter, frame composition, sound recording, picture and sound editing. The course exposes the extent of the filmmaking process from shooting, lighting, to editing and mixing. Student to produce a short film (one to two minutes) with a post synchronized sound track. *Prerequisites: VIS 1 or 2 or 3, 22, 60, 70N, 84, 174; VIS 177 recommended.*

**177. Scripting and Editing Strategies (4)**

The aim of this course is to examine the conceptual rather than technical structures of scripting and editing. The emphasis for script writing will be on the reading and analysis of both traditional and more experimental works. Students will be expected to write several short scripts. Editing will be approached as a structural partner to scripting, studying the strategies and grammars that shape a film or videotape. Based on works available for study, students will produce analytical papers. *Prerequisites: VIS 70N, 111, and 174.*

**180A. Generating the Narrative I (4)**

An exploration of storytelling techniques through a series of short (five minutes in length) exercises, this course will familiarize the students with the mechanisms of narrative by teaching them how to construct a scene and to build sequences by the assembling of scenes. Collective work in group of four or five students will be encouraged. *Prerequisites: VIS 111, 174 and one from VIS 140, 141A, 141B, 145A, 145B, 164, 165, 172, 176, 177; VIS 177 strongly recommended.*

**180B. Generating the Narrative II (4)**

Continuation of VIS 180A. This class explores narrative structure. Students will be to produce a fifteen- to thirty-minute narrative. The emphasis will be on fiction. Collective work will be encouraged. *Prerequisite: VIS 180A.*

**181. Sound and Lighting (4)**

An advanced course aimed at gaining a sophisticated control of lighting and sound-recording techniques with the understanding of their theoretical implications and the interrelation between production values and subject matter. The interrelation between sound and image in various works (film, video, or installations) will also be discussed. Lighting principles like modelling, matching lights, and continuity lighting will be demonstrated in class. Sound characteristics like perspective, distance, and presence will be presented with rerecording and the construction of a mix sound track. *Prerequisites: VIS 174 and three of the following courses, depending on emphasis: VIS 164, 165, 172, 176, 177.*

**182. Advanced Editing (4)**

Covering both film and video editing, this course is designed to study the problems of editing from both a theoretical and practical point of view. Films and tapes will be analyzed on a frame-by-frame, shot-by-shot basis. Course may be repeated twice for credit. *Prerequisite: VIS 177 and either 172, 173, or 186.*

**186. Advanced Filmmaking Strategies (4)**

Designed as the second part of a two-part sequence, this course presents the techniques of sync sound recording and shooting, crew work, planning preproduction and production, and links technical decisions with creative and theoretical understanding of film production. The student will prepare, produce and edit a short 16mm film (three to five minutes). It is recommended that the student have, at the beginning of the quarter, a fully developed script for the final project. *Prerequisites: VIS 176, 177, and consent of instructor.*

**187. Animation (4)**

A labor-intensive, moderately technical 16mm production course using departmental facilities. Assignments designed to explore different techniques such as cell and drawn animation, clay and object animation, clay and object animation, cut-outs, rotoscope imagery and other special effects. Large amount of time required. Ability in drawing not necessary. May be repeated once for credit. *Prerequisites: VIS 186 and consent of instructor.*

**190. Polynesian Music and Dance (2/4)**

The performing arts . . . traditional dance and music from small-scale societies. This course will examine in an experiential manner the performative mode of ceremonial dance and music from the islands of Polynesia to West African cultures. *Prerequisite: none; concurrent corequisite: VIS 21.*

**197. Media Honors Thesis (4)**

This advanced-level sequence coordinates three consecutive independent research courses to culminate in a completed thesis project in the third quarter of study. After the project's public presentation, the faculty involved in the project will determine whether the student will graduate with departmental honors. *Prerequisite: consent of instructor. Note:* Requires a written proposal, 3.5 GPA in the major, prior consent from all involved and approvals by the department chair and provost.

**198. Directed Group Study (2-4)**

Directed group study on a topic or in a group field not included in regular department curriculum, by special arrangement with a faculty member. *Prerequisite: consent of instructor. Note:* Open only to upper-division students. Requires instructor's, department chair's, and provost's approval. Pass/Not Pass grades only.

**199. Special Studies in the Visual Arts (4)**

Independent reading, research, or creative work under direction of a faculty member. *Prerequisite: consent of instructor. Note:* Open only to upper-division students. Requires instructor's, department chair's, and provost's approval. Pass/Not Pass grades only.



## GRADUATE

**216. The Object (4)**

An inquiry into the world of artifacts (some of them "works of art") by which human beings are surrounded, and the ways in which they function as agents of communication and modifiers of consciousness. Contemporary perspectives drawn from the fields of anthropology, sociology, contemporary art, and semiotics will be utilized alongside those derived from art theory, especially the structural-analytic tradition.

**222. Communities and Art (The Shakers, William Morris & Co., and Bauhaus) (4)**

A critical review of three communities which aimed to change the social and spiritual quality of life by aesthetic means. *Prerequisite: graduate status or consent of instructor.*

**232. Tactics and Strategies (4)**

A workshop-laboratory class involving a game-theory approach to the making of art in which attempts will be made to define a domain of interaction between a variety of possible players, the simplest of which is a two-person game involving art-audience.

**237. Graduate Studies in Art (4)**

This course provides the opportunity for in-depth graduate study in the practical, critical, ideological, or theoretical contexts and contents of art making. Courses under this heading may reflect current interests of the instructor or treat a controversial issue in the art world. In recent years, the course has been devoted to topics such as film history in Russia after the Revolution, exploration in subject matter and form, scripting (film, video), portraiture, art as editing, art and technologies. May be repeated for credit.

**279. Graduate Video Workshop (4)**

The course explores creative aspects of the video medium through various formats, styles and approaches in independent production, integrating elements into artistic form. Concept, development from script, shooting, editing, sound, etc., will be stressed. May be repeated for credit. *Prerequisite: consent of instructor.*

**290A. Graduate Seminar (4)  
Contemporary World Views**

As products of a human mind, all works of art are conceived within the value system of their maker. Whether or not the artist is conscious of it, the world of art reflects a world view. Once produced, it becomes susceptible to interpretations which attach to it or find in it human values. Some of these values are ideological, such as "socialist realism," others are more a matter of artistic outlook or belief, such as "expressivist," "idealist," "mimetic," and "realistic." This course will locate the world views implicit within contemporary works of art, including, when appropriate, those of the faculty and graduates. Required of first-year students.

**290B. Graduate Seminar (4)  
Critical Approaches to Art Making: Context, Subtext,  
and Pretext**

This course is designed to encourage the development of a self-critical approach to art making. Key intellectual issues of contemporary art will be explored through the discussion of writings by artists and critics. Topics to be discussed include the concept of artistic tradition; art and politics and the politics of art and criticism; women's art and feminism; modernism and post-modernism as period concepts; representation, re-presentation and the textuality of art; the function and significance of quotation and appropriation in art; and media specific approaches to art.

**295. Individual Studies for Graduate Students (1-12)**

Individual research with the student's individual faculty adviser in preparation for their comprehensive exhibitions for the

M.F.A. degree. These units can only be taken after completing the First Year Review, and are intended to be with the chair of the student's review committee.

**298. Directed Group Study (1-12)**

Directed group study on specific topics not covered at present in the normal curriculum. Used as an experimental testing of courses that may be given regular course numbers if proved successful. Special arrangement with faculty member. *Prerequisite: consent of department.*

**299. Graduate Research (1-4)**

Graduate-level research under the direct guidance of a faculty member. *Prerequisite: consent of instructor.*

**500. Apprentice Teaching (1-4)**

Apprentice teaching in undergraduate courses given by the Department of Visual Arts. Graduate students are required to teach a minimum of one quarter (three units) within the department to fulfill degree requirement.

## Warren College

OFFICE: Literature Building, Second Floor,  
Warren College

### The Writing Program

OFFICE: Building 410, University Center

Each student must complete a two-course sequence in writing: Warren 10A-B within four quarters following successful completion of the Subject A requirement. **Note:** Effective fall quarter 2000 all new and continuing students will be required to complete Warren writing courses only at UCSD. The purpose of the sequence is to teach and thereby enable students, through intensive practice, to read critically and write appropriately in a variety of academic contexts. Classes are seminar-size and center on discussion of student work.

The two-quarter sequence emphasizes written argumentation based on primary and secondary sources. The curriculum provides a context within which a diversity of cultural experiences is foregrounded to address a range of issues inherent in the relationship of the "Individual and U.S. Society," the primary theme of the sequence. The readings are accessible, scholarly writings that interrogate aspects of this relationship, and may include novels, short stories, essays, autobiographies, political documents, and book-length nonfictional treatments of the theme. Thus, the writing and readings prepare students for their studies in

the Ethics and Society course as well as for their work in various academic disciplines.

In both 10A and 10B, student writing is duplicated and discussed by the class in a workshop setting. Instructors hold conferences with students individually during the quarter and provide written and oral commentaries on student work. Every student receives a mid-quarter evaluation, and a final narrative evaluation is placed in the student's academic file. The minimum writing requirement is 8,000 words per quarter. Warren College 10A and 10B are offered P/NP only, and students cannot test out of this general-education requirement.

**10A-10B. The Writing Course (4-4)**

A workshop course in reading and writing required of all Warren College students. The course emphasizes argumentation and critical writing based on sources. *Prerequisite: satisfaction of the university Subject A requirement.*

### Warren Honors Program

OFFICE: 3238 Literature Building, Second Floor,  
Warren College

The Warren Honors Program offers students educational, cultural, and social experiences designed to broaden their intellectual interests. The activities vary each year and are planned to foster student interaction and promote a sense of community.

Students may replace one course in a minor, program of concentration, or area study with a faculty-directed Independent Study (199) honors research paper. If the research paper is written within the student's major, departmental approval may be needed for acceptance toward major requirements. The paper may also be written as part of an Academic Internship (197). The Michael Addison award is presented at the graduation ceremony to the student who is judged to have written the most distinguished research paper in the Honors Program.

Entering freshmen with a high school GPA of 3.8 or above and SAT I scores of 710 verbal/650 mathematics, SAT II writing score of 710, or are National Merit Scholars or Regents Fellows, are eligible to participate in the Honors Program. Students remain in the program until thirty-six units of UCSD credit are completed. After that, a cumulative GPA of 3.5 on all units completed at UCSD must be maintained to remain in the program. Entering transfer students with a GPA of 3.8 based on at least thirty-six quarter-units of college work are also eligible.

Students who do not qualify for the Honors Program at the time of admission may join it as soon as a cumulative GPA of 3.5 is attained on thirty-six or more units completed at UCSD.

### Warren Scholars Seminar

The Warren Scholars Seminar offers an interdisciplinary academic curriculum which is designed to help students broaden their intellectual interests. Students enroll in two seminars, Warren 11A and 11B, Warren Scholars Seminar, which fulfill the college writing requirement. The seminars are taught by a variety of distinguished faculty and teaching assistants.

Entering freshman Honors Program students are admitted to the Warren Scholars Seminar by invitation.

Students in the Honors Program may participate in teaching assistant apprenticeships (Warren 195, Apprentice Teaching) in Warren 11A and B. Teaching assistants participate in planning and developing the seminars. They interview the faculty speakers, are trained to lead group discussions, read and evaluate student papers, and plan social events for the class.

Additional information may be obtained by writing to: Warren College Honors Program Coordinator, Warren College, UCSD, La Jolla CA 92093-0422.

#### 11A-11B. Warren Scholars Seminar (4-4)

The Warren College Scholars Seminar allows students to develop and refine their expressive and analytical skills by participation in a two-quarter sequence. The emphasis is on the interdisciplinary approach to a group of topics linked to the relation of individuals and society, and the function of evidence and observation in the formation of theories.

#### 195. Apprentice Teaching (1)

Undergraduate instructional assistance. Responsible both in area of learning and instruction. Student must prepare reading materials assigned by the professors and lead student discussions in Warren 11A or 11B. *Prerequisite: student must be in the Warren College Honors Program.*

### Ethics and Society

OFFICE: Academic Advising, Literature Building, Second Floor, Warren College

Ethics and Society is an interdisciplinary course required of all Warren students. It is cross-listed as Political Science 27 and Philosophy 27 (see departmental listings). A student may enroll in this course through either department, but not both. Ethics and Society is to be

taken after the completion of Warren Writing 10A-10B (or Scholars Seminar 11A-11B), either in the spring of the freshman year or in any quarter of the sophomore year. This requirement is waived for certain upper-division transfer students (see the program of concentration brochure).

### Health Care-Social Issues

OFFICE: Interdisciplinary Programs, 3238 Literature Building, Second Floor, Warren College

Health Care-Social Issues is an interdisciplinary minor administered by Warren College, available to all UCSD students with a general interest in health care issues and to students considering a health care career. For more information, see listing under "Health Care-Social Issues."

### Law and Society

OFFICE: Interdisciplinary Programs, 3238 Literature Building, Second Floor, Warren College

Law and Society is an interdisciplinary minor administered by Warren College, available to all UCSD students with a general interest in law as a social institution and to students considering law-related careers. For more information, see listing under "Law and Society."

### Academic Internship

OFFICE: Literature Building, Second Floor, Warren College

The Academic Internship Program is developed and administered by Warren College, but it is available to juniors and seniors with a 2.5 GPA (some internships require a 3.0 GPA) in any college at UCSD. For more information, see listing under "Academic Internship."

### One-Unit Undergraduate Seminar

The One-Unit Undergraduate Seminar Program is a campuswide program administered by Warren College. The purpose is to (a) foster closer interaction between undergraduate students and faculty members; (b) introduce un-

dergraduates to exciting areas of intellectual interest. Generally, the seminars are accessible to students at all levels with no prerequisites. Enrollments are limited to twenty-five students per seminar. Grading is P/NP only, and each student is limited to four seminars for credit.

## Women's Studies

OFFICE: 2024 Humanities & Social Sciences Building, Muir College, (619) 534-3589

### Affiliated Faculty

#### Professors

Rae Blumberg, Ph.D., *Sociology*  
R. Michael Davidson, Ph.D., *Literature*  
Susan G. Davis, Ph.D., *Communication*  
Abraham Dijkstra, Ph.D., *Literature*  
Page duBois, Ph.D., *Literature*  
Ann Ducille, Ph.D., *Literature*  
Yen Espiritu, Ph.D., *Ethnic Studies*  
DeeDee Halleck, Ph.D., *Communication*  
Harry Hirsch, Ph.D., *Political Science*  
Jorge Huerta, Ph.D., *Theatre and Dance*  
Judith Hughes, Ph.D., *History*  
Helene Keyssar, Ph.D., *Communication*  
Susan Kirkpatrick, Ph.D., *Literature*  
Lisa Lowe, Ph.D., *Literature*  
Babette Mangolte, Ph.D., *Visual Arts*  
Masao Miyoshi, Ph.D., *Literature*  
Louis Montrose, Ph.D., *Literature*  
Chandra Mukerji, Ph.D., *Sociology/*  
*Communication*  
Jann Pasler, Ph.D., *Music*  
Carol Plantamura, M.F.A., *Music*  
Rosaura Sanchez, Ph.D., *Literature*  
Ellen Seiter, Ph.D., *Communication*  
Shirley Strum, Ph.D., *Anthropology*  
Sherley Anne Williams, M.A., *Literature*

#### Associate Professors

Suzanne Brenner, Ph.D., *Anthropology*  
Ann Craig, Ph.D., *Political Science*  
Judith Halberstam, Ph.D., *Literature*  
Valerie Hartouni, Ph.D., *Communication*  
Christine Hunefeldt, Ph.D., *History*  
Stephanie Jed, Ph.D., *Literature*  
Rebecca Klatch, Ph.D., *Sociology*  
Rachel Klein, Ph.D., *History*  
Todd Kontje, Ph.D., *Literature*

Martha Lampland, Ph.D., *Sociology*  
 Stephanie McCurry, Ph.D., *History*  
 Michael Meranze, Ph.D., *History*  
 Carol Padden, Ph.D., *Communication*  
 Pamela Radcliff, Ph.D., *History*  
 Roddey Reid, Ph.D., *Literature*  
 Vicente Rafael, Ph.D., *Communication*  
 Marta Sanchez, Ph.D., *Literature*  
 Kathryn Shevelow, Ph.D., *Literature*  
 Susan Smith, Ph.D., *Visual Arts*  
 Nicole Tonkovich, Ph.D., *Literature*  
 Cynthia Truant, Ph.D., *History*  
 Cynthia Walk, Ph.D., *Literature*  
 Winifred Woodhull, Ph.D., *Literature*

### Assistant Professors

Nancy Caciola, Ph.D., *History*  
 Lisa Catanzarite, Ph.D., *Sociology*  
 Maria Charles, Ph.D., *Sociology*  
 Steven Epstein, Ph.D., *Sociology*  
 Rosemary George, Ph.D., *Literature*  
 Susan Larsen, Ph.D., *Literature*  
 Shelley Streeby, Ph.D., *Literature*  
 Paule Cruz-Takash, Ph.D., *Ethnic Studies*  
 Lisa Yoneyama, Ph.D., *Literature*  
 Omelbanine Zhiri, Ph.D., *Literature*

### Adjunct Associate Professor

Mary Walshok, Ph.D., *Sociology*

## Women's Studies

The field of women's studies has exploded over the past twenty years. It has developed a theoretical base, body of knowledge, and perspective which cannot be attained within the confines of the traditional disciplines. In its analysis of the powerful and problematic construction of gender, ethnic, class and sexual diversity, the field of women's studies revises and enlivens our understanding of the world with new conceptual paradigms.

The UCSD Women's Studies Program is an interdisciplinary academic program spanning departments and disciplines and offering students the opportunity to study constructions of gender, race, class, sexual and national identities. The intersection of these categories of experience as well as the history of debate over what these categories mean is an important component of the Women's Studies Program curriculum. Students learn to apply the methods and theories of social scientists, historians,

and literary scholars to the study of gender. They explore the relationship of theory and scholarship to activism. They develop critical reasoning and analytic skills, research and communication skills, conceptual tools for social change, and the abilities to interpret complexities of power, asymmetries in gender relations across history, class, and cultures.

Women's studies prepares undergraduates for a variety of careers. The major in women's studies, for example, provides an excellent foundation for students with career aspirations in law, medicine and health sciences, public administration, and social services. Students wishing to pursue doctoral work will also find that interdisciplinary training in women's studies equips them with theoretical and methodological strengths in most disciplines and applied research fields. Specialists in women's studies are increasingly being used as consultants in industry, higher education, insurance companies, and personnel firms. State and federal government agencies require people who have special training in analyzing gender relations. Finally, educational institutions need specialists to develop and administer women's centers and other institutional structures designed specifically to study and assist women.

The Women's Studies Program offers two options of study: an undergraduate major and minor (or program of concentration). To declare a major, a department stamp is required. Because women's studies is an interdisciplinary major, it is important to work closely with a faculty adviser in the planning of your program.

### Preparation for the Major and Minor

All women's studies majors and minors are required to take the Introduction to Women's Studies sequence: Women's Studies 2A, 2B, and 100.

### Major Program

#### Concentration in History

Group A. **Seven upper-division women's studies courses (twenty-eight units) in history**, from the women's studies approved and petitionable course list.\*

Group B. **Five upper-division women's studies courses (twenty units) in depart-**

**ments other than history** to be selected from the women's studies approved and petitionable course list.\* At least one of these courses must be chosen from Women's Studies 102-103-104. All five courses may be chosen from Women's Studies 102-103-104 (i.e., each course may be repeated once, provided the course content is different). A maximum of three courses (twelve units) may be selected in any one department.

#### Concentration in Literature

Group A. **Seven upper-division women's studies courses (twenty-eight units) in literature**, from the women's studies approved and petitionable course list.\*

Group B. **Five upper-division women's studies courses (twenty units) in departments other than literature** to be selected from the women's studies approved and petitionable course list.\* At least one of these courses must be chosen from Women's Studies 102-103-104. All five courses may be chosen from Women's Studies 102-103-104 (i.e., each course may be repeated once, provided the course content is different). A maximum of three courses (twelve units) may be selected in any one department.

#### Concentration in Social Science

Group A. **Seven upper-division women's studies courses (twenty-eight units) in communication and sociology**, from the women's studies approved and petitionable course list.\*

Group B. **Five upper-division women's studies courses (twenty units) in departments other than communication and sociology** (including the Departments of Anthropology, Ethnic Studies, Political Science, or Urban Studies) to be selected from the women's studies approved and petitionable course list.\* At least one of these courses must be chosen from Women's Studies 102-103-104. All five courses may be chosen from Women's Studies 102-103-104 (i.e., each course may be repeated once, provided the course content is different). A maximum of three courses (twelve units) may be selected in any one department.

\*Upper-division courses not presently on the Women's Studies approved course list may be petitioned for major credit, if the principal focus of the course is on women or gender.

### Honors Program

The Women's Studies Honors Program allows advanced women's studies majors to pursue

individual projects in the context of collective intellectual exchange with their peers and advising faculty. Students are eligible if they a) have senior standing at the time they begin the program, b) are approved by the women's studies faculty director and steering committee. Normally, students eligible for honors will have a 3.5 grade average in upper-division courses taken for the major, but highly motivated students who do not meet this criterion may be admitted to the program at the discretion of the director and the women's studies steering committee.

In the fall quarter of their senior year, students take the Honors Seminar (WS 190), taught by a member of the Women's Studies faculty. The first half of the quarter is devoted to intensive analysis and discussion of recent publications in the field of women's studies. During the second half of the quarter, each student develops a short thesis proposal and presents it for group discussion. While taking the Honors Seminar, each student also registers for WS 196A: The Honors Thesis, 4 units of independent study with a faculty member associated with women's studies. With the guidance of this adviser, the student carries out background research for the thesis prospectus and selects a thesis director. In the winter quarter, students complete the thesis under the supervision of their thesis director in the Honors Thesis course, WS 196B.

In the spring quarter, each student who has successfully completed a thesis will present it in the WS 90 undergraduate seminar.

Students who complete the Honors Seminar and the thesis with a combined grade of B+ or above and make the required oral presentation of the thesis in WS 90 have the words "with distinction" added to the notation of the major on their diplomas and transcripts.

### *Senior Thesis Option*

Women's studies offers a special program for those majors who wish to conduct in-depth research in an area of women's studies over the course of two quarters. Students who choose this option first find a faculty supervisor and then enroll in two consecutive Women's Studies 199 courses (these courses may substitute for two of the required twelve upper-division courses, one in Group A and one in Group B).

Thesis writers will work closely and on a regular basis with their faculty supervisors. During

the first quarter, a preliminary proposal for the thesis, including a working outline and bibliography, is submitted. The bulk of the writing and revision will be done during the second quarter. This rigorous experience of writing and receiving frequent feedback from a faculty supervisor enhances the student's intellectual growth.

### *Double Major in Women's Studies and Another Department or Program*

Students who wish to major both in women's studies and in another department or program must fulfill all requirements for the women's studies major as described above. Students must submit a double major petition for approval by the participating departments and the student's provost. Women's studies will accept up to two upper-division courses which overlap requirements for the two majors. (Majors with a concentration in history may not double major in history; those concentrating in literature may not double major in any of the literature majors.)

### *Minor Program (and Program of Concentration)*

Women's studies minors are required to complete the Introduction to Women's Studies sequence: Women's Studies 2A, 2B, and 100 and four additional upper-division courses (sixteen units) applicable to the women's studies major and minor. Of the four upper-division courses, no more than three may come from the same department. Students who petition the women's studies minor (or program of concentration) with junior or senior standing may, if they wish, petition to substitute two comparable upper-division women's studies courses for Women's Studies 2A or 2B. Women's studies permits one lower-division course and one upper-division course to be taken P/NP. College grading options vary. Please see college academic advisers and women's studies advisers.

### *Special Studies, Internships, and Grade Options*

Many women's studies majors and minors elect to do gender research under the rubrics of Directed Group Study (198), Independent Study (199), internships, and mentor programs. Because these courses can be taken only with a P/

NP grade option, the number of such courses to be applied to the major should be carefully discussed with a women's studies adviser. Some graduate and professional schools will consider it easier to evaluate a student's transcript if there are more letter grades. College guidelines and requirements for grade options also vary. Please see college academic advisers and women's studies advisers.

## COURSES

### Approved for the Women's Studies Major and Minor

#### LOWER-DIVISION

#### **WS 2A. Introduction to Women's Studies: Feminist Theories and Methods (4)**

Survey of feminist critiques. Examines critiques from distinct historical and cultural conditions. Analyzes intersections of gender, class, race, ethnicity, sexuality, colonialism. Texts include case studies, ethnographies, literary, historical narratives and documents.

#### **WS 2B. Introduction to Women's Studies: Contests and Controversies in Feminist Analysis (4)**

Analyzes topics (varying yearly) relevant to current feminist debate, including pornography, abortion, occupational segregation, feminization of poverty, violence against women, and women in health, media, and social movements. Attention given to construction of gender identity within individual academic disciplines.

#### **WS 90. Current Research in Women's Studies (1)**

This seminar will introduce students to current interdisciplinary research topics and methods in the study of gender and sexuality. Faculty members at UCSD, as well as distinguished outside visitors, will be invited to present their work.

#### UPPER-DIVISION

#### **WS 100. Feminism in a Global Frame: Politics, Positions, Practices (4)**

An interdisciplinary course, focusing on non-western feminisms and the historical, cultural, economic, and colonial struggles that shape and are shaped by them. Possible topics include comparative international feminism, women, resistance, and revolution, gender and colonialism, the construction of sexuality and gender in the context of global movements and migrations (of people, capital, and culture). *Prerequisite: upper-division standing or consent of instructor.*

#### **WS 102. Selected Topics in Women's Studies (4)**

An interdisciplinary course focusing on one of a variety of topics in women's studies, such as gender and science, the body, reproductive technologies, women and public policy. May be repeated for credit as topics vary. *Prerequisite: upper-division standing or consent of instructor.*

#### **WS 103. Feminist Theory (4)**

An interdisciplinary course in feminist theory. Topics may range from a general survey of feminist theory in a variety of disciplines to a more focused interdisciplinary theoretical topic, such

as postmodernism and feminism. May be repeated for credit as topics vary. *Prerequisite: upper-division standing or consent of instructor.*

**WS 104. Cross-Cultural Perspectives (4)**

An interdisciplinary course focusing on the relationship between gender and culture from a multiplicity of cultural perspectives. Possible topics include women in Latin America, gender and ethnicity, Asian-American women. May be repeated for credit as topics vary. *Prerequisite: upper-division standing or consent of instructor.*

**WS 190. Honors Seminar (4)**

Interdisciplinary readings in feminist theory and research methodology to prepare students for writing an honors thesis. Open to women's studies majors who have been admitted to Women's Studies Honors Program. May be applied toward primary concentration in women's studies major. *Prerequisites: admission to Women's Studies Honors Program and department stamp required.*

**WS 196A. Women's Studies Honors Research (4)**

A program of independent study providing candidates for women's studies honors to develop, in consultation with an adviser, a preliminary proposal for the honors thesis. An IP grade will be awarded at the end of this quarter. A final grade for both quarters will be given upon completion of Women's Studies 196B. *Prerequisites: consent of instructor and department stamp required.*

**WS 196B. Honors Thesis (4)**

Honors thesis research and writing for students who have completed Women's Studies 190 and 196A. A letter grade for both Women's Studies 196A and 196B will be given at the completion of this quarter. *Prerequisites: consent of instructor and department stamp required.*

**WS 198. Directed Group Study (4)**

Directed group study on a topic not generally included in the women's studies curriculum. *Prerequisites: consent of instructor and director of Women's Studies Program and department stamp required.*

**WS 199. Independent Study (4)**

Tutorial; independent study on a topic not generally included in the women's studies curriculum. *Prerequisites: consent of instructor and director of Women's Studies Program and department stamp required.*

**WS 500. Apprentice Teaching in Women's Studies (4)**

Consideration of pedagogical methods appropriate to undergraduate teaching in women's studies courses under supervision of instructor of course. Instructor will define apprentice's responsibilities in preparing class presentations, directing student discussions, evaluating and grading students' work, and maintaining productive association with students.

**Applicable Departmental Courses**

Please refer to appropriate departmental listings for courses noted below.

ANGN 171. Culture and Identity

ANRG 117. Gender Across Cultures

COCU 108. Images of Women

COCU 116. Feminist Theatre Workshop

COCU 137. Politics of Bodies

COCU 138. Feminist Theory

COCU 139. Reproductive Discourse and Gender

ETHN 134. The Chicana

ETHN 183. Gender, Race, Ethnicity, and Class

HIEA 137. Women and Family in Chinese History

HIEU 147. The History of Women in Europe: Middle Ages to the Early Modern Era

HIEU 148. The History of Women in Europe: Early Enlightenment to the Victorian Era

HIEU 149. History of Women in Europe: 1870 to the Present

HIEU 180. Topics in European Women's History: Gender and Politics from the Old Regime to the French Revolution

HILA 117. Indians, Blacks, and Whites: Family Relations in Latin America

HILA 161. History of Women in Latin America

HISC 103. Gender and Science in Historical Perspective

HITO 164. Gender Differences in Historical Perspective

HIUS 130. Cultural History from 1607 to the Civil War

HIUS 131. Cultural History from the Civil War to the Present

HIUS 156. American Women, American Womanhood

HIUS 157. American Women, American Womanhood: 1870 to Present

HIUS 172. Feminist Traditions in America

HIUS 173. Topics in American Women's History

LTCS 130. Gender, Race/Ethnicity, Class, and Culture

LTEN 120E. Women in the Eighteenth Century

LTEN 146. Women and English/American Literature

LTEN 150. Gender, Text, and Culture

LTEN 185. Themes in Afro-American Literature

LTEU 102. Women in Antiquity

LTEU 147. Women in Italy

LTWL 160. Women and Literature

LTWL 155. Gender Studies

LTIT 140. Women in Italy

LTTH 101. Issues in Feminist Theory

MU 115. Women in Music

Phil 169. Feminism and Philosophy

Poli Sci. 107A. Gay and Lesbian Politics

Poli Sci. 115A. Gender and Politics

Poli Sci. 116A. Feminist Theory

Poli Sci. 116B. Advanced Feminist Theory

Poli Sci. 134P. Organizing Women in Latin America

Poli Sci. 166F. The American Welfare State

Soc/A 103F. Feminist Criticism and Social Theory

Soc/B 118. Sociology of Sex and Gender Roles

Soc/B 119. Sociology of Sexuality and Sexual Identities

Soc/C 129. The Family

Soc/C 132. Gender and Work

Soc/D 120W. Gender and Development

Soc/D 133. Comparative Sex Stratification

VA 121C. Images of Women in Medieval and Renaissance Art

**Petitionable Departmental Courses for the Women's Studies Major and Minor**

The following courses may be petitioned to satisfy major and minor requirements when the principal focus of the course is on women or gender.

ANBI 102. Evolution of Sex Differences

ANBI 110. Perspectives on Human Evolution

ANBI 175. Modeling the Behavior of our Early Ancestors

ANGN 137. Engendering Cultures

ANGN 180. The Culture of Children

ANRG 162. Peoples of the Middle East

COCU 100. Introduction to Communication and Culture

COCU 105. Media Stereotypes

COCU 125. How to Read a Film

COCU 175. Advanced Topics in Communication: Culture

COCU 179. Colonialism and Culture

COMT 116. Practicum in Child Development

COSF 101B. Television Documentary

COSF 175. Advanced Topics in Communication: Social Forces

ETHN 100. Theories and Methods in Ethnic Studies

ETHN 101. Ethnic Images in Film

ETHN 189. Special Topics

HIEU 130. Europe in the Eighteenth Century

HIEU 131. The French Revolution: 1789-1814

HIEU 161. Topics in Roman History

HIEU 163. Topics in Medieval History

HISC 166. Topics in the History of Social Sciences

HITO 112. The History of Psychoanalysis

HIUS 107. Early Republic

HIUS 180. Immigration and Ethnicity in American Society

LTCS 110. Popular Culture

LTCS 140. Subaltern Studies in Context

LTCS 150. Topics in Cultural Studies

LTEN 110. The Renaissance: Themes and Issues

LTEN 113. Shakespeare

LTEN 120A. The Eighteenth Century: Themes and Issues

LTEN 125C. Second Generation Romantic Poets

LTEN 127A. Victorian Period

LTEN 127G. The 90s: Decade of Decadence

LTEN 130A. Modern British Literature: Themes and Issues

LTEN 143. The English Novel in the Eighteenth Century

LTEN 144. The English Novel in the Nineteenth Century

LTEN 145. English Novel in the Twentieth Century

LTEN 148. Genres in English and American Literature

LTEN 149. Themes in English and American Literature

- LTEN 153. Revolutionary War/Early National Period  
LTEN 154. The American Renaissance  
LTEN 155. Interactions Between American Literature and the Visual Arts  
LTEN 156. American Literature from the Civil War to WWI  
LTEN 175B. New American Poetry: Post World War II to the Present  
LTEN 176. Major American Writers  
LTEN 178. Comparative Ethnic Literature: Discourse on Gender, Class, Race, Ethnicity  
LTEN 181. Asian-American Literature  
LTEN 183. Afro-American Prose  
LTEN 189. Postcolonial Literatures  
LTEN 190. Seminars  
LTFR 121. The Middle Ages and the Renaissance  
LTFR 124. Nineteenth Century  
LTFR 125. Twentieth Century  
LTFR 141. French Literature  
LTFR 143. Major French Author: Maryse Conde  
LTGM 123. Eighteenth Century German Literature  
LTGM 126. Twentieth Century German Literature  
LTGM 130. German Literary Prose  
LTGM 190. Seminars  
LTGN 100. The Classical Tradition  
LTGN 113. Genres in Russian Literature in Translation  
LTGN 115. Russian/Soviet Film  
LTGN 130. Novel and History in the Third World  
LTGN 143. Later Japanese Literature in Translation  
LTGN 145. Special Topics – Japanese Literature  
LTGN 160. Specialized Genres in Literature  
LTGN 179. Contemporary Science Fiction  
LTGN 180D. Visual Arts, Film Studies, and Literature: Women Directors  
LTGN 180E. Visual Arts, Film Studies, and Literature: Film Movement  
LTGN 180H. Visual Arts, Film Studies, and Literature: Film History  
LTGN 185. Literature and Ideas  
LTGN 191. Honors Seminar  
LTRU 128. Single Author, Soviet Literature  
LTSP 122. Romantic Movement  
LTSP 129. Twentieth Century Prose  
LTSP 151. Themes and Motifs  
LTSP 152. Chicano Prose  
LTSP 171. Studies in Literature and Society  
LTWR 120. Personal Narrative  
LTWR 142. Forms of Written Discourse  
Music 107. Critical Studies Seminar  
Phil 177. Philosophy and Literature  
Soc/B 114. Social Psychology of Close Personal Relationships  
Soc/B 120S. Special Topics in Social Psychology and Social Interaction  
Soc/B 178. Special Topics in the Sociology of Culture  
Soc/C 126. Social Organization of Education  
Soc/C 135. Medical Sociology  
Soc/C 148. Political Sociology  
Soc/C 152. Social Inequality and Public Policy  
Soc/C 159. Special Topics: Social Organizations, Institutions  
Soc/D 189. Special Topics  
THHS 101. Topics  
USP 143. U.S. Health Care  
USP 145. Aging: Social and Health Policy Issues  
USP 147. Case Studies in Health Care Problems  
VA 128EN. Topics in Art Criticism and Theory  
VA 129DN. Special Problems in Non-Western Art  
VA 150. History and Art of Silent Cinema  
VA 152. Film in Social Context



## **Nondiscrimination and Affirmative Action Policy Statement for University of California**

The University of California prohibits discrimination against or harassment of any person employed by or seeking employment with the university on the basis of race, color, national origin, religion, sex, physical or mental disability, medical condition (cancer-related), ancestry, marital status, age, sexual orientation, citizenship, or status as a Vietnam-era veteran or special disabled veteran. This nondiscrimination policy covers admission, access, and treatment in university programs and activities.

The University of California is an affirmative action/equal opportunity employer. The university undertakes affirmative action to assure equal employment opportunity for underutilized minorities and women, for persons with disabilities, and for Vietnam-era veterans and special disabled veterans. University policy is intended to be consistent with the provisions of applicable State and Federal law.

Inquiries regarding the University of California, San Diego's (UCSD) equal employment opportunity policies and student-related nondiscrimination policies may be directed to:

### Academic and Student Affairs—

Ramon A. Gutierrez, Associate Chancellor  
Bldg. 107 University Center, UCSD  
9500 Gilman Drive, Dept. 0005  
La Jolla, CA 92093-0005  
(619) 534-0195

### Staff and Management—

Paula C. Doss, Director  
Human Resources for Equal Opportunity/  
Staff Affirmative Action  
Torrey Pines Center South, Suite 370  
9500 Gilman Drive, Dept. 0923  
La Jolla, CA 92093-0923  
(619) 534-3694

UCSD recognizes its obligation to provide program accessibility (as described in Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act of 1990) for

persons with disabilities. For information as to the existence and location of services, activities, and facilities that are accessible to and usable by persons with disabilities, contact:

Joseph W. Watson  
Vice Chancellor Student Affairs  
Sec. 504 Coordinator—Students  
Bldg. 112 University Center, UCSD  
9500 Gilman Drive, Dept. 0015  
La Jolla, CA 92093-0015  
(619) 534-4370

Marsha A. Chandler  
Senior Vice Chancellor Academic Affairs  
Sec. 504 Coordinator—Faculty  
Bldg. 105 University Center, UCSD  
9500 Gilman Drive, Dept. 0001  
La Jolla, CA 92093-0001  
(619) 534-3130

Steve W. Relyea  
Vice Chancellor Business Affairs  
Sec. 504 Coordinator—Staff  
Bldg. 110 University Center, UCSD  
9500 Gilman Drive, Dept. 0007  
La Jolla, CA 92093-0007  
(619) 534-3390

Barry J. Niman  
ADA Coordinator  
Manager, Employee Rehabilitation Program  
Torrey Pines Center South, Suite 348  
9500 Gilman Drive, Dept. 0944  
La Jolla, CA 92093-0944  
(619) 534-6743  
(619) 534-3059

## **UCSD Policies and Procedures Applying to Student Activities**

Students enrolling at UCSD are required to observe campus regulations, including but not limited to the Standards of Conduct and the Policies and Procedures Applying to Student Activities, which are available to students at the following locations:

Student Legal Services  
Student Organizations and Leadership Opportunities

College Dean Offices  
Office of Graduate Studies and Research  
Office of the Student Affairs Dean, School of Medicine  
Office of the Student Conduct Coordinator  
SIO, Graduate Student Department.

## **Notice to Students of Their Privacy Rights**

In accordance with the Federal Family Educational Rights and Privacy Act of 1974 and campus procedures implementing the University of California Policies Applying to the Disclosure of Information from Student Records, students at the San Diego campus of the university have the right:

1. To inspect and review records pertaining to themselves in their capacity as students;
2. To have withheld from disclosure, absent their prior consent for release, personally identifiable information from their student records, with exceptions as noted in Section 10.70 of the university's policies (see also Directory or Public Information below);
3. To inspect records maintained by the campus of disclosure of personally identifiable information from their student records;
4. To seek correction of their student records through a request to amend the records or a request for a hearing; and
5. To file complaints with the Department of Education regarding alleged violations of the rights accorded them by the Federal Act.

## **Directory or Public Information**

The Federal Family Educational Rights and Privacy Act of 1974 (revised June, 1976) permits the university to release or publish, without the student's consent, items in the category of "public information" which are name, address (campus and/or permanent), telephone number, campus email address, date and place of birth, major fields of study, dates of attendance, degrees and honors received, the most

recent previous educational institutions attended, participation in officially recognized activities, including intercollegiate athletics, and the name, weight and height of participants on intercollegiate university athletic teams. Students may request in writing, by the last day of registration each quarter, that any or all personally identifiable information from their records not be regarded as public information. Forms for this purpose are available in the Registrar's Office.

### **Notification of Rights Under FERPA for Postsecondary Institutions**

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. They are:

1. The right to inspect and review the student's education records within forty-five days of the day UCSD receives a request for access.

Student should submit to the registrar, dean, head of the department written requests that identify the record(s) student wishes to inspect. The UCSD official to whom the request was submitted will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records were not maintained by the UCSD official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request amendments of the student's education records that the student believes are inaccurate or misleading.

Students may ask UCSD officials to amend a record that they believe is inaccurate or misleading. They should write the UCSD official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate or misleading. If the UCSD official decides not to amend the record as requested by the student, that official will notify the student of the decision and advise the student of the right to a hearing regarding the request for

amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

3. The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

One exception which permits disclosure without consent is disclosures to UCSD or UC officials with legitimate educational interests. A UCSD or UC official is a person employed by UCSD or UC in an administrative, supervisory, academic, research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom UCSD or UC has contracted (such as attorney, auditor, or collection agent); a person serving on the Board of Regents; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another UCSD or UC official in performing his or her tasks. A UCSD or UC official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility.

4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by UCSD to comply with the requirements of FERPA.

The name and address of the office that administers FERPA is:

Family Policy Compliance Office  
U.S. Department of Education  
400 Maryland Avenue, SW  
Washington, DC, 20202-4605

Questions about these rights or any other aspect of student records management by UCSD officials may be referred to the Director, Student Policies and Judicial Affairs, Student Center, Building B, or by telephone at (619) 534-6225 or email at [naguilar@ucsd.edu](mailto:naguilar@ucsd.edu). The text of FERPA may be found in the Government Documents section of the UCSD Geisel Library. Copies of the UCSD student records policy, PPM 160-2, may be obtained at the Student Policies and Judicial Affairs Office.

### **UCSD Sexual Harassment Prevention and Policy**

The University of California, San Diego is committed to creating and maintaining a community in which all persons who participate in university programs and activities can work together in an atmosphere free from all forms of harassment, exploitation, or intimidation. Specifically, every member of the university community should be aware that the university is strongly opposed to sexual harassment and that such behavior is prohibited both by law and university policy. It is the intention of the university to take whatever action may be needed to prevent, correct, and if necessary, discipline behavior which violates this policy.

### **Laws and University Policies Prohibiting Sexual Harassment**

The California Fair Employment and Housing Act and Title VII of the Federal Civil Rights Act of 1964, as amended, prohibit sexual harassment in employment. Title IX of the Educational Amendments prohibits sexual harassment in educational institutions which are recipients of federal funds. UCSD's policy prohibits discrimination on the basis of sex, including sexual harassment, and provides for disciplinary action for inappropriate conduct.

### **Defining Sexual Harassment**

Sexual harassment is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature when any or all of the following conditions result:

- Submission to such conduct is made either explicitly or implicitly a term or condition of instruction, employment, or participation in any university activity.
- Submission to or rejection of such conduct by an individual is used as a basis for evaluation in making academic or personnel decisions affecting an individual.
- Such conduct has the purpose or effect of unreasonably interfering with an individual's performance or creating an intimidating, hostile, or offensive university environment.

Certain basic legal issues are involved in most sexual harassment cases. These are factors that a government investigating agency or a court would look at to determine whether you have been sexually harassed.

- Was the conduct sexual in nature?
- Was the conduct unwelcome?
- Was the conduct severe or pervasive?
- Was the conduct unreasonable?

**The Equal Opportunity Commission's definition describes two types of conduct considered to be sexual harassment: quid pro quo and hostile environment.**

**Quid pro quo:** In more familiar vernacular, this is called a sex-for-jobs situation. In this form of sexual harassment, the alleged harasser is someone in a position of authority to affect the terms and conditions of employment or education. Unlike hostile environment sexual harassment, one incident can be enough in quid pro quo cases.

**Hostile environment** describes sexually offensive conduct that permeates the workplace, classroom, or academic department, making it difficult for employees or students to do their work. Harassers can be supervisors, co-workers, peers, customers, patrons, or visitors. The conduct is continuous, frequent, repetitive, and part of an overall pattern, rather than one event or several isolated incidents and rises to such a level that it interferes with the individual's performance.

### *Prevention and Training*

The UCSD Office of Sexual Harassment Prevention and Policy (SHPP), (619) 534-8298, is available to faculty, staff, and students for training sessions concerning your rights to a university environment free from sexual harassment. Education on how to respond to sexual harassment complaints is available. A copy of the Policy and Procedures is available at the SHPP Office at 201 University Center, where you may review it freely. UCSD welcomes your suggestions for improvements.

### *Filing Complaints*

If you believe you have been sexually harassed, you are encouraged to discuss your options and learn about campus procedures by talking with an information advisor as listed in the campus directory under Sexual Harassment.

You may file a formal written complaint with the SHPP Director, at (619) 534-8298; the California Department of Fair Employment and Housing within 365 days of the alleged unlawful conduct; the U.S. Equal Employment Opportunity Commission within 300 days of the last incident of harassment; or as a law suit in court.

### *Retaliation*

Any student, staff, or faculty bringing a sexual harassment complaint or assisting in investigating such a complaint will not be adversely affected in terms and conditions of education or employment. Complaints of such retaliation will be promptly investigated and punished.

### *Grievances*

If the complainant is not satisfied with the conclusions reached at the preliminary inquiry stage or final case disposition, the SHPP director shall advise the complainant of the formal grievance procedures.

### *The Regents of the University of California*

#### **REGENTS EX OFFICIO**

*Governor of California and President of the Board of Regents*

**Pete Wilson**

*Lieutenant Governor of California*

**Gray Davis**

*Speaker of the Assembly*

**Cruz Bustamante**

*State Superintendent of Public Instruction*

**Delaine Eastin**

*President of the Alumni Associations of the University of California*

**Judith W. Levin**

*Vice President of the Alumni Association of the University of California*

**Charles J. Soderquist**

*President of the University*

**Richard C. Atkinson**

#### **APPOINTED REGENTS**

The term of office of appointed regents is twelve years, and terms expire on March 1 of the year indicated.

William T. Bagley (2002)  
Roy T. Brophy (1998)  
Carol Chandler (2009)  
Frank W. Clark, Jr. (2000)  
Ward Connerly (2005)  
John G. Davies (2004)  
Alice J. Gonzales (1998)  
John F. Hotchkis (2009)  
S. Sue Johnson (2002)  
Meredith J. Khachigian (2001)  
Howard H. Leach (2001)  
David S. Lee (2006)  
Velma Montoya (2005)  
S. Stephen Nakashima (2004)  
Ralph Ochoa (2000)  
Gerald L. Parsky (2008)  
Peter Preuss (2008)  
Tom Sayles (2006)  
Kathryn T. McClymond, Student Regent  
(June 30, 1998)

#### **PRINCIPAL OFFICERS OF THE REGENTS**

*President of the Regents*

**Pete Wilson**

*Chair of the Regents*

**Meredith J. Khachigian**

*Vice Chair of the Regents*

**Velma Montoya**

*Treasurer*

**Patricia A. Small**

*General Counsel*

**James E. Holst**

*Secretary of the Regents*

300 Lakeside Dr., 22nd Floor  
Oakland, CA 94612-3550

**Leigh Trivette**

#### **FACULTY REPRESENTATIVES TO THE BOARD OF REGENTS**

**Sandra J. Weiss**

*(September 1, 1996 to August 31, 1998)*

**Aimee Dorr**

*(September 1, 1997 to August 31, 1999)*

#### **Systemwide Administration**

*President of the University*

**Richard C. Atkinson**

*Provost and Senior Vice President—  
Academic Affairs*

**C. Judson King**

Senior Vice President—Business and Finance

**V. Wayne Kennedy**

Vice President—University and External  
Relations

**Bruce B. Darling**

Vice President—Health Affairs

**Cornelius L. Hopper, M.D.**

Vice President—Agriculture and Natural  
Resources

**W. R. Gomes**

Vice President—Clinical Services Development

**William H. Gurtner**

### CHANCELLORS OF THE CAMPUSES

Berkeley

**Robert M. Berdahl**

Davis

**Larry N. Vanderhoef**

Irvine

**Laurel L. Wilkening**

Los Angeles

**Albert Carnesale**

Riverside

**Raymond L. Orbach**

San Diego

**Robert C. Dynes**

San Francisco

**Haile T. Debas, M.D.**

Santa Barbara

**Henry T. Yang**

Santa Cruz

**M.R.C. Greenwood**

### UNIVERSITY PROFESSORS

University Professor Emeritus

**J. Michael Bishop**

Departments of Microbiology and Immunology,  
and Biochemistry

1543 Health Science West, Box 0552

UC San Francisco

San Francisco, CA 94143

University Professor Emeritus

**E. Margaret Burbidge**

Department of Physics, 0354

2282 Applied Physics and Mathematics  
Building

UC San Diego

La Jolla, CA 92093

University Professor

**Marvin L. Cohen**

Department of Physics

539 Birge Hall

UC Berkeley

Berkeley, CA 94720

University Professor Emeritus

**Donald Cram**

Department of Chemistry and Biochemistry

Mail Code 156905

4070 Young Hall

UC Los Angeles

Los Angeles, CA 90024

University Professor Emeritus

**Gerard Debreu**

Departments of Economics and Mathematics

787 Evans Hall

UC Berkeley

Berkeley, CA 94720

University Professor

**Robert B. Edgerton**

Departments of Psychiatry and Biobehavioral

Sciences and Anthropology

C9-938 Neuropsychiatric Institute

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## UCSD Facts and Figures (as of Fall 1997)

On-campus student enrollment	
Undergraduate .....	15,140
Warren .....	3,566
Muir .....	3,339
Revelle .....	3,158
Marshall .....	3,113
Roosevelt .....	1,964
Graduate .....	2,314
Medical School (including 516 Medical Center residents and interns, and 194 graduate academics) .....	1,213
Total students .....	18,667

Grade-point averages	
Lower-division undergraduate .....	2.92
Upper-division undergraduate .....	3.00
Graduate .....	3.70

Number of undergraduates in most populous departments	
Biology .....	3,762
Psychology .....	942
Economics .....	936
Computer Science and Engineering .....	917
Bioengineering .....	747
Applied Mechanics and Engineering Sciences .....	635
Chemistry and Biochemistry .....	604
Political Science .....	603
Communication .....	587
Electrical and Computer Engineering .....	570
Literature .....	482
History .....	315
Visual Art .....	301

Based upon the previous year's experience, 93 percent of all new freshmen enrolled at UCSD in the fall quarter are also enrolled in the subsequent fall quarter. Over three-fourths of all students who begin their undergraduate studies at UCSD complete their degree requirements here within six years. Questions or requests for more detailed information should be directed to the Office of Student Research and Information.

UCSD Extension enrollment .....	37,508
Summer Session enrollment .....	7,337
On campus teaching faculty members .....	1,439
Books in library collection .....	2,531,418
Total land area—UCSD	
Main campus .....	1,157

Outlying areas .....	406
UC Natural Reserves .....	414
Total acres .....	1,977

### Members of Honorary Societies/Prizes/

#### Awards

Academie des Sciences, France .....	1
Acoustical Society of America .....	1
African Studies Association .....	1
American Academy of Arts and Sciences ..	77
American Academy of Mechanics .....	4
American Academy of Microbiology .....	1
American Academy of Religion .....	1
American Anthropological Association .....	6
American Association for the Advancement of Science .....	75
American Association of Anatomists .....	1
American Astronomical Society .....	10
American Chemical Society .....	57
American Geophysical Union .....	8
American Institute of Aeronautics and Astronautics .....	9
American Institute of Chemists .....	2
American Mathematical Society .....	22
American Nuclear Society .....	3
American Philosophical Society .....	12
American Physical Society .....	36
American Psychiatric Association .....	1
American Psychological Association .....	9
American Society for Biological Chemists ..	13
American Society for Cell Biology .....	4
American Society of Composers, Authors & Publishers .....	2
American Society of Mechanical Engineers ..	7
American Society of Plant Physiologists .....	1
Arnold and Mable Beckman Foundation Young Investigators Award .....	1
Balzan .....	1
Beckman .....	1
Chancellor's Summer Faculty Fellowship ...	12
Charles E. Molnar Award .....	1
Council on Foreign Relations .....	1
Econometric Society .....	8
Fields Medal .....	1
Fulbright Awards .....	43
German Marshall Fund .....	4
Gregory Luebbert Prize .....	1
Guggenheim .....	138
Hellman Faculty Fellowship .....	11
Humboldt Research Award .....	7
Institute of Electrical & Electronic Engineers .....	14
Institute of Mathematical Statistics .....	3
Institute of Medicine .....	15

International Academy of Astronautics .....	6
International Union of Radio Scientists .....	1
Johan Skyette Prize .....	1
La Society des Oceanists, Musée de L'Homme .....	1
MacArthur Foundation .....	6
Meteroical Society .....	1
National Academy of Education .....	2
National Academy of Engineering .....	12
National Academy of Sciences .....	60
National Medal of Science .....	5
New York Academy of Science .....	6
Nobel Laureates .....	5
Oceanology International Lifetime Achievement Award .....	1
Optical Society of America .....	7
Presidential Early Career Award for Scientists and Engineers .....	1
Presidential Young Investigators Award .....	8
Pulitzer Prize .....	1
Royal Anthropological Institute .....	1
Royal Anthropological Institute— Great Britain & Ireland .....	1
Royal Astronomical Society .....	5
Royal Danish Academy of Science and Letters .....	1
Royal Historical Society .....	1
Royal Netherlands Academy of Science .....	1
Royal Society of Chemistry .....	3
Royal Society of London .....	9
Royal Society of Victoria .....	1
Royal Statistical Society .....	1
Searle Scholar .....	6
Sloan Research Fellows .....	4
Society of Experimental Psychology .....	7
Swedish Royal .....	1
Tyler Prize .....	1
White House National Medal of Science .....	1

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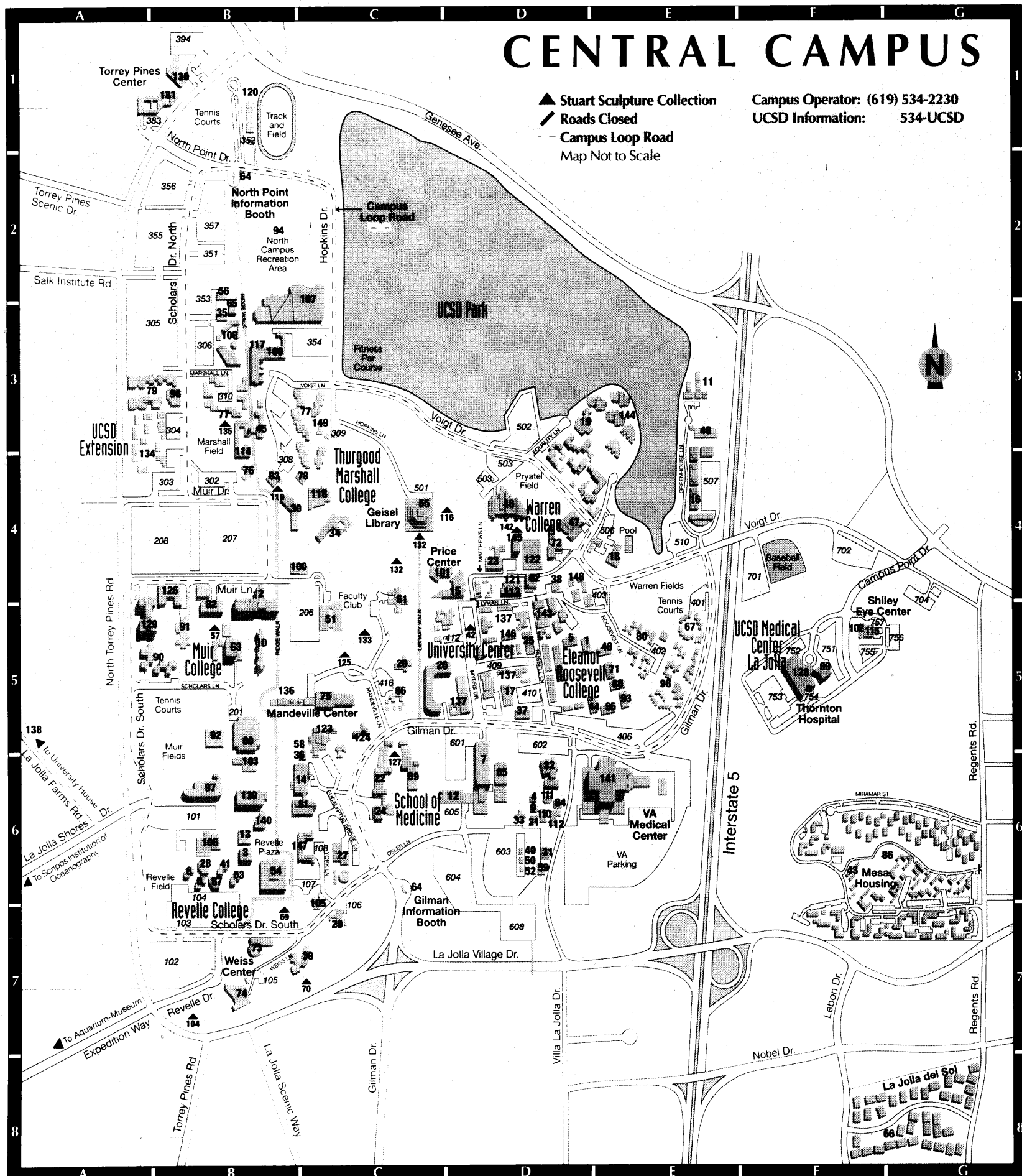
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