

1978



1978-1979  
GENERAL  
CATALOG  
July 1978

University of California, San Diego

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# Correspondence Directory

UNIVERSITY OF CALIFORNIA, SAN DIEGO, La Jolla, California 92093

## Admissions

Undergraduate	Registrar & Admissions	Building 102, Administrative Complex, Q-021
Graduate	(Address the appropriate department of instruction)	
School of Medicine	Admissions Office	1301 Basic Science Bldg. M-006

## Registration

Registrar & Admissions	Building 102, Administrative Complex, Q-021
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## Housing

Undergraduate	Housing Administration	Building 206, Administrative Complex, Q-041
Married Students	Residential Apartments Office	9258 Regents Road, S-007
Graduate Apartments	Residential Apartments Office	9258 Regents Road, S-007
Off-campus Housing	Office of Housing Services	Building B-Student Center, B-009

## Residence Status

Registrar & Admissions	Building 102, Administrative Complex, Q-041
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## Financial Aids (Loans & Grants for Undergraduates and Graduate Students)

Student Financial Services	Building 214, Administrative Complex, Q-013
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## Scholarships (for Undergraduates)

Student Financial Services	Building 214, Administrative Complex, Q-013
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## Fellowships

Office of Graduate Studies and Research	Building 108, Administrative Complex, Q-003
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## Teaching and Research Assistantships

(Address the appropriate department of instruction)

## Employment

Student Employment Office	Building 210, Administrative Complex, Q-013
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## Student Activities

Student Center	Revelle Campus, B-023
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## Foreign Students' Affairs

Office of International Education	International Center, Q-018
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## Educational Opportunity Program (EOP)

Student Center	Revelle Campus, B-030
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## Graduate Advancement Program

Office of Graduate Studies and Research	Building 108, Administrative Complex, Q-003
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## Graduate Women's Program

Office of Graduate Studies and Research	Building 108, Administrative Complex, Q-003
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## Provosts

John Muir College	H&SS Building	Muir Campus C-006
Revelle College	Revelle Provost Building	Revelle Campus B-021
Third College	Building 412	Warren Campus, Q-015
Warren College	Building 302	Warren Campus, Q-022

## Dean of Graduate Studies

Office of Graduate Studies and Research	Building 108, Administrative Complex, Q-003
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## General Information

Public Information Office	Building 211, Administrative Complex, Q-036
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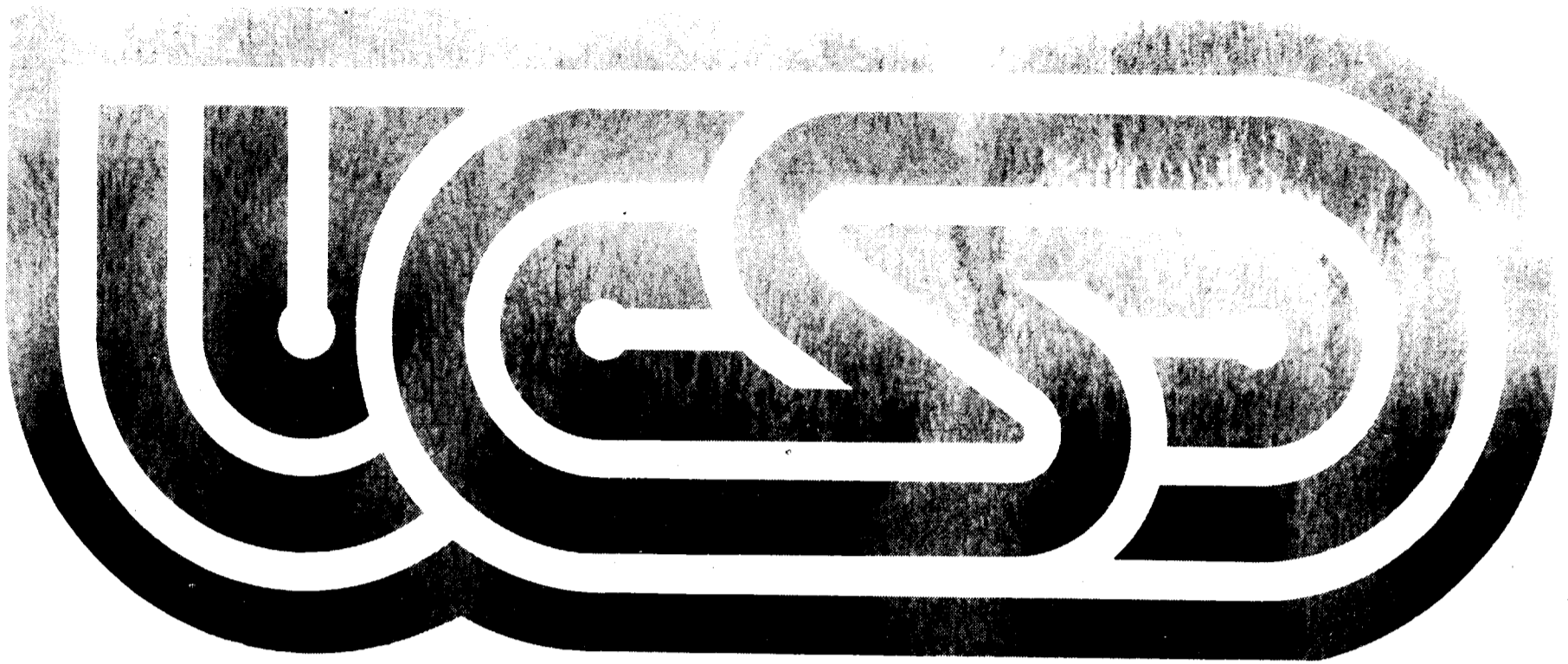
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# Academic Calendar

UNDERGRADUATE STUDENTS: DEADLINE FOR APPLICATIONS FOR SCHOLARSHIPS

GRADUATE STUDENTS: APPLICATIONS FOR FELLOWSHIPS

Deadline date for filing application materials  
Notice of awards  
Acceptance of awards

NOTE: Most departments adhere to the above schedule for assistantships also, but many will accept later applications.

UNDERGRADUATE STUDENTS: ADMISSION  
Opening date for filing application materials

GRADUATE STUDENTS: ADMISSION  
Applicants should check with their prospective departments to determine deadline dates.

GRADUATE STUDENTS: APPLICATION FOR INTERCAMPUS EXCHANGE PROGRAM

GRADUATE STUDENTS: FILING APPROVED LEAVE OF ABSENCE

GRADUATE ENROLLMENT AND REGISTRATION DEADLINES

*Continuing Students*

Deadline for early enrollment without \$10 late filing fee

*New Students*

Enrollment through these dates

GRADUATE STUDENTS — REGISTRATION FEES DUE

UNDERGRADUATE ENROLLMENT AND REGISTRATION DEADLINES

*Continuing Students*

Deadline for early enrollment without \$10 late filing fee

Deadline for registration fee payment

NOTE: Continuing undergraduates who enroll early but fail to pay fees before these dates will also have classes cancelled and must be reinstated.

*New Students*

Enrollment through these dates

LATE REGISTRATION PERIOD — All students \$25 late fee

Special permission required to register after this date

MEDICAL SCHOOL STUDENT DEADLINES

(See Medical School Announcement for Medical School deadlines)

QUARTER BEGINS

INSTRUCTION BEGINS

## FALL QUARTER 1978

Jan. 15

Jan. 15  
Apr. 1  
Apr. 15

Nov. 1

Aug. 28

Sep. 5

May 26

Sep. 26

Sep. 26

May 26

Sep. 7

Sep. 20

Sep. 27  
thru  
Oct. 6

Sep. 18

Sep. 25

## WINTER QUARTER 1979

July 1

Dec. 14

Dec. 21

Nov. 17

Jan. 9

Jan. 9

Nov. 17

Dec. 18

Jan. 3

Jan. 10  
thru  
Jan. 19

Jan. 4

Jan. 8

## SPRING QUARTER 1979

Oct. 1

Mar. 8

Mar. 19

Mar. 2

Apr. 3

Apr. 3

Mar. 2

Mar. 16

Mar. 28

Apr. 4  
thru  
Apr. 13

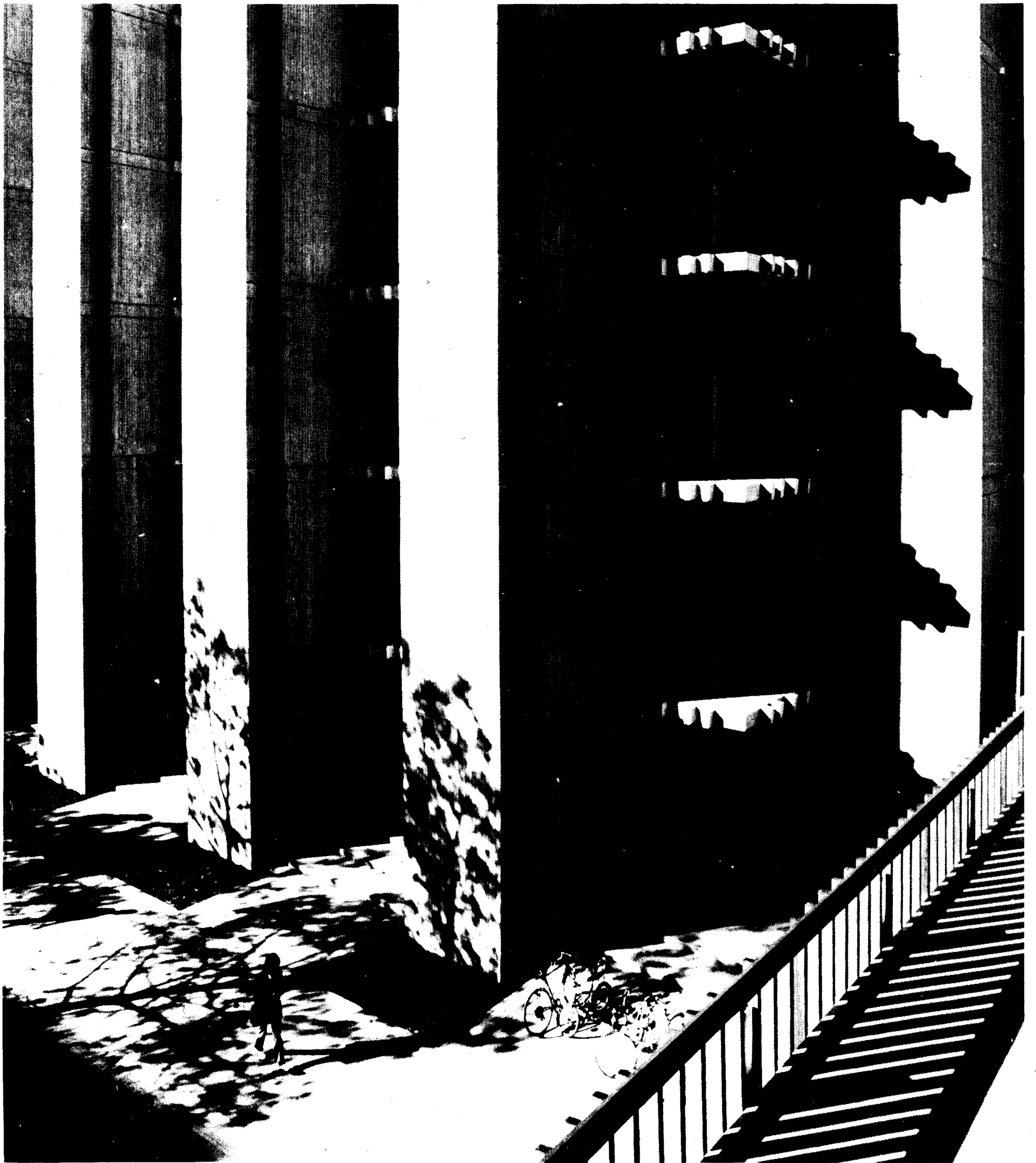
Mar. 29

Apr. 2

\*Some dates may be subject to change. Refer to quarterly *Schedule of Classes* for NECESSARY CORRECTIONS.

# 1978-79\*

	<b>FALL QUARTER 1978</b>	<b>WINTER QUARTER 1979</b>	<b>SPRING QUARTER 1979</b>
UNDERGRADUATE STUDENTS: DEADLINE FOR CHANGE OF PROGRAM			
Adding courses	Oct. 6	Jan. 19	Apr. 13
Dropping courses without late fee	Oct. 6	Jan. 19	Apr. 13
Changing to or from P/NP	Oct. 6	Jan. 19	Apr. 13
Dropping courses without penalty of "F" grade	Nov. 3	Feb. 16	May 11
GRADUATE STUDENTS: DEADLINES FOR CHANGE OF PROGRAM			
Adding or dropping courses without penalty/petition	Oct. 6	Jan. 19	Apr. 13
GRADUATE STUDENTS: MASTER'S DEGREE			
Filing for advancement to candidacy	Oct. 6	Jan. 19	Apr. 13
Filing approved thesis	Dec. 8	Mar. 23	June 15
GRADUATE STUDENTS: DOCTOR OF PHILOSOPHY DEGREE			
Filing for advancement to candidacy	Oct. 6	Jan. 19	Apr. 13
Filing draft dissertation with doctoral committee	Nov. 10	Feb. 23	May 18
Filing approved dissertation and related materials	Dec. 8	Mar. 23	June 15
GRADUATE RECORD EXAMINATION (GRE) TEST DATES			
	Oct. 21	Jan. 13	Apr. 28
	Dec. 9	Feb. 24	June 9
GRADUATE SCHOOL FOREIGN LANGUAGE TEST (GSFLT)			
	Oct. 14	Feb. 3	Apr. 14
			June 23
THANKSGIVING VACATION (ACADEMIC AND ADMINISTRATIVE HOLIDAYS)	Nov. 23-24		
INSTRUCTION ENDS	Dec. 2	Mar. 17	June 9
FREE DAY	Dec. 4	Mar. 19	June 11
FINAL EXAMINATIONS	Dec. 5-9	Mar. 20-24	June 12-16
UNDERGRADUATE AND GRADUATE STUDENTS REMOVING INCOMPLETE GRADES (I) ASSIGNED IN PRIOR QUARTER	Dec. 9	Mar. 24	June 16
QUARTER ENDS	Dec. 9	Mar. 24	June 16
COMMENCEMENT			June 17
GRADUATE STUDENTS: COMPLETION OF REQUIREMENTS			
Final date for completion of all requirements for degrees to be awarded at end of quarter	Dec. 8	Mar. 23	June 15
CHRISTMAS HOLIDAYS (ADMINISTRATIVE HOLIDAYS)	Dec. 25 & 26 Jan. 1 & 2		
ACADEMIC AND ADMINISTRATIVE HOLIDAY		Feb. 19	
ADMINISTRATIVE HOLIDAY		Mar. 26	
MÉMORIAL DAY (ACADEMIC AND ADMINISTRATIVE HOLIDAY)			May 28
GRADES MAILED TO ALL STUDENTS (APPROXIMATE)	Jan. 4	Apr. 13	July 6





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## Explorers Welcome

Your experience at UC San Diego will be largely what you choose to make of it.

If you are genuinely interested in stretching your mind, and in acquiring knowledge and skills that will serve you well for the rest of your life, the University of California, San Diego could be the right choice for you.

If you still don't know where you are headed, or what you want to do with your life, UC San Diego might be able to help you find your way.

But if you are considering UC San Diego solely because someone else wants you to come here, or as a place to hibernate, we suggest you forget us. Because at UC San Diego, all of us are really serious about education.

Not that we aren't equally serious about enjoying ourselves in the process of learning — college years can be and should be years of adventure and happiness. These are the years for exploring, for unfolding, for living with other explorers, who like yourself, are searching for answers to certain very fundamental questions.

UC San Diego can be a very good place to make this search, and that's why most of our students come here. Very few undergraduate students truly know where they are going or what they want to do a decade from now.

If you feel confused about the future bear in mind that

- a third or more of all high school students graduating this year will eventually find occupations in fields that haven't been invented yet;
- the average American worker changes occupation five times during a working career.

UC San Diego welcomes explorers.

## UC San Diego Is Special

So what makes UC San Diego unique? For one thing, this is an exciting place. It's intellectually stimulating to study with men and women who are making headlines in the arts, sciences, humanities, medicine, and oceanography. It's an inspiring experience to share a campus with a Nobel prize-winner who foresees the day when people may sail to distant planets by riding their spacecraft on the solar wind.

One reason for choosing UC San Diego, then, is its faculty.

## The Colleges of UC San Diego

A second feature which makes UC San Diego a "special" place is its "small-college" structure. This structure is designed to work for your benefit.

State-wide, the University of California has eight general campuses. Of these, two are built around the small-college concept made famous by Oxford University in England. One of them is UC San Diego, the other is UC Santa Cruz.

In adopting the small-college structure, the planners of the San Diego campus decided to capitalize on the virtues of "smallness" while retaining the advantages of "bigness." To become a respected university, they reasoned, a university must have a large faculty and staff, and it must be "big" enough to afford well-equipped teaching facilities, laboratories, and research libraries.

With these advantages of "bigness" the planners decided to merge the benefits of "smallness." Instead of one sprawling campus, they would create several more compact cam-





pus. They would thus establish an environment in which the students might retain their individualities and feel a sense of belonging. The planners were aware that many students prefer such an informal setting to the crowded world of the big-city campus.

These were the qualities which the planners of UC San Diego had in mind when they organized the "small-college" system. The four colleges are, in alphabetical order, John Muir College, which began operation in 1967, Revelle College, the first of the four colleges, which opened in 1964, Third College, which opened its doors in 1971, and Earl Warren College, which admitted its first students in the fall of 1974.

## Recreation at UC San Diego

UC San Diego's undergraduate colleges sit on a 1200-acre site high on the bluffs overlooking the Pacific Ocean at La Jolla. This seaside community has long been famed as a vacation and retirement colony. It has some of the finest beaches and coves, restaurants, art galleries, and other recreational and cultural attractions in the nation.

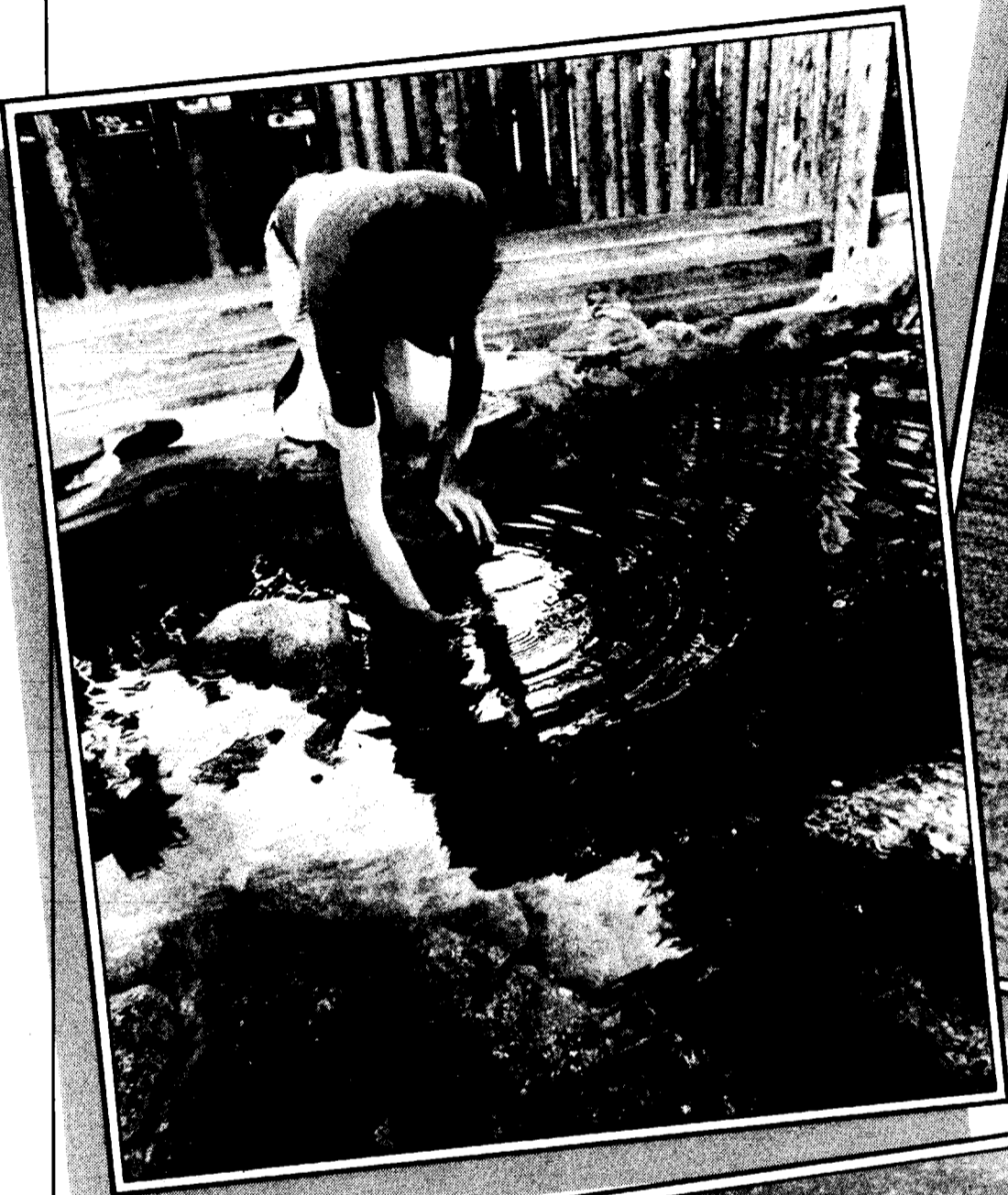
Naturally then, much of the social life at UC San Diego centers around the waterfront, with surfing and scuba-diving among the favorite diversions of students here.

Inland, student life ranges from the small-town atmosphere of Del Mar southward to the open-air markets of Tijuana and the primitive wilderness of the Baja California Peninsula in Mexico.

The City of San Diego, some twelve miles from the campus, offers a variety of recreational opportunities including Old Town (where California was born), Sea World in Mission Bay, the world-famed San Diego Zoo, and the Sports Arena and San Diego Stadium, sites of a year-round calendar of major league sporting events and concerts.







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For theater-lovers there's Balboa Park's Old Globe, home of the National Shakespeare Festival every summer. Next door to the Old Globe, the Cassius Carter Center Stage Theater presents a season of plays, while downtown the Civic Theater also schedules a full season of cultural events including opera, ballet, and the San Diego Symphony.

On-campus entertainment includes a series of Friday and Saturday night films at very low prices throughout the year. The Department of Drama presents plays throughout the school year in the UCSD Theatre. Concerts ranging from rock to jazz to classical, free dances in the cafeterias and gym, street dances, noon concerts and appearances by prominent jazz and rock groups are also scheduled regularly.

Informal meeting places such as Reville's Coffee House and Muir's Five-and-Dime are visited by students throughout the day and evening. The Student Center provides many meeting rooms and recreational facilities for students. The Mandeville Center, a \$5.3 million fine arts building, which opened in March, 1975, houses offices, classrooms and work spaces for the Departments of Music and Visual Arts, as well as an 850-seat auditorium. The three-level structure provides a center for a greatly expanded program of art exhibits, concerts, and other cultural events.

## **Mountains, Deserts And Beaches**

Many Southern Californians live out-of-doors. The San Diego metropolitan area — which includes UC San Diego — has the most benign climate in the United States, year-around.

Fishing opportunities are plentiful offshore in kelp beds west of La Jolla, and surrounding the Coronado Islands in the Mexican waters. Bass and trout fishing are found in nearby

lakes and streams. An hour's drive to the east, the Laguna Mountains provide pleasure at all seasons for campers and hikers. Beyond the Lagunas lies the vast Borrego Desert with its breathtaking display of wildflowers in the spring.

For 900 miles southward from the U.S.-Mexican border stretches the peninsula of Baja California, a mecca for lovers of unspoiled beaches and untouched mountains and deserts. The peninsula, site of the grueling Baja cross-country road races each year, is still largely unexplored wilderness, despite the recent opening of a trans-peninsular highway.

## **Most Sports- Minded Campus**

UC San Diego Physical Education Department Chairman Dr. Howard Hunt calls this campus "the most sports-minded in America." And Dr. Hunt has the statistics to prove it. UC San Diego fields more intercollegiate athletic teams — thirty — than any other college or university in the nation. This total is all the more remarkable in light of the fact that UC San Diego has no big-time football team and that the student body voted four-to-one against allowing any athletic scholarships.

The University's amateur sports program has produced some championship teams. In one recent year, for example, UC San Diego's Tritons were national volleyball champions, and the team included two All-Americans. Local and regional championships have been common to other teams as well.

The same athletic philosophy governs men's and women's athletics. Athletes of both sexes share successfully in the use of facilities, equipment and financial resources. Although students may be of varying interests and abilities, all derive benefits from participating with other athletes, receiving instruction from qualified coaches, and striving for excellence.



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## Selecting Your Major

Your major course of study at UC San Diego will be determined by a number of things, including your interests, skills, abilities and needs.

Should you need help in selecting a major, there are many people standing by to aid you. Among them are the academic advisers in the provosts' offices, faculty members (who can help you to select a curriculum that is right for you), and a staff of specialists in Counseling and Psychological Services (who can help you appraise your needs).

With or without such help, you will probably select a major by your second year at UC San Diego, and perhaps will change it as your education progresses.

## Planning Your Career

The choice of a major can be part of your career planning. But your choice will not necessarily lock you in for life to any specific type of work. A major in biology, for example, can provide certain laboratory skills, or pre-professional training for a health field, or lead to jobs quite unrelated to biology.

A firm commitment to a particular field is not expected. However, by graduation, in your own best interests, you should know where you want to begin, and have a direction in mind.

There are career-planning services to help you in this process. Counseling, occupational literature, employer information and data on employment trends are all available. These services, together with your own experience, probably will lead you to a satisfying initial choice.

## What We Don't Have

As you will see from the list of majors shown in this catalog, UC San Diego offers a variety of programs in the humanities, fine arts, social sciences, and natural sciences. We must admit, however, that there are some programs not offered here. Further, although every academic program has met all the rigorous standards set by Systemwide faculty and administrators, there are certain emphases in some majors which may not be what you are looking for. In some cases, our not offering a particular program or activity reflects a deliberately chosen philosophy; in others, the lack is temporary, to be liquidated as we grow; and in still others it is due to a reluctance to duplicate offerings at other UC campuses or in other segments of higher education.





So — when you come to UC San Diego, don't expect to find:

- An intercollegiate football team;
- Athletic scholarships;
- Physical Education as a major or minor;
- Business courses (although we do offer a management science major, through the Department of Economics);
- Oceanography as an undergraduate major (although we can prepare you for graduate work in that field);
- Nursing (although we can give you the first two years leading to qualifying for the Schools of Nursing at UCLA and UC San Francisco, as well as other institutions);
- Dentistry (although our various B.A. programs in the sciences make excellent pre-dental programs);
- Industrial Arts;
- Secondary Teaching Credentials (although at UC San Diego you can complete the first four years of the five required by the State of California);
- Journalism (although many of our majors will qualify you to work as a journalist);
- Geography;
- Early Childhood Education.

Some departmental emphases of which you should be aware:

Our biology programs are strongly oriented toward the cellular and molecular levels of life. While we offer courses in organismal and field biology, there are no majors with this sort of emphasis.

Our Department of Visual Arts offers excellent programs in fine arts studio work and in art history — but you won't find illustration or fashion design or similar commercially applicable programs.

Our Department of Psychology offers an emphasis in experimental psychology, with choices of experimental approaches. We also offer a general psychology major, but

nothing in the fields of humanistic psychology or clinical psychology.

Our Teacher Education Program leads to the partial credential in elementary teaching; graduates of this program are qualified for teaching jobs, with the understanding that the full credential is to be obtained within seven years, which will involve taking courses at some other college or university after the completion of the TEP here.

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

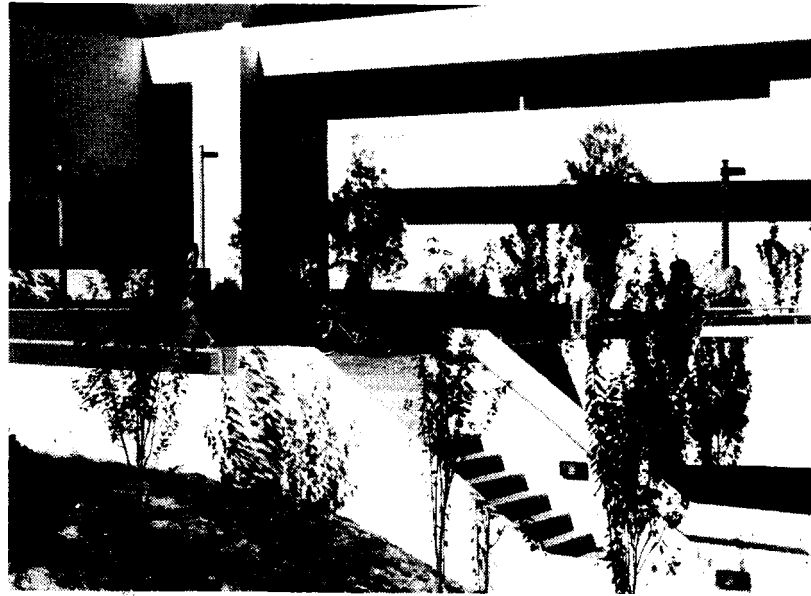
- How do I apply for admission? Page 49. (see also "Note," below.)
- How much does it cost? See "Fees and Expenses." Page 51.
- How does UC San Diego grade? Page 58.
- What about scholastic requirements? Page 45.
- How do I go about choosing a college at UC San Diego? Page 13.
- What kind of services and facilities are available at UC San Diego for students? Page 83.
- How many students and faculty were there at UC San Diego in 1977/78? Page 243.
- Where do I write for more information? See inside front cover.

NOTE: An admissions packet for students interested in entering UC San Diego is available at any California high school or junior college counselor's office. Out-of-state students may obtain a packet by writing to the Office of Admissions on any University of California campus.





# Choosing a College at UC San Diego



As a member of the nine-campus family of the University of California, UC San Diego is a full-fledged university in every sense of the term. Graduate and undergraduate programs are offered in a wide range of disciplines, leading to the bachelor's, master's, M.D. and Ph.D. degrees. UC San Diego's Scripps Institution of Oceanography is world-renowned in its field, and the University's relatively new School of Medicine already has won national distinction for the quality of its scholarship. UC San Diego's undergraduate programs also have been singled out for special honors in national surveys, despite the comparative youth of UC San Diego as a general campus.

So UC San Diego is, first and foremost, a university. There is one feature, however, which sets this campus apart from most large universities in California and elsewhere: the "small-college" concept, patterned after the model so successfully pioneered, centuries ago, by Oxford and Cambridge.

Early in UC San Diego's history, the University's planners agreed that some students learn more, and with greater personal satisfaction, when their academic and social loyalties are concentrated upon a relatively small group of instructors and fellow students. At the same time, the planners recognized that there are many advantages to "bigness" in a university. So the benefits of "bigness" were combined with the assets of "smallness" in planning the small-college environment at UC San Diego.

The concept was launched at UC San Diego with the opening of Revelle College in 1964. Three more colleges—John Muir, Third, and Earl Warren—have since been inaugurated. Each college has its own distinctive academic flavor. Thus you may choose from a rich variety of educational philosophies and environments in selecting the program best suited to your own personality and needs.

Each college has its own residence halls, recreational facilities, and student services, creating an atmosphere of intimacy not generally achieved on a large campus. But the colleges and graduate schools combine to constitute a large university at UC San Diego, with such advantages as a major library (UC San

Diego's, still growing, already has passed the one-million-volume mark); an ultra-modern computer center; a center for performing and visual arts; a rich, year-round program of cultural attractions and entertainments, and a complete array of physical education and recreational facilities.

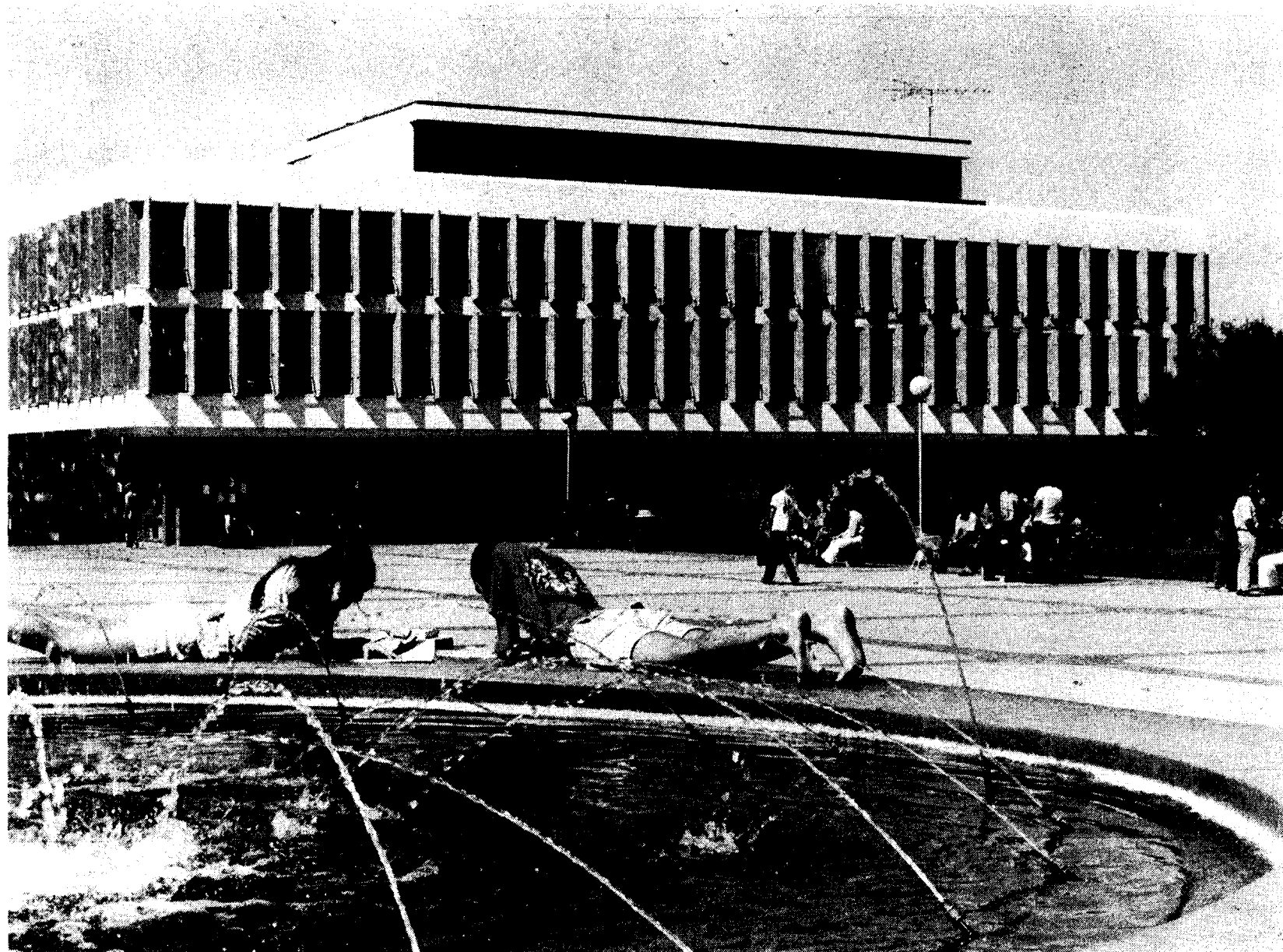
Separate colleges may be found on many American university campuses, but these are designed usually to serve specific disciplines—a college of engineering, a college of agriculture, a college of business administration, and the like. At UC San Diego, however, every subject is offered in every college, and your choice of a college will depend not on the subjects you wish to study, but rather on the nature of the environment in which you wish to study those subjects.

So the question you must answer for yourself, as you read the pages which follow, is not "Which college is best for pre-med, or literature, or...?" The real question, which you alone can answer, is "Which college offers the environment in which I, as an individual, will do my best work?"

In addition to your major course of study—which will be essentially the same, no matter which college you choose—you will be required to satisfy a number of breadth (general education) requirements. Such requirements are a feature of every educational institution, and at UC San Diego they are among the most obvious differences among the four colleges. Each has its own distinctive pattern of breadth requirements, designed to meet the desires and needs of different kinds of personalities.

In sum, when you apply for admission to UC San Diego, you will be asked to specify the college of your choice. Bear in mind all of the above considerations as you read the following brief descriptions of the four colleges: Revelle, Muir, Third, and Warren.

Much of the success you will enjoy at UC San Diego — and much of the pleasure and personal satisfaction you will derive — will hinge upon the care with which you make this important choice.



## Revelle College

Revelle College, the first college on the UC San Diego campus, was named in honor of Dr. Roger Revelle, former University-wide dean of research, and for many years director of UC San Diego's Scripps Institution of Oceanography.

Formerly called the School of Science and Engineering and later First College, Revelle College was established in 1958. After being temporarily housed on the Scripps campus, Revelle moved into its first complete buildings during the 1963-64 academic year. In 1960 Revelle began a graduate program in the physical sciences. From that beginning, it rapidly developed its humanities and social science programs, and today the teaching program reflects a broad spectrum of learning.

**The Educational Philosophy** 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 of Arts 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 should enable 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 of those fields. Early in their

careers, they should know three languages: their own, a foreign language, and the universal language of mathematics. They will study a foreign language as a spoken, vital means of communication; studying that language, they will come to know something of the general nature of language itself. And they will study mathematics as part of general education and as preparation for a required sequence of courses in the physical and biological sciences. They will learn more about their own culture in a one year program of study in the humanities and fine arts, which requires the regular writing of essays. Finally, they will, as sophomores, study the social and behavioral sciences. They will also have some elective time in which they can take courses in disciplines that they would like to explore further. Once they have completed this program, they will be ready for the relatively more specialized work of the upper division.

During the students' upper-division years (junior and senior), 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 in the graduate division.

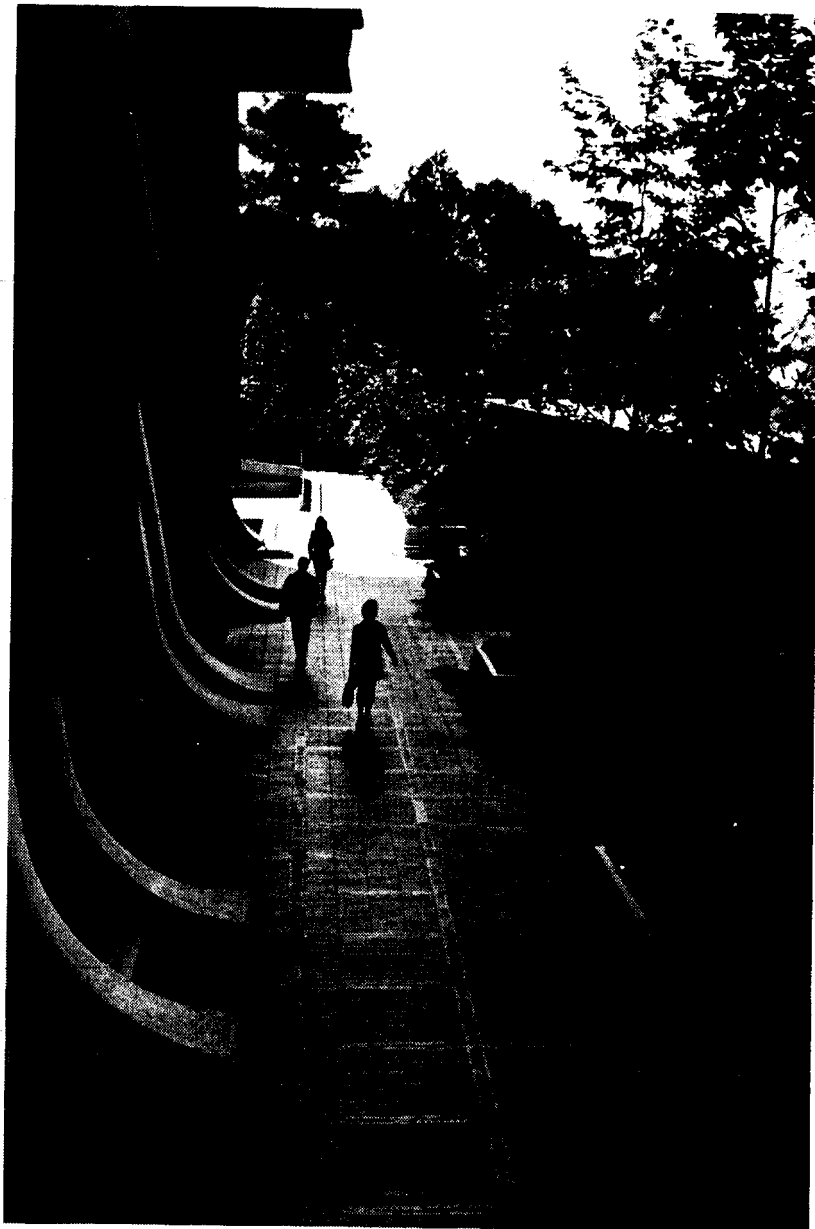
The students' *general* education will not, however, stop at the end of the sophomore year; in addition to their majors, all upper-division students will do a substantial fraction of course work in an area or areas of learning distinctly different in content and method from that of the major. (Generally, the following will be considered "areas of learning" in the above sense: mathematics and natural sciences; the social sciences; humanities.)

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 justifies the application of the theory to non-scientists 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** Revelle College students are required to demonstrate an acceptable level of basic knowledge in the humanities, fine arts, social sciences, language, mathematics, and the physical and biological sciences.

Students are encouraged to meet the requirements of the lower division and the upper-division requirements of the major as rapidly as possible. The entire program is designed to be completed in four years. Variations within the program will occur, of course, depending on the student's interest, prior training, and ability to make use of individual study. Those who de-



monstrate superior achievement and competence in an academic area may take advanced courses and individual-study programs.

**Lower Division** In order to fulfill the minimum lower-division 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 lower-division general education requirements are:

1. Satisfaction of the general University Subject A requirement.
2. A three-course sequence in an interdisciplinary humanities program including three laboratories in writing and rhetoric.
3. One course in the fine arts.
4. Three lower-division courses in the social sciences (at least two of the courses must be in one social science sequence).
5. Three additional courses to be selected from the humanities or social science sequences.
6. Three courses in mathematics (three quarters of calculus).

## Choosing a College at UC San Diego

7. Five courses in the natural sciences (two courses in physics, two courses in chemistry and one course in biology).
8. Verbal and reading proficiency in a modern foreign language or successful completion of a modern or classical language course approved for this requirement.

**Subject A** Satisfaction of the University requirement in Subject A. (See "Undergraduate Admissions, Policies, and Procedures" and "Humanities").

**Humanities** The purposes of the general educational 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 three courses, in sequence, of the interdisciplinary humanities program offered by the Departments of History, Literature, and Philosophy, which focus on some of the great documents of civilizations. Either Humanities 11A-B-C or 12A-B-C is taken in the freshman year. In addition, laboratories in writing and rhetoric are taken in conjunction with the sequence. Writing laboratory sections are organized to give students experience in several rhetorical strategies as well as to give students training and practice in the preparation and critique of expository essays relevant to the materials studied concurrently in the humanities portion of the course. Completing either of these sequences (with a "C" grade in each course) satisfies the Subject A requirement for students who have not otherwise satisfied it. Additional attention is given to those students who enter Revelle College with a Subject A deficiency.

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

**Fine Arts** One course is required and is usually taken in the freshman or sophomore year, to provide a broad and fundamental experience in the interpretation of creativity in drama, music, or visual arts. (See "Courses, Curricula, and Programs of Instruction".)

**Social Sciences** Three lower-division courses in the social sciences are required for the bachelor's degree. Students will choose three lower-division courses offered by the Departments of Anthropology, Economics, Linguistics, Political Science, Psychology or Sociology. At least two of the courses must be in one social science sequence.

Students wishing to submit courses in other departments (such as communications and urban and rural studies) in satisfaction of this requirement should consult the Office of the Revelle Provost prior to taking such classes.

**Additional Three-Course Requirement in Either Humanities or Social Science** After completing the three-course humanities requirement and the three-course social science requirement, a student must take three additional courses in humanities or social sciences. Students must select these additional courses in one of the following ways:

- A. Three courses in one humanities sequence or three courses in one of the approved sequences in literature, history, philosophy, music, drama, or visual arts.

OR

- B. Three courses in a social science sequence which, when combined with the regular social science requirement, meet one of these patterns:

1. Three courses in two different social science departments (3-3).

or

2. Two courses in three different social science departments (2-2-2).

**Mathematics** Mathematics has for centuries held an important place in education, in the sciences, and in the humanities. 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 facility to apply mathematics in their studies of the physical, biological and behavioral sciences.

There are two beginning-year course 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 and college preparation in mathematics as well as future plans. Students are urged to keep their math skills at a high level by taking math during their junior and senior years in high school. Students who have completed college courses in calculus or who present advanced placement credit in mathematics may not receive credit for mathematics courses which duplicate their advanced standing work. (See "Courses, Curricula, and Programs of Instruction: Mathematics".)

**Natural Sciences** The natural science sequences present the fundamental concepts of modern physical science 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 sciences, they offer an opportunity to gain a certain understanding and appreciation of current developments in these fields.

Two sequences are offered: Natural Science 1A-B-C-D-E and Natural Science 2A-B-C-D-E. Students may enroll in one sequence or the other depending upon their prior preparation in mathematics. Students

should recognize that in content and degree of difficulty the Natural Science 2 sequence is the appropriate preparation for majors in engineering, physics, chemistry, and molecular biology; students qualified for Natural Science 2A-B-C-D-E need not necessarily take that sequence if they are preparing for a major outside those subject areas. (See "Courses, Curricula, and Programs of Instruction: Natural Sciences".)

**Language** Requirements are in terms of levels of proficiency that must be attained by the student, rather than only in terms of a certain course or number of courses that must be passed. Proficiency may be attained in any modern foreign or classical language. Programs are currently offered in French, Spanish, Russian, German, Chinese, Italian, Hebrew, Greek and Latin. Students who have preparation in other modern languages should see the Office of the Revelle Provost. The language requirement may be satisfied by one of the following:

1. Demonstration of oral proficiency and a satisfactory score in a standard language examination.
2. A passing grade in Literature 10 in a modern foreign language or Literature 100 in Greek or Latin.
3. Successful completion of language sequence 4, 5 and 6.

The normal preparation for lower-division language proficiency will be language courses in the student's freshman year. With normal high school preparation in language most students will require about a year of course work to prepare for the examination, but some students will take less time and some more, because of differences in ability, industry, and previous language work in high school, on other campuses, or in informal

extracurricular activities (e.g., foreign movies, language clubs, language tables) involving the language.

To assist students in attaining the required language proficiencies in French, Spanish, German, and Russian, three special kinds of aid are offered:

1. Self-instructional materials and equipment, which students can use to advance their proficiency at their own optimum speed.
2. A program of small tutorial classes, conducted by native speakers of the language.
3. Instruction by linguistic scientists about language and the learning of languages. This instruction is intended to broaden the scope of students' education as well as to assist them in their own language study.

## Upper Division

**The Major** All undergraduate majors offered at UC San Diego are available to Revelle College students. A major shall consist of not less than twelve (12) nor more than fifteen (15) upper-division courses, except that a departmental major may be increased by three (3) additional upper-division courses in related electives.

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 approved by the provost, plan his or her own major. The individual major must be approved by the Executive Committee of the College before it may be accepted in lieu of a de-

### Freshman Year

FALL	WINTER	SPRING
Humanities 11A or 12A Language Mathematics 1A or 2A Fine Arts/Elective/ Natural Science 1A	Humanities 11B or 12B Language Mathematics 1B or 2B Natural Science 1B or 2A	Humanities 11C or 12C Language Mathematics 1C or 2C Natural Science 2B/ Elective

### Sophomore Year

FALL	WINTER	SPRING
Humanities or Social Science Natural Science 1C or 2C Social Science Elective/Language	Humanities or Social Science Natural Science 1D or 2D Social Science Elective/Language	Humanities or Social Science Natural Science 1E or 2E Social Science Elective/Language

## Choosing a College at UC San Diego

partmental or interdepartmental major. The faculty adviser shall 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 2.00 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.

**Restricted Electives** In addition to the major requirements, departments may require a student to pass a number of courses in his or her general area of learning. The requirement is intended to give breadth as well as depth to the student's major. The major program and related elective choices may total up to eighteen (18) courses in the upper division.

**Non-Contiguous Courses** In addition to the major and the general education requirements, Revelle College students are required to complete six courses in an area of studies *other than* that of the major. For the purposes of this requirement, the humanities, the social sciences, and the natural sciences (including mathematics) will be considered three different areas. At least three of the six courses must be at the upper-division level. Each department will designate a minor adviser. Minor programs are subject to approval by the provost. The requirement may be met in one of the following ways:

- I. *The Non-Contiguous Minor*  
Students have available two options with respect to the non-contiguous minor:
  - a) *Departmental Minor* — All six non-contiguous 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.
  - b) *Project Minor* — A project minor centers on a problem or period chosen by the student. The project is often interdepartmental and interdisciplinary. The program must have the approval of a minor adviser in the "center-of-gravity" department, who will also be available to assist the student in planning the program for the minor. (Students unable to locate an appropriate faculty adviser should ask the Office of the Revelle Provost for assistance.)
- II. *Six Electives Unrelated to the Major*  
Under this option, a student is free to elect any six courses for which the student is qualified, subject only to the constraints that at least three courses be at the upper-division level and that all six courses are non-contiguous to the student's major.

**The Graduation Requirements** In order to graduate from Revelle College, a student must:

1. Satisfy the University of California requirement in American History and Institutions. (See "Undergraduate Admissions, Policies, and Procedures: American History and Institutions".)
2. Satisfy the lower-division general education requirements (including Subject A).
3. Successfully complete a major consisting of at least twelve (12) upper-division courses as stipulated by the department.
4. Complete six (6) non-contiguous courses (at least three (3) must be upper-division).
5. Pass at least forty-six (46) courses (184 quarter units).
6. Attain a C average (2.0) or better in all work attempted in the University of California (exclusive of University Extension). Departments may require a C average in all upper-division courses and/or a grade of C in specific courses used on the major.
7. Meet the senior residence requirement. (See "Undergraduate Admissions, Policies, and Procedures: Senior Residence".)

Upon satisfaction of the graduation requirements, Revelle College will recommend that the student be awarded the degree Bachelor of Arts.

**Honors in Revelle College** Provost's Honors will be awarded each quarter to students who complete the previous quarter's program with distinction according to criteria established by the Executive Committee of the College.

The Executive Committee of Revelle College will award College Honors with the bachelor's degree to students with a superior overall grade-point average at graduation. The honors designations are *cum laude*, *magna cum laude*, *summa cum laude*. To be eligible for College Honors, a student must have completed at least twenty (20) courses (eighty [80] quarter units) in the University of California. Honors earned will be recorded on each student's diploma.

**Phi Beta Kappa Society** The Phi Beta Kappa Society is a national honorary society, originally founded at the College of William and Mary in 1776, in which membership is conferred for high scholastic standing. Membership is determined by vote of the chapter according to students' scholarship records. Revelle students are advised that among the minimum requirements for election to this society are the demonstration of knowledge of a foreign language and a college level quantitative science such as mathematics.

**Transfer Students** Transfer students accepted by Revelle College will, in general, be held to the lower-division general education requirements and the

lower-division prerequisites for a major. The general education requirements, however, will be interpreted in a manner which considers the student's total educational program. The provost, in consultation with appropriate departments, will evaluate the credentials of each transfer student on an individual basis. Some departments may require a transfer student with senior standing to satisfy a residence requirement within the major department. Students should consult their major advisers about the minimum number of courses required for this purpose.

In order to transfer to Revelle College from another college or school within the University of California, a student will be required to have a C (2.0) average or better on all work attempted at any University of California campus. (See "Undergraduate Admissions, Policies and Procedures; Admission in Advanced Standing".)

## The Faculty of Revelle College

NAME	TITLE	DEPARTMENT
Abelson, John N., Ph.D.	Professor	Chemistry
Addison, Michael C., Ph.D.	Professor	Drama
Allison, Henry E., Ph.D.	Professor	Philosophy
Arnold, James R., Ph.D.	Professor	Chemistry
Attiyeh, Richard E., Ph.D.	Professor	Economics
Bear, Donald V. T., Ph.D.	Associate Professor	Economics
Behar, Jack, Ph.D.	Associate Professor	Literature
Bishop, Errett A., Ph.D.	Professor	Mathematics
Blume, Bernhard, Ph.D.	Professor Emeritus	Literature
Bond, F. Thomas, Ph.D.	Associate Professor	Chemistry
Bradner, Hugh, Ph.D.	Professor	AMES/IGPP
Brueckner, Keith A., Ph.D.	Professor	Physics
Burbidge, E. Margaret, Ph.D.	Professor	Physics
Burbidge, Geoffrey R., Ph.D.	Professor	Physics
Butler, Warren L., Ph.D.	Professor	Biology
Casalduero, Joaquin, Ph.D.	Professor Emeritus	Literature
Catalan, Diego (M-P), Ph.D.	Professor	Literature
Cespedes, Guillermo, Ph.D.	Professor Emeritus	History
Chen, Joseph Cheng-Yih, Ph.D.	Professor	Physics
Chodorow, Stanley A., Ph.D.	Associate Professor	History
Clark, Leigh B., Ph.D.	Associate Professor	Chemistry
Conlisk, John, Ph.D.	Professor	Economics
Craig, Harmon, Ph.D.	Professor	SIO
Crowne, David K., Ph.D.	Associate Professor	Literature
Dennis, Edward A., Ph.D.	Associate Professor	Chemistry
Dijkstra, Abraham J., Ph.D.	Associate Professor	Literature
Doolittle, Russell F., Ph.D.	Professor	Chemistry
Doppelt, Gerald D., Ph.D.	Assistant Professor	Philosophy
Dunseath, Thomas K., Ph.D.	Associate Professor	Literature
Edelman, Robert S., M.A.	Assistant Professor	History
Elliott, Robert C., Ph.D.	Professor	Literature
Ellis, Albert T., Ph.D.	Professor	AMES
Fahey, Robert C., Ph.D.	Associate Professor	Chemistry
Feher, George, Ph.D.	Professor	Physics
Firtel, Richard A., Ph.D.	Assistant Professor	Biology
FitzGerald, Carl H., Ph.D.	Professor	Mathematics
Fleming, Raymond R., Ph.D.	Assistant Professor	Literature

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**The Faculty of Revelle College** *continued*

Frankel, Theodore T., Ph.D.	Professor	Mathematics
Fredkin, Donald R., Ph.D.	Associate Professor	Physics
Freedman, Michael H., Ph.D.	Assistant Professor	Mathematics
Friedkin, Morris E., Ph.D.	Professor	Biology
Fung, Yuan-cheng, Ph.D.	Professor	AMES
Garsia, Adriano M., Ph.D.	Professor	Mathematics
Getoor, Ronald K., Ph.D.	Professor	Mathematics
Gibson, Carl H., Ph.D.	Associate Professor	AMES/SIO
Goodkind, John M., Ph.D.	Professor	Physics
Goodman, Murray, Ph.D.	Professor	Chemistry
Gould, Robert J., Ph.D.	Professor	Physics
Green, Melvin H., Ph.D.	Professor	Biology
Grobstein, Clifford, Ph.D.	Professor	Biology
Halkin, Hubert, Ph.D.	Professor	Mathematics
Hamburger, Robert N., M.D.	Professor	Pediatrics
Harrison, Newton A., M.F.A.	Professor	Visual Arts
Hawkins, James W., Ph.D.	Professor	SIO
Hayashi, Masaki, Ph.D.	Professor	Biology
Hegemier, Gilbert A., Ph.D.	Professor	AMES
Heller, Walter P., Ph.D.	Associate Professor	Economics
Hooper, John W., Ph.D.	Professor	Economics
Hughes, H. Stuart	Professor	History
Intaglietta, Marcos, Ph.D.	Professor	AMES
Jackson, Gabriel, Ph.D.	Professor	History
Jordan, David K., Ph.D.	Associate Professor	Anthropology
Kaplan, Nathan O., Ph.D.	Professor	Chemistry
Kearns, David R.	Professor	Chemistry
Kraut, Joseph, Ph.D.	Professor	Chemistry
Kroll, Norman M., Ph.D.	Professor	Physics
Langacker, Ronald W., Ph.D.	Professor	Linguistics
Lee, Edward N., Ph.D.	Professor	Philosophy
Lettau, Reinhard, Ph.D.	Professor	Literature
Libby, Paul A., Ph.D.	Professor	AMES
Liebermann, Leonard N., Ph.D.	Professor	Physics
Lin, Shao-Chi, Ph.D.	Professor	AMES
Linck, Robert G., Ph.D.	Associate Professor	Chemistry
Lindsley, Daniel L.	Professor	Biology
Livingston, Robert B., M.D.	Professor	Neurosciences
Lonidier, Fred, M.F.A.	Assistant Professor	Visual Arts
Loomis, William F., Jr., Ph.D.	Associate Professor	Biology
Lovberg, Ralph H., Ph.D.	Professor	Physics
Luft, David S., Ph.D.	Assistant Professor	History
Lyon, James K., Ph.D.	Professor	Literature
Ma, Shang-keng, Ph.D.	Professor	Physics
Macdougall, J. Douglas, Ph.D.	Assistant Professor	SIO
Malmberg, John H., Ph.D.	Professor	Physics
Manaster, Alfred B., Ph.D.	Associate Professor	Mathematics
Mandler, Jean M., Ph.D.	Professor	Psychology
Mann, Judith K., Ph.D.	Assistant Professor	Economics
Maple, M. Brian, Ph.D.	Associate Professor	Physics
Marcuse, Herbert, Ph.D.	Honorar Professor	Philosophy

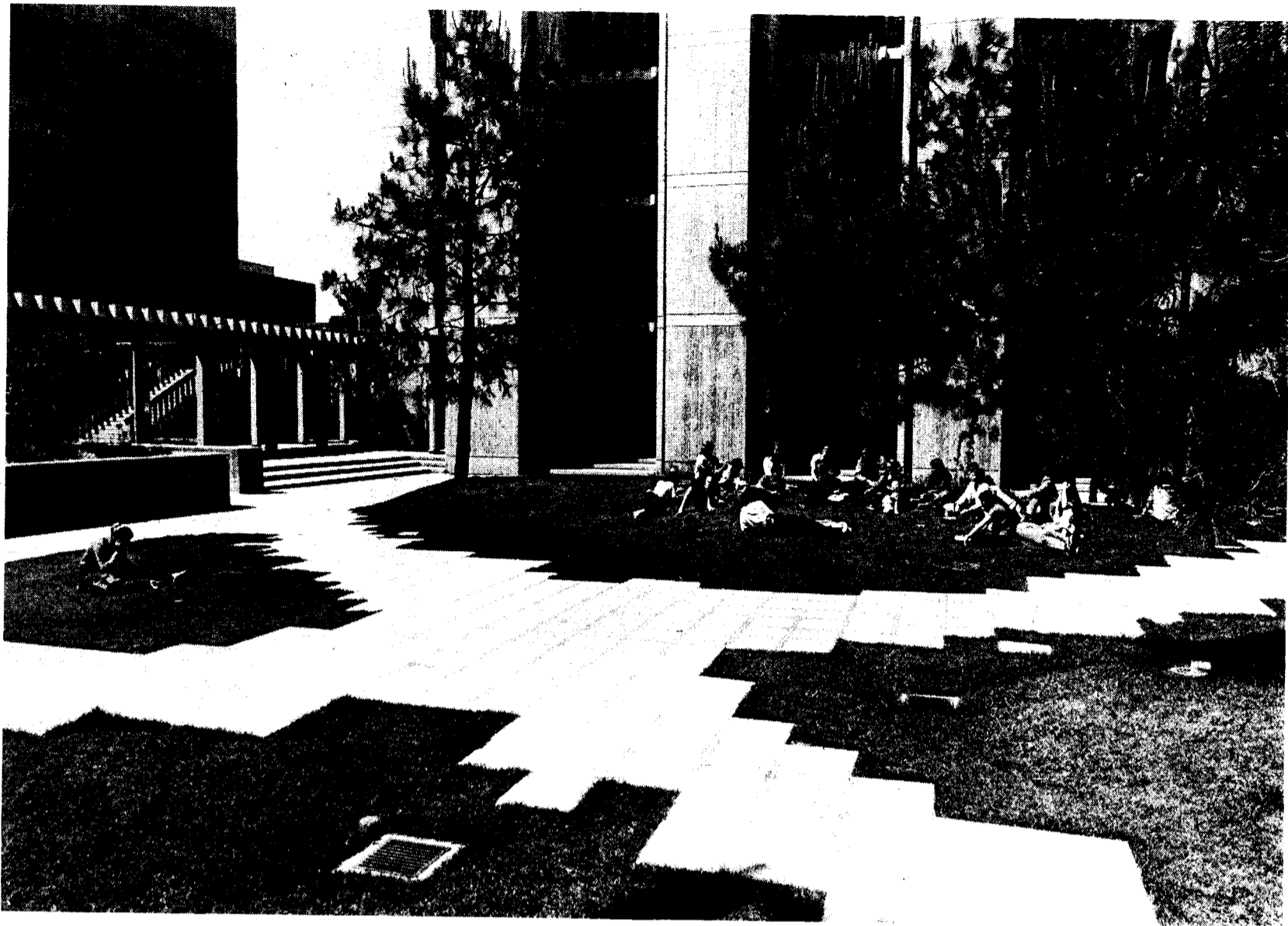


Marti, Kurt, Ph.D.	Associate Professor	Chemistry
Masek, George E., Ph.D.	Professor	Physics
Matthias, Bernd T., Ph.D.	Professor	Physics
Mayer, Joseph E., Ph.D.	Professor Emeritus	Chemistry
McIlwain, Carl E., Ph.D.	Professor	Physics
Meeker, Michael E., Ph.D.	Associate Professor	Anthropology
Miles, John W., Ph.D.	Professor	AMES
Miller, David R., Ph.D.	Associate Professor	AMES
Miller, Jeffrey O., Ph.D.	Assistant Professor	Psychology
Miller, Stanley L., Ph.D.	Professor	Chemistry
Montal, S. Maurice, Ph.D.	Associate Professor	Physics/Biology
Montrose, Louis A., Ph.D.	Assistant Professor	Literature
Moore, Stanley W., Ph.D.	Professor Emeritus	Philosophy
Mosshammer, Alden A., Ph.D.	Associate Professor	History
Nachbar, William, Ph.D.	Professor	AMES
Newmark, Leonard D., Ph.D.	Professor	Linguistics
Norman, Donald A., Ph.D.	Professor	Psychology
Olafson, Frederick A., Ph.D.	Professor	Philosophy
Olfe, Daniel B., Ph.D.	Professor	AMES
Pearce, Roy Harvey, Ph.D.	Professor	Literature
Penner, Stanford S., Ph.D.	Professor	AMES
Perrin, Charles L., Ph.D.	Associate Professor	Chemistry
Peterson, Laurence E., Ph.D.	Professor	Physics
Pfaelzer, Mary J., Ph.D.	Assistant Professor	Literature
Phillips, David P., Ph.D.	Associate Professor	Sociology
Piccioni, Oreste, Ph.D.	Professor	Physics
Pippin, Robert B., Ph.D.	Assistant Professor	Philosophy
Ramanathan, R., Ph.D.	Associate Professor	Economics
Rand, Sinai, Ph.D.	Associate Professor	AMES
Randel, Fred V., Ph.D.	Associate Professor	Literature
Reissner, M. Erich, Ph.D.	Professor	AMES/ Mathematics
Revelle, Roger R., Ph.D.	Professor	Political Science
Rice, John A., Ph.D.	Assistant Professor	Mathematics
Roberson, Robert E., Ph.D.	Professor	AMES
Rohrl, Helmut, Ph.D.	Professor	Mathematics
Rumelhart, David E., Ph.D.	Associate Professor	Psychology
Russell, R. Robert, Ph.D.	Professor	Economics
Saltman, Paul D., Ph.D.	Professor	Biology
Saville, Jonathan, Ph.D.	Associate Professor	Literature
Schane, Sanford A., Ph.D.	Professor	Linguistics
Scheffler, Immo E., Ph.D.	Associate Professor	Biology
Schrauzer, Gerhard N., Ph.D.	Professor	Chemistry
Scobie, James R., Ph.D.	Professor	History
Shenk, Norman, Ph.D.	Associate Professor	Mathematics
Shuler, Kurt E., Ph.D.	Professor	Chemistry
Singer, S. Jonathan, Ph.D.	Professor	Biology
Small, Lance W., Ph.D.	Professor	Mathematics
Smith, Donald R., Ph.D.	Associate Professor	Mathematics
Sommers, Joseph, Ph.D.	Professor	Literature
Sorenson, Harold W., Ph.D.	Professor	AMES
Steier, Saul, Ph.D.	Assistant Professor	Literature
Steinmetz, Philip	Assistant Professor	Visual Arts
Stroll, Avrum, Ph.D.	Professor	Philosophy

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**The Faculty of Revelle College** *continued*

Strum, Shirley C., Ph.D.	Assistant Professor	Anthropology
Suess, Hans E., Ph.D.	Professor Emeritus	Chemistry
Suhl, Harry, Ph.D.	Professor	Physics
Swanson, Robert A., Ph.D.	Professor	Physics
Sworder, David D., Ph.D.	Professor	AMES
Tapp, June L., Ph.D.	Professor, Provost of Revelle College	Psychology
Terras, Audrey A., Ph.D.	Associate Professor	Mathematics
Thierstein, Hans R., Ph.D.	Assistant Professor	SIO
Thompson, William B., Ph.D.	Professor	Physics
Tokuyasu, Kiyoteru, Ph.D.	Professor-in- Residence	Biology
Traylor, Teddy G., Ph.D.	Professor	Chemistry
Tuzin, Donald F., Ph.D.	Associate Professor	Anthropology
Urey, Harold C., Ph.D.	University Professor Emeritus	Chemistry
Van Atta, Charles W., Ph.D.	Professor	AMES/SIO
Vernon, Wayne, Ph.D.	Associate Professor	Physics
Vold, Robert L., Ph.D.	Associate Professor	Chemistry
Walk, Cynthia, Ph.D.	Assistant Professor	Literature
Weare, John H., Ph.D.	Associate Professor	Chemistry
Wheatley, John C., Ph.D.	Professor	Physics
Wheeler, John C., Ph.D.	Associate Professor	Chemistry
Wierschin, Martin W., Ph.D.	Professor	Literature
Williams, Forman A., Ph.D.	Professor	AMES
Williamson, Stanely G., Ph.D.	Professor	Mathematics
Wilson, Kent R., Ph.D.	Professor	Chemistry
Wilson, Mark L., Ph.D.	Assistant Professor	Philosophy
Winters, Barbara A., Ph.D.	Assistant Professor	Philosophy
Wong, David Y., Ph.D.	Professor	Physics
Wright, Andrew, Ph.D.	Professor	Literature
Xuong, Nguyen-Hua, Ph.D.	Professor	Physics/Biology/ Chemistry
Zimm, Bruno H., Ph.D.	Professor	Chemistry
Zweifach, Benjamin W., Ph.D.	Professor	AMES
* * *		
Smith, Jeffrey	Lecturer	
Waddy, Lawrence	Lecturer	Literature



## John Muir College

In the fall of 1967, John Muir College, second of the colleges planned for UC San Diego, admitted its first students. The college was named for John Muir, the California naturalist, geologist, and writer. Born in Dunbar, Scotland, in 1838, Muir was educated in Scotland and at the University of Wisconsin. He explored the Sierra Nevada Mountains, Alaska, and the Arctic regions and worked for many years in the cause of conservation and the establishment of national parks and forests. His books are still widely read for their vivid and engaging descriptions of the land and the people of early California. Muir made his home in Martinez, California. He was awarded an honorary degree by the University of California in 1913. He died in 1914.

**The Character of the College** John Muir College seeks to be an institution of a special kind. First of all, it intends to be an academic community: its members are engaged in inquiry and the sharing of ideas. At the same time a majority of its members are young adults who need to define themselves in relation to the physical world and the society in which they live. Self discovery, when undertaken in the midst of academic pursuits and opportunities, can be unusually profound and meaningful, especially if learning is truly joined with living, if knowledge gained in the classroom, the library

and the laboratory can in some real way be applied to the experience of the Muir student and the problems of contemporary society.

These are grand intentions. Simply announcing them does not make them so. The connection between learning and living, for example, is not always easy to maintain. Work is needed and students are expected to share in it. They help to conceive and design new courses. They serve on the John Muir College Council and the Curriculum Review and Development Board; these are concerned with the general governance of the College and its academic program. They act as house advisers in the residence halls and as discussion leaders in the Contemporary Issues Program. They help to formulate and administer the rules under which they live. They share in the decisions affecting allocations of resources. They are active members of the community.

Appropriately, therefore, the general-education requirements and the curriculum as a whole encourage active rather than passive learning. Active learning necessitates self-education and opportunities for independent study. The major programs provide many forms of this. Those students who choose not to pursue a major will be expected to complete projects that demand much independent investigation.

**The Graduation Requirements** To receive a Bachelor of Arts degree from John Muir College a student must:

## Choosing a College at UC San Diego

1. Meet the general University requirement in Subject A, English Composition. (See "Undergraduate Admissions, Policies and Procedures".)
2. Satisfy the University of California requirement in American History and Institutions. (See "Undergraduate Admissions, Policies and Procedures".)
3. 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.")
4. Fulfill the general-education requirements described below.
5. Pass forty-five, four-unit academic courses or their equivalent. Eighteen of the forty-five courses must be upper-division level. Departments may require a "C" average in all upper-division courses and/or a grade of "C" in specific core courses required for the major.
6. Show some form of concentration and focus of study. Ordinarily this is accomplished by completing a departmental major. Students in the College may attempt any major upon completion of the prerequisites. Students who do not choose to meet this requirement by means of a departmental or interdisciplinary major must complete a special project. As the name implies, this is a specialized form of concentration. It normally consists of a combination of regular course work and independent study. Each project must be approved by the provost. (See the paragraph "Major Programs and Special Projects", below.)
7. Satisfy the residency requirement that nine of the last eleven courses passed must be taken as a student in the College.

While John Muir College does not call for the completion of a minor to fulfill its requirements for the degree of Bachelor of Arts, it does acknowledge such a completion of an approved departmental minor on a student's transcript. No course may be used to complete both a major and a minor. At least three of the six courses must be upper-division. Only one of the lower-division classes may be taken P/NP, and only one upper-division may be taken P/NP.

Upon satisfaction of the graduation requirements, Muir College will recommend the student be awarded the degree of Bachelor of Arts.

**Honors in Muir College** The College will award Honors with the Bachelor's degree to students with an exceptional grade-point average in their major and overall course work.

To be eligible for College Honors, a student must have completed at least eighty, graded, quarter units in



the University of California, and have the recommendation of the major department.

The honors designations are *cum laude*, *magna cum laude* and *summa cum laude*. All honors are approved by the department in which the student has majored and by the provost of the College. Honors earned will be recorded on each student's diploma.

**Phi Beta Kappa Society** The Phi Beta Kappa Society is a national honorary society, originally founded at the College of William and Mary in 1776, in which membership is conferred for high scholastic standing. Membership is determined by vote of the chapter according to students' scholarship records. Muir students are advised that among the minimum requirements for election to this society are the demonstration of knowledge of a foreign language and a college level quantitative science such as mathematics.

**The General-Education Requirements** The Muir College general-education program is described as follows:

Each student is required to complete one-year sequences from four of six categories: two from among fine arts, humanities (history, literature or philosophy), foreign language and two from among mathematical science, natural science, social science.

The specific courses in the six categories are approved by the Muir College Curriculum Review and Development Board. Each year this board, consisting of faculty and students, determines which of the course offerings of the various departments may be used in the general-education program. The basic criterion is that a year sequence must be a unified and coherent treatment of a single subject or topic. The following points should be noted.

1. Only complete sequences may be applied to the general-education requirement. Ordinarily an entire sequence is taken in one academic year.
2. More appropriate advanced courses may, with

*prior written consent from the Office of the Provost*, be substituted for those listed.

3. The same sequence may be used both to satisfy part of the general-education program and to meet a departmental requirement of prerequisite.
4. Units obtained from Advanced Placement and similar examinations may not be used to satisfy the general-education requirements.
5. Students should request from the Office of the Provost an up-to-date list of general-education requirements before making their final selection of courses.
6. Courses taken to satisfy the general-education requirement may, in general, be taken for a letter grade or Pass/Not Pass.
7. Muir undergraduates are reminded that students must be in good standing (2.0 G.P.A.) and that the average number of P/NP courses is one per quarter.

This general-education program was established by the faculty of the College to guide the students toward a broad and liberal education while allowing them substantial choice in the development of that education. It should be understood that this freedom carries with it the responsibility on the part of students for careful planning. Almost all of the major programs at UC San Diego have a pattern of prerequisites, some of them quite extensive. 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. Students of the college are encouraged to consult regularly with the academic counselors in the Office of the Provost as well as with members of the faculty concerning the selection of appropriate courses. Some examples of the choice which must be made are given in the paragraph "Major Programs and Special Projects".

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 a subject represented on the approved list will normally be accepted as completing one of the four required sequences. After the Office of Admissions evaluates a student's transcript, the Office of the Provost makes an evaluation of prior work for each student at the time of his or her first enrollment.

**Major Programs and Special Projects** Students in Muir College may attempt any major for which they have completed prerequisite courses. It was stated above that many majors have precise and often extensive lower-division prerequisites. This means that students should plan their lower-division work carefully. Since many students change their plans concerning a major, it is often useful to plan with regard to general areas of interest rather than a specific major. Each academic department has, in its section of this catalog, a paragraph entitled "The Major Program." Students are encouraged to read these carefully, for they indicate both the extent of the prerequisites 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 modern, foreign language is required by several departments (e.g., linguistics, literature).
2. Specific science courses are required by many departments. For example, mathematics and APIS require Science 4A, 4B, 4C; biology requires Science 3A, 3B, 3C, and 4A, 4B, 4C.
3. The physical and life sciences, applied sciences (APIS and AMES), together with certain of the social-sciences (economics and psychology), require at least one year of calculus.

The Muir Special Project major is intended for students who have specific talents and interests which are not accommodated by one of the departmental majors.

A project normally includes both regular course work and independent study as well as a recommended back-up major; taken together, this must represent the same amount of work as an ordinary major. 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 the knowledge and skill acquired. In either case, a regular member of the faculty must serve as adviser to a student doing the project. It should be understood that the demands of a special project 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 Provost's Academic Advising Office.

The Office of the Dean of John Muir College performs many different general services. Its staff consists of several full-time professionals, a number of student interns, and a close working relation with Page One—a student-staffed peer center. The staff is accustomed to dealing with problems concerning prospective careers, procedures for applying to graduate or professional schools, decisions about withdrawing from school, legal problems, getting involved in student government and other activities, planning and carrying out social, cultural and recreational programs for faculty, students and staff, assisting you in getting a thorough hearing if you feel that a faculty or staff member has treated you unfairly, and many other problems or concerns. If you are uncertain about where to go to get information or help with your problems or concerns, the dean's office staff will be able to help you.

The Office of the Dean is in Room 2125 of the Humanities and Social Sciences Building on the Muir Campus, and Page One is located in the Lower Muir Commons.

## The Faculty of Muir College

NAME	TITLE	DEPARTMENT
Alfvén, Hannes, Ph.D.	Professor Emeritus	APIS
Anderson, Donald W., Ph.D.	Professor	Mathematics
Anderson, Norman, Ph.D.	Professor	Psychology
Anderson, Victor, Ph.D.	Professor	APIS
Antin, David, M.A.	Professor	Visual Arts
Antin, Eleanor, B.A.	Assistant Professor	Visual Arts
Bailey, Frederick G., Ph.D.	Professor	Anthropology
Balzano, Gerald, Ph.D.	Assistant Professor	Music
Barnouw, Jeffrey, Ph.D.	Assistant Professor	Literature
Barrera, Mario, Ph.D.	Assistant Professor	Pol. Science
Bender, Edward, Ph.D.	Associate Professor	Mathematics
Berger, Bennett, Ph.D.	Professor	Sociology

Berman, Ronald S., Ph.D.	Professor	Literature
Booker, Henry G., Ph.D.	Professor	APIS
Bowles, Kenneth L., Ph.D.	Professor	APIS
Boynton, Robert, Ph.D.	Professor	Psychology
Bradbury, Jack, Ph.D.	Assistant Professor	Biology
Brody, Stuart, Ph.D.	Associate Professor	Biology
Carlsson, Gunnar E., Ph.D.	Assistant Professor	Mathematics
Chen, Matthew, Ph.D.	Associate Professor	Linguistics
Chrispeels, Maarten J., Ph.D.	Associate Professor	Biology
Christmas, Eric C.	Professor	Drama
Clark, Deborah J., Ph.D.	Assistant Professor	Literature
Cohen, Alain J.J., Ph.D.	Associate Professor	Literature
Cohen, Harold	Professor	Visual Arts
Coles, William A., Ph.D.	Associate Professor	APIS
Davis, Murray S., Ph.D.	Acting Associate Professor	Sociology
Davisson, Darrell	Assistant Professor	Visual Arts
dePicciotto, Solomon, Ph.D.	Assistant Professor	Mathematics
Deutsch, J. Anthony, Ph.D.	Professor	Psychology
Douglas, Jack D., Ph.D.	Professor	Sociology
Drake, Sandra, Ph.D.	Assistant Professor	Literature
Druian, Rafael	Professor	Music
duBois, Page A., Ph.D.	Assistant Professor	Literature
Ebbesen, Ebbe B., Ph.D.	Associate Professor	Psychology
Elman, Jeffrey L., Ph.D.	Assistant Professor	Linguistics
Erickson, Robert, M.A.	Professor	Music
Evans, John W., M.D., Ph.D.	Professor	Mathematics
Fantino, Edmund J., Ph.D.	Professor	Psychology
Farber, Manny	Professor	Visual Arts
Fejer, Jules A., D.Sc.	Professor Emeritus	APIS
Fillmore, Jay P., Ph.D.	Associate Professor	Mathematics
Francois, Jean-Charles	Associate Professor	Music
Fussell, Edwin S., Ph.D.	Professor	Literature
Gaffney, Floyd, Ph.D.	Professor	Drama
Gearhart, Suzanne, Ph.D.	Assistant Professor	Literature
Gilpin, Michael, Ph.D.	Assistant Professor	Biology
Gragg, William B., Ph.D.	Professor	Mathematics
Graña, Cesar, Ph.D.	Professor	Sociology
Guillén, Claudio, Ph.D.	Professor	Literature
Gusfield, Joseph R., Ph.D.	Professor	Sociology
Halpern, Francis R., Ph.D.	Professor	Physics
Helstrom, Carl W., Ph.D.	Professor	APIS
Howden, William, Ph.D.	Assistant Professor	APIS
Howell, Stephen H., Ph.D.	Associate Professor	Biology
James, Luther	Acting Associate Professor	Drama
Johnson, Bruce, Ph.D.	Assistant Professor	Sociology
Jules-Rosette, Bennetta, Ph.D.	Assistant Professor	Sociology
Katsell, Jerome H., Ph.D.	Assistant Professor	Literature
Kirkpatrick, Susan, Ph.D.	Assistant Professor	Literature

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**The Faculty of Muir College** *continued*

Klima, Edward S., Ph.D.	Professor	Linguistics
Konecni, Vladimir, Ph.D.	Assistant Professor	Psychology
Kuroda, Sige-Yuki, Ph.D.	Professor	Linguistics
Large, John, Ph.D.	Assistant Professor	Music
Ledden, Patrick J., Ph.D.	Lecturer (with Employment Security)	Mathematics
Lee, Sing, Ph.D.	Associate Professor	APIS
Levy, Robert I., Ph.D.	Professor	Anthropology
Lewak, George, Ph.D.	Associate Professor	APIS
Lin, James P., Ph.D.	Assistant Professor	Mathematics
Luo, Huey-Lin, Ph.D.	Associate Professor	APIS
MacLeod, Donald I.A., Ph.D.	Assistant Professor	Psychology
Mandler, George, Ph.D.	Professor	Psychology
Masry, Elias, Ph.D.	Associate Professor	APIS
McClelland, James, Ph.D.	Assistant Professor	Psychology
Metzger, Thomas A., Ph.D.	Associate Professor	History
Mills, Stanley E., Ph.D.	Professor	Biology
Mitchell, Allan, Ph.D.	Professor	History
Monteon, Michael P., Ph.D.	Assistant Professor	History
Munsinger, Harry I., Ph.D.	Associate Professor	Psychology
Obeyesekere, Gananath, Ph.D.	Professor	Anthropology
Oesterreicher, Hans K., Ph.D.	Associate Professor	Chemistry
Ogdon, Wilbur L., Ph.D.	Professor	Music
Oliveros, Pauline, A.B.	Professor	Music
Orloff, Marshall J., M.D.	Professor	Surgery
Parrish, Michael E., Ph.D.	Associate Professor	History
Pickowicz, Paul G., Ph.D.	Assistant Professor	History
Price, Paul A., Ph.D.	Associate Professor	Biology
Ramos, Reyes, Ph.D.	Assistant Professor	Sociology
Rands, Bernard	Professor	Music
Rommel, Jeffrey B., Ph.D.	Assistant Professor	Mathematics
Reynolds, George S., Ph.D.	Professor	Psychology
Reynolds, Roger, M.M.	Professor	Music
Rickett, Barnaby, Ph.D.	Associate Professor	APIS
Ritchie, Robert C., Ph.D.	Associate Professor	History
Rodin, Burton, Ph.D.	Professor	Mathematics
Rosenblatt, Murray, Ph.D.	Professor	Mathematics
Ross, Lola R., Ph.D.	Associate Professor	Community Medicine
	Director	Interdisciplinary Sequences
Rotenberg, Manuel, Ph.D.	Professor	APIS
Roth, Moira, Ph.D.	Assistant Professor	Visual Arts
Rothenberg, Jerome, Ph.D.	Acting Professor	Visual Arts
Ruiz, Ramón E., Ph.D.	Professor	History
Rumsey, Victor H., D.Eng.	Professor	APIS
Saier, Milton, Ph.D.	Associate Professor	Biology
Sato, Gordon H., Ph.D.	Professor	Biology
Savitch, Walter J., Ph.D.	Associate Professor	APIS
Scheiber, Harry N., Ph.D.	Professor	History
Schwartz, Theodore, Ph.D.	Professor	Anthropology
Sharpe, Michael J., Ph.D.	Professor	Mathematics



Silber, John J., Ph.D.	Professor	Music
Sims, James, Ph.D.	Assistant Professor	Drama
Smith, Douglas W., Ph.D.	Associate Professor	Biology
Soule, Michael E., Ph.D.	Associate Professor	Biology
Spiro, Melford E., Ph.D.	Professor	Anthropology
Spitzer, Nicholas, Ph.D.	Associate Professor	Biology
Stewart, John L., Ph.D.	Professor, Provost of the John Muir College	Literature
Strasen, Barbara, M.A.	Assistant Professor	Visual Arts
Swartz, Marc J., Ph.D.	Professor	Anthropology
Teilhet, Jehanne H., Ph.D.	Lecturer (with Employment Security)	Visual Arts
Terdiman, Richard	Associate Professor	Literature
Tschirgi, Robert, M.D., Ph.D.	Professor	Neurosciences
Turetzky, Bertram J., M.A.	Professor	Music
Vendler, Zeno, Ph.D.	Professor	Philosophy
Wagner, Arthur, Ph.D.	Professor	Drama
Warschawski, Stefan E., Ph.D.	Professor Emeritus	Mathematics
Wavrik, John J., Ph.D.	Associate Professor	Mathematics
Wayne, Don, Ph.D.	Assistant Professor	Literature
Wesling, Donald T., Ph.D.	Associate Professor	Literature
Williams, Ben A., Ph.D.	Assistant Professor	Psychology
Wong, Yen Lu, M.A.	Assistant Professor	Drama
Yip, Wai-lim, Ph.D.	Professor	Literature

### Honorary Fellows of the College

- Hannes Alfvén, *Scientist and Nobel Laureate*  
 †Georg von Bekesy, *Psychologist and Nobel Laureate*  
 Ernst Krenek, *Composer*  
 †Ernest Mandeville, *Philanthropist*  
 William McGill, *Psychologist and Educator*  
 Jonas Salk, *Scientist*  
 Claude E. Shannon, *Mathematician*  
 †Earl Warren, *Jurist and Statesman*  
 Robert Penn Warren, *Poet and Novelist*

†Deceased



# Third College

The Third College enrolled its first students in the fall of 1970. It is a liberal arts and sciences college with academic programs in the humanities, social sciences, natural sciences, applied and engineering sciences, and mathematics. It has a distinctive academic focus on understanding the factors which determine societal change and development and the alleviation of contemporary social problems. The Third College is committed to the scholarly investigation and understanding of the factors which determine the quality of life in urban and rural settings in Western and non-Western countries, whether these factors be technological, political, economic, or cultural.

The programs of the College are also guided by the belief that education cannot be divorced from the social imperatives of our time. The Third College has, therefore, encouraged the development of academic programs both for those who wish to pursue pure scholarship solely for the sake of knowledge and for those who wish to prepare for professional careers and employment upon graduation. In terms of the latter, Third College offers a program in teacher education, and has pioneered field-placement and internship programs to provide students with opportunities to apply their knowledge to real-world situations. In addition, Third College sponsors a number of activities which direct

the intellectual resources of the University to matters of public importance and interest. Probably the best known of these activities are the lecture series and symposia sponsored by Third College and its five course groups and programs: Communications, Third World Studies, Urban and Rural Studies, Science and Technology, and the Third College Composition Program.

It is fundamental to the philosophy of Third College that students, faculty and staff comprise an intellectual community joined in the task of mutual learning. This philosophy finds expression in a collegiate advising and counseling system designed to provide students with full benefits from the rich and diversified academic programs at UC San Diego.

To insure the best possible academic programs and courses in all disciplines and their proper relationship to Third College and its students, Third College has organized its faculty (and the academic majors and programs of UC San Diego) into five course groups and programs: Science and Technology, covering the natural sciences, the applied and engineering sciences, and mathematics; Urban and Rural Studies, covering the social sciences with an urban focus; Third World Studies, covering the humanities and social sciences with an emphasis upon developing countries and minorities within the boundaries of the United States; Communications, covering the social sciences with a focus upon the analysis of small group and mass



## Choosing a College at UC San Diego

communications; and the Third College Composition Program.

These five course groups and programs are the primary sources of educational innovation and development in Third College. They have had an outstanding record of achievement.

**The Graduation Requirements** To receive a bachelor's degree from Third College, a student must:

1. Satisfy the general University requirement in Subject A, English Composition.
2. Satisfy the general University requirement in American History and Institutions.
3. Complete and pass a minimum of forty-five four-unit academic courses with at least a "C" average. Eighteen of the forty-five courses must be upper-division level; at least three of the eighteen upper-division courses must be outside of the major discipline.
4. Fulfill the core courses (general education requirements) by satisfactorily completing either Program A or Program B (see general education requirements).
5. Complete a departmental or interdisciplinary major.
6. Satisfy the college residency requirement that nine of the last eleven courses must be taken as a Third College student.

**Honors in Third College** The College will award Honors with the bachelor's degree to students who have completed at least eighty quarter units for a letter grade at the University of California, San Diego and have the recommendation of their major department and the provost. To receive Honors, students must have 3.25 or above grade-point averages in both their major and overall academic work. The levels are designated as *cum laude*, *magna cum laude*, and *summa cum laude*. Honors earned will be recorded on each student's diploma.

The College also awards Provost's Honors to students who complete four consecutive quarters of at least twelve units with a grade-point average of 3.5 or better.

**Phi Beta Kappa Society** The Phi Beta Kappa Society is a national honorary society, originally founded at the College of William and Mary in 1776, in which membership is conferred for high scholastic standing. Membership is determined by vote of the chapter according to students' scholarship records. Third College students are advised that among the minimum requirements for election to this society are the demonstration of knowledge of a foreign language and a college level quantitative science such as mathematics.



**The General Education Requirements** The general education course requirements of Third College are designed to introduce students to the academic focus of Third College as well as to provide a foundation of knowledge from which Third College students may pursue any of the many departmental and interdisciplinary majors offered at UC San Diego.

Students must complete one of the following programs:

<b>Program A</b>	<b>Program B</b>
1 quarter composition	1 quarter composition
2 quarters mathematics	2 quarters mathematics
3 quarters natural science covering biology, chemistry and physics	3 quarters natural science covering biology, chemistry and physics
3 quarters third world studies	3-quarter courses consisting of one course each of communications third world studies urban and rural studies
3 quarters urban and rural studies	
2 quarters communications	3-quarter sequence in any social science or humanities and arts discipline (including foreign language but not studio courses)

**Minor** Third College offers an optional minor program which consists of six interrelated four-unit courses (usually in a single discipline). A minimum of three courses must be upper-division level. Courses toward the minor must be taken on a letter-grade basis. A formal request must be made to the Academic Advising Office and the appropriate department or program.

**Language** Third College does not require proficiency in a foreign language as a condition for graduation. However, a given major may require one or more foreign languages. Students should ascertain which foreign language(s), if any, are required for their chosen majors by consulting major programs under the respective departments of instruction. (See "Courses, Curricula, and Programs of Instruction" in this catalog.)

**Transfer Students** Transfer students accepted by Third College will, in general, be held to the lower-division general education requirements and to the

lower-division prerequisites for a major. The general education requirements, however, will be interpreted rigorously only for those subjects that are directly related to the student's proposed major. The academic adviser, in consultation with appropriate departments, will evaluate the credentials of each transfer student on an individual basis.

In order to transfer to Third College from another college or school within the University of California, a student will be required to have a C (2.0) average or better on all work attempted at any University of California campus. (See "Admission to the University: Advanced Standing".)

**The Majors** Third College students may major in any of the departmental or interdisciplinary majors offered at UC San Diego. For further information and specific details on majors, students should refer to "Courses, Curricula, and Programs of Instruction".

## The Faculty of Third College

Name	Title	Department
Anderson, Alonzo B., Ph.D.	Assistant Professor	Psychology
Arneson, Richard J., Ph.D.	Assistant Professor	Philosophy
Bellman, Beryl L., Ph.D.	Assistant Professor	Sociology
Blanco, Carlos, Ph.D.	Professor	Literature
Blumberg, Rae Lesser, Ph.D.	Acting Associate Professor	Sociology
Brown, Willie C., Ph.D.	Associate Professor	Biology
Chung, Sandra L., Ph.D.	Assistant Professor	Linguistics
Dublin, Thomas, Ph.D.	Assistant Professor	History
Engle, Robert F., Ph.D.	Professor	Economics
Enright, Thomas J., Ph.D.	Assistant Professor	Mathematics
Evans, Ronald J., Ph.D.	Assistant Professor	Mathematics
Fortes, P. A. George, M.D., Ph.D.	Assistant Professor	Biology
Frazer, William R., Ph.D.	Professor	Physics
Garst, Michael E., Ph.D.	Assistant Professor	Chemistry
Gough, David A., Ph.D.	Assistant Professor	AMES
Haff, Leonard R., Ph.D.	Assistant Professor	Mathematics
Harper, Elvin, Ph.D.	Associate Professor	Chemistry
Heifetz, Robert J., Ph.D.	Associate Professor	Urban and Rural Studies Program
Helinski, Donald R., Ph.D.	Professor	Biology
Helton, John, Ph.D.	Professor	Mathematics
Hu, Te C., Ph.D.	Professor	APIS
Huerta, Jorge A., Ph.D.	Assistant Professor	Drama

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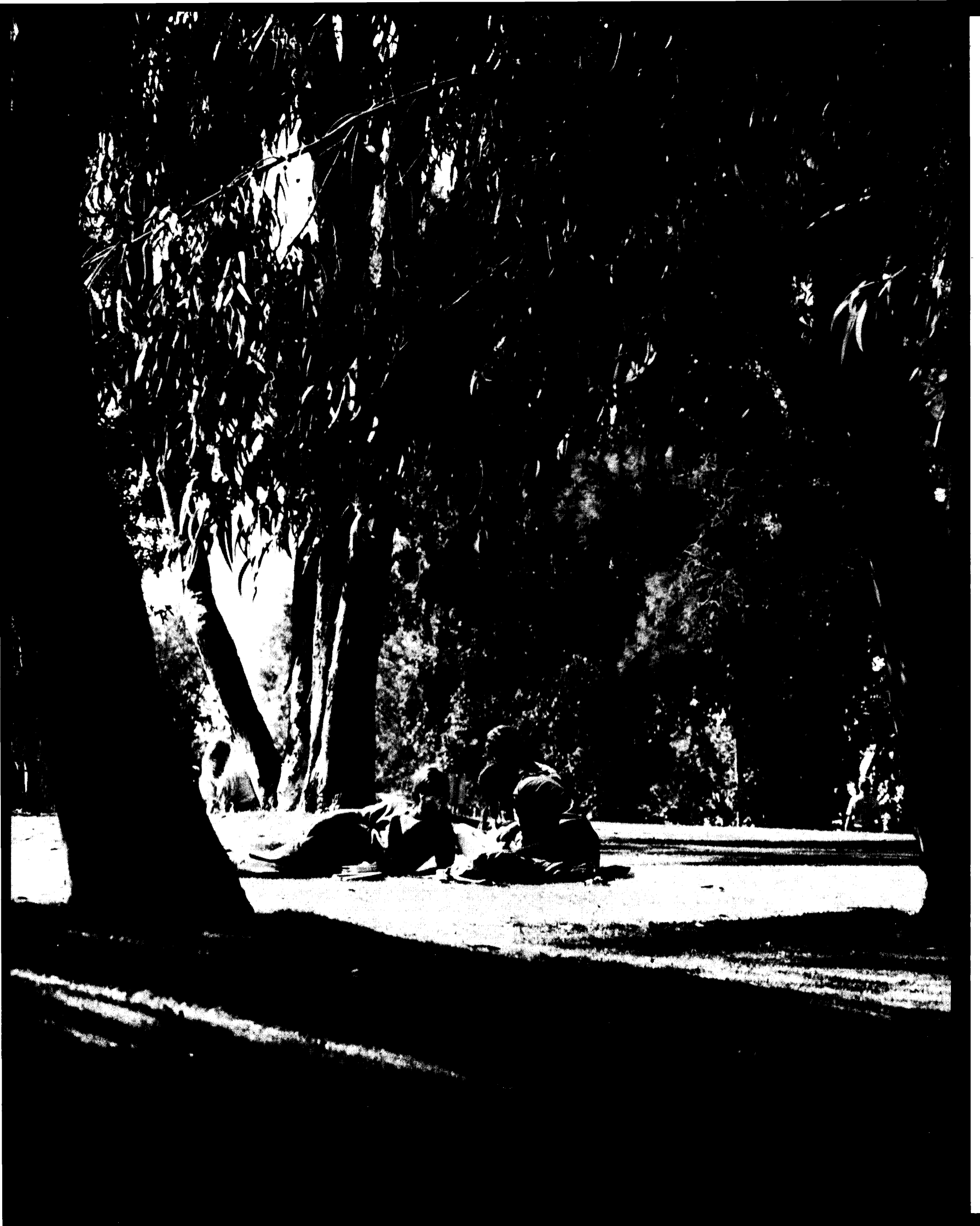
**The Faculty of Third College** *continued*

Justus, Joyce E., Ph.D.	Lecturer with Security of Employment	Anthropology
Kristan, William B., Jr., Ph.D.	Assistant Professor	Biology
Laitin, David D., Ph.D.	Assistant Professor	Political Science
Leong, John, Ph.D.	Assistant Professor	Chemistry
Lilien, David M., Ph.D.	Assistant Professor	Economics
Lindenberg, Katja, Ph.D.	Associate Professor	Chemistry
Luco, Juan, Ph.D.	Associate Professor	AMES
Lumpkin, Oscar, Ph.D.	Assistant Professor	Physics
Lytle, Cecil W., B.S.	Assistant Professor	Music
McMorris, Trevor C., Ph.D.	Professor	Chemistry
Mehan, Hugh B., Jr., Ph.D.	Assistant Professor	Sociology
Mukerji, Chandra, Ph.D.	Assistant Professor	Sociology
Newport, Elissa L., Ph.D.	Assistant Professor	Psychology
Penn, Nolan E., Ph.D.	Professor	Psychiatry
Piñon, Ramon, Jr., Ph.D.	Assistant Professor	Biology
Popkin, Samuel L., Ph.D.	Associate Professor	Political Science
Real, Michael R., Ph.D.	Assistant Professor	Communications Program
Reynolds, Edward, Ph.D.	Associate Professor	History
Romo, Ricardo, Ph.D.	Assistant Professor	History
Sanchez, Martha E., Ph.D.	Assistant Professor	Literature
Sanchez, Rosaura, Ph.D.	Assistant Professor	Literature
Schiller, Herbert I., Ph.D.	Professor	Communications Program
Schultz, Sheldon, Ph.D.	Professor	Physics
Sebald, Anthony, Ph.D.	Assistant Professor	AMES
Simon, Melvin I., Ph.D.	Professor	Biology
Sites, Richard L., Ph.D.	Assistant Professor	APIS
Solis, Faustina, M.S.W.	Associate Professor	Community Medicine
Sollors, Werner M., Ph.D.	Assistant Professor	Literature
Stern, Herbert, Ph.D.	Professor	Biology
Thiess, Frank B., Ph.D.	Lecturer with Security of Employment	Mathematics
Thomas, Charles W., II, Ph.D.	Professor	Urban and Rural Studies Program
Tolbert, Emory J., Ph.D.	Assistant Professor	History
Waisman, Carlos H., Ph.D.	Assistant Professor	Sociology
Watson, Joseph W., Ph.D.	Associate Professor, Provost of Third College	Chemistry
Williams, Sherley, M.A.	Associate Professor	Literature
Wiseman, Jacqueline P., Ph.D.	Professor	Sociology
Wulbert, Daniel E., Ph.D.	Associate Professor	Mathematics
Wynter, Sylvia, M.A.	Professor	Literature
Yguerabide, Juan, Ph.D.	Associate Professor	Biology
	* * *	
Bender, Gerald J., Ph.D.	Acting Assistant Professor	Political Science

Coughran, Edward H., B.A. Cunningham, J. Barry, M.A.	Lecturer Associate Supervisor	Mathematics Physical Education
Douglass, John H., Ph.D.	Supervisor	Physical Education
Ezell, S. Dean, Jr., Ph.D.	Lecturer	Biology
Fenner-Lopez, Claudio, M.A. Fimbres, Gloria	Lecturer Supervisor of Teacher Education	Visual Arts Teacher Education Program
Lawrence-Wallace, Cynthia, B.S.	Supervisor of Teacher Education	Teacher Education Program
Marshall, Margaret C., M.F.A.	Assistant Supervisor	Physical Education
Miller, Terrence C., M.S.	Acting Assistant Professor	APIS
Moss, Robert C., Jr., B.A.	Assistant Supervisor	Physical Education
Ngubo, Olive P., M.S.W.	Supervisor of Field Placement	Urban and Rural Studies Program
Obeyesekere, Ranjini, Ph.D.	Lecturer	Literature
Porter, Diane R., B.A.	Lecturer	Visual Arts
Shore, Herbert B., Ph.D. Somero, Meredith G., Ph.D. Souviney, Randall J., M.A.	Associate Adjunct Professor Lecturer Supervisor of Teacher Education	Physics Biology Teacher Education
Stavrianos, Leften S., Ph.D. Sullivan, Daniel M.	Adjunct Professor Lecturer	History Visual Arts

**Honorary Fellow of the College**

Ernesto Galarza, *Novelist and Educator*







## Earl Warren College

Earl Warren College, the newest undergraduate college at the University of California, San Diego, enrolled its first students in the fall of 1974. Growing to a maximum of two thousand students, it is designed to provide the best of both worlds: the resources of a university with a strong tradition of academic excellence and the sense of belonging to a smaller community.

During the summer of 1977 the College was officially named after Earl Warren, former Chief Justice of the United States Supreme Court and the only three-time Governor of California. Mr. Warren, a native Californian, put himself through college and law school at the University of California (B.L. 1912; J.D. 1914). He also served as an ex-officio UC Regent for eleven years during his gubernatorial terms. Warren served as District Attorney of Alameda County, and later was Attorney General of California. He was governor during an era of lightning growth for California. He developed the State Department of Mental Hygiene and led a reform of the prison system in California by establishing the Board of Corrections and the Prisoner Rehabilitation Act. As governor, he had to see the government services were provided each week to what amounted to a

"new city of 10,000," including schooling for five hundred new young Californians every week. Under Chief Justice Warren, the Supreme Court elaborated a doctrine of fairness in such areas as criminal justice, voting rights, legislative districting, employment, housing, transportation and education.

Earl Warren College should be of particular interest to students who wish to study a field or subject in depth. The general education program of the College is designed to provide each student with a maximum of flexibility. Under all circumstances it provides the student with necessary skills and the breadth of learning characteristic of a university education.

The College's students and faculty represent all disciplines offered at UC San Diego. Graduation requirements consist predominantly of one major and two minor areas of study which enable a student to develop a program of study covering a wide range of material while focusing in on a few particular areas. The diversity of our academic program has made Warren College an exciting home for lively and stimulating intellectual discourse.

In an effort to enhance the academic and intellectual development of its students, the College is committed to preparation for the post-baccalaureate years. Whether students wish to continue their education in graduate or professional school, seek out an immediate career, or pursue other options, the College stands

ready to assist. Realizing the importance of future planning, the College has developed an active life/career planning program. Students are encouraged to identify their abilities and interests, examine career possibilities, and prepare for the future. The College's Academic Internship Program has been developed on the conviction that quality education results from a combination of classroom theory and practical experience. All Warren College students have the option of undertaking an off-campus assignment working full or part time for a public or private organization. Placements match each student's major area of academic study with a sponsoring organization. A Warren College student may enroll in the program for a maximum of sixteen units. It is the intention of the Academic Internship Program that students have the opportunity to observe and participate in a variety of organizational activities.

The Internship Program is national in scope and varied in offerings. Students might work for a senator in Washington, a conservation group in San Francisco, a legal aid office in Los Angeles, a business in San Diego or any number of other possibilities. Efforts will always be made to develop new placements, based on a student's unique interests.

Warren College and the School of Medicine have developed a joint pre-medical program which is scheduled to begin in the fall of 1978. Selection of



students for this program, sponsored by an award from the Commonwealth Fund, will occur after the freshman year. Information regarding the program will be available in the fall.

## The Graduation Requirements

To receive a Bachelor of Arts degree from 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 below.
3. Attain a C average (2.0) or better in all work attempted at the University of California.
4. Satisfy the College residency requirement that nine of the last eleven courses passed must be taken as a student in the College.
5. Pass forty-five four-unit academic courses or their equivalent (180 units).

To receive a Bachelor of Science degree from Warren College a student must comply with requirements 1 through 4 above. Additionally, the total number of courses must be forty-eight (192 units) of which fifteen must be upper-division courses in the major. Presently the Bachelor of Science degree is offered only in the following engineering programs: chemical engineering, engineering physics, engineering science, computer engineering and electrical engineering.

Students who transfer to Warren College from other institutions must complete the graduation requirements of the College. In order to determine which courses may be applied to the graduation requirements, the Office of the Provost will make an evaluation of prior work for each student at the time of his or her first enrollment.

## The General Education Requirements

The faculty of the College, in planning the College program sought to impose a minimum number of explicit course requirements on students of the College. This plan stemmed from a firm conviction that each student should have the opportunity to develop a program best suited to his or her own interests, and carries with it a commitment from the faculty and staff of the College to provide extensive advising concerning individual academic programs and their possible career implications. Warren College students work within the following academic plan:

1. Each student must complete a two-course sequence in writing and a two-course sequence in a subject which requires formal or algorithmic reasoning. Warren College 10A,B, the required writ-

ing sequence, is normally taken in the freshman year. The courses aim primarily at helping the student discover his or her authentic voice in writing, and then at building on that base an increasingly conscious control of language. The sequence is intended to move from free writing through narrative to writing of a structural and critical complexity comparable to that of the college essay. The student's own ideas, experiences, and social environment, along with a reading list in 10B, are the subject matter for writing in the course. The classes are small; they are taught in workshop style, devoting most of their time to the discussion of student papers. Ideally, each class should work at becoming an audience of increasingly competent critics whose ideas and suggestions enable its members to become skilled writers. Students who must complete the Subject A requirement will do so with this sequence. Subjects which can be taken to satisfy the formal skills requirement are: two courses in calculus, computer science or symbolic logic.

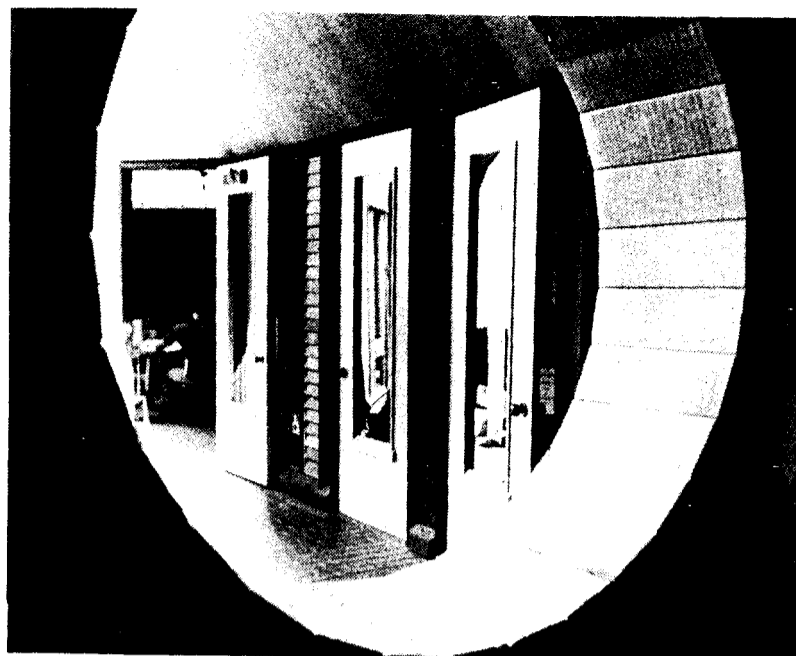
- Each student will complete a major. Warren College students may attempt any major offered at UC San Diego. Each department determines the courses required for its major; generally this will be a set of twelve to eighteen upper-division courses. In addition, most majors require a certain amount of introductory course work and the beginning student is urged to plan his or her program to permit a wide choice of major fields. For example, calculus or a foreign language is required for a significant number of majors; a student who takes neither of these subjects excludes all these majors from further consideration.

Students in good academic standing may be permitted to double major. Students must secure approval by petition from the appropriate departmental advisers and the College provost. Students must fulfill the requirements (prerequisites and upper-division courses) of both majors. Additional criteria established by Academic Senate must also be met.

- In addition to a major, each Warren College student must complete two programs of concentration ("minors"). Each program of concentration is designed to acquaint the student with two subjects other than the major. Thus, programs of concentration using courses from the major department, are rarely, if ever, possible.

Each department offers one or more programs of concentration. Each program of concentration is a focused collection of six courses. A typical program of concentration will consist of lower-division coursework which serves as an introduction to the discipline (e.g., Economics 1A-B-C) followed by upper-division advanced work in the specified area of study (e.g., macroeconomics).

At least one of the programs of concentration a



student completes must be non-contiguous; that is, in a discipline area outside that of the major. The discipline areas are 1) humanities and fine arts, 2) natural sciences, and 3) social sciences. A mathematics major could have one program of concentration in a related area, e.g. computer science, and one in some other discipline area, e.g. economics or literature.

For students who double major in two subjects that are non-contiguous (e.g., biology and literature), no additional programs of concentration will be required. For students who pursue two majors that are contiguous (e.g. psychology and economics), one non-contiguous minor will be required.

A detailed list of the College's programs of concentration is available in the Office of the Provost.

**Honors** Warren College will award College Honors with the bachelor's degree to students with a superior overall grade-point average at graduation. The honors designations are *cum laude*, *magna cum laude*, *summa cum laude*. To be eligible for College Honors, a student must have completed at least twenty (20) courses (eighty [80] quarter units) for a letter grade in the University of California. Honors earned will be recorded on each student's diploma.

Several of the major departments have established honors programs of intensive study for highly motivated students. The criteria for such honors are described in the departmental section of the catalog.

**Phi Beta Kappa Society.** The Phi Beta Kappa Society is a national honorary society, originally founded at the College of William and Mary in 1776, in which membership is conferred for high scholastic standing. Membership is determined by vote of the chapter according to students' scholarship records. Warren students are advised that among the minimum requirements for election to this society are the demonstration of knowledge of a foreign language and a college level quantitative science, such as mathematics.

## The Faculty of Warren College

NAME	TITLE	DEPARTMENT
Anagnostopoulos, Georgios H., Ph.D.	Associate Professor	Philosophy
Baker, Bruce S., Ph.D.	Assistant Professor	Biology
Berg, Darwin K., Ph.D.	Assistant Professor	Biology
Brooks, William F., Ph.D.	Assistant Professor	Music
Bunch, James R., Ph.D.	Associate Professor	Mathematics
Burkhard, Walter A., Ph.D.	Assistant Professor	APIS
Carpenter, Adelaide T., Ph.D.	Assistant Professor	Biology
Comisso, Ellen T., Ph.D.	Assistant Professor	Political Science
Corrigan, Mary K., M.A.	Associate Professor	Drama
Cowhey, Peter F., Ph.D.	Assistant Professor	Political Science
Crawford, Vincent P., Ph.D.	Assistant Professor	Economics
D'Andrade, Roy G., Ph.D.	Professor	Anthropology
Davis, Fred, Ph.D.	Professor	Sociology
Deak, Frantisek J., Ph.D.	Assistant Professor	Drama
DeLuca, Marlene A., Ph.D.	Associate Professor-in-Residence	Chemistry
Dryden, Deborah M., Ph.D.	Assistant Professor	Drama
Farrell, Peter, M.M.	Professor	Music
Fredman, Michael L., Ph.D.	Associate Professor	APIS
Granger, Clive W. J., Ph.D.	Professor	Economics
Holland, John J., Ph.D.	Professor	Biology
Hughes, Judith M., Ph.D.	Associate Professor	History
Kaur, Madlyn M., Ph.D.	Acting Professor	Visual Arts
Kaprow, Allan, M.A.	Professor	Visual Arts
Kernell, Samuel H., Ph.D.	Acting Associate Professor	Political Science
Kerr, Norbert L., Ph.D.	Assistant Professor	Psychology
Kyte, Jack E., Ph.D.	Assistant Professor	Chemistry
Lakoff, Sanford A., Ph.D.	Professor	Political Science
Langdon, Margaret H., Ph.D.	Associate Professor	Linguistics
Lawder, Standish, Ph.D.	Associate Professor	Visual Arts
Lugannani, Robert, Ph.D.	Professor	APIS
Luker, Kristin, Ph.D.	Assistant Professor	Sociology
Magde, Douglas, Ph.D.	Assistant Professor	Chemistry
Martinez, Ronald L., Ph.D.	Assistant Professor	Literature
Milstein, Laurence B., Ph.D.	Assistant Professor	APIS
Munk, Walter, Ph.D.	Professor	SIO
Nee, Thomas B., M.A.	Professor	Music
Nesbitt, Muriel, Ph.D.	Associate Professor	Biology
Nodelman, Sheldon A., Ph.D.	Associate Professor	Visual Arts
O'Neil, Thomas M., Ph.D.	Professor	Physics
Perlmutter, David M., Ph.D.	Professor	Linguistics
Pomeroy, Earl, Ph.D.	Professor	History

Rappaport, Armin, Ph.D.	Professor	History
Ringrose, David R., Ph.D.	Associate Professor	History
Rudee, M. Lea, Ph.D.	Professor, Provost of Warren College	APIS
Schneider, Alan M., Sc.D.	Professor	AMES
Selverston, Allen I., Ph.D.	Associate Professor	Biology
Sham, Lu Jeu, Ph.D.	Professor	Physics
Shirk, Susan L., Ph.D.	Assistant Professor	Political Science
Smallwood, Dennis E., Ph.D.	Associate Professor	Economics
Taylor, Julie M., Ph.D.	Assistant Professor	Anthropology
Trangenstein, John A., Ph.D.	Assistant Professor	Mathematics
Wadsworth, Adrian R., Ph.D.	Assistant Professor	Mathematics
Wills, Christopher J., Ph.D.	Associate Professor	Biology
York, Herbert F., Ph.D.	Professor	Physics
Dann, Diana E., M.S.	Assistant Supervisor	Physical Education
*****		
Kobayashi, Bert N., Ph.D.	Supervisor	Physical Education
Sweet, Judith, M.S.	Assistant Supervisor	Physical Education

		REVELLE COLLEGE	MUIR COLLEGE	THIRD COLLEGE		WARREN COLLEGE
				Program A	Program B	
LOWER DIVISION	Required Subjects	MATHEMATICS 3 CHEMISTRY 2 PHYSICS 2 BIOLOGY 1 FOREIGN LANGUAGE 3+ HUMANITIES (with composition) 3 (+3 courses is average to attain proficiency) Total 14	WRITING 1-3  Total 1-3	MATHEMATICS 2 SCIENCE 3 URBAN AND RURAL STUDIES 3 THIRD WORLD STUDIES 3 COMMUNICATIONS 2 COMPOSITION 1 Total 14	MATHEMATICS 2 SCIENCE 3 URBAN AND RURAL STUDIES 1 THIRD WORLD STUDIES 1 COMMUNICATIONS 1 COMPOSITION 1 Total 9	WRITING FORMAL SKILLS (Mathematics, Computer Science, or Symbolic Logic) 2  Total 4
	Restricted Electives	FINE ARTS 1 SOCIAL SCIENCE 3 Additional SOCIAL SCIENCE or HUMANITIES 3 Total 7	1 year in each of 2 subjects from among: FINE ARTS HUMANITIES FOREIGN LANGUAGE AND 1 year in each of 2 subjects from among: SOCIAL SCIENCE NATURAL SCIENCE MATHEMATICAL SCIENCE Total 12	0	Any one-year (3-quarter) sequence in one of the: FINE ARTS (not studio or performance) HUMANITIES SOCIAL SCIENCES or a FOREIGN LANGUAGE Total 3	PREPARATION FOR 2 MINORS
	Free Elect.	3*	9-11*	10*	12*	14*
UPPER DIVISION	MAJOR	12-15	12-15	12-15	12-15	12-15
	MINOR	One required, non-contiguous 3-6	Optional	Optional	Optional	Two required, one non-contiguous 6-12
	FREE ELECT.	3-9*	9-12*	9-12*	9-12*	0-6*
No. courses required		46	45	45	45	45
NOTE: Engineering programs (for which the BA or BS is granted in Third and Warren and the BA only in Revelle and Muir) require 48 courses for graduation.						

**COMPARISON OF GRADUATION REQUIREMENTS IN THE COLLEGES OF UC SAN DIEGO**

The numbers in this chart stand for the numbers of COURSES in each category. Each course carries four quarter units of credit. Numbers marked with an asterisk (\*) indicate how many free electives are available to the student who takes 48 courses; those who choose to take fewer (say 45 or 46) will have correspondingly fewer free electives.



# Undergraduate Admissions, Policies and Procedures



All communications concerning undergraduate admission should be addressed to the Office of Admissions, 102 Administrative Complex, University of California, San Diego, La Jolla, California 92093.

## Definitions

**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 collegiate level institution.

**An Advanced-Standing Applicant:** A high school graduate who has been a registered student in another college or university or in college-level extension classes other than a summer session immediately following high school graduation. An advanced-standing applicant may not disregard his or her college record and apply for admission as a freshman.

**Advanced-Standing Credit:** Credit which an undergraduate student earns 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 advanced-standing credit is determined by the Office of Admissions.

**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.

**A Foreign Applicant:** A student claiming citizenship in another country.

## Undergraduate Colleges and Majors

In the preceding chapter, which describes the educational philosophies of the four colleges at UC San Diego, you will find information concerning some of the programs offered by each college. It is very important that you read the preceding chapter carefully, and that

you decide which of the colleges is the right one for you. Although you may still be uncertain about your major, your application for admission must include the name of the college with which you plan to affiliate.

The listing below shows the names of undergraduate major programs listed alphabetically in this catalog in capitals; the lower-case subheads are the available concentrations within these programs or the general terms to help you locate a major in your desired field of study.

### ANTHROPOLOGY

### APPLIED MECHANICS AND ENGINEERING SCIENCE (AMES)

- Applied Mechanics
- Bioengineering
  - Bioengineering with engineering emphasis
  - Bioengineering with premedical emphasis
- Chemical Engineering
- Engineering Sciences
- Systems Science

### APPLIED PHYSICS AND INFORMATION SCIENCE (APIS)

- Applied Physics
  - Acoustics
  - Electronics
  - Optics
  - Solid State
- Computer Engineering
- Computer Science
- Electrical Engineering
  - Communication Systems
  - Electronics
  - Systems and Control
- Engineering Physics
- Information Science
  - Communication Systems
  - Electronics
  - Systems and Control

Art—see VISUAL ARTS

Biochemistry—see BIOLOGY, CHEMISTRY

Bioengineering—see AMES

### BIOLOGY

- Biochemistry

## Undergraduate Admissions

Biology  
Cell Biology  
Genetics  
Human Biology  
Microbiology  
Physiology  
Population Biology

Biophysics—see PHYSICS

### CHEMISTRY

Biochemistry  
Chemical Physics  
Chemistry  
Earth Sciences/Chemistry

### CHICANO STUDIES

Chicano Studies - History  
Chicano Studies - Literature  
Chicano Studies - Political Science  
Chicano Studies - Sociology

### CHINESE STUDIES

### CLASSICAL STUDIES

### COMMUNICATIONS

Communications - Sociology  
Communications - Visual Arts

Computers—see APIS

### DRAMA

EARTH SCIENCES—see also CHEMISTRY or PHYSICS

### ECONOMICS

Economics  
Management Science

Education—see Footnote 1

Engineering—see AMES, APIS

English—see LITERATURE

French—see LITERATURE

Geology—see EARTH SCIENCES

German—see LITERATURE

### HISTORY

European History  
Nonwestern History (Africa and Asia)  
Western Hemisphere History (United States and Latin America)

Information Science—see APIS

Languages—see LITERATURE

### LINGUISTICS

### LITERATURE

English-American  
French  
General Literature  
German  
Literature and Society  
Literature/Writing  
Russian  
Spanish

Management Science—see ECONOMICS

### MATHEMATICS

### MUSIC

### MUSIC/HUMANITIES

### PHILOSOPHY

### PHYSICS

Biophysics  
Biophysics with premedical emphasis  
Earth Sciences/Physics  
Physics

### POLITICAL SCIENCE

Pre-Law—see Footnote 2

Pre-Medical—see Footnote 3

### PSYCHOLOGY

Russian—see LITERATURE

### SOCIOLOGY

Spanish—see LITERATURE

Systems Science—see AMES

Teacher Education Program—see Footnote 1

### THIRD WORLD STUDIES

### URBAN AND RURAL STUDIES

### VISUAL ARTS

Art History/Criticism  
Studio

FOOTNOTE 1. To become a teacher in California, you must major NOT in education but in an academic subject or group of subjects, while at the same time taking special courses related to educational topics. UC San Diego offers a program leading to a preliminary Multiple Subjects credential within the framework of academic departments; there is no separate department of education. The main themes of the program are multicultural and child-centered education. To obtain a lifetime credential in California, the teacher must complete a fifth year of college within five years of receiving the B.A. degree and teach successfully, full time, for two years. (see "Teacher Education Program" for more information.)

FOOTNOTE 2. Law schools do not require any particular major; they require evidence of good performance in demanding subjects. Economics, history, literature, sociology, philosophy, psychology, engineering, etc., are all appropriate majors to pursue for this purpose.

FOOTNOTE 3. As with law schools, schools of medicine do not require a particular major, but they do want solid backgrounds in chemistry, mathematics, physics, and biology. Especially recommended as premedical programs are: AMES (bioengineering), biology, chemistry, physics.

## Undergraduate Admissions

The University's 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. 3. Standardized aptitude tests provide a broad base for comparison, and mitigate the effects of differing grading practices.

NOTE: The admission requirements discussed here are for students applying for fall, 1979, and thereafter.



Those considering earlier entry (winter or spring, 1979) will be admitted according to slightly different rules, which are set forth in the admissions packet for the academic year 1978-79.

## Admission as a Freshman Applicant

The University defines a "freshman applicant" as a student who has graduated from high school but who has not enrolled since then in a regular session in any collegiate-level institution. This does not include attendance at a summer session immediately following high school graduation. If this definition does not apply to you, you must meet the requirements for admission as an advanced-standing student.

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.

If you are not a resident of California you must also meet certain additional requirements that are discussed in the following pages. As a nonresident applicant you must show exceptional academic promise in order to qualify for admission.

**High School Diploma Requirement** You must have a diploma from a high school in order to enter the University as a freshman. The Certificate of Proficiency, awarded by the State of Department of Education upon successful completion of the High School Proficiency Examination, will be accepted in lieu of the regular high school diploma. Subject, scholarship, and examination requirements discussed below must also be met.

**Subject Requirement** You must complete certain high school subjects with at least a grade of C in each semester of each course. (Counselors often refer to these subjects as the "a to f" list. See list below.) If you are a graduate of a California high school, these courses must appear on a list that your high school principal has certified will meet the course descriptions below, and that he or she has placed on file with the University. Any of these "a to f" courses may be used to satisfy the admission requirements even if they are taken prior to the tenth grade, so long as your high school gives you credit for them. The one exception is that in order to meet the "d" requirement below, courses in laboratory science must be taken after completion of the ninth grade.

Courses taken in high school summer programs are considered as belonging to the following school year. For example, a summer school course taken after completion of the ninth grade is considered a tenth-grade course.

If you are a graduate of an out-of-state high school, the Office of Admissions will determine which of your courses are equivalent to those in the following list:

### Subject Requirements ("a to f")

- a. History 1 year  
One year of United States history, or one-half year of United States history and one-half year of civics or American government, whichever combination has the higher grade.
- b. English 3 years (4 years, beginning with applicants for fall 1981)  
Three years of English composition and/or literature, university preparatory in nature. Not more than one course will be accepted from the ninth grade. Check with your counselor for a complete list.
- c. Mathematics 2 years  
Two years of mathematics — elementary algebra, geometry, intermediate and advanced algebra, trigonometry, calculus, elementary functions, matrix algebra, probability, statistics, or courses combining these subjects. Nonacademic courses such as arithmetic and business mathematics may not be used.
- d. Laboratory Science 1 year  
A year course in one laboratory science, taken in the tenth, eleventh, or twelfth grade.
- e. Foreign Language 2 years  
Two years of one foreign language. Any foreign language with a written literature may be used.
- f. Advanced Course 1 or 2 years  
This requirement must be satisfied by one of the following:
  - Mathematics  
A total of one year of advanced mathematics — intermediate algebra, trigonometry, or other comparable mathematics courses.
  - Foreign Language  
Either an additional year in the same language used for "e" above or two years of a second foreign language.
  - Science  
A year course in any laboratory science completed in addition to the laboratory science used for "d" above.
  - Elective Courses  
Although the ten to eleven units listed above are the only courses used in computing the grade-point average, a total of fifteen high school units is required for admission to the University. (A year course in high school is equivalent to one unit.) The remaining units provide an excellent opportunity for you to broaden your preparation for university work by taking elective courses in areas other than those in which you have concentrated, and by going beyond the minimum work in required areas of study.

**Scholarship Requirement** You must earn at least a C in each of the required courses. In addition, your grade-point average (GPA) must be high enough to make you eligible when the GPA is considered along with the score on your chosen aptitude test. (See *Examination Requirement* below, with the Table of Grade-Point Averages and Corresponding Required Test Scores.)

Approved "a to f" courses taken before the tenth grade apply to the Subject Requirement, but are not used in figuring the GPA for the Scholarship Requirement. This GPA is based only upon those of the required "a to f" courses taken in grades ten, eleven, and twelve. If you have gone beyond the minimum requirements in one or more of these subjects, only the best grades will be used. For example, if you have more than the required two years in mathematics (which is an excellent idea!), only the two best years will be used in the calculation. The same is true in the other required subjects.

Your grades will be considered by the University exactly as shown on your official transcript, with no extra weight given to courses bearing such labels as "advanced," "accelerated," or "honors." Any weighing of this sort must be done by the high school.

Grades are counted on a semester basis, unless your high school records only year grades. You may repeat up to two semesters of courses in which you received a grade of D or lower, so as to meet the subject and scholarship requirements. When you have repeated a course, the original D or F is not included in figuring the GPA, but the final grade will not be counted higher than C. If the D or F was earned before the ninth grade, the repeated course will be treated as if you were taking it for the first time.

**Examination Requirement** All freshman applicants must submit scores from the test pattern listed below. This requirement also applies to advanced-standing applicants with fewer than twelve quarter or semester units of transferable college credit. If you are applying for admission to the fall quarter, you should take the tests as soon as possible. The following tests are required:

1. One aptitude test — Either:
  - A. The Scholastic Aptitude Test (SAT); total score; OR
  - B. The American College Test (ACT); composite score.
2. Three Achievement Tests (College Entrance Examination Board), which must include: (A) English composition; (B) Mathematics (level 1 or 2); and (C) One from among the social studies or the foreign languages. These achievement tests do not affect admission, but are used for guidance and placement.

If tests are repeated, the University will accept the highest score received. If you take the SAT, both the

mathematical and verbal scores must be from the same sitting.

If you make a perfect score on the SAT (1600) or the ACT (35), you need a GPA of only 2.78 to be eligible for admission. On the other hand, if you are a resident of California and have a GPA of 3.30 or better, you are eligible even if the test score is at the very bottom. Out-of-state students must have a GPA of 3.40 or better. And the tests must be taken by every applicant — even those with a GPA of 4.00.

Between these extremes, the following table is used. If you know your GPA (using the best grades earned in grades ten, eleven, and twelve to meet minimum requirements in the "a to f" pattern), the table will show the required test score; conversely, if you know your SAT total or your ACT composite, the table will show the required GPA.

**Admission by Examination Alone** If you do not meet the scholarship and subject requirements for admission, you can qualify for admission as a freshman by examination alone. To do so, you must take the SAT and the three Achievement Tests discussed above but must earn higher scores. The required total score on the Scholastic Aptitude Test is 1,100, and you must earn at least 500 on each Achievement Test. If you are a California applicant, your total score on the three Achievement Tests must be 1,650 or higher. If you are a nonresident applicant, your total score on the three Achievement Tests must be 1,730 or higher.

See your counselor to make arrangements to take the required tests or, for SAT information, write to Educational Testing Service, P.O. Box 592, Princeton, New Jersey 08540. For ACT information, write to ACT program, P.O. Box 168, Iowa City, Iowa 52240. Your test scores will be regarded as official only if they are reported directly to the Admissions Office by the Educational Testing Service. The testing schedule is listed below:

#### SAT TEST DATES

14 October, 1978	SAT only (Calif., Fla., N.Y., and Texas only)
4 November, 1978	SAT and Achievement
2 December, 1978	SAT and Achievement
27 January, 1979	SAT and Achievement
31 March, 1979	SAT only
5 May, 1979	SAT and Achievement
2 June, 1979	SAT and Achievement

#### ACT TEST DATES

21 October 1978
9 December 1978
10 February 1979
7 April 1979
23 June 1979

Applicants should arrange to take the tests as early as possible so that the scores can be reported in time to be considered for admission.

**TABLE OF GRADE-POINT AVERAGES and CORRESPONDING REQUIRED TEST SCORES**

A-F GPA	ACT* COMPOSITE	SAT** TOTAL	A-F GPA	ACT* COMPOSITE	SAT** TOTAL
2.78	35	1600	3.04	23	990
2.79	35	1580	3.05	22	970
2.80	34	1550	3.06	21	950
2.81	34	1530	3.07	21	920
2.82	33	1510	3.08	20	900
2.83	33	1480	3.09	19	880
2.84	33	1460	3.10	18	850
2.85	32	1440	3.11	18	830
2.86	32	1410	3.12	17	810
2.87	32	1390	3.13	16	780
2.88	31	1370	3.14	15	760
2.89	31	1340	3.15	14	740
2.90	30	1320	3.16	14	710
2.91	30	1300	3.17	13	690
2.92	29	1270	3.18	12	670
2.93	29	1250	3.19	11	640
2.94	28	1230	3.20	10	620
2.95	28	1200	3.21	9	600
2.96	27	1180	3.22	9	570
2.97	27	1160	3.23	8	550
2.98	26	1130	3.24	8	530
2.99	26	1110	3.25	7	500
3.00	25	1090	3.26	7	480
3.01	25	1060	3.27	6	460
3.02	24	1040	3.28	6	430
3.03	24	1020	3.29	5	410
			3.30	5	400

\* ACT is scored in intervals of 1 point from a minimum of 1 to 35 maximum.

\*\*SAT is scored in intervals of 10 points from a minimum of 400 to 1600 maximum.

## Admission as an Advanced-Standing Applicant

The University defines an "advanced-standing applicant" as a high school graduate who has been a registered student in another college or university or in college-level extension classes other than a summer session immediately following high school graduation. An advanced-standing applicant may not disregard his or her college record and apply for admission as a freshman.

**Scholarship Requirement** As you will see below, the requirements for admission in advanced standing vary according to your high school record. If you are a nonresident applicant, you must also meet the additional requirements described at the end of this section. If you have completed fewer than twelve quarter or semester units of transferable college credits since high school graduation, you must also satisfy the examination requirement for freshman applicants.

The transcript you submit from the last college you

attended must show, as a minimum, that you were in good standing and that you had earned a grade-point average of 2.0 or better. If your grade-point average fell below 2.0 at any one college you attended, you may have to meet additional requirements in order to qualify for admission.

As an advanced-standing applicant you must meet one of the following conditions:

1. If you were eligible for admission to the University as a freshman, you may be admitted in advanced standing any time after you have established an overall grade-point average of 2.0 or better in another college or university.
2. If you were not eligible for admission as a freshman only because you had not studied one or more of the required high school subjects, you may be admitted after you have:
  - a. Completed, with a grade of C or better, appropriate college courses in the high school subjects that you lacked, and

## Undergraduate Admissions

- b. Established an overall grade-point average of 2.0 or better in another college or university, and
- c. Completed twelve or more quarter or semester units of transferable college credit since high school graduation or have completed the pattern of tests required of freshman applicants.

Note: If you choose not to make up all of your subject deficiencies, you may become eligible by the provision which follows:

3. If you were ineligible for admission to the University as a freshman because of low scholarship or a combination of low scholarship and a lack of required subjects, you may be admitted after you have earned a grade-point average of 2.4 or better in at least eighty-four quarter units (fifty-six semester units) of college credit in courses accepted by the University for transfer. In addition, if you had omissions or grades below C in the high school "a to f" pattern, you must take appropriate courses in college so that no more than two such courses remain uncleared. In general, one semester of work in college is held equivalent to one year of that subject in high school. Transferable college courses may be used both to clear high school omissions **and** to provide college credit; non-transferable courses are often approved to clear the high school deficiencies but will not give college credit.

The requirements are the same for students who are not California residents except that the required college GPA is 2.8, for those who were eligible at the time of their high school graduation as well as for those who were not.

**Determining Your Grade-Point Average** Your grade-point average 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 up to a maximum of sixteen quarter units without penalty. Only the grade earned in the repeated course will be included in the grade-point average.

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, 4 points; B, 3 points; C 2 points; D, 1 point; and F, no points.

## Applicants from Foreign Countries

Admission regulations are basically the same for foreign students as for domestic students. It is recognized, however, that often a foreign student cannot fulfill all of the subject requirements although he or she will be expected to demonstrate adequate preparation for his or her chosen field. Only those applicants who

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

Courses at UC San Diego 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, and who have not previously studied in the United States or another English-speaking country, will be expected to take the *Test of English as a Foreign Language (TOEFL)* before coming to the U.S. Arrangements for taking this test may be made by writing to the Educational Testing Service, P.O. Box 899, Princeton, New Jersey 08540.

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. Foreign students whose command of English is slightly deficient will be required to take an English course, and therefore a reduced program. For this reason, foreign applicants are strongly advised to perfect their English before coming to the United States.

In addition to an adequate English language background, foreign students must have sufficient funds to cover all fees, living and other expenses, and transportation connected with their stay in the United States. They should bear in mind that expenses are likely to be heaviest at the beginning (see "Fees and Expenses").

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

## Additional Preparation for University Work

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 ten "Carnegie" units, while graduation from high school requires anywhere 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.

If you intend, for example, to major in any science, more than two years of mathematics is essential. A science major without a working knowledge of trigonometry and at least intermediate algebra is likely to be delayed in getting his or her degree. Science courses also are extremely useful, and if you are a prospective science major you should take as many as possible from among chemistry, physics, and biology, in that order of priority. In foreign languages, our two-year entrance requirement is just barely adequate to

get you started. So if you have any interest in language, or plan to enter a college program (undergraduate or graduate) that requires it, you should continue with the same language you have been studying.

For more detailed information on recommended high school courses, ask your counselor to show you a copy of the Universitywide publication *Prerequisites and Recommended Subjects*.

### Advanced Standing College Credit

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 post-secondary institutions, allowing you to take regular college courses while you are still in high school. These courses are accepted by the University exactly as they would be if you were a full-time college student.

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

**Advanced Placement** The Placement Examinations of the College Entrance Examination Board are taken, usually during the senior year, in conjunction with courses taken in high school. You will receive ten quarter units of University credit for most examinations in which you earn a score of 5, 4, or 3. These credits will apply toward the total required for graduation from the University.

**College Level Examination Program** Usually known as "CLEP," this program provides an opportunity for students to receive college credit for education they have gained in various nontraditional ways. The tests are administered by many colleges, as well as through military services. For each of the General Examination tests, with the exceptions of Mathematics and English, a score of 500 or better carries ten quarter units of University credit if you have no college work in that area. No credit is given for the math and English tests. Most of the Subject Examinations carry five units of credit for scores at or above the fiftieth percentile.

The local test center is at San Diego State University, Library East, 560, 5300 Campanile Drive, San Diego, California 92182. Candidates should apply to CEEB for information, but should direct their registration forms to the test center of their choice.

**Credit from Another College** The University gives unit credit to transfer students for courses they have taken at other 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.

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. A student may earn 105 quarter units (70 semester units) toward a University degree at a community college. Subject credit for courses taken in excess of those units will still be granted.

The transferability of units from California community colleges and all other post-secondary institutions proceeds as follows: (1) transferability of units is decided by the systemwide administration of the University of California, and these decisions are binding upon all UC campuses; (2) applicability of transferred units to breadth (general education) requirements is decided for each UC San Diego college by its provost; (3) applicability of units toward the major is decided by the appropriate UC San Diego department. Information about these matters may be obtained, before transfer, from the Office of Admissions and the Office of Relations with Schools at UC San Diego.

Students who have earned more than 135 quarter units before transfer should consult with the provost of the UC San Diego college they plan to enter.

### Admission Procedures

**Applying for admission** Application packets for undergraduate admission are available from high school and community college counselors or from any campus admissions office. Submit your completed application and the related materials to the admissions office on the campus where you wish to enroll on or after the appropriate date below:

#### Application Filing Dates

<b>Fall Quarter 1979</b>	<b>November 1, 1978</b>
<b>Winter Quarter 1980</b>	<b>July 1, 1979</b>
<b>Spring Quarter 1980</b>	<b>October 1, 1979</b>

All campuses observe the dates listed above for the beginning of application filing. Each campus will accept for consideration all applications filed during the first month of the filing period. After the first month the deadline will vary from campus to campus. The application to San Diego must include a choice of college (Muir, Revelle, Third, Warren) before it can be completely processed. Each campus has enrollment quotas that limit the number of new freshman and new advanced-standing students that may be accepted. Once these quotas have been filled, additional applications cannot be accepted and will be directed according to preferences listed on the application to another University campus where enrollments are still open.

**Redirection** Through its redirection program, the University has been able to assure that each qualified applicant is offered admission to one of the University campuses. If at the end of the first month of the application filing period a campus has more qualified

## Undergraduate Admissions

applicants than it can accommodate within its enrollment quotas, redirection to alternate campuses becomes necessary. Fifty percent of the available space on a campus required to limit its enrollment is reserved for the most highly qualified on the basis of scholastic achievement. The other fifty percent provides for selection from among remaining qualified applicants on the basis of individual review of each application. This selection process will give consideration to such criteria as academic interests, available campus programs, hardship factors which prohibit or restrict a student from attending another campus, selective recruitment effort, special achievements and awards, and similar considerations.

It is equally important that you file your completed application as early in the filing period as possible. You may be assured that as the number of applications exceeds the quotas established for a campus, assistance will be provided to qualified applicants who are willing to consider admission to an alternate campus of the University. If redirection becomes necessary, you will be notified as early as possible in the admissions cycle.

If your plans change after you have filed for admission, and you prefer to register on a different campus, you must write to Student Academic Services, 570 University Hall, University of California, Berkeley, California 94720, indicating the campus at which you now wish to register and the reason for your change. Your records will be transferred to the campus you indicate, provided facilities are available there. Such requests must be received within the filing periods shown above.

**Application Fee** There is a nonrefundable fee of \$20 for filing an application for admission. Make your check or money order payable to The Regents of the University of California and attach it to your application form.

**Duplicate Applications** You should not file more than one application for admission to the University for the same quarter. Since the admission requirements are the same on all campuses, admission to the University entitles you to attend the campus you have selected if there is space available. If you apply for admission to more than one campus, the processing of your applications will be significantly delayed. Fees submitted with duplicate applications will not be refunded.

**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 where the application is filed.

If you are applying for admission as a freshman, ask your high school to submit a preliminary transcript showing your work through the junior year. The transcript also should list the courses you are now taking and those you plan to take. You must also arrange for a final transcript that includes your courses and grades for the senior year and a statement of graduation. If you have

passed the California High School Proficiency Examination, a verification of your "Certificate of Proficiency" is required. If you have completed any college courses before or at the time of graduation, a transcript of your record from the college is required.

If you are applying for admission in advanced standing, the Office of Admissions will need transcripts from your high school of graduation and from each college you have attended. A preliminary transcript from your present college, listing the courses you are now taking and those you plan to take before transferring to UC San Diego, should also be requested.

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.

**Notification of Admission** When the application is received in the Office of Admissions, and initial processing has been completed, you will be notified of the receipt of your application. With the normal volume of applications this processing usually takes from six to eight weeks.

The length of time before final notification of admission is subject to variation depending on the unique circumstances of each applicant. In general most applicants for the fall quarter will receive final notification by late spring. Applicants for the winter and spring quarters will be notified as soon as possible following receipt of all appropriate transcripts. In the case of advanced-standing applicants whose eligibility depends on their final semester of work, notification cannot be made until receipt of that transcript. Delays will occur if required records have not been received by the Office of Admissions. Inquiries by phone or mail will only interrupt the evaluation process and prolong the time before notification.

If admitted to the University, you will be asked to sign and return a Statement of Intention to Register (S.I.R.), accompanied by a nonrefundable fee of \$50. This amount will be applied toward payment of the university registration fee, provided you register in the quarter to which you have been admitted.

A student who fails to register in the quarter for which he or she was admitted and who thereafter applies and is admitted to a subsequent quarter, must return a new Statement of Intention to Register together with a nonrefundable fee of \$50.

**Re-Application** An application for admission is effective only for the quarter for which it is submitted. If you are not eligible for admission, or if you are admitted and do not register, you must file a new application if you wish to be admitted to another quarter. The new application will be considered in light of the admission requirements currently in effect and the space available on the campus.

**Deferred Admission** If you find that attendance for the quarter admitted is precluded for reasons other than attendance at another institution, you may request a deferment of admission to a subsequent quarter by writing to the Office of Admissions.

**Student Health Requirement** Entering students are required to complete a Medical History Form and submit the results of a tuberculin test prior to registration and to send them to the Student Health Center. Forms and complete instructions are usually sent to entering 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.

## 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 initial registration for classes. All materials needed for registration will be provided at the college provosts' offices on the days assigned for new students' registration.

**The Undergraduate Program** The normal undergraduate program consists of an average of four

courses each quarter for four years. Students wishing to take more than sixteen units of credit in a quarter should refer to the quarterly *Schedule of Classes* for information regarding possible signatures of approval which may be required for their programs.

**Confirmation of Program** All students enrolled for classes will receive Study-List Cards. The Study-List Card confirms the student's official program as it appears on the registrar's file. Students will be held responsible for all the courses listed unless an appropriate Withdrawal Form or Change of Program Card (Drop/Add Card) has been filed with the Office of the Registrar.

## Fees and Expenses

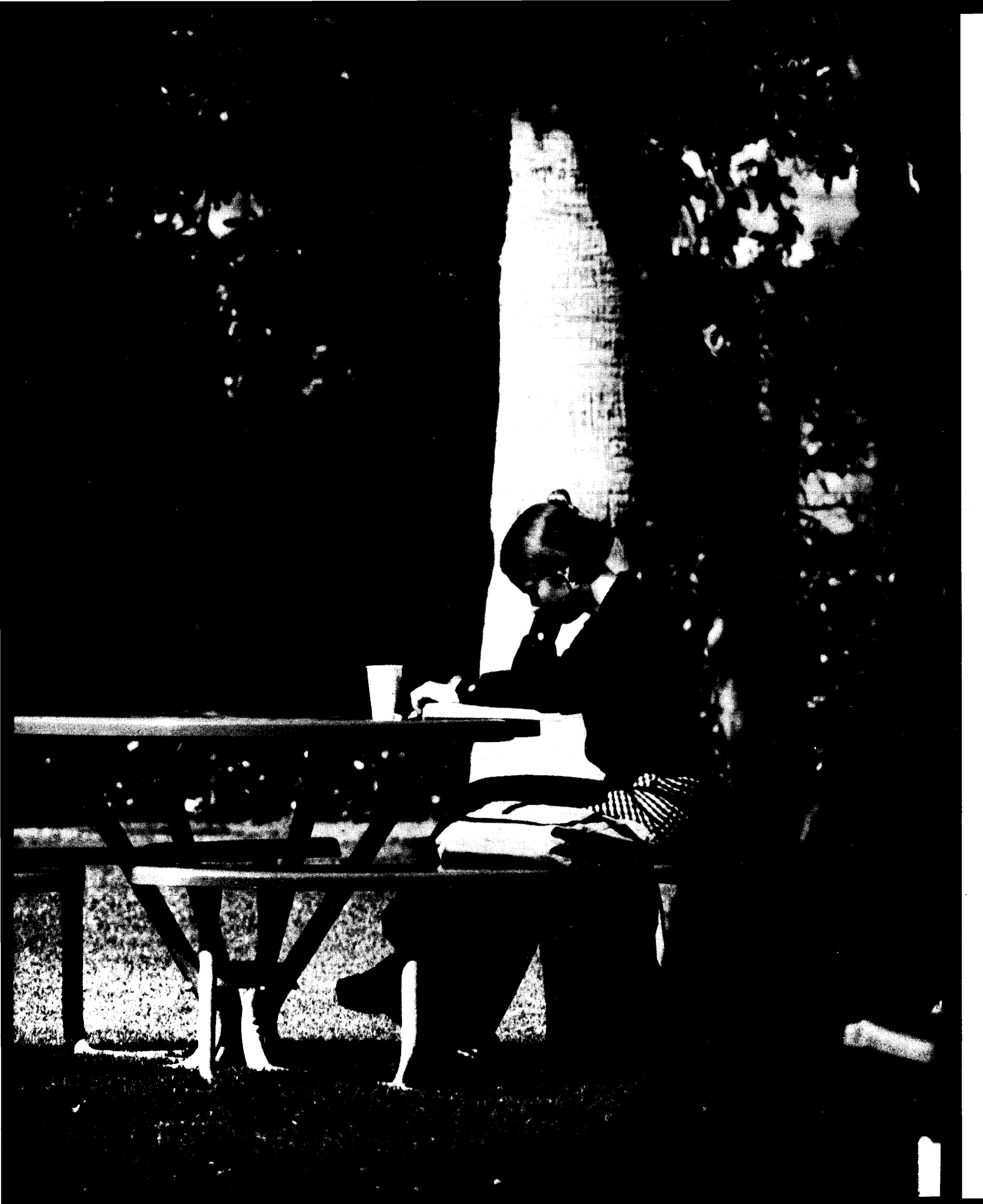
The exact cost of attending the University of California, San Diego, will vary according to personal tastes and financial resources of the individual. Generally, the total expense for three quarters, or a college year, is estimated at \$3,500 - \$4,500 for California residents living away from home.

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 UC San Diego, see "Campus Services and Facilities" in this catalog.

### Estimated Expenses for Undergraduate Residents of California

	FALL QUARTER	WINTER QUARTER	SPRING QUARTER	TOTAL
University				
Registration Fee	\$125.00	\$125.00	\$125.00	\$375.00
Educational Fee	100.00	100.00	100.00	300.00
Campus Activity Fee	6.00	6.00	6.00	18.00
Student Center Fee	10.00	10.00	10.00	30.00
Board and Room in Residence Halls (Avg.)	700.00	700.00	700.00	2100.00
Books, Supplies (Approx.)	80.00	70.00	60.00	210.00
Personal Expenses (Approx.)	200.00	200.00	200.00	600.00
Total	\$1221.00	\$1211.00	\$1201.00	\$3633.00

NOTE: Changes in fees are subject to Regents' approval.





# Undergraduate Registration and Academic Regulations



## Registration

Prior to the quarter for which they have been admitted, new students will receive information from their colleges regarding orientation and initial registration for classes. All materials needed for registration will be provided at the college provost's offices on the days assigned for new students' registration.

Continuing students (those currently registered or eligible to register) should refer to the quarterly *Schedule of Classes* and the quarterly registration procedures letter for specific registration and fee-payment instructions. The *Schedule of Classes* is published prior to each quarter and may be purchased at the University Bookstore. The quarterly registration procedures letter accompanies the packet of registration materials mailed to all continuing students eligible to register.

A student who has not registered (enrolled for classes AND paid fees) by the deadline date published in the quarterly *Schedule of Classes* will be removed from the registrar's file and must initiate reinstatement procedures. The *Schedule* is available in the University Bookstore approximately midway through the preceding quarter.

## Definitions

**A Registered Student:** A student who has enrolled for classes and paid registration fees.

**An Enrolled Student:** A student whose Preferred-Program Card has been received and processed by the Office of the Registrar and who has been assigned space in classes, but who has not paid registration fees.

**Class Level:** Regular students are classified as freshmen, sophomores (upon completion of 40.5 quarter units), juniors (upon completion of 84 units), seniors (upon completion of 135 units).

**The Undergraduate Program:** The normal undergraduate program consists of an average of four courses each quarter for four years. Students wishing to take more than sixteen units of credit in a quarter

should refer to the quarterly *Schedule of Classes* for information regarding possible signatures of approval which may be required for their programs.

**Confirmation of Program:** All students enrolled for classes will receive Study-List Cards. The Study-List Card confirms the student's official program as it appears on the registrar's file. Students will be held responsible for all the courses listed unless an appropriate Withdrawal Form or Change of Program Card (Drop/Add Card) has been filed with the Office of the Registrar.

**Change of Program:** After an official Preferred-Program Card has been filed with the Office of the Registrar, an undergraduate may add or drop courses or sections of courses by submitting a Drop/Add card. Students should refer to the quarterly *Schedule of Classes* calendar as well as study list forms for drop/add procedures, deadline dates, and any signature and fee requirements which apply to each respective period.

**Change of Address:** Students who change their local or permanent addresses after enrollment are expected to notify the registrar in writing at once. Change of address cards are available at the Office of the Registrar, 101 Administrative Complex. Students will be held responsible for communications from any University office sent to the last address given, and should not claim indulgence on the plea of not receiving the communication.

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

**Approval for Enrollment Beyond 192 Units:** The minimum unit requirement for the bachelor's degree is 184 quarter units in Revelle College and 180 quarter units in Muir, Third, and Warren Colleges. A student is expected to complete the requirements for graduation within this minimum unit requirement.

## Undergraduate Registration

Under special circumstances, students may extend their undergraduate training beyond the minimum. However, students who are attempting to achieve more than 192 quarter units will *not* be permitted to register without their college provost's approval.

**Bar from Registration:** A student may be barred from registering for classes for the following reasons:

1. Failure to respond to official notices.
2. Failure to settle financial obligation when due or to make satisfactory arrangements with the Business Office.
3. Failure to complete the physical examination.
4. Failure to present certification of degrees/status on leaving previous institution(s).
5. Failure to comply with admission conditions.

Each student who becomes subject to a bar-from-registration-action is given advance notice and ample time to deal with the situation. However, if the student 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 petition from the provost or dean who requested the barring action. Reinstatement is not final until this petition has been processed by the registrar.

**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' 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.

**Final Grades:** The Office of the Registrar will mail copies of final grades to students' local addresses as soon as possible at the end of the fall and winter quarters. Spring quarter grades will be mailed to students' permanent addresses. Students should examine this copy of their transcript record for accuracy and report any omissions or errors to the Office of the Registrar immediately.

## Fees and Residency

### General

The University registration fee, the educational fee and the nonresident tuition fee (if applicable) must be paid for the student to be considered as registered. A student who has not registered (enrolled for classes and paid fees) by the deadline date published in the quarterly *Schedule of Classes* will be removed from the registrar's file and must initiate reinstatement procedures. The *Schedule* is available in the University Bookstore approximately midway through the preceding quarter.

Note: See "Estimated Expenses for Undergraduate Residents of California", page 51.

**University Registration Fee** The university registration fee is currently \$125 per quarter for undergraduates. This fee, which must be paid at the time of registration, covers certain expenses for use of library books, for recreational facilities and equipment, for registration and graduation, for all laboratory and course fees, and for such consultation, medical advice, and hospital care or dispensary treatment as can be furnished by the Student Health Service or by health and accident insurance purchased by the University. 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 firemen or policemen. Students should check with the Financial Aids Office for full ruling.

In addition, there is a campus activity fee of \$6 per quarter for undergraduates and a student center fee of \$10 per quarter for all students to be used for the construction and operation of the student centers.

**Educational Fee** The educational fee was established for all students beginning with the fall quarter, 1970. The undergraduate educational fee is \$100 per quarter. Resident students with demonstrated financial need may defer payment of the educational fee by accepting an obligation to repay, at a later date, the sum deferred. Students interested in this provision should contact the Financial Aids Office, Building 213, Administrative Complex.

In May 1974 the Regents adopted the reduced educational fee for part-time undergraduate students, effective fall quarter 1974. To be eligible for this reduced fee (50% of the educational fee) undergraduates must be enrolled for fewer than nine units at the end of the third week of classes. Undergraduates enrolled in Special, Education Abroad, and other special programs are excluded from this reduced fee policy. Extension courses taken by students in the concurrent enrollment program will be included in the students' total workload. Any student who receives a refund will be billed if, after the refund date, his or her units are increased to nine or more.

**Nonresident Tuition Fee** Students who have not been residents of California for more than one year immediately prior to the residence determination date for each term in which they propose to attend the University are charged, along with other fees, a nonresident tuition fee of \$635 for the quarter. The residence determination date is the day instruction begins at the last of the University of California campuses to open for the quarter.

## Residence Requirements

**General** California residence is established by an adult who has relinquished prior residence and is physically present within the state with the intent to make California the permanent home. California residence must be established more than one year prior to the term for which resident classification is requested. Indicia of California residence include, but are not limited to: registering and voting in California elections; designating California as the permanent address on all school and employment records, including military records if one is in the military service; obtaining a California I.D. card or driver's license; obtaining California vehicle registration; paying California income taxes as a resident; establishing an abode where one's permanent belongings are kept; licensing for professional practice in California, etc. Conduct inconsistent with the claim of California residence includes, but is not necessarily limited to: maintaining voter registration and voting in person or by absentee ballot in another state; obtaining a divorce in another state; attending an out-of-state institution as a resident; obtaining a loan requiring residence in another state; maintaining out-of-state driver's license and vehicle registration, etc.

As a general rule, students seeking resident classification must perform all acts of intent which are applicable to their particular circumstances within the one year durational period. In addition, a substantial number of these acts must be performed when the student first comes to California or very shortly thereafter. If they are not, the durational period for reclassification is extended until both presence and intent have been demonstrated for one year.

Students who are within California for educational purposes only do not gain the status of resident regardless of the length of their stay in California.

The residence of the parent with whom an unmarried minor (under age eighteen) maintains his or her place of abode is the residence of the unmarried minor. When minors live with neither parent their residence is that of the parent with whom they maintained their last place of abode. Minors may establish their residence when both parents are deceased and a legal guardian has not been appointed. The residence of unmarried minors who have a parent living cannot be changed by their own act, by the appointment of a legal guardian, or by relinquishment of a parent's right of control.

A man or a woman establishes his or her residence. A woman's residence shall not be derivative from that of her husband, or vice versa.

## Exceptions

1. Students who remain in this state after their parent, who was theretofore domiciled in California for at least one year prior to leaving and has, during the student's minority and within one year immediately prior to the residence determination date, established residence elsewhere, shall be entitled to resident classification until they have attained the age of majority and have resided in the state the minimum time necessary to become a resident so long as, once enrolled, they maintain continuous attendance at an institution.
2. Nonresident students who are minors or eighteen years of age and can evidence that they have been totally self-supporting through employment and actually present within California for the entire year immediately prior to the residence determination date and have evidenced the intent to make California their permanent home may be eligible for resident status.
3. Students shall be entitled to resident classification if immediately prior to the residence determination date they have lived with and been under the continuous direct care and control of any adult or adults other than a parent for not less than two years, provided that the adult or adults having such control have been California residents during the year immediately prior to the residence determination date. This exception continues until the student has attained the age of eighteen and has resided in the state the minimum time necessary to become a resident student, so long as continuous attendance is maintained at an institution.
4. Exemption from payment of the nonresident tuition fee is available to the natural or adopted child, stepchild or spouse who is a dependent of a member of the United States military stationed in California on active duty. Such resident classification may be maintained until the student has resided in California the minimum time necessary to become a resident. If a student is enrolled in an institution and the member of the military is transferred on military orders to a place outside the United States immediately after having been on active duty in California, the student is entitled to retain resident classification under conditions set forth above.
5. Students who are members of the United States military stationed in California on active duty, except a member of the military assigned for educational purposes to a state-supported institution of higher education, shall be entitled to resident classification until they have resided in the state the minimum time necessary to become a resident.
6. Students who are adult aliens are entitled to resident classification if they have been lawfully admitted to the United States for permanent re-

## Undergraduate Registration

sidence in accordance with all applicable provisions of the laws of the United States and have thereafter established and maintained residence in California for more than one year immediately prior to the residence determination date.

A student who is an adult alien shall be entitled to resident classification if the student is a refugee who has been granted parolee status or indefinite voluntary departure status in accordance with all applicable laws of the United States; provided that the student has lived in the state for one year. (Effective until June 30, 1980.)

7. Students who are minor aliens shall be entitled to resident classification if the student and the parent from whom residence is derived have been lawfully admitted to the United States for permanent residence, provided that the parent has had residence in California for more than one year after acquiring a permanent resident visa prior to the residence determination date for the term.

A student who is a minor alien shall be entitled to resident classification if both the student and his parent are refugees who have been granted parolee status or indefinite voluntary departure status in accordance with all applicable laws of the United States, provided that the student has lived in this state for one year. (Effective until June 30, 1980.)

8. Children of deceased public law enforcement or fire suppression employees, who were California residents and who were killed in the course of law enforcement or fire suppression duties, may be entitled to resident classification.

### Procedures

New and returning students are required to complete a Statement of Legal Residence. The student's status is determined by the attorney in residence matters' deputy who is located in the Office of Admissions and Registrar, 102 Administrative Complex.

Students are cautioned that this summation is not a complete explanation of the law regarding residence. They should also note that changes may have been made in the rate of nonresident tuition and the residence requirements between the time this catalog statement is published and the relevant residence determination date. Regulations have been adopted by the Regents, a copy of which is available for inspection in the Office of Admissions and Registrar.

All students classified incorrectly as residents are subject to reclassification and to payment of all nonresident fees not paid. If incorrect classification results from false or concealed facts by the student, the student also is subject to University discipline. Resident students who become nonresidents must immediately notify the attorney in residence matters' deputy.

Inquiries from prospective students regarding residence requirements for tuition purposes should be directed to the Attorney in Residence Matters; University of California; 590 University Hall; Berkeley, California 94720. No other University personnel are authorized to supply information relative to residence requirements for tuition purposes. Any student, following a final decision on residence classification by the residence deputy, may make written appeal to the attorney in residence matters at the above address within 120 days after notification of the final decision by the residence deputy.

### Miscellaneous Expenses, Fees, Fines and Penalties

Books and stationery average about \$70 per quarter. However, students should also be aware of the following possible expenses:

Statement of intent to register fee (new undergraduate)	\$50
Application fee	20
Changes in study list after announced dates (Drop/Add cards)	3
Duplicate registration and/or other cards from enrollment packet	3
Duplicate Student ID Card	3
Request to Receive/Remove Grade "I" (undergraduate)	5
Removal of Grade "I" (graduate)	5
Special Course Subject A	45
Transcript of record	2
Late filing of announcement of candidacy for B.A.	3
Late filing of enrollment cards	10
Returned check collection	5
Late payment of fees (late registration) (See also "Withdrawal from the University," below)	25

**Parking Fee** Students who park motor vehicles on the campus are subject to parking fees. Parking permits are sold by the university cashier. A copy of the campus parking regulations may be obtained from the cashier at the time of permit purchase.

## General Degree Requirements

Each of the undergraduate colleges on the San Diego campus has specific requirements for a degree. (See "Choosing a College at UC San Diego") In addition, the following are required of all undergraduates:

**American History and Institutions** A knowledge of American history and of the principles of American institutions under the 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. 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 passing 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: History 1ABC, 7ABC, 150 through 169, and Political Science 10, 109, 110, 112 A or B.
3. By passing an examination to be conducted by the Committee on Educational Policy and Courses. The student will have no more than two opportunities to pass the examination. A student who fails in the second attempt will be obliged to satisfy the requirement by passing one of the designated courses.
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 a one-quarter or one-semester course in either American history or American government at a recognized institution of higher education, junior colleges included, within the United States.
7. An alien attending the University on a 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** Every undergraduate must demonstrate an acceptable level of ability in English composition upon entrance or during the first year. This requirement may be met by:

1. Achieving a score of 600 or better in the CEEB Achievement Test in English composition, or
2. achieving a grade of 5, 4 or 3 in the College Entrance Examination Board (CEEB) Advanced Placement Examination in English, or
3. entering the University with credentials showing the completion of an acceptable college-level course of four quarter units or three semester units in English composition with a grade of C or better.

Satisfaction of the Subject A requirement is determined by the Office of Admissions. Students not meeting the requirement in one of the ways described above must enroll in special courses designed to clear the Subject A requirement (see "Subject A").

**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, such as when a student attends classes on another UC campus or participates in the UC Education Abroad Program, exceptions may be granted by the provost.

## Regulations Pertaining to Undergraduate Students

### Double Majors

Students in good academic standing may be permitted to register for double majors. Students must secure approval by petition and by fulfillment of the requirements (prerequisites and upper-division courses) of both programs. The following conditions must exist:

1. Lower-division prerequisites may overlap.
2. At least eight upper-division courses must be unique to each major.
3. The majors must be completed within the limit of 208 units.
4. Approval is secured from appropriate departmental advisers.
5. Approval is secured from the college provost.

Normally, students will be sophomores when the request is made in order to ensure correct planning.

With very few exceptions, double majors within the same department are unacceptable, as are double majors consisting of a departmental major and an interdisciplinary major associated with the same department.

### 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 chairperson and the provost of the student's college. The applicant shall show that his or her background is adequate for the proposed study.
2. A student must have completed at least ninety-six units of undergraduate study and must be in good academic standing (2.0 grade-point average or better).

3. Normally, credit for supervised special studies in a single term may total no more than four units. If the total number of units of such courses exceeds four in a given term, the following further documentation is required. For five to eight units, there must be a recommendation from the chairperson (or one of the chairpersons) of the department(s) concerned. For nine or more units, there must be a recommendation from a committee including three or more faculty appointed by the chairperson (or one of the chairpersons) of the department(s) concerned. All recommendations must be submitted to and approved by the provost of the student's college and must attest to the educational merit of the proposed study and the suitability of the number of units.
4. Only a grade of P or NP is to be assigned for a 197, 198 or 199 course.
5. Subject to the approval of the CEP Subcommittee on Undergraduate Courses, a department may impose additional limitations on its supervised special studies courses.

#### 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. Each department should set the grade-point average which it considers a minimal guarantee of preparation and ability both in specific departmental course work and overall.
4. The faculty instructor is responsible for maintaining the overall quality of instruction, and has responsibility for all grades given in the class. The undergraduate instructional apprentice shall not be placed in full charge of individual sections.
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).
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. The total credit accumulated as an apprentice shall not exceed eight units.

#### Honors at Graduation

The proposal to establish minimum criteria for awarding honors at graduation is currently pending approval by the Academic Senate. The proposal is that, effective fall 1978, in order to receive honors at graduation at UC San Deigo a student must meet the following criteria:

1. The student must receive letter grades for at least eighty quarter units of course work at the University of California.
2. The student's grade-point average for coursework at the University of California must meet the criteria established below.
3. Each college may recommend the students to be awarded honors at graduation in accordance with the following minimum criteria:

Honors	Minimum* grade-point average
summa cum laude	3.95
magna cum laude	3.85
cum laude	3.65

\*Whether the regulation is approved with minimum grade-point averages or percentages, the grade-point averages listed above are approximately those which will be needed to receive honors.

#### Grading Policy

Grades in undergraduate courses are defined as follows: A, excellent; B, good; C, fair; D, barely passing; F, not passing (failure); I, incomplete (work of passing quality but incomplete for good cause). The designations P (Pass) and NP (Not Pass) are used in reporting grades on some undergraduate courses. P denotes a letter grade of C or better (See "Special Grade Options"). NR indicates no record or no report of grade was received from the instructor.

**Grade Points** Grade points are assigned on a four-point basis: A, 4 points per unit; B, 3 points per unit; C, 2 points per unit; D, 1 point per unit; F and I, zero points. The grade-point average is computed by dividing the total number of grade points earned by the total unit value of courses attempted. P, NP, NR and I grades are excluded in computing the grade-point average.

**No Report/No Record** An "NR" appearing on student transcripts in lieu of a grade indicates that the student's name appeared on a course report but no grade was assigned by the instructor. An NR entry will lapse automatically into an "F" 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.

## Special Grade Options

**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. Under such regulations as each college may determine, and with the approval of the instructor, a student in good standing may take up to an average of one course per quarter on a Pass/Not Pass basis. Enrollment under this option must take place within the first two 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.

After the Preferred-Program Card has been filed, the Drop/Add Card will be used to change from letter grade to P/NP, or vice versa. After classes commence, the instructor's signature will be required on this card. The last day to add courses will be the final date to make this change.

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.

**Muir College** policy regulations state that:

1. Students must be in good academic standing (2.0 GPA), have accumulated a minimum of ninety-six units and may enroll in an average of one course each quarter on a P/NP basis.
2. Muir College's general education courses may be taken on a P/NP basis if the courses are not prerequisites to majors.
3. Courses to be counted toward a departmental major or as prerequisites to the major may not be taken on a P/NP basis except with the consent of the department chairperson or his or her designated representative.
4. All courses taken as non-major electives may be taken on a P/NP basis.
5. Courses taken to be counted toward a Muir Special Project major may be taken for a letter grade only. For a course to be counted as part of a Muir Special Project major the student must earn in it a grade of "C" or better.
6. Course approval forms for 199's and Muir Special Project 199's must be completed and submitted to the department at least two weeks prior to the beginning of a new quarter.

**Revelle College** policy regulations state that:

1. Courses taken Pass/Not Pass may not be used in satisfaction of any lower-division Revelle College breadth requirements except fine arts.
2. 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.
3. All courses used to satisfy the non-contiguous minor (or courses) requirement may be taken on a Pass/Not Pass basis.
4. All courses taken as electives may be taken on a Pass/Not Pass basis.

**Third College** policy regulations state that:

1. Courses to be counted toward a departmental major or as prerequisites to the major must be taken on a letter grade basis, not P/NP (Pass/Not Pass).
2. Courses to be counted toward a minor must be taken on a letter grade basis, not P/NP.
3. Courses taken toward completion of the Third College general education requirements may be taken on a Pass/Not Pass basis while at the same time, the restrictions for prerequisites to majors and courses counted toward minor must be observed.
4. All 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.

**Warren College** policy regulations state that:

1. A Warren College student in good standing shall have the privilege of enrolling in an average of one course each quarter on a P/NP basis.
2. Courses to be counted toward a departmental major, or as a prerequisite to the major, must be taken for a letter grade. Individual departments may authorize exceptions to this regulation.
3. Courses to be counted toward the College's writing or formal skills requirements may be taken on a P/NP basis. At the same time, the stipulation regarding prerequisite courses to the major must be observed.
4. Courses to be counted toward the required two programs of concentration may be taken on a P/NP basis.
5. All courses taken as non-major electives may be taken on a P/NP basis.

**Repeat of D, F, or NP Grades** Undergraduates may repeat courses only when grades of D, F, or NP were received. When a D, F, or NP course is repeated and is one among the first sixteen units repeated, it will not be counted in the grade-point average. In the case of repetitions beyond sixteen units, the grade-point average will be based on all grades assigned and total units attempted. Courses in which a grade of D or F has been awarded may not be repeated on a P/NP basis; and courses in which a grade of NP has been awarded may be repeated only on a P/NP basis.

**Incomplete Grades** The 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.

The grade Incomplete may be assigned in undergraduate courses when a student's work is of passing quality, but incomplete for good cause.

Undergraduate students whose work is of passing quality, but incomplete for good cause, may file a Request to Receive/Remove Grade Incomplete form. A \$5 fee is payable at the Office of the Cashier. Students should file all copies of this request with the instructor prior to the scheduled final examination. The form shall state the agreed-upon completion date, which may not be later than the end of final examinations week of the subsequent quarter. The instructor will file all copies of this form with quarterly course reports.

If an I grade is not completed by the last day of final examinations the subsequent quarter, it will automatically lapse to an F or NP, depending upon the student's initial grading option.

An undergraduate NR or F assigned because a student failed to submit the Request for Incomplete form may be changed to I providing that the delay in submitting the request form was for verified illness or other emergency beyond the student's control. An NR so assigned will lapse to an F the subsequent quarter if not replaced by a final grade.

**Credit by Examination** With the instructor's approval, undergraduate students in good standing may petition to obtain credit for some courses by examination. There will be a \$5 fee for each Credit by Examination Petition submitted. For further information, consult the Office of the Provost in your college.

**Scholastic Requirements** The scholastic status of all UC San Diego undergraduates is governed by the following provisions:

1. **PROBATION** Students are subject to probation if at the end of a quarter their grade-point average or cumulative grade-point average is less than 2.0 (C).

2. **DISQUALIFICATION** Students are subject to disqualification for enrollment if their grade-point average for the quarter is below 1.5, or if they have completed two consecutive terms on academic probation.

Continued registration of undergraduates who are subject to academic disqualification is at the discretion of the faculty of their college. On the San Diego campus the faculties normally delegate this responsibility to the provost.

If the provosts feel students will be able to overcome their academic deficiency, they will allow the students to continue on probation.

Students who have been dismissed, or who are on probation and wish to transfer from one campus of the University to another, must obtain the approval of the dean or provost into whose jurisdiction they seek to transfer. After completing a transfer, the student is subject to the supervision of the dean or provost on the new campus. See "Intercampus Transfer" below. (Students subject to disqualification are not eligible to receive veterans' benefits and should contact the Veterans Affairs Office on campus.)

**Application for Degree** Undergraduate seniors are required to file an Undergraduate Degree Application Card each quarter during their senior year. This enables the provost of the college to determine whether or not the program the student is undertaking will satisfy degree requirements. The student will be notified of any deficiency.

**Withdrawal from the University** Students who decide to withdraw from the University after payment of registration fees, must file a Request for Withdrawal form with the Office of the Registrar before leaving the campus. This form serves two purposes: (1) a refund of fees if appropriate (see below); (2) withdrawal from classes without penalty of F grades. Students who decide to withdraw after the completion of a quarter and before registration fees have been paid for a subsequent quarter need not file a Request for Withdrawal since they will be automatically withdrawn. The effective date for calculating a fee refund is the day the student's withdrawal form is received in the Office of the Registrar.

**New Undergraduate Students** Prior to the first day of instruction, the registration fee is refunded minus the \$50 statement of intention to register fee.

**Continuing and Readmitted Students** There is a service charge of \$10 for cancellation of registration or withdrawal before the first day of instruction. The following schedule of refunds is effective beginning with the first day of instruction and refers to calendar days:

1-14 days	15-21 days	22-28 days	29-35 days	36 days and over
80 percent	60 percent	40 percent	20 percent	0 percent



The effective date of withdrawal used in determining the percentage of fees to be refunded is the date on which the student submits his or her withdrawal form to the Office of the Registrar. A student claiming an earlier date of withdrawal and therefore a higher percentage refund must submit written evidence to support his or her claim.

### **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 standing who are absent for two or more consecutive quarters must file an application for readmission no later than eight weeks prior to the beginning of the quarter at the Office of the Registrar, 101 Administrative Complex. A nonrefundable fee of \$20 is charged for each application for readmission filed.

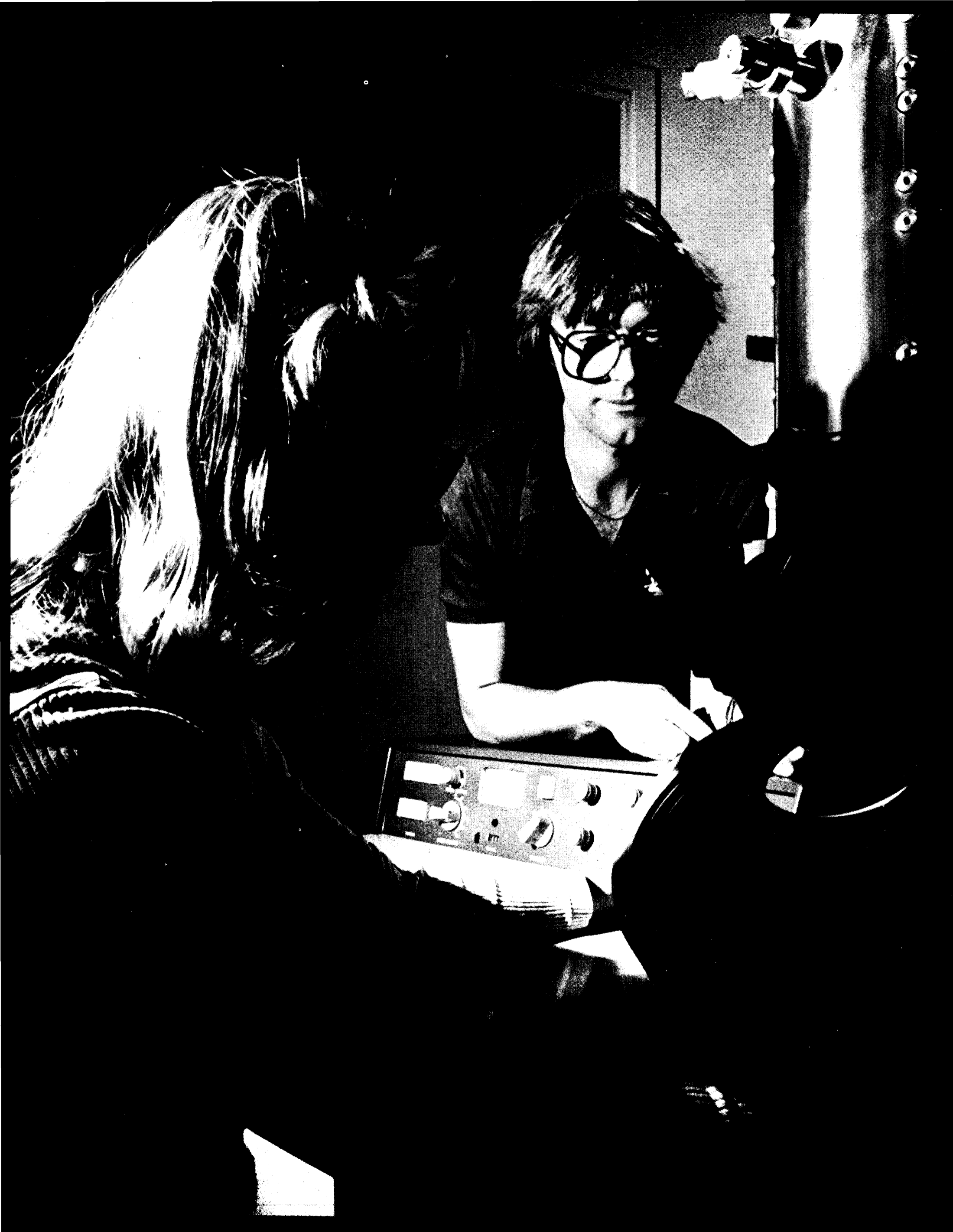
Whereas a formal leave of absence request for undergraduates is not required, students desiring to be

absent are urged to consult with their provost's office. The provosts recognize the need for some students to "stop out" for a while. Each provost's office is prepared to deal, in a totally flexible manner, with any changes in the plans of the student, or with any problems the student may have.

**Transcript of Records** Application for a transcript of record 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; transcripts will be released only upon signed request of the student. A \$2 fee is charged for one transcript; \$1 is charged for each additional copy requested at the same time. Checks should be made payable to The Regents of the University of California.

**Intercampus Transfer** An undergraduate 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 transfer in the same status to another campus of the University. The student who wishes to transfer must file an application on the present campus. Application forms for intercampus transfer are available in the Office of the Registrar.



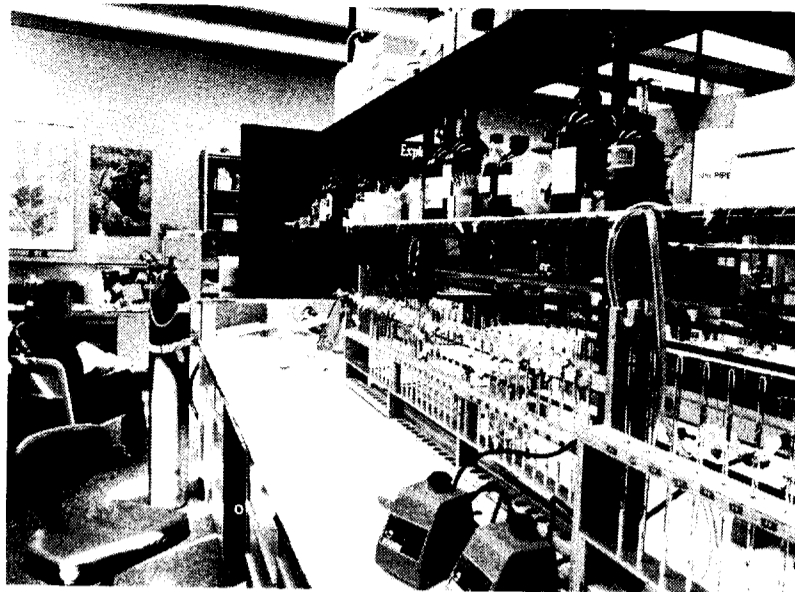


# Graduate Studies

At the University of California, San Diego, all programs leading to masters' 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 merging of administrative responsibilities for graduate studies and for research reflects the intention of the San Diego campus to emphasize the research character of graduate work and to distinguish between graduate studies and those programs leading to baccalaureate or strictly professional degrees. The Ph.D. degree should be regarded as a degree identified with research and creative scholarship.

Graduate studies involve 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. There can be no guarantee that satisfactory research will be completed in any prescribed time. A Ph.D. degree is the culmination of creative effort; it attests to the ability of the recipient to continue original inquiry. In addition to requiring original research, the Office of Graduate Studies and Research strongly encourages all of its doctoral candidates to obtain teaching experience.

La Jolla has become one of the most important intellectual centers of the West. Not only has the University attracted many of the world's great scholars, but other research institutions such as the Salk Institute for Biological Studies and the Scripps Clinic and Research Foundation have enhanced the area's reputation. From the beginning, UC San Diego has been determined to offer intellectual opportunities not elsewhere available. Much of the training it offers takes place outside the classroom — it is not only in the seminar but in independent research and in tutorial work that graduate study goes on. In addition to the permanent faculty, there are many visitors from other universities; there are opportunities to study at other branches of the University of California; and there is constant association between members of the University and those intellectuals who have come here to work within the institutes on campus. It is the aim of this university to achieve a standard of excellence for graduate study; the freedom it offers, tempered by the discipline it demands, has



already endowed UC San Diego with a unique spirit and an enviable list of accomplishments.

## The Nature of Graduate Instruction

Graduate courses demand, on the part of both instructor and student, either a capacity for critical analysis or a specialization of research interests not normally appropriate to an undergraduate major. These courses normally 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. In addition, courses at the upper-division level (100-197) may be taken in partial satisfaction of the requirements for an advanced degree. The main purpose of graduate study is to foster independence and originality of thought in the pursuit of knowledge. The graduate student is accorded considerable liberty in choice of courses as long as the minimum academic and residence requirements are met.



## Graduate Degrees Offered as of 1978-79

Anthropology	M.A., Ph.D.
Applied Physics	M.S., Ph.D.
Biology	Ph.D.
Chemistry	M.S., Ph.D.
Comparative Studies in Language, Society and Culture	Ph.D.***
Earth Sciences	Ph.D.*
Economics	Ph.D.*
Engineering Sciences:	
Aerospace Engineering	M.S., Ph.D.
Applied Mechanics	M.S., Ph.D.
Bioengineering	M.S., Ph.D.
Engineering Physics	M.S., Ph.D.
History	M.A.** , Ph.D.
Information and Computer Science	M.S., Ph.D.
Linguistics	Ph.D.*
Teaching English to Speakers of Other Languages	M.A.*
Literature, Comparative	Ph.D.*
Literature, English and American	Ph.D.*
Literature, French	Ph.D.*
Literature, German	Ph.D.*
Literature, Spanish	Ph.D.*
Marine Biology	Ph.D.*
Mathematics	M.A., Ph.D.
Mathematics (Applied)	M.A.
Music	M.A., Ph.D.
Neurosciences	Ph.D.*
Oceanography	Ph.D.*
Philosophy	Ph.D.*
Physics	M.S., Ph.D.
Physics (Biophysics)	Ph.D.
Physiology and Pharmacology	M.S., Ph.D.
Psychology	Ph.D.*
Sociology	Ph.D.*
Theatre	M.F.A.
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.

\*\*Students are admitted for the M.A. only in Third World History, European History and Social/Ethnic History of the United States.

\*\*\*Students who have completed some graduate study at UC San Diego and have been admitted to a doctoral program may apply for this interdisciplinary program.

## Administration

### The Office of Graduate Studies and Research

The Office of Graduate Studies and Research is supervised by a dean, assisted by an associate dean, who are appointed by the chancellor. The dean is re-

sponsible to the Vice Chancellor, Academic Affairs and to the Graduate Council, a standing committee of the Academic Senate, for the administration of graduate affairs. The deans are members of planning and administrative committees of the University.

The Dean of Graduate Studies is responsible for graduate admissions, student degree programs, the administration of fellowships, traineeships, and other graduate-student support, and the maintenance of common standards of high quality in graduate programs across the campus.

### The Office of Graduate Studies in the Health Sciences

The Office of Graduate Studies in the Health Sciences, an affiliate of the Office of Graduate Studies and Research, is located in the Basic Science Building. This office is supervised by an associate dean who is responsible to the Vice Chancellor for Health Sciences and the Dean of Graduate Studies and Research. Graduate students in the health sciences should consult the associate dean on problems concerning their academic progress.

### The Graduate Council

The Graduate Council is a standing committee of the San Diego Division of the Academic Senate. The primary function of the council is to exercise general responsibility for graduate-study programs and to implement University-wide policies, procedures, requirements and standards. Its members are selected by the Committee on Committees to give proper representation to the academic departments, schools, and interdepartmental programs on the San Diego campus.

### The Graduate Adviser

The graduate adviser is the deputy of the dean for the department or group and is the person to whom graduate students are to direct requests for information about graduate study in the 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 on all graduate students in the department or group are main-

tained, and supplying relevant information as requested by the dean.

7. Assisting the dean in the application of university regulations governing graduate students, graduate study, and graduate courses.
8. Advising the chairperson of the department and the dean in the planning and construction of the graduate program in the department or group.

## Graduate Student Council

The Graduate Student Council (GSC) is the officially recognized graduate student representative body at UC San Diego and works for all graduate students — including those at SIO and the Medical School — in all academic, administrative, campus and state-wide areas. The GSC, composed of two representatives from each department and a chairperson, appoints graduate-student representatives to important campus organizations and committees including the Academic Senate, the Graduate Council, the Student Body Presidents' Council, the Graduate Senate. The GSC also sponsors group, departmental, and campus-wide graduate student social activities. The GSC collects no dues or fees, and any graduate student may apply to the council for help in any graduate student matter.

## Graduate Student Affirmative Action Program

The University of California, San Diego has made a commitment to broaden the base of recruitment of graduate students from those groups, such as minorities, women, the aged and physically handicapped, which have been historically underrepresented in the University as a result of economic, educational or societal inequities. The Graduate Student Affirmative Action Program grew out of the need to facilitate the admission of and to provide support for these groups. Several forms of financial assistance are available to individuals who demonstrate the academic potential to complete requirements for advanced degrees. The Office of Graduate Studies and Research, together with graduate departments, administers fellowships, scholarships, traineeships, nonresident tuition scholarships, teaching or language assistantships, and research assistantships — all of which are available on a competitive basis.

Further information and assistance regarding the Graduate Student Affirmative Action Program for women and minorities, the aged, and the physically handicapped may be obtained from the Assistant to the Dean, Graduate Student Affirmative Action, Building 108, Administrative Complex.

## The Master's Degree

The Master of Arts and Master of Science degrees are offered under two plans: Plan I, Thesis Plan and

Plan II, Comprehensive Examination. Since some departments offer both plans, students should consult with their advisers and their major departments before selecting a plan for completion of degree requirements.

## Programs of Study

**Plan I: Thesis Plan** During the quarter following advancement to candidacy, the student electing Plan I must submit a thesis. The thesis committee, appointed by the chairperson of the department and approved by the Dean of Graduate Studies, must consist of at least three faculty members (two from the candidate's major department and one, preferably tenured, from a different department.)

Thirty-six quarter units are required: eighteen units in graduate courses, including at least 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.

For information covering thesis preparation, see *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.

When all members of the committee have approved the thesis, a Report of the Thesis Examination for the Master of Arts or Master of Science Degree under Plan I must be completed. Acceptance of the thesis by the librarian represents the final step in the completion of all requirements by the student for a Master of Arts or Master of Science degree on the San Diego Campus.

**Plan II: Comprehensive Examination Plan** During the quarter following advancement to candidacy, the student electing Plan II must pass a comprehensive examination administered by the major department. A Report of the Comprehensive Examination for the Master of Arts or Master of Science Degree under Plan II must be filed.

Thirty-six quarter units are required: twenty-four units in graduate courses, including at least fourteen units in graduate-level courses in the major field; and twelve additional units in graduate or upper-division courses.

**Residence Requirements** The minimum requirement is three academic quarters, at least one of which must follow advancement to candidacy. Academic residence is established by satisfactory completion of six units or more per quarter, some of which must be graduate level.

A student must be registered in the final 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

## Graduate Studies

course work undertaken, and a minimum of two quarters or more of residency, the student may file an Application for Candidacy for the Master of Arts or Master of Science Degree, electing Plan I or Plan II. 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".)

**General Requirements** Only upper-division and graduate courses in which a student is assigned grades "A," "B," "C," or "S" are counted in satisfaction of the requirements for the Master of Arts and Master of Science degrees.

**Graduate Work at Other Campuses of the University of California** With the approval of the department concerned and of the Dean of Graduate Studies, work completed at other campuses of the University of California may satisfy one of the three quarters of the residence and one-half of the total units required for the master's degree at UC San Diego.

**Graduate Work Completed Elsewhere** 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 in graduate standing at an institution other than the University of California may be applied toward a Master of Arts or a Master of Science degree at UC San Diego.

## 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 final examination, but great weight is given to the student's final presentation and the oral defense of the thesis.

### Program of Study

**Plan III: Modified Thesis Program** During the quarter following advancement to candidacy, the student must submit a thesis. The thesis committee, appointed by the chairperson of the department and approved by the Dean of Graduate Studies, must consist of at least three faculty members (two from the department and at least one, preferably tenured, from a different department).

Seventy-two quarter units, with a GPA equivalent to 3.0 in upper-division and graduate course work undertaken, are required leading to a Master of Fine Arts thesis. For information covering thesis preparation, see *Instructions for the Preparation and Submission of Doctoral Dissertations and Masters' Theses* which is mailed to students upon their advancement to candidacy.

When all members of the committee have approved the thesis, a Report of the Modified Thesis Examination for the Master of Fine Arts degree under Plan III must be

completed. Acceptance of the thesis by the librarian represents the final step in the completion of all requirements by the student for a Master of Fine Arts degree on the San Diego campus.

**Residence Requirements** The minimum requirement is six academic quarters, at least one of which must follow advancement to candidacy. Academic residency is established 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 UC San Diego.

In exceptional circumstances, a student may be given a leave of absence for the purpose of study elsewhere. While appropriate credit may be allowed for the study, the period involved will not change the residence requirement of two years.

A student must be registered in the final 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, and a minimum of five quarters or more of residency, the student may file an Application for Candidacy for the Master of Fine Arts degree. 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.

**General Requirements** Only upper-division and graduate courses in which a student is assigned grades "A," "B," "C," or "S" are counted in satisfaction of the requirement for the Master of Fine Arts degree.

## 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 disciplines and having displayed the ability to make original contributions to knowledge in their fields of study. More generally, the degree constitutes an affidavit of critical aptitude in scholarship, imaginative enterprise in research, proficiency and style 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 academic quar-

ters of residence and is spent in fulfilling the requirements established by the Graduate Council and by the major department (course work, teaching, departmental examinations, etc.). 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 is advanced to candidacy.

The second stage, or in-candidacy study, is devoted primarily to independent study and research and to the preparation of the dissertation. Three quarters of academic residency should elapse between advancement to candidacy and the final defense of the dissertation. Most students will need three to five years to complete all of the requirements for the doctorate.

**Residence Requirements** The residence requirement for the Doctor of Philosophy degree is six quarters, three of which must be in continuous academic residence at UC San Diego. 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. A student must be registered in the final quarter in which the degree is to be awarded. (See "Registration in the Final Quarter.")

**Appointment of Doctoral Committee** At least two weeks prior to a scheduled qualifying examination, the department arranges for the appointment of a doctoral committee. This committee conducts the qualifying examination, supervises 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 major department, and one of these two must be a tenured UC San Diego faculty member.

**Reconstituted Doctoral Committee** For a variety of reasons a doctoral committee may have to be reconstituted. The request for reconstitution of a doctoral committee must be submitted in writing (including departmental affiliation of the members of the reconstituted committee) to the Dean of Graduate Studies by the chairperson of the student's major department.

**Qualifying Examination and Advancement to Candidacy** The doctoral committee administers the qualifying examination and authorizes the issuance of the Report on the Qualifying Examination and Advancement to Candidacy. 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 prior to taking the qualifying examination and advancing 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 pamphlet, *Instructions for the Preparation and Submission of Doctoral Dissertations and Masters' Theses*, which is mailed to students upon their advancement to candidacy.

The doctoral committee shall supervise and pass on the student's dissertation and conduct the final oral examination which shall be public and so announced in the campus publication, *UC San Diego*. The dissertation must be filed with the University Librarian, who accepts it on behalf of the Graduate Council. Acceptance of the dissertation by the librarian represents the final step in the completion by the candidate of all requirements for the Doctor of Philosophy degree.

The petition, Report of the Final Examination and Filing of the Dissertation for the Degree of Doctor of Philosophy, must be initiated by the department, signed by members of the doctoral committee, chairperson of the (major) department and the librarian, and approved by the Dean of Graduate Studies.

## 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 four quarters, at least three of which must be spent in continuous residence at UC San Diego. The C.Phil. degree cannot be conferred after or simultaneously with the award of a Ph.D. degree.

## Postgraduate Appointments

A UC San Diego student is not eligible for any UC San Diego postgraduate appointment until all requirements for the Ph.D. degree have been completed. Such appointments may begin the day after the librarian has accepted the dissertation.

## 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. Graduate programs in the health sciences are conducted in two ways: (1) by regular campus-wide departments with activities re-

lated to the health sciences, for example, the Departments of Biology, Chemistry, and AMES, and (2) by interdisciplinary groups of faculty drawn from the School of Medicine and from campus-wide departments. Program requirements are flexible, consisting of graduate courses and supervised laboratory or clinical investigation.

The following departments or groups provide research training opportunities in the biomedical sciences: bioengineering, biochemistry, biology, biophysics, neurosciences, physics, physiology/pharmacology, psychology, and Scripps Institution of Oceanography.

**Ph.D.-M.D. Program** Students may meet the requirements for both Ph.D. and M.D. degrees in a program offered jointly by the School of Medicine and Health Sciences Graduate Programs. Any student interested in such programs should consult the Associate Dean for Graduate Studies in the Health Sciences. The student must obtain approval of and be admitted to both the School of Medicine and the relevant graduate program. Although most of the work in the first two years of the program will normally be in the School of Medicine, the medical curriculum provides the opportunity for meeting many of the requirements for the Ph.D. The student must complete requirements for the Ph.D. in accordance with the regulations of a department or group and must in addition meet the requirements for the professional degree.

**Five Year B.A.-M.A./M.S. Programs** In the Departments of Applied Mechanics and Engineering Sciences, Applied Physics and Information Science, Mathematics, and Physics, UC San Diego students with distinguished academic records through their junior year are urged to elect in their senior year to begin work toward the master's degree to be awarded at the end of a year of graduate study. In their senior and fifth years such students can combine graduate and undergraduate courses, receiving the bachelor's degree at the end of the senior year and the master's degree at the end of the following year. They may apply at the beginning of their senior year for admission to graduate study at the end of that year. Such admission will be granted if, at the end of their senior year, they have satisfied departmental and Graduate Council requirements for admission to graduate study.

**Accelerated Master's Program in Applied Mathematics** The Department of Mathematics offers an accelerated program in Applied Mathematics whereby highly qualified juniors may be admitted to graduate standing at the end of their junior year and receive a master's degree at the end of what would have been their senior year.

Juniors with exceptional records in the field of mathematics, who will have successfully completed all requirements for the B.A. in Mathematics and the general education requirements of their college by the end of their junior year, may apply for admission to this

program with the approval of the chairperson of the Department of Mathematics and the provost of their undergraduate college.

**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 UC San Diego, a joint program in chemistry is currently offered in conjunction with San Diego State University. Individuals interested in this joint program should consult the Department of Chemistry at San Diego State University.

## Special Programs

**Intercampus Graduate Student Exchange Program** An advanced 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 may become an intercampus exchange student on that UC campus.

Informal arrangements between departmental faculty on the two campuses should 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 three weeks prior to the opening of the quarter, a student must complete the application entitled "Intercampus Exchange Program for Graduate Students." This application, signed by the student's adviser and the Dean of Graduate Studies of the home campus, is forwarded for signature by the department and the Dean of Graduate Studies on the host campus.

Registration is accomplished by the student registering and paying all required fees at the home campus, and then presenting a validated Identification Card to the Office of the Registrar 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. Library, infirmary and other student privileges will be extended by the host campus. Grades obtained in courses taken by the student will be transferred to the home campus for entry on the student's official record.

**Off-Campus Study (Other than Intercampus Exchange Program)** The research and study programs of graduate students may require them to be off campus for extended periods. During such periods a student is required to remain a registered student at UC San Diego and to carry nine to twelve units of course work.

If the off-campus study is outside the state of California, one-half of the registration fee may be waived. The full educational fee and student center fee must be paid.



A student beyond the first year who holds a fellowship and wishes to continue to hold the fellowship while studying off campus must comply with the rules and regulations governing the award and seek the approval of the Dean of Graduate Studies.

Regulations concerning accepting additional awards or compensation for employment as outlined under the financial assistance section apply to off-campus study as well as on-campus study.

**University Extension** Through a reciprocal agreement with University Extension at UC San Diego, a limited number of spaces in Extension classes are open to registered graduate students without payment of additional fees. The number of spaces available for each quarter varies. The student must obtain a University Extension Application for Enrollment from the Office of Graduate Studies, and personally secure the necessary approvals.

Students wishing to offer University Extension course work in partial satisfaction of requirements for a higher degree must file a General Petition with the Office of Graduate Studies well in advance of proposed enrollment, so that approval may be obtained from the Graduate Council.

**Education Abroad Program** This statewide program is coordinated on the San Diego campus by the Office of International Education. Study abroad is presently available on campuses in Austria, Brazil, Egypt, France, Germany, Ghana, Hong Kong, Israel, Italy, Japan, Kenya, Norway, Spain, Sweden, and the United Kingdom and Ireland.

A graduate student is eligible for the Education Abroad Program after completion of one full academic year at a UC campus with an overall B average and two years of university-level work in the language of the country (if applicable) with a B average. The student must submit an application to the Office of International Education accompanied by required supporting documentation.

Selection procedures involve an interview with members of the coordinating committee for the Education Abroad Program of the student's home campus, the statewide director of the Education Abroad Program and a final acceptance by the host university.

Costs vary according to location. Teaching assistantships are occasionally available at some of the overseas campuses.

The student must register (pay fees) and enroll at UC San Diego and also enroll at the host university and must obtain clearance from UC San Diego's Student Health Service. Full academic credit is received for courses satisfactorily completed.

Complete information and application forms for the various overseas campuses may be obtained from the Office of International Education, International Center,

Administrative Complex, Q-018, UC San Diego, or from the Director, Education Abroad Program, 1205 South Hall, University of California, Santa Barbara 93106.

See also "Education Abroad Program" in chapter entitled "Courses, Curricula and Programs of Instruction."

**Foreign Language Training at the U.S. Defense Language Institute (West Coast Branch)** University of California graduate students who have completed one quarter of graduate work have a unique opportunity to acquire fluency in foreign languages through the cooperation of the U.S. Defense Language Institute in Monterey. Courses in thirty-two languages are available at the Institute.

Each year thirty persons certified by the University of California Language Training Advisory Committee are admitted on a "space-available" basis. Complete information is available by writing to the Secretary, Language Training Advisory Committee, College Eight, University of California, Santa Cruz, California 95064.

**Postdoctoral Study** Postdoctoral students play a major role in UC San Diego's teaching and research programs. All interested candidates should make advance arrangements with the relevant department or research unit. The Office of Graduate Studies and Research has administrative responsibility for the enrollment and census of postdoctoral scholars undertaking training at UC San Diego. A scholar is enrolled by means of a Postdoctoral Study and Training Enrollment



## Graduate Studies

form initiated in the office of the faculty sponsor and forwarded to the Office of Graduate Studies and Research for approval, after which an identification card is issued. The scholar completing postdoctoral studies at UC San Diego 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 enrolled.

## Fees

The exact cost of attending the University of California, San Diego will vary according to personal tastes and financial resources of the individual. Each new student entering UC San Diego 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 the current quarterly tuition fee irrespective of the number of courses taken. For the 1978-79 academic year, quarterly expenses may include the following fixed costs:

### Fees Per Quarter\*

	RESIDENT	NONRESIDENT
Tuition		\$635
Registration Fee	\$125	125
Education Fee	120	120
Student Center Fee	10	10

Students should also be aware of the following charges:

Application fee for admission	\$20
Changes in study list after announced deadline dates (Drop/Add Cards)	3
Duplicate registration and/or other cards from enrollment packet	3
Duplicate student ID card	3
Petition for readmission	20
Removal of Grade "I"	5
Advancement to candidacy for Ph.D.	25
Transcript of record	2
Late payment of fees (Late registration)	25
Late filing of enrollment cards (including Preferred-Program Card)	10
Returned check collection	5
Filing fee	62.50

\*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.

### California Residency and the Nonresident Tuition Fee

Students who have not been residents of California for more than one year immediately prior to the residence determination date for each term in which they propose to attend the University are charged, along with other fees, a nonresident tuition fee of \$635 for the quarter or \$952.50 for the semester. 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 school on the semester system, the day instruction begins for the semester.

## General

California residence is established by an adult who has relinquished prior residence and is physically present within the state with the intent to make California the permanent home. California residence must be established more than one year prior to the term for which resident classification is requested. Indicia of California residence include, but are not limited to: registering and voting in California elections; designating California as the permanent address on all school and employment records, including military records if one is in the military service; obtaining a California I.D. card or driver's license; obtaining California vehicle registration; paying California income taxes as a resident; establishing an abode where one's permanent belongings are kept; licensing for professional practice in California, etc. Conduct inconsistent with the claim of California residence includes, but is not necessarily limited to: maintaining voter registration and voting in person or by absentee in another state; obtaining a divorce in another state; attending an out-of-state institution as a resident; obtaining a loan requiring residence in another state; maintaining out-of-state driver's license and vehicle registration, etc.

As a general rule, students seeking resident classification must perform all acts of intent which are applicable to their particular circumstances within the one year durational period. In addition, a substantial number of these acts must be performed when the student first comes to California or very shortly thereafter. If they are not, the durational period for reclassification is extended until both presence and intent have been demonstrated for one year.

Students who are within California for educational purposes only do not gain the status of resident regardless of the length of their stay in California.

The residence of the parent with whom an unmarried minor (under age 18) maintains his or her place of abode is the residence of the unmarried minor. When minors live with neither parent their residence is that of the parent with whom they maintained their last place of abode. Minors may establish their residence when both parents are deceased and a legal guardian has not been appointed. The residence of unmarried minors who have a parent living cannot be changed by their own act, by the appointment of a legal guardian, or by relinquishment of a parent's right of control.

A man or a woman establishes his or her residence. A woman's residence shall not be derivative from that of her husband, or vice versa.

### Exceptions

1. Students who remain in this state after their parent, who was theretofore domiciled in California for at least one year prior to leaving and has, during the student's minority and within one year immediately prior to the residence determination date, established residence elsewhere, shall be entitled to resident classification until they have attained the age of majority and have resided in the state the minimum time necessary to become a resident so long as, once enrolled, they maintain continuous attendance at an institution.
2. Nonresident students who are minors or 18 years of age and can evidence that they have been totally self-supporting through employment and actually present within California for the entire year immediately prior to the residence determination date and have evidenced the intent to make California their permanent home may be eligible for resident status.
3. Students shall be entitled to resident classification if immediately prior to the residence determination date they have lived with and been under the continuous direct care and control of any adult or adults other than a parent for not less than two years, provided that the adult or adults having such control have been California residents during the year immediately prior to the residence determination date. This exception continues until the student has attained the age of 18 and has resided in the state the minimum time necessary to become a resident student, so long as continuous attendance is maintained at an institution.
4. Exemption from payment of the nonresident tuition fee is available to the natural or adopted child, stepchild, or spouse who is a dependent of a member of the United States military stationed in

California on active duty. Such resident classification may be maintained until the student has resided in California the minimum time necessary to become a resident. If a student is enrolled in an institution and the member of the military is transferred on military orders to a place outside of the United States immediately after having been on active duty in California, the student is entitled to retain residence classification under conditions set forth above.

5. Students who are members of the United States military stationed in California on active duty, except members of the military assigned for educational purposes to a state-supported institution of higher education, shall be entitled to resident classification until they have resided in the state the minimum time necessary to become a resident.
6. Students who are adult aliens are entitled to resident classification if they have been lawfully admitted to the United States for permanent residence in accordance with all applicable provisions of the laws of the United States and have thereafter established and maintained residence in California for more than one year immediately prior to the residence determination date.

A student who is an adult alien shall be entitled to resident classification if the student is a refugee who has been granted parolee status or indefinite voluntary departure status in accordance with all applicable laws of the United States; provided that the student has lived in the state for one year. (Effective until June 30, 1980.)

7. Students who are minor aliens shall be entitled to resident classification if they and the parent from whom residence is derived have been lawfully admitted to the United States for permanent residence, provided that the parent has had residence in California for more than one year after acquiring a permanent resident visa prior to the residence determination date for the term.

A student who is a minor alien shall be entitled to resident classification if both the student and his parent are refugees who have been granted parolee status or indefinite voluntary departure status in accordance with all applicable laws of the United States; provided that the student has lived in this state for one year. (Effective until June 30, 1980.)

8. Children of deceased public law enforcement or fire suppression employees, who were California residents, and who were killed in the course of law enforcement or fire suppression duties, may be entitled to resident classification.

### Procedures

New and returning students are required to complete a Statement of Legal Residence. The student's status is determined by the Attorney in Residence Matters' Deputy who is located in the Office of Admissions and Records.

Students are cautioned that this summation is not a complete explanation of the law regarding residence. They should also note that changes may have been made in the rate of nonresident tuition and the residence requirements between the time this catalog statement is published and the relevant residence determination date. Regulations have been adopted by the Regents, a copy of which is available for inspection in the Office of Admissions and Records.

All students classified incorrectly as residents are subject to reclassification and to payment of all nonresident fees not paid. If incorrect classification results from false or concealed facts by the student, the student also is subject to University discipline. Resident students who become nonresidents must immediately notify the Attorney in Residence Matters' Deputy.

Inquiries from prospective students regarding residence requirements for tuition purposes should be directed to the Attorney in Residence Matters; University of California; 590 University Hall; Berkeley, California 94720. No other University personnel are authorized to supply information relative to residence requirements for tuition purposes. Any student, following a final decision on residence classification by the Residence Deputy, may make written appeal to the Attorney in Residence Matters at the above address within 120 days after notification of the final decision by the Residence Deputy.

**University Registration Fee** The university registration fee is a quarterly fee required of all students regardless of number of courses taken. It must be paid at the time of the student's registration. This fee covers the use of recreational facilities and equipment, the International Center, Student Employment Service, the Day Care Center, Crafts Center, Student Information Center, Arts and Lectures programs, and such medical consultation, dispensary treatment or hospital care as can be furnished by the Student Health Service or by health and accident insurance purchased by the University. No part of this fee is refunded to students who do not make use of these privileges. Exemption from this fee may be granted to surviving children of certain deceased California firemen or policemen. Students who believe they may qualify for an exemption on this basis must consult with the Student Financial Services Office, Building 214, Administrative Complex, for a ruling.

**Reduced Registration Fee** One-half of the established registration fee may be waived for graduate students:

1. Whose research or study requires them to remain outside the state of California throughout the quarter. Students must file a General Petition for this privilege.
2. Who are full-time employees of the University, as provided for in the University of California's Staff Personnel Policy 260. Authorization for this privilege is secured from the personnel manager 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 should be recommended for a higher degree from UC San Diego unless the Dean of Graduate Studies and Research shall have certified that all requirements for that degree have been met prior to the appointment to a rank carrying the voting privilege.

The reduction pertains to one-half of the registration fee only. A student must pay, in addition, the full educational and student center fees.

**Educational Fee** The educational fee was established for all students beginning with the fall quarter, 1970. Resident students with demonstrated financial need, who are enrolled in at least six units of course work, may defer payment of the educational fee by accepting an obligation to repay, at a later date, the sum deferred. Students interested in this provision should communicate with the Student Financial Services Office, Building 214 Administrative Complex, at least two months before the first day of the quarter.

**Student Center Fee** Every student is required to pay a student center fee each quarter.

**Filing Fee** A student on an approved leave of

absence who has completed all requirements except for the final reading of his or her 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 may receive partial refunds of registration fees. 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 Graduate Studies and Research. See the circular *Student Fees and Deposits* available from the Office of the Registrar.

**Parking Fee** Students who park motor vehicles (including motorcycles) on the campus are subject to parking fees. (See "Parking on Campus" in chapter entitled "Campus Services and Facilities.")

**Penalty Fees** Penalty fees are charged for failure to comply with normal deadline dates. To avoid such penalties, students should fulfill all requirements in advance of the deadlines listed in the Academic Calendar.

**Transcript of Records** Students may obtain transcripts of their UC San Diego records from the Office of the Registrar for \$2 for the first copy, \$1 for each additional copy ordered at the same time. Transcripts must be requested several days in advance of date needed.

## Financial Assistance

**Types of Financial Assistance Available** Several kinds of financial assistance are available to graduate students at the University of California, San Diego. 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 may be obtained from the department offices.

Descriptions in this section deal entirely with awards administered directly by the University. By "appointment or award" is meant employment for compensation, fellowship or scholarship-type awards, or any other formally recognized educational benefits.

Applicants for financial aid 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** Fellowship stipends are tax-free awards granted for scholarly achievement and promise which enable full-time students to pursue graduate studies and research leading to an advanced degree without requiring them to render any services.

Traineeship stipend awards are not subject to withholding. However, under a recent IRS decision, and as stated in Section 6041 of the Internal Revenue Code, information returns on Form 1099 are required to be filed for awards that exceed \$600 in a taxable year and where a service is performed. At the present time, awards included in the IRS decision are those made under the provisions of Title I, National Research Service Awards (NRSA) Act of 1974 and contain the alphanumeric characters "T32," in the grant identification number.

Stipends range from \$3,200 to \$4,980 and, unless explicitly stated otherwise, do not include tuition or fees in addition to stipends. Part-time students and non-degree students are not eligible. Appointees must register for and complete a full program of graduate study and research each quarter (nine to twelve units of graduate-level work) and must remain in good academic standing, as indicated by yearly evaluations described under "Standards of Scholarship," and by quarterly reviews of course work completed. 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 the fellow's or trainee's proposed summer graduate study or research, approved by the appropriate adviser, is required by the Dean of Graduate Studies before the end of the spring quarter preceding the summer portion of the fellowship or traineeship tenure.

Fellows and trainees may not engage in remunerative employment without the prior approval of the Dean of Graduate Studies. Many fellowships and traineeships offer the privilege of participation in the teaching programs of the University.

The principal types of fellowships at the University of California, San Diego are the following:

1. Regents Fellowships.
2. San Diego Fellowships.
3. Fee Scholarships.
4. Tuition Scholarships.
5. Tuition/Fee Scholarships.
6. U.S. Public Health Service Predoctoral Traineeships.

7. Dissertation — Research Assistantships (California residents only).
8. Dissertation Fellowships (California residents only).

**Assistantships** Graduate students may be employed by the University of California, San Diego on a part-time basis (not to exceed fifty percent time) as research assistants, teaching assistants and language assistants. Assistantships do not include payment for tuition or fees and are subject to tax withholding for salaries received. To qualify for possible tax exemption, the student must be a candidate for a degree and be in a department which requires all candidates for the degree to perform equivalent research and/or teaching, whether or not compensated. Teaching assistants must also be enrolled in a 500 series teaching course to be eligible for a tax certification by the University. Eligible students, upon request to their major departments, may obtain tax certificates for submission to the Internal Revenue Service. Final decision on tax exemption rests with the Internal Revenue Service.

Exemption from withholding of federal income tax may be claimed on Form W-4, Employee's Withholding Allowance Certificate, if no tax liability was incurred the previous year and no tax liability is anticipated during the current year, i.e., (1) gross income is \$2,950 or less if single, or (2) combined gross income of married graduate student and spouse is \$4,700 or less. This exemption must be revoked by filing a new Form W-4 either (1) within 10 days from the time federal income tax liability is incurred for the year, or (2) on or before December 1 if it is anticipated that federal income tax liability will be incurred for the next year. A certificate for exemption from withholding will expire on April 30 of year following unless a new Form W-4 is filed before that date. (See Form W-4 for further details.)

Appointees are required to register for and complete a full program of graduate study and research each quarter (nine to twelve units of graduate-level work) leading to a higher degree and must remain in good academic standing, as indicated by yearly evaluations, described under "Standards of Scholarship," and quarterly reviews of course work completed.

**Application Procedures** Entering students may obtain application materials with instructions from academic department or group offices. Only one application form is needed to apply for admission and for any of the following: fellowships, traineeships, and assistantships (teaching, language, or research).

An applicant who plans to seek fellowship assistance should submit scores on the verbal and quantitative tests of the Graduate Record Examination (GRE), a national test for admission to graduate school. It is administered several times a year throughout the United States and at centers in ninety-six countries by the Educational Testing Service. See Academic Calendar for examination dates. Direct inquiries to the

Graduate Record Examinations, Educational Testing Service, Princeton, New Jersey 08540.

In order for a student 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, including scores of the Graduate Record Examination, must be received by the Office of Graduate Studies and Research by January 15. No assurance can be given that such applications can be processed after January 15. Applications for assistantships may be accepted after that date, but many departments offer assistantships at the same time they consider applications for fellowships. Therefore, applicants for such appointments are strongly urged to submit their applications as early as possible.

Continuing and returning students should consult with their departments.

The awarding of fellowships and similar awards for the following academic year will be announced not later than April 1. UC San Diego adheres 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 to not accept another appointment without first obtaining formal release for that purpose.

**Loans and Grants-in-Aid** See section on financial assistance in chapter entitled "Campus Services and Facilities."

**Time Limits for Graduate Student Support** A graduate student may not serve as a teaching assistant, teaching fellow, language assistant or reader (or any combination of these titles) for more than four years. In addition, the total length of time for all financial support provided by UC San Diego (excluding loans) may not exceed six years for the Ph.D. candidate, ten quarters for a Master of Fine Arts candidate, or seven quarters for a Master of Science or Master of Arts candidate.

**Fellowships and Loans 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 the University of California, San Diego are urged to consult one of the many directories available through the reference departments of large libraries in the United States, or the fellowship adviser in the Office of Graduate Studies and Research (Building 108, Administrative Complex). Most application deadlines occur in the fall or early winter. Among the many organizations which have awarded fellowships to students at UC San Diego

are the National Science Foundation, the United States Public Health Service, and the Danforth Foundation.

California residents may apply for a California State Graduate Fellowship to assist in payment of the university registration fee, the student center fee and the educational fee. The deadline for application is usually in January, and application materials and additional information can be obtained from departmental offices, or the Office of Graduate Studies and Research.

## General Policies and Requirements

**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 *University Policies and Campus Regulations Applying to Campus Activities, Organizations and Students*, copies of which are available at the Office of Graduate Studies and Research.

**Student Appeals** Because department chairpersons — 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 (i.e., course grades, examination results) should first be made to the individual faculty involved, and, if necessary, the department chairperson.

Graduate students who wish to appeal actions of individual faculty, departments or administrators that result in disqualification from further graduate study or from receiving financial support based on merit may do so if

1. The student feels that due process was not followed in arriving at a decision which resulted in disqualification.
2. The student feels 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.

In resolving student appeals, the Dean of Graduate Studies may seek a review and recommendation by the members of the Graduate Council. However, the dean's decision in all cases is final.

**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 signatures before being filed with the Office of Graduate Studies and Research.

**Foreign Language Requirements** Some departments require candidates to demonstrate language proficiency in one or more languages, or proficiency in computer technology, as part of the formal requirements for the Ph.D. degree. In these cases, the testing of proficiency is the responsibility of the department concerned, and no record of the satisfaction of such requirement is filed with the Office of Graduate Studies and Research, or entered on the official record by the Office of the Registrar.

## Grades

**Standards of Scholarship** A student's grade-point average is computed by dividing the total number of grade points earned by the total unit value of courses. S, U, NR, I and IP grades are excluded in computing a grade-point average. To be in good standing academically a graduate student must meet departmental standards for good standing including a satisfactory precandidacy spring evaluation. As a minimum, a graduate student must maintain a GPA of 3.0 in upper-division and graduate 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 appointment.
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 UC San Diego.

Graduate students who are not in good standing for any reason may be subject to probation and/or disqualification from further graduate study.

Only upper-division and graduate courses in which grades of "A," "B," "C" or "S" (Satisfactory) are earned can be counted in satisfaction of the requirements for a higher degree.

In addition, each department prepares, not later than the second week of each spring quarter, a detailed, written evaluation of each of its graduate students who has not advanced to candidacy. These evaluations are designed to inform students of their individual strengths, weaknesses, and progress and to improve communications between faculty and graduate students. Evaluations are made available to students who may elect to add written comments before a copy of the evaluation is sent to the Office of Graduate Studies and Research.

**Grading System** Grades and grade points are described as follows:

A. Excellent 4.0 grade points/per unit

B	Good	3.0 grade points/per unit
C	Fair	2.0 grade points/per unit
D	Barely Passing	1.0 grade point/per unit
F	Failure	0 grade-points/per unit
I	Incomplete but work of passing quality (lapses to F or U if not made up by last day of finals week in the following quarter)	No grade-points
IP	In Progress (provisional grade; No grade-points replaced when full sequence is completed)	No grade-points
S	Satisfactory (equivalent to "B" or better)	No grade-points
U	Unsatisfactory	No grade-points

All grades except Incomplete and In Progress are final when filed in an instructor's course report 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" or "F" grades may not be eligible to continue on appointment and may be subject to academic probation or dismissal.

**No Report** An "NR" listed on a transcript is a computer-produced abbreviation assigned by the registrar indicating that the student was listed on a course report, but no grade was turned in by the instructor. When an "NR" appears, the student should take steps to remove the "NR" entry from his or her record. An "NR" which has not been removed by the last day of finals week in the following quarter after it was incurred shall lapse automatically into an "F" and shall be computed in the student's GPA.

**"I" (Incomplete) Grade** An "I" is assigned when work is of passing quality but incomplete for reasons beyond the student's control, e.g., illness. An "I" grade may be replaced upon completion of the work 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 a "F" grade and will be computed in the student's GPA.

Incomplete grades assigned in the quarter before a graduate student withdraws or takes an approved leave of absence remain as such until the end of the next quarter in which the student registers and pays fees.

**To Remove an "I" (Incomplete) Grade** The student must obtain a petition, Removal of Grade "I", from the Office of the Registrar, secure appropriate signatures and pay the required fee. The approved petition must be filed with the Office of the Registrar no later than 4:30 p.m. on the last day of finals week in the next quarter in which the student is registered.

**"IP" (In Progress) Grades** An "IP" is assigned when a course extends over more than one quarter, and the evaluation of a student's performance may not be possible until the end of the final term. A student who has dropped out without completing the entire sequence may be assigned final grades and unit credit for any term(s) completed, 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. 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 be considered as "F's."**

**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 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 *General Catalog*.

In addition, and with the approval of the department and the instructor concerned, graduate students may elect to have their work in any undergraduate course, or in a graduate course outside their major department graded on an "S/U" basis; also, if departmental requirements have been fulfilled for advancement to candidacy for the Ph.D. degree, graduate students may take any course on an "S/U" basis. Additionally, noncredit courses may be reported on an "S/U" basis.

Selection of an "S/U" 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.

**Repetition of Courses** A student assigned a grade of "D," "F," or "U" may 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. When a course is repeated with a passing grade, the units count but once in satisfaction of unit requirements for a higher degree; however, both grades will remain on the transcript, and will be used in calculating the overall grade-point average.

**Final Grades** A copy of the transcript is sent to each student at the end of every quarter. While course reports submitted by instructors at the end of the quarter are generally considered final, **students should carefully examine their transcripts for omissions and clerical errors and consult with instructors and the Office of the Registrar to clarify any discrepancies.**

**Teaching** Some departments require all students seeking a graduate degree to participate in the teaching program of the department and to enroll in a teaching course in the 500 series. The nature and extent of the duties required for each department are described under "Courses, Curricula and Programs of Instruction." Teaching units are not considered an overload on study-list limits.

**Certificate of Completion** Upon request, the Office of the Registrar will issue a certificate of completion to any graduate student who has completed all requirements for a higher degree but whose diploma has not yet been issued.

**Certificate of Resident Study/Foreign Students** In addition to a formal transcript, the Office of the Registrar will issue a "Certificate of Resident Study" to any foreign student whose visa status requires a return home before completion of studies in the United States. The student must have completed at least three quarters of full-time resident study with a grade-point average of at least 3.0, not covered by a diploma or other certificate.

## Admission Requirements

**Academic** Applicants for graduate admission must present official evidence of receipt of a baccalaureate degree from an accredited institution of higher learning or the equivalent, with training comparable to that provided by the University of California. A scholastic average of "B" or better in upper-division courses, or prior graduate study is required.

**The Graduate Record Examinations (GRE)** All applicants who wish to be considered for fellowships or graduate scholarships are required by the Graduate Council to submit scores from the Aptitude Test of the Graduate Record Examinations. Moreover, most departments and groups at UC San Diego require or recommend that applicants submit GRE test scores in support of their applications for admission.

## Admission Policies

**Duplication of Advanced Degrees** Normally, duplication of advanced degrees is not permitted. A professional degree is not regarded as a duplication of an academic degree.

**Non-Degree Study** There is no "student-at-large" classification at the University of California, San Diego; application for admission must be made to a specific department or group. Applicants who wish to take "course work only" within a department or group and who do not intend to pursue a higher degree at UC San Diego 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.

**Part-time Study** Students who enroll in fewer than nine upper-division or graduate units per quarter are considered part-time students. Applicants desiring admission as part-time students must satisfy all admission requirements, pay the same fees as full-time students, and may not hold fellowships or assistantships.

## 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" to determine the proper time to apply.

All other applicants should ask their prospective major departments for this information.

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 or group 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 for admission must complete a graduation application and forward it, together with a non-refundable application fee of \$20, to the Office of Graduate Admission, Q-003, UC San Diego, La Jolla, California 92093. (Only one application is needed to apply for admission and for fellowships, traineeships, scholarships, or assistantships.) Detailed instructions as to how to complete the application appear on the cover of the application packet. Listed below are the documents which are required in support of an application for graduate admission.

**Required Supporting Documents** All supporting documents — except letters of recommendation — should be forwarded to the Office of Graduate Admissions, Q-003, UC San Diego, La Jolla, California, 92093. Letters of recommendation should be forwarded directly to the applicant's prospective major department or group.

**Academic Records** — Applicants should 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 the Office of Graduate Admissions. (Transcript labels are enclosed in the application packet.) 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 UC San Diego must submit evidence of degree conferral (as well as a final academic record) as soon as possible.

**Special Note to Foreign Applicants** — In all applications for graduate admission, as noted earlier, official records bearing the signature of the registrar and the



seal of the issuing institution are preferred. 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, English translations must accompany official documents in their original language.

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** — Applicants who are applying for admission to a department or group which requires that they take the GRE (see graduate brochure, *Applying for Graduate Study*) should do so as early as possible to insure the timely receipt of their score results. **Fellowship and scholarship applicants must arrange to take the GRE no later than December in order to meet the January 15 deadline** (see "Academic Calendar"). The GRE is administered six times a year in the United States and five times a year in ninety-six other countries. Applications may be obtained from the Educational Testing Service, Box 955, Princeton, New Jersey 08540.

**Letters of Recommendation** — Applicants should arrange to have three letters of recommendation forwarded directly to their prospective major department or group. (Recommendation forms are enclosed in the application packet.) Only one set of recommendation letters need be submitted in support of an application for admission and fellowship or assistantship consideration. It is most important that letters of recommendation be completed by professors in a position to analyze an applicant's abilities and academic promise. Applicants who have applied within the last two years, but did not enroll, should check with their major department or group to determine if letters of recommendation are still on file.

**Confidential Financial Statement** — Foreign applicants are required to certify that they will possess sufficient funds to cover all fees, transportation and living expenses while studying in the United States. A Confidential Financial Statement in which foreign applicants are asked to indicate the amount and source of their funds for graduate study is enclosed in the application packet and should be returned with the application. Written evidence of sufficient financial resources for the entire degree program must be shown before admission and visa forms will 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.

**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. The TOEFL is offered four times a year at centers throughout the world. Arrangements for taking the TOEFL may be made through the nearest United States embassy or by writing to the Educational Testing Service, Box 899, Princeton, New Jersey 08540.

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 UC San Diego and to enroll in an English course until the required proficiency is attained.

## Admission and Registration

Official admission to graduate study at the University is contingent upon review of an applicant's record, an affirmative recommendation by the prospective department or group, and action by the Office of Graduate Studies and Research. The Dean of Graduate Studies or the prospective major department or group may deny admission if an applicant's scholastic record is undistinguished, if the preparation is judged inadequate as a foundation for advanced work, or if the department's or group's facilities are already filled to capacity. Only the official Certificate of Admission from the Dean of Graduate Studies constitutes formal approval of admission to a graduate program at the University of California, San Diego.

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 departments or groups 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 and group offices approximately two weeks before the opening of the quarter (see "Academic Calendar").

## Reapplication

Students who fail to register in the quarter for which they first applied may request reconsideration of their applications for a later quarter within the same academic year. Application for admission for the subsequent academic year may be made by submitting a statement of activities and official transcripts of any

## Graduate Studies

academic work undertaken since the first application. In no case are application files retained for more than four consecutive academic quarters. Application for admission after this period may be made only by completing a new application and providing all necessary documents.

## Medical History Forms

All new students, graduate or undergraduate, and all students returning to the San Diego campus after an absence of three or more successive quarters, must submit a completed medical history form to the Student Health Service.

Entering students are required to complete a medical history form prior to registration and to send it to the Student Health Service. A report of a tuberculin test must be submitted also. In addition, students are urged to submit a physical examination form completed by their family physician, particularly if they plan to take part in intercollegiate athletics. Information sent to the Student Health Service is held confidential and is carefully reviewed to help provide individualized health care. Routine physical examinations are not provided by the Student Health Service.

Information and required forms are mailed to all new students by the Student Health Service well in advance of registration.

## Readmission

A graduate student whose status has lapsed because of an interruption in registration must petition for readmission at least eight weeks prior to the first day of the quarter in which he or she wishes to re-enroll. Students must submit supplementary transcripts of all academic work since last enrolled in UC San Diego, pay a readmission fee of \$20, complete a General Petition, a Statement of Activities and a Statement of Legal Residence. **Readmission is not automatic.**

## Registration Requirements and Procedures

NOTE: Deadlines differ for new/returning and continuing students. Consult the "Academic Calendar."

New students must enroll and pay fees on or before the deadline dates set for registration of new students each quarter. Enrollment packets may be picked up at the major department after the student arrives on campus.

Continuing and returning students must enroll and pay fees during the period designated by the Office of the Registrar; enrollment packets are sent directly to the departments. (See *Schedule of Classes* for current deadlines.)

**Full-Time Student** A full-time student is required to be registered for nine to 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. Failure of a student to register or to take a leave of absence will constitute evidence of withdrawal from graduate study. 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.

**Part-Time Student** A part-time student is enrolled in less than nine units a quarter but is admitted as a regular student, and **must pay the same fees as a full-time student.**

**Registration Procedures** A student if not officially registered for classes until the entire registration procedure outlined below has been completed **each quarter.**

1. Using the current copy of *Schedule of Classes* available from the University Bookstore, complete the Preferred-Program Card and all other forms in the registration packet.
2. Secure graduate adviser's signature on completed Preferred-Program Card (Study-List Card).
3. File completed registration packet including Preferred-Program Card with the Office of the Registrar prior to the deadline date.  
NOTE: Deadlines differ for new and continuing/returning students. See "Academic Calendar" and *Schedule of Classes*.
4. **Pay required fees to the Office of the Cashier prior to the registrar's deadline date. When paying fees, present the Fee Card enclosed in registration packet together with Student Identification Card for validation.**

**Late Registration** Students will be assessed late fees if not enrolled and registered by the registrar's published deadline dates each quarter.

A \$10 late filing fee will be assessed if a student does not enroll (file the enrollment packet with appropriate signatures) with the Office of the Registrar, Building 101, Administrative Complex, by the deadline dates published in the "Academic Calendar" and in the *Schedule of Classes*.

Additionally, a \$25 late registration fee will be assessed if the student has not completed registration (paid fees) prior to 3:00 p.m. on the deadline for completing registration as outlined in the "Academic Calendar" and the *Schedule of Classes*.

A student who has not completed registration (enrolled and paid fees, including late fees if required) by the registrar's deadline date **must petition for permission to register late.**

**Student Identification Card** A validated Student Identification Card entitles the student to library privileges, a student health card and use of other university facilities. If the card is lost, a duplicate may be obtained from the Office of the Registrar (see "Fees and Expenses"). Identification cards must be surrendered to the Office of the Registrar when petitioning to withdraw or to go on leave of absence.

UC San Diego graduate students working on campus during summer months may request Temporary Student Identification Cards from their departments.

**Changes of Name or Address** Students must file official change of name or address forms with the Office of the Registrar when applicable.

**Preferred-Program Card (Study List)** A student must complete the Preferred-Program Card (Study-List Card) included in the registration packet, listing all course work, independent study, or research to be undertaken for each quarter of registration. The Preferred-Program Card must be approved by the graduate adviser and filed with the Office of Registration and Scheduling. Following enrollment, each student will receive confirmation of class enrollments on an official Study-List Card. Only successfully completed course work appearing on the Study-List Card will be credited toward a degree. Unapproved withdrawal from a course listed on the Study-List Card will result in a failing grade.

**Study-List Limits** A graduate student in a regular quarter is limited to sixteen units in undergraduate courses or to twelve units in graduate courses, or to a total made up of twelve to sixteen in proper proportion—i.e., six graduate and eight undergraduate, when taking both undergraduate and graduate courses.

Research assistants and others employed part-time register for nine to twelve units; if half-time employment involves research or other activities which are awarded graduate credit, the student's graduate adviser may authorize registration for a full program of study. Students engaged full-time in other occupations are limited to six units.

To obtain approval for exceeding these study limits, a student must complete a General Petition (in advance of the start of the quarter) and submit it to the Dean of Graduate Studies.

Teaching units (500 series) above the maximum are not considered an overload.

**Changes in Study Lists** After the Preferred-Program Card has been filed with the registrar, a student may add or drop courses or change sections of a given course during the first and second week of classes without fee by completing an Add/Drop Card, available at the Office of the Registrar, with the approval and signature of the student's adviser. (See *Schedule of Classes*, "Change of Program".) If a change is being

made from a letter grade to or from "S/U", the instructor's signature is required. Add/Drop Change Cards must be completed in full and must include identical course information as listed in the *Schedule of Classes*. When changing units in a variable-unit course, a student must drop the course, then re-add it with the correct number of units.

If a change is made in the third and subsequent weeks, the student must complete an Add/Drop Card (completing both sides of the card), secure the appropriate signatures and approval of the Dean of Graduate Studies, and pay a fee to the cashier.

Properly executed changes in study lists 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.

**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 he or she expects to receive the degree.

**Continuous Registration** All full-time and part-time 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 by the registrar's deadline dates will be assumed to be withdrawn from UC San Diego, and will be dropped from the official register of graduate students. A student who decides to continue study at a later date must petition for readmission, pay the non-refundable readmission fee, and be considered for admission with all others requesting admission to that quarter.

**Leave of Absence/Extension** Prior to leaving the campus, a student who discontinues his or her studies with the intention of resuming them during a later quarter must file a formal Leave of Absence/Request for Withdrawal for the period (one to nine quarters). The Dean of Graduate Studies may grant a request for an extension beyond three years with a supporting letter from the chairperson of the department or group. A student who fails to file a leave of absence, or who allows a leave to expire will be considered withdrawn and must apply formally for readmission.

Prior to the end of the second week of instruction of the quarter in which the leave is to begin, a student must secure the approval of the graduate adviser and the chairperson of the (major) department, clear through Special Services, Student Financial Services, Office of the Cashier, and Loan Office, and obtain approval of the Dean of Graduate Studies. The student's validated

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Identification Card must be attached to the leave of absence.

A student may request an extension of an approved leave *prior to the expiration of the leave*.

A student who has not completed one quarter or more of academic residency or who is not in good academic standing will not be permitted to take a leave of absence but must withdraw.

A new Statement of Legal Residence is required for all graduate students **returning from a leave of absence of two quarters** or more. In addition, a student who has been on leave of absence for three or more consecutive quarters must be cleared by the Student Health Service prior to reenrolling at UC San Diego.

A student on leave of absence status may not make use of university facilities, nor place any demands upon faculty including discussion of dissertation work (either directly or by correspondence) during the period of the leave.

A student on leave of absence cannot be employed at UC San Diego or the University Hospital in any capacity and may not hold a fellowship, traineeship, or similar appointment administered by the University.

**Withdrawal** A student withdrawing from the University must obtain a Leave of Absence/Request for Withdrawal and secure appropriate signatures. The approved form must be filed with the Office of Graduate Studies and Research, and the Student Identification Card surrendered.

Students who withdraw during the first thirty-five days of instruction will receive refunds of fees in proportion to the number of lapsed calendar days since the first day of instruction. The date of withdrawal used in calculating the refund shall be the date on which notice of withdrawal is submitted to the Office of Graduate Studies and Research.

A student who has registered (enrolled and paid fees) and fails to file a Request for Withdrawal (no later than two weeks before the end of the quarter) will receive a grade of "F" or a nonpassing grade in each course, thus jeopardizing eligibility for readmission.

**Bar from Registration/Non-Academic** After suitable warning and opportunity to rectify the matter, a student may be barred from further registration for a variety of non-academic reasons, including failure to comply with official notices, to settle financial obligations when due, to complete medical examination requirements or other related matters.

**Bar from Registration/Academic** Academic disqualification is determined by the Dean of Graduate Studies on recommendation of the chairperson of 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; accumulation of

more than eight units of "F", or "U" grades; or failure to comply with conditions set at a time of admission to a graduate degree program.

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## Appendix

**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 UC San Diego students are listed here.

### Graduate Record Examination (GRE)

**Address:** Graduate Record Examinations, Box 955, Princeton, New Jersey 08540

**Purpose:** To appraise intellectual qualification of candidates for admission to graduate study and to help sponsors of fellowship programs select the recipients of their awards.

**Application:** Information and forms are available at the Office of the Registrar, UC San Diego, or the above address.

Applications must be submitted to Educational Testing Service (see above for address) at least *four weeks* prior to scheduled examination dates in the United States and Puerto Rico and at least six weeks in all other countries. In an emergency, it may be possible to take the GRE without registering beforehand.

**Examination Schedule:** Six times a year in the U.S.; five times a year in ninety-six countries; several additional times a year in eight major U.S. cities (dates change each year).

<b>Fee:</b>	Aptitude	\$13.00
	One Advanced Test	13.00
	Late Registration Penalty	4.00

### Graduate School Foreign Language Testing Program (GSFLT)

**Address:** Educational Testing Service, Box 519, Princeton, New Jersey 08540

**Purpose:** To measure ability to read and understand literature written in French, German, Russian, or Spanish in order to meet foreign language requirements for advanced degrees.

**Application:** Information and forms are available from the above address or the San Diego State University Testing Office, 560 Love Library, 5300 Campanile Drive, San Diego 92182. Telephone: 286-5216

Applications must be submitted to the university administering the examination at least one month prior to scheduled examination dates.

**Examination Schedule:** Four times a year  
(dates change each year)

**Fee:** \$11

**Miller's Analogy Test (MAT)**

**Address:** The Psychological Corporation, 304  
East 45th Street, New York, New York 10017

**Purpose:** A high-level mental test which provides information to support candidates for admission to graduate study.

**Application:** Information and applications are available from the above address or from the San Diego State University Testing Office, 560 Love Library, 5300 Campanile Drive, San Diego, California 92182. Telephone: 286-5216

**Examination Schedule:** The third Thursday of every month at 3:00 p.m. at San Diego State University. Student should arrive at least thirty minutes prior to exam to pick up and take reservation card to bookstore cashier's office to pay the fee.

**Fee:** \$5

**Test of English as a Foreign Language  
(TOEFL)**

**Address:** Box 899, Princeton, New Jersey 08540

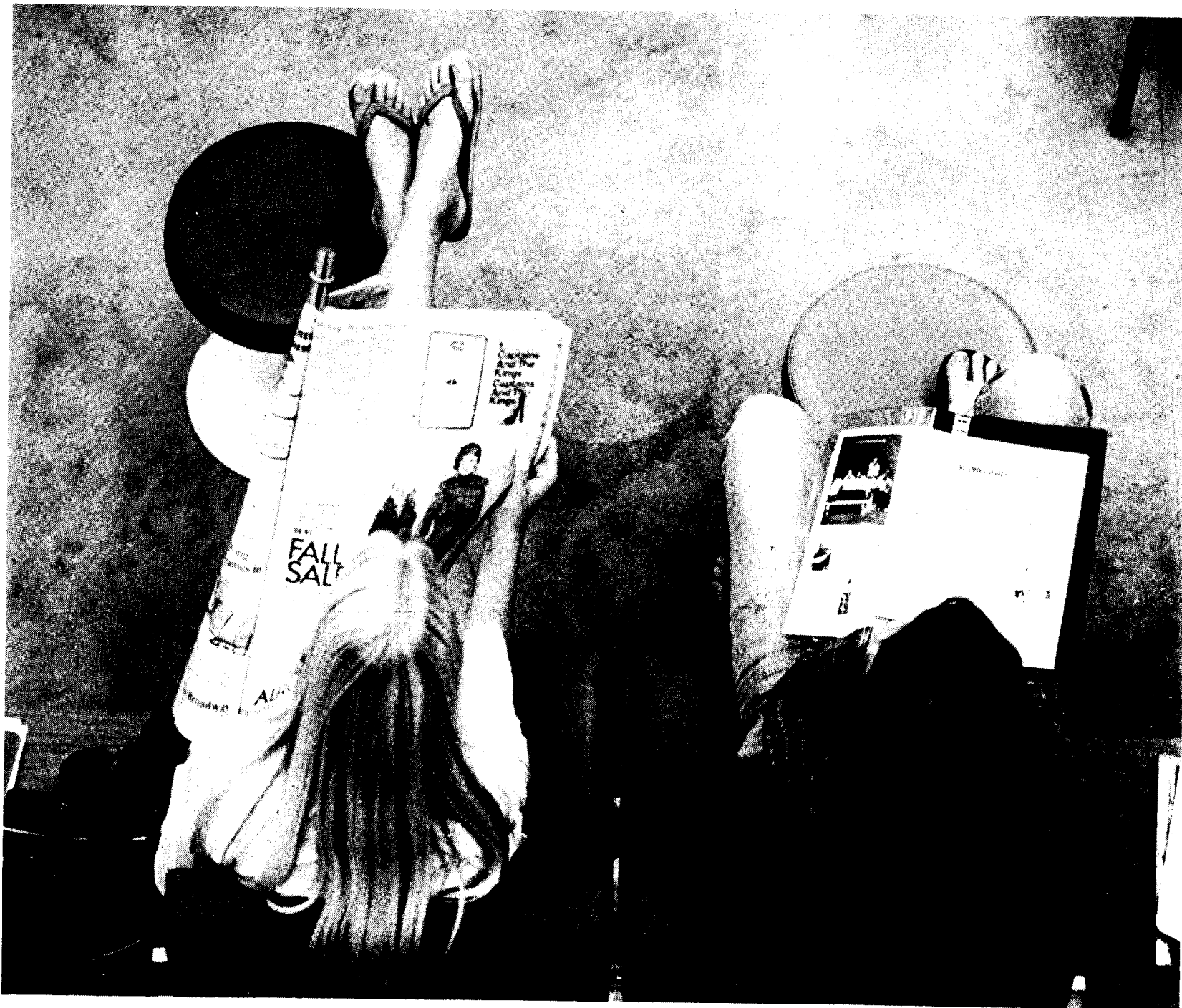
**Purpose:** To help foreign students demonstrate their English language proficiency at the advanced level required for graduate study.

**Application:** Information and forms are available from the above address; United States embassies, consulates, and related centers; and the San Diego State University Testing Office, 560 Love Library, 5300 Campanile Drive, San Diego 92182. Telephone: 286-5216

Applications must be submitted to the appropriate agency at least six weeks prior to the scheduled examination date.

**Examination Schedule:** Four times a year (dates change each year) in about 125 countries.

**Fee:** Test \$17.





# Campus Services and Facilities

A broad range of special services and facilities is available to students at UC San Diego, undergraduate and graduate alike. (Services limited to graduate students will be found under the section entitled "Graduate Studies".)

## ACADEMIC SERVICES AND PROGRAMS

**OASIS (Office of Academic Support & Instructional Services, Extension 3760)** is a program designed to provide tutorial services and academic support to those undergraduate students who request help.

**Tutorial Services:** The Tutorial Program offers free, long-term tutoring on a quarterly basis in the lower-division math and science sequences for all four colleges. In addition, the Math/Physics Clinic, Biology/Chemistry Clinic, and the Computer Skills Clinic offer problem-oriented help on a walk-in basis for those students who do not need long-term tutoring. Special services are also available in psychology, political science and economics.

**Other Academic Support Services:** The OASIS staff offers workshops to improve reading, note-taking, exam preparation, writing, library search strategies, time management and other study skills in classroom and laboratory settings. In addition, consultation is available for educational research and/or evaluation and for the development of instructional media materials. In-depth diagnostic evaluations and prescriptions are available to students of diverse backgrounds. Particular emphasis is provided to help students learn academic skills necessary for success at UC San Diego through the Academic Skills Program.

For further information and to sign up for any of these services, call extension 3760 or come to the Student Center Complex, Building B.

**Writing Clinic** The Writing Clinic offers non-credit assistance in writing to all students who request it. The instruction, given informally in one or more tutorial sessions, focuses on such immediate writing tasks as course papers, letters of application, and scholarly articles.



**The University Library** The University Library of the University of California, San Diego consists of the Central University Library, the Science and Engineering Library, the Biomedical Library, the San Diego Medical Society-University Hospital Library, the Scripps Institution of Oceanography Library, and the Cluster Undergraduate Library. The combined holdings of the library are over one million volumes, and 25,000 periodical and other serial publications are received.

The library, through its Instructional Services Program and the Contemporary Issues section in Muir College, offers courses and information on the use of academic libraries. These courses, and the reference services offered at each of the campus libraries, are designed to assist students and faculty with research and instruction.

An important reference service is the compilation of subject bibliographies using a computerized literature searching system, a process which not only saves library users the work of manually searching printed indexes, but also allows more thorough searching on desired topics. Contact the reference department of any library unit for information on the charges for this service and the procedures for requesting it.

The *Central University Library* consists of the general and specialized graduate and research collections in the arts, humanities, and social sciences. Other resources are local, state, national and international documents, maps, microforms section and a listening facility for music courses and instruction. The library's special collections of rare and valuable books include important collections separated into three distinct categories by *area*: Baja California, local history and Tonga; by *authors*: Lawrence, Hemingway and Yates, and *subject*: Renaissance, Pacific Voyages, Archive for New Poetry, Spanish Civil War, Hispanic collections and the Contemporary Music Archive.

The *Science and Engineering Library*, in Urey Hall, contains strong collections in aeronautics, astrophysics, atomic energy, chemistry, electronics, engineering, instrumentation, mathematics, missiles research, physics, space sciences, and nuclear energy.

## Campus Services and Facilities

The *Biomedical Library*, in the Basic Sciences Building of the School of Medicine, contains research collections in biology and medicine. A branch of the Biomedical Library is maintained at the University Hospital.

The *Scripps Institution of Oceanography Library* has outstanding collections in oceanography, marine biology and underseas technology, and also specializes in geology, geophysics and zoology publications.

The *Cluster Undergraduate Library*, in the Humanities-Library Building, has a general collection to serve the basic needs of undergraduate students.

The *Slide Collection*, a unit of the UC San Diego library located in the Mandeville Center, has been developed to provide visual materials (slides) for on-campus instructional purposes. The collection of over 70,000 slides covers all periods of art history in architecture, sculpture, painting, and the minor arts.

**The Computer Center** The UC San Diego Computer Center operates two major computer systems, both located on the first floor of the AP&M Building in Muir College. The Burroughs B6700 computer offers a wide variety of programming languages and classes of service, and may be reached either by coming to the AP&M Building, or by means of a variety of remote terminals. The CDC3600 is a second-generation computer with excellent facilities in the FORTRAN language. Users may also use a variety of computers located at other universities, including the IBM 360/75 at UCSB and the CDC 7600 at Lawrence Berkeley Laboratory.

The Center's facilities are used to support instruction, research, and administrative activities. Most students and research staff members do their own programming. Open shop access is available via the input/output stations or remote terminals. (Computer terminals for inter-active use are available in the Computer Center Classroom, Room 125, Communications/Media Center, Third College and in the Playback Center, Cluster Library.) Large jobs are run under the control of a professional operations staff. Non-credit programming courses are offered at frequent intervals and at various levels of sophistication. These courses supplement the programming instruction available in the credit courses offered by many departments. The Center provides a consulting staff to aid users on special problems. Documents are available on most of the Center's many facilities. The larger manuals are sold through the campus bookstore, while smaller write-ups are available at no charge through the Center's consulting office or the on-line documentation facility.

The Computer Center regularly has a need for a small staff of student programmers, generally to work on the maintenance or development of large system programs, or utility library programs. Occasionally, part-time employment in the Center provides support for students working on advanced degrees in information and computer science.

**Foreign Student Adviser** See section "Office of International Education."

**Education Abroad Program** The Education Abroad Program provides students enrolled at the University of California with an opportunity for an inter-cultural experience at UC centers located in Africa, Asia, Europe and Latin America while allowing normal progress toward a degree.

The program is described in detail in the "Courses and Curricula" section of this catalog under the "Education Abroad" heading.

**Educational Opportunity Program (EOP)** Students who are considering application for undergraduate admission to UC San Diego and who feel they need special support services may contact the EOP Office in the Student Center Complex, Extension 4253. This program supplements such regular University services as admissions, counseling, financial aid, and graduate and career placement. It is generally helpful to all students as an additional University resource, but is particularly helpful to minority students and/or those who will need financial assistance to matriculate at UC San Diego.

## University Extension

Extension is the self-supporting system through which UC San Diego endeavors to meet the lifelong educational needs of the San Diego community. It offers a broad range of programs, from business and scientific courses designed to help professionals update their knowledge to arts and humanities classes that enrich one's cultural perspective. Self-discovery workshops, lecture and film series, current events seminars, exercise and sports classes, and study tours all over the world are part of the curriculum. Both credit and non-credit courses are offered on campus and in other San Diego County locations. This year's enrollment is approximately 40,000.

To fulfill its goal of extending the resources of the University to the community, the following programs are also part of the Extension curriculum: Tutorial Degree Program; Institute for Continued Learning; National Media Courses; The Mystery Library; Summer Study Skills Institute; Alcohol Studies Program; Professional Certificate Courses. For further information on Extension courses, call 452-3400 for a free *Explore* catalog. Extension is entirely supported by course fees and receives no state money.

**Concurrent Registration** is a procedure which allows Extension students to enroll in regular UC San Diego courses on a space-available basis with the approval of the course instructor. This program is also open to high school students under special conditions. A reciprocal arrangement with UC San Diego allows an equal number of UCSD students to enroll in Extension courses free of charge. Undergraduates at UC San Diego should call their provost's office for information;



graduate students should contact the Office of Graduate Studies and Research.

**Tutorial Degree Program** is a self-directed course of studies leading to a B.A. degree from the Union for Experimenting Colleges and Universities. Participants set their own educational goals, design their own curriculum, and work at their own pace under the supervision of UC San Diego faculty.

**Institute for Continued Learning** 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.

**National Media Courses** is a series of innovative new programs developed by UCSD Extension for colleges and universities across the country. The courses utilize outstanding newspaper articles and television series (for example, *The Ascent of Man*) as major course components.

**The Mystery Library** is a book club devoted to exploring mystery fiction and to republishing great mystery classics. The program is administered under the auspices of Extension by a board of distinguished mystery writers.

**Summer Study Skills Institute** is designed to help college-bound students gain a competitive edge. Open to those of high school age and older. Additional study skills classes are offered throughout the year.

**Alcohol Studies Program** includes a summer conference which draws mental health and law enforcement professionals from all over the west for seminars on intoxicant abuse, and a series of courses for driving-while-intoxicated offenders assigned by the court.

**Professional Certificate Courses** are planned sequences of related courses, offered in cooperation with professional associations. Accounting, systems management, real estate, and taxation are some of the fields represented.

## STUDENT AFFAIRS

**Vice Chancellor and Dean, Student Affairs Office (Extension 4370)** This office provides direction and support to all Student Affairs services and programs. The office is located in the Student Center.

**College Deans' Offices (Revelle, Extension 3492; Muir, Extension 3587; Third, Extension 4391; Warren, Extension 4353).** The staffs of the college deans' offices perform many different functions and provide help, advice, counseling and referral in many areas. They regularly coordinate with other offices on such issues as: career planning topics, procedures for applying to graduate school or professional schools,

decisions about remaining in or withdrawing from school, legal problems, grade problems, involvement in student governments and other activities, handling financial concerns, housing concerns, assisting with specialized concerns for physically limited students, assisting in hearing procedures regarding grievances of any kind.

Contact your college dean's office for assistance, particularly if you are uncertain of what office or resource would best be able to aid you with your problem or concern.

**Office of University Events.** The Office of University Events provides a central source for all programming in the areas of fine arts, films, lectures, and popular entertainment on the UC San Diego campus.

Through a system of campus-wide committees, students and interested faculty and staff recommend the programs which are to be presented during the year.

The Office of University Events maintains the Master Calendar of Public Events which acts as a clearing house for all public events presented at UC San Diego. During the 1976-77 school year more than 735 events took place.

For student organizations and other campus-related units, the office provides a central source for programming advice and assistance in the areas of event planning, publicity, ticket handling, technical set-up, contracts, etc.

**Counseling and Psychological Services (Information: 452-3755)** The functions of Counseling and Psychological Services are:

1. To provide professional assistance to students having difficulty coping with academic, vocational, personal, emotional, or marital problems.
2. To provide professional consultation to the university community in matters of student behavior in order to prevent problems and enhance the student experience.
3. To consult with professionals and non-professionals working with students on this campus, e.g., deans, administrators, members of the faculty, etc.
4. To promote and conduct basic and applied research, both independently and in cooperation with other offices and departments concerning various aspects of student development.
5. To participate, upon request, in the general education functions of the University and to conduct special programs related to student development.
6. To provide internship experiences for graduate students in mental-health disciplines.

## Campus Services and Facilities

Counseling is available to any regularly enrolled graduate or undergraduate student, and spouse, on an individual or group basis. The services offered include:

1. *Personal Counseling* Students who have problems that may be limiting their effectiveness are encouraged to seek counseling. The most usual problems include depression, loneliness, unsatisfying personal relationships, concerns about issues of sexuality, drugs, alcohol, or academic achievement.
2. *Vocational Counseling* Students who are uncertain of their major or of their career goals may explore their interests and skills, and the options available to them.
3. *Workshops* A variety of groups and workshops about specific issues are offered throughout the year. Ordinarily, focal topics will include, for example, motivation, stress reduction, assertion training, human growth, creativity, women's issues, etc.

Members of Counseling and Psychological Services are clinical and counseling psychologists and social workers. Most major cultural and ethnic groups are represented on this staff. Psychologists have offices at all colleges, as well as in a central location. The counseling relationship is private and confidential.

## Career Planning And Placement

Career Planning and Placement offers a continuously updated group of services to undergraduate and graduate students. These services include general career advising, workshops, job hunting techniques and information concerning employment and graduate/professional school programs.

**General Career Advising (Information: 452-3750)** All students are offered advising, learning experiences, and information on:

1. *Career Planning:*  
The career planning program provides advising based on academic field and/or interest of students:
  - a. Humanities & Social Sciences Programs
  - b. Physical & Engineering Sciences Programs
  - c. Health & Biological Sciences Programs

These programs include individual and group advising, field trips and access to career consultants which provide students the opportunity to explore a full range of career opportunities.

2. *Specific Occupational Exploration* Students acquire knowledge of career areas of choice, plan their education as necessary, and seek entrance in a career field most compatible with their needs.

**Graduate/Professional School Program (Information 452-3750)** The Office of Career Planning and

Placement offers central services for students making graduate and professional school programs their next educational step.

1. *Pre-Medical/Dental Advising Services* assists those students who have narrowed their career focus to gaining admission into medical or dental school. Note: juniors should check how/when/where of medical/dental school application during the late fall quarter.
2. *Advising Services* provides basic "what do you need to know about applying to graduate schools" advising, and assistance with comparing and contrasting types of programs. Gives in-depth advising to students on professional programs not directly related to undergraduate majors offered at UC San Diego — e.g., management, social work, law, etc.
3. *Letters of Recommendation Service* Students who are or will be receiving degrees from UC San Diego may establish a file for application to graduate or professional school. The file includes letters of recommendation, copies of which will be sent at the student's request.
4. *Graduate/Professional School Visits* Career Planning sponsors visits by representatives from several educational programs. Students will find these people an excellent source of general and particular information.

**Employment** Career Planning and Placement provides job-listing, referral, interviewing, and advising services to students seeking employment. Services offered are:

1. *Job Planning* (Information: 452-3750) Individual and group advising helps students relate skills to occupational fields of choice, identify and approach potential employers, and learn job-hunting techniques. Note: this service is recommended for students at all academic levels seeking part-time, summer, or career employment.
2. *Part-Time Employment* (Information: 452-4500) Listings of off-campus, part-time and summer employment opportunities are available to currently enrolled students. Other sources provided are:
  - a. Internships — an opportunity for work experience in a field related to students' academic major or career interest fields; internships are available during the academic year as well as for the summer months.
  - b. Skills File — a computerized listing of students with specialized skills which provides job referrals to employers requesting those skills. A good opportunity for part-time employment of short or long term duration.

- c. Listings of live-in positions, which offer room and board (and sometimes a small salary) in exchange for work.

Note: employment *CANNOT* be arranged by correspondence; persistence in checking jobs posted is the best guarantee for finding employment. Foreign students should obtain any necessary work permits from the Office of International Education; students under the age of eighteen must obtain a work permit from their local high school or the State Labor Department Office.

3. *Full-Time Employment* (Information: 452-3750) Career-related employment listings are received and posted from local, statewide, and national employers.
4. *On-Campus Interviewing Service* (Information: 452-3750) This service affords students the opportunity of interviewing for particular jobs in business, industry and government.
5. *Teacher Placement Service* (Information: 452-3750) provides advising, placement files, and educational job listings to those degree candidates and alumni seeking teaching positions, particularly at two- and four-year colleges.

**Career and Graduate School Library** (Information: 452-3750) gives students and alumni self-help access to a large spectrum of career literature on occupations, employers, medical/dental schools, and other graduate and professional programs. Also available is an audio cassette-library on occupations and career planning techniques.

**On-Campus Student Employment** Located at Building 210, Administrative Complex, on-campus student employment office is the personnel office for students working under staff (or combination staff and academic) titles on campus. Only currently registered UC San Diego students and those with a Letter of Admission are eligible for referrals to positions listed in this office. Students interested in on-campus employment must complete an information card for use in the student employment office. Employment *CANNOT* be arranged in advance or by correspondence, since the majority of jobs are available at the time they are listed and must be filled immediately. Students taking a full course load are currently limited in the number of hours they may work on campus. Students may be employed full time during the summer months. Freshmen are discouraged but not barred from seeking employment their first quarter at UC San Diego. Students with financial difficulties are urged to confer with the financial aid counselor for their college in the Office of Student Financial Services. Foreign students will be asked to obtain a work permit from the Office of International Education before applying for referrals. Work-study placement is handled through the student employment office. Students with work-study awards may begin to receive work-study referrals one week prior to the beginning of classes in September.

## Financial Assistance

All financial assistance for undergraduate and medical students and need-based aid for graduate students is administered by the Office of Student Financial Services and is described in this section. Information relating to graduate-student support in the form of fellowships and assistantships is presented in the section entitled "Graduate Studies".

The University of California, San Diego expects that students and their families will bear as much of the necessary cost of the student's education as their circumstances will permit. In those cases where resources are insufficient to meet a normal budget, the Student Financial Services Office will attempt to help students find supplemental financial aid. Applications and requests for information should be addressed to the Office of Student Financial Services, Q-013, University of California, San Diego, La Jolla, California 92093.

No student should leave the University for financial reasons before exploring all possible avenues of aid with a financial-aid counselor. Financial assistance, loans, grants and work-study, unless otherwise designated, are processed by the Student Financial Services Office. A Financial Aid Form, tax return, and/or other appropriate documents substantiating need will be required of all students seeking financial assistance. Applications for all forms of financial aid should be submitted to the Office of Student Financial Services on time.

**Financial Aid Form (FAF)** To permit an evaluation of need, parents of all entering and continuing dependent students who apply for need-based aid are required to provide financial information on the Financial Aid Form. This form should be filed by February 1 with the College Scholarship Service, P.O. Box 1025, Berkeley, California 94701, and must indicate that a report is to be sent to the University of California, San Diego. A word of caution: the filing of the Financial Aid Form does not constitute an application for a scholarship or financial aid.

**Independent Students** Nationally, in awarding aid, it is assumed that parents are responsible for financial assistance to meet college expenses. A student's desire for independence does not release parents from this responsibility. The student who claims financial independence under current California standards must:

1. Not have been claimed as an exemption by his or her parents for federal or state income-tax purposes for the preceding three (3) tax years.
2. Not have lived at home for the three (3) calendar years preceding the time when he or she expects to receive aid.
3. Have some visible means of support.

4. Not have received nor receive in excess of \$600 per year from parents.

To be considered independent, an applicant must file a notarized tax certification form signed by the parents or guardian. Applicants must also provide copies of 1040 forms filed by their parents and themselves.

## FINANCIAL ASSISTANCE — UNDERGRADUATES

**Scholarships** The Committee on Undergraduate Scholarships and Honors awards more than 200 scholarships annually to undergraduate students enrolled at the San Diego campus. These scholarships are donated by private individuals, organizations, corporations, and by the Regents of the University.

All scholarship awards are made on a competitive basis, consideration being given to scholastic achievement, financial need (except for students applying for Regent's Honoraria) and promise. Eligibility for a scholarship is determined from the applicant's statements on the application form, appropriate letters of recommendation, official transcripts, the Financial Aid Form and appropriate tax forms.

**Applying for a Scholarship** Applications are available in the Office of Student Financial Services. Completed applications for the following academic year must be returned between January 15 and February 1. Applications postmarked or presented in person after the stated deadline will not be accepted for scholarship consideration.

**Announcement of Awards** Scholarship awards are announced by June. Most scholarships are awarded for one year; financial assistance for succeeding years will depend upon the student's academic performance in the University and continuing need. Every effort will be made to offer other assistance, such as loans, grants, etc., to supplement scholarship awards. Applicants with financial need who do not receive scholarships will be considered for loans, grants, and work-study.

**Regents' and University Scholarships** The highest honor that may be conferred upon an undergraduate student is the awarding of a Regents' or University Scholarship. Regents' Scholarships are granted by the president of the University of California and the chancellor of the San Diego campus, consideration being given to academic excellence and promise. Regents' Scholars receive an initial honorarium of \$100, dormitory-assignment preference, and an annual stipend to cover the difference between student resources and the yearly standard cost of education. The term of appointment is four years for students entering from high school and two years for all others.

University Scholarships, granted by the president of the University of California, are awarded to students of exceptional academic achievement who demonstrate

financial need. A University Scholar can receive up to a \$1200 stipend. The appointment is for one year only, but a student may reapply each year.

All scholarship applicants are reviewed for these two major awards. An applicant who wishes to be considered for an honorarium only is not required to submit a Financial Aid Form.

### President's Undergraduate Fellowship Program

This program is designed to assist unusually talented undergraduate students to carry out special studies and projects under faculty supervision. The prospective fellow and his or her faculty sponsor must submit a project proposal, including a tentative budget, by May 15 preceding the academic year for which the award is to be made. The chancellor, acting with the advice of the Committee on Undergraduate Scholarships and Honors, will select the fellows by June 1 each year. Stipends will be based on need, to be determined by the cost of the project and the student's own resources.

**The Alumni Awards Program** The Alumni & Friends, UC San Diego have begun an awards program to honor undergraduate students demonstrating high academic achievement. The awards are granted to individuals selected from applicants by the Committee on Undergraduate Scholarships and Honors and after interviews with the Scholarship Committee of the Alumni & Friends. Students who wish to be considered for an Alumni Award may file an application with the Student Financial Services Office.

## GRANTS

**Basic Educational Opportunity Grants** The Basic Educational Opportunity Grant Program is a federal aid program designed to provide financial assistance to those who need it to attend post-high school educational institutions. Basic Grants are intended to be the "floor" of a financial aid package and may be combined with other forms of aid in order to meet the full costs of education. The amount of your Basic Grant is determined on the basis of your own and your family's financial resources.

You will be eligible for a grant if you meet several important criteria:

1. You have established your financial need by submitting a copy of the Financial Aid Form to the Basic Grant processing center.
2. You will be enrolled in an undergraduate course of study and have not previously received a bachelor's degree from any institution.
3. You are a U.S. citizen or are in the United States for other than a temporary purpose and intend to become a permanent resident or are a permanent resident of the Trust Territories of Pacific Island.

The Basic Educational Opportunity Grant Award is a grant and, unlike a loan, does not have to be repaid.

**Educational Fee Grants** These grants are awarded only to undergraduates in their first year of attendance at the University of California. Students must be California residents and have financial need. Eligible students will receive grants up to a maximum of \$100 per quarter for the first three quarters of attendance.

**University of California Grant Program** The University of California Grant-In-Aid Program provides non-repayable grants-in-aid to students who demonstrate financial need, without reference to grade-point average.

**Cal Grant A (California State Scholarships) and Fellowships (Special Application Required)** All financial aid applicants are required to apply for a Cal Grant A. These grants are awarded by the State of California to entering and continuing undergraduate students who are California residents. Awards range from \$300 to \$700 to be applied toward registration and educational fees. Undergraduates may obtain applications for this program from their current school or the California Student Aid Commission, 1410 5th Street, Sacramento, California 95814.

Fellowships are awarded to first and second year graduate students, and awards usually cover total fees required for registration. Graduate students may obtain applications for this program from the UC San Diego Office of Graduate Studies and Research, their major department, or the California Student Aid Commission. GRE scores are required.

Applicants for grants and fellowships must be United States citizens and California residents. Awards are based on academic achievement and financial need and usually may be renewed for succeeding years. *The California State scholarship and fellowship deadline usually occurs in February.*

**Cal Grant B (College Opportunity Grant) (Special Application Required)** Cal Grant B is awarded by the State of California to entering undergraduates who are United States citizens and California residents, and who demonstrate financial need. Cal Grant B awards are renewable and range from \$300 to \$1,800 per academic year. The award may also include payment of all or part of the UC San Diego registration fees. Individuals wishing further information or applications may contact a high school counselor or write directly to the California Student Aid Commission, Cal Grant B Section, 1410 5th Street, Sacramento, California 95814. The 1978-79 deadline was February 1, 1978. Please check with the Office of Student Financial Services for current deadlines.

## FINANCIAL ASSISTANCE: UNDERGRADUATE AND GRADUATE

**College Work/Study Program** This federally financed program provides funds for student employment by the University or by public and private non-

profit organizations. Students who are U.S. citizens from moderate- and low-income families will be considered. Students who receive work-study awards will receive instructions and job referrals. The Work-Study Program provides experience in many fields, including city planning, mental health, community service in economically depressed areas, recreation, library work, experimental sciences (chemistry, physics, biology, oceanography and related fields), hospital and business administration, and office work. Pay ranges from \$2.70 per hour.

**University Work/Study** The program is administered in the same manner as the federal program, except that funding is provided by the Regents of the University, and the student is limited to on-campus jobs. Foreign students with financial need may apply for this aid.

## Loans

Loans are not intended to provide full support, but should be used to supplement other resources. Students with financial need are encouraged to request loan assistance as supplementary aid. Information about all available loans may be obtained from the Office of Student Financial Services.

**Educational Fee Loan** Continuing University of California students who are residents of the State of California and demonstrate financial need may qualify for a deferral of the educational fee. Educational Fee Loans, depending upon need, can range from \$100 to \$300 per year for undergraduates and \$120 to \$360 per year for graduates. Each continuing student who receives financial aid from the University's Office of Student's Financial Services will be offered this Educational Fee Loan as part of the award.

Repayment of the Educational Fee Loan shall begin nine months subsequent to the completion of a student's higher education, including graduate study. Students who terminate their higher education will be required to begin payment of the loan nine months subsequent to termination. The repayment period may not exceed ten years, and the note will bear interest at the rate of three percent per annum on the unpaid balance beginning nine months after the student leaves school. Minimum quarterly repayment is at least two and one-half percent of the total fees deferred or \$30, whichever is greater, plus interest. Interest shall not accrue, and payments need not be made in whole or part for a maximum of four years while a student is serving on active duty in the Armed Forces or Action Corps.

**University Loan Funds** These funds are provided by the Regents of the University to full-time graduate and undergraduate students. The amount of this loan is determined by financial need. Eligible students may receive up to \$1,000 per academic year. Students, regardless of age, are required to obtain co-signers. Foreign students may apply for this loan. University loans normally are repayable in ten equal

semi-annual payments beginning upon graduation or withdrawal from the University of California (whichever occurs first) but not later than six months from that date. Interest at the rate of three percent per annum accrues from the beginning of the repayment period.

**National Direct Student Loans** A student is eligible for a National Direct Student Loan if he or she is a United States citizen or holds an immigrant visa and is carrying at least one-half the normal full-time academic workload. An undergraduate student may borrow up to \$2500 during the first two years. The aggregate sum for all undergraduate studies may not exceed \$5000. A graduate or professional student may apply for up to \$2500 annually with a \$10,000 maximum for his or her total academic career. Loans are granted for educationally related expenses and are intended to supplement a student's resources in order to meet standard costs of attending the University. Students under eighteen years of age are required to obtain a co-signer. These loans are interest-free until nine months after graduation or withdrawal from student status. Repayments begin at that time. Minimum repayment is \$30 per month, including interest at three percent per annum and may extend up to a ten-year period. Cancellation prior to July 1, 1972 will apply to those loans. Loans made subsequent to June 30, 1973 include cancellation provisions up to 100 percent of the total debt only for those who serve as full-time teachers of disadvantaged or handicapped students in non-profit elementary or secondary schools, as defined by federal guidelines. Staff members in pre-school programs (Headstart) may also qualify for this cancellation benefit, depending upon their salary scale. Members of the Armed Forces may qualify for up to fifty percent cancellation at the rate of twelve and one-half percent per annum for service in an area of hostilities.

**Short Term Loans** These funds, made possible by gifts to the University, are granted in small amounts to help students in short-term emergencies, and usually must be repaid within thirty days. Applications are available in the Student Financial Services Office.

**Federally Insured Student Loans (Special Application Required)** These loans are available to full-time students who are citizens or nationals of the United States, or persons who are in the United States for other than a temporary purpose and intend to become permanent residents thereof. Undergraduate students may borrow up to \$2500 per academic year, subject to bank policy, with a total maximum of \$7500 for all years of school. Graduate students may borrow an aggregate sum up to \$10,000. The federal government guarantees the loan to the lender in case of death or default of the borrower and, if the student is eligible, will pay the full rate of interest on the loan up until nine months after he or she is no longer enrolled as a full-time student. Interest on a Federally Insured Student Loan is seven percent per year. If the adjusted family income is \$25,000 or less, the government will pay the interest on loans until repayment begins.

If a student wishes to apply for the interest subsidy and the adjusted family income is \$25,000 or greater, he or she may submit a Financial Aid Form (FAF) with his or her application. The Office of Student Financial Services will perform a needs analysis to determine eligibility for the subsidy. (If a current FAF is already on file, another need not be submitted.) Repayment starts between nine and twelve months after the borrower leaves school with a minimum monthly payment of \$30 with up to a maximum of ten years of repayment. During repayment, the borrower will pay the interest. Repayment may generally be deferred if the student is continuing his or her education in another accredited institution or is serving in the Armed Forces, or the Action Corps. During such periods of deferment, the federal government will continue to pay the interest if the interest subsidy was approved at the inception of the loan. This loan may be obtained from a participating bank, savings and loan or credit union. Students who may require this assistance should bank where such a loan is available.

Federally Insured Loan applications are available in the Office of Student Financial Services, beginning July 1, for the following academic year.

## FINANCIAL ASSISTANCE, GRADUATE

See section entitled "Graduate Studies."

**Student Health Service, Extension 3300** Entering students are required to complete a Medical History Form and present evidence of a recent tuberculin skin test prior to registration and to send them to the Student Health Center. The information submitted to the Student Health Service is kept confidential and is carefully reviewed to help provide optimal health care. Students are also urged to submit a physical examination form completed by their family physician, particularly if they plan to enter into intercollegiate athletic competition.

A comprehensive health care program for students is included among the benefits provided by the university registration fee. A well-qualified medical staff is in attendance at the Student Health Center on campus, and students are encouraged to come and discuss any health problem. Professional and confidential attention is assured. Appointments may be made in person or by telephone. Outpatient service is available from 8 a.m. to 11:30 a.m. and 1:00 p.m. to 4:30 p.m., Monday through Friday. Infirmary care is provided at the Student Health Center for illness not requiring hospitalization. Low-cost dental and optometric care are also available.

All registered students are automatically covered under a student health insurance program during the fall, winter, and spring quarters. Limited benefits for hospitalization and certain other services can be obtained as necessary for acute illness or injury. Optional more comprehensive coverage is available. The faculty of the School of Medicine and the facilities of the University Hospital are extensively utilized in providing this care. Every possible effort is made also to assist stu-

dents with handicaps or chronic conditions. It should be noted, however, that pre-existing illnesses may not be covered by the student health insurance plan...

A comprehensive and economical insurance policy is available for purchase by students for the summer quarter. Registered students may purchase a similar policy for their married spouses and/or dependent children, renewable each quarter.

Medical History Forms and Physical Examination Forms are sent to students. Further information on insurance may be obtained at the Student Health Center after arrival on campus. Students should also obtain a copy of the brochure which explains the operation of the Student Health Service and the insurance program in detail.

**Dental Care, Extension 2080** The Dental Group provides dental care for eligible students, and, when time permits, their spouses. Examination and X-rays of teeth, filling of cavities, emergency care, and prophylactic cleaning are among the services offered at reduced rates. Orthodontal and dental surgery services are not available at the Center. You can check on the fees and make an appointment by calling 452-2080 during the work week.

**Office of International Education** The Office of International Education has both foreign and domestic functions. It is responsible for the proper documentation of all non-immigrants on the campus, whether they be foreign students, postdoctoral fellows, or faculty. In addition, the Office of International Education assists with hospitality programs, counseling, and other needs of the foreign community. All new students, researchers, and faculty who are citizens of a country other than the United States are asked to visit the Office of International Education, International Center, Administrative Complex, as soon after their arrival on campus as possible and to bring their passports with them so that their visa status may be verified.

Departments are required to advise the Office of International Education of both the arrival and departure of visiting foreign faculty members.

**Office of Religious Affairs** The Office of Religious Affairs is a cooperative venture of the religious community to provide religious counseling, coordinate the activities of the various religious student groups, arrange speakers and programs of interest to the general campus, and serve as a theological resource for the educational enterprise. For further information: Building 507, Warren College, Extension 2521.

**Disabled Student Services** The DSS provides assistance to students with physical or perceptual disabilities. Some of the services offered are pre-registration, counseling, supportive personnel, a referral list to on-campus services, and liaison service with off-campus agencies. The DSS staff also works in conjunction with the various campus agencies — OASIS,

Financial Aids, Career Planning and Placement, Housing, etc. Students are encouraged to contact the DSS, B-023, Student Center at UC San Diego, or call (714) 452-4382 or 452-4470 for further information.

UC San Diego is an accessible campus. Although the overall size of the entire campus is large, each of the four colleges is relatively self-sufficient and compact.

**Veterans Affairs** The Office of Veterans Affairs on campus is located in the Office of Student Financial Services and provides information regarding veterans' educational assistance and veterans' dependents' educational benefits. If you have any questions before you arrive on campus, contact your nearest Veterans Administration Office. Be sure to check in with the Office of Veterans Affairs on campus as soon as you are admitted to assure prompt and proper payment of your benefits. Students who are already receiving benefits under the G.I. Bill or dependents' programs should be certified each year for benefits and are required to notify the Office of Veterans Affairs on campus of any changes in program, units, degree objective, or address.

A representative from the Veterans Administration is on campus part-time to answer inquiries about check problems and to be a resource person for all programs administered by the Veterans Administration.

Veterans who need tutorial assistance or who are interested in VA work-study should contact the campus veterans' coordinator located in the Office of Veterans Affairs on campus.

**Selective Service** It appears that there will be no draft for a time, so any questions about lotteries, classifications, physical examinations, or conscientious objection should be directed to the local selective service office in San Diego.

**On-Campus Housing (Mail Code Q-041)** Reville, John Muir, and Earl Warren Colleges each have residence-hall accommodations. Residence halls are arranged around a suite plan with students sharing a common living-study area. Most of the rooms are designed for double occupancy. The limited single rooms are usually reserved by returning students. The residence-hall contract provides for a mandatory board plan. The cost for room and board is approximately \$2,057 plus a \$45 deposit for the 1978/79 school year (fall-winter-spring quarters), and will vary depending upon payment and meal plans chosen and type of room accommodation.

Single and double rooms in apartments at John Muir and Third Colleges are available. UC San Diego will also offer two-bedroom apartments for four single undergraduate students. They are located at the Mesa Apartments approximately a mile and a half from the campus. A board plan is available for all apartment dwellers on an optional basis.

## Campus Services and Facilities

A housing brochure with an application for on-campus housing is sent to all who have indicated their interest in on-campus housing on their applications for admission. Students must return the housing application and file a Statement of Intent to Register Form to be eligible for housing. Contracts are sent based on a priority system and as space permits.

The resident dean or counselor of the applicable college assigns rooms in the residence halls or spaces in the apartments. The Housing and Food Services Administration Office, located in Building 206, Administrative Complex, administers housing contracts, accepts housing payments, and handles other details related to housing.

Apartments for married students consist of fifty-six one-bedroom units and thirty-one two-bedroom units in the Coast complex, and eight one-bedroom units, 350 two-bedroom units and eight three-bedroom units at Mesa. Students with children have priority for all two-bedroom apartments, although some units are presently allocated for married couples without children and single graduate students. The apartments in both complexes are unfurnished except for stoves, refrigerators, disposals, and living-room drapes. Most Mesa apartments are carpeted. Coin-operated washers and dryers are available in the community buildings on the apartment grounds. Rental rates for two-bedroom apartments range from \$173 to \$245 per month including utilities and one parking space.

Accommodations for single graduate students are limited to nineteen single apartments at Coast and some two-bedroom units at Mesa which can be shared by two students. There is a waiting list for the apartments.

You may write to, or apply in person at the Residential Apartments Office, S-007, University of California, San Diego, La Jolla, Ca. 92093, for brochures and applications for Coast or Mesa apartments at UC San Diego.

The Off-Campus Housing Office, (714) 452-3670, can also assist others in finding suitable accommodations in the surrounding communities of Clairemont, Del Mar, La Jolla, Pacific Beach, and Solana Beach.

**Off-Campus Housing** The Off-Campus Housing Office is located in Building B, Student Center Complex. Available through this office are the following resources: off-campus rental listings, suggested lease and rental agreements, other related forms, maps of off-campus communities, hotel and motel information, legal advice relating to landlord-tenant problems, and bus schedules for San Diego Transit and North County Transit routes coming to or close to the campus.

Interested individuals may wish to obtain recent copies of the *San Diego Union* or *Evening Tribune* in order to assess the real estate market. There is a housing shortage, and prices tend to be higher than in other parts of the country. Accommodations within three

miles of campus are in short supply. Many students share homes and apartments; this information is also posted on the bulletin boards in the office.

For further information regarding either off-campus housing or transportation, contact the Off-Campus Housing Office, Student Center Complex, Building B, B-009, La Jolla, California 92093.

**Food Services** A wide variety of foods in various settings is available on campus. Three complete cafeterias are located on the Revelle, Muir and Warren campuses respectively. Additionally, seven unique snack bar facilities are situated at various locations on campus including: Muir Rathskeller; Revelle Deli, Waffle and Bake Shop; Third College Snack Bar and Munch Box; Warren Snack Bar; Winzer Snack Bar; Scripps Lunchroom, and Revelle Coffee Hut. Hours vary depending on locations.

The Bookstore, Ice Cream Hustler and the Notion Store stock a limited selection of foodstuffs, and a large variety of vending machines are located at key traffic locations throughout the campuses.

**Intercollegiate Athletics** The UC San Diego Intercollegiate Athletics Program is one of the most extensive sports programs in the country. With close to thirty teams to choose from, students of varying interests and abilities have an open door to healthy athletic experiences. Teams are formed based on demonstrated student interest and include the following: baseball, field hockey, volleyball, rugby, basketball, water polo, swimming, surfing, crew, tennis, badminton, soccer, golf, track and field, cross country, fencing and cycling.

The same athletic philosophy governs men's and women's sports. Athletes of both sexes share successfully in the use of facilities, equipment, and financial resources. No athletic scholarships are provided, but the values derived from participating with other athletes, receiving instruction from qualified coaches, travelling to other campuses, and striving for excellence are numerous.

**Recreational Facilities, Department of Physical Education, Gymnasium, Extension 4032 or 4037** Two gymnasiums, tennis courts, natatorium and playing fields are important centers of campus life and may be used by all students at no charge. Students are entitled to lockers, towel issue and the use of many items of recreational equipment. A nominal fee is charged for use of the golf driving range (next to the Mesa Apartments) and for sailing, waterskiing and rowing privileges at the Santa Clara facility on Mission Bay, as well as for recreational privileges for spouses and children of UC San Diego students.

**Intramural Sports** The UC San Diego Intramural Sports Program offers a diversified schedule of quarterly sports activities for all students. Activities range from the traditional football, basketball and softball to the more innovative innertube waterpolo and team ten-



nis. Leagues are formed to meet the competitive desires of the participants and include those for both the highly skilled performer and those for students merely interested in fun and exercise. Major emphasis is placed on a coed sports program (men and women competing on the same team) which enhances social interaction while promoting physical fitness.

**Recreational Athletic Clubs** Recreational Athletic Clubs play a vital role in the students' social life on campus. A gamut of activities are offered quarterly such as ballroom dance, horseback riding, karate, outing, snow ski and scuba diving. Clubs meet on a weekly basis for activity sessions and sponsor events such as aikido and karate tournaments, seminars, folk dance workshops and festivals, films, glider meets, and ski trips at minimal cost to students.

**Special Events** Campus special events provide a quarterly schedule of major and recreational events including dances, carnivals, festivals and casino nights. Recreation-oriented events include bike races, cross-country runs, over-the-line tournaments and superstars all-sports competition.

**Aquatic Sports** The Aquatic Center at Santa Clara Point on Mission Bay is only seven miles from campus. Classes are offered in waterskiing, sweep rowing, surfing, SCUBA diving and sailing (Hobie Cats, Sloops and Cat Rigged). Recreational sailing, waterskiing and rowing are also available.

**The Student Center, Phone: 452-3362 8 a.m.-5 p.m. Open: 8 a.m.-12 a.m., Monday-Thursday; 8 a.m.-1 a.m., Friday; 9 a.m.-1 a.m., Saturday; 10 a.m.-12 p.m., Sunday.** The Student Center is the central meeting place for members of the UC San Diego community. Step One, which opened in April, 1974, contains the Student Information Center, meeting rooms, lounges and a game room. Also available in this facility are offices for student organizations and various administrative units in Student Affairs. Among these units are the Offices of the Vice-Chancellor of Student Affairs, Director of the Student Center, and student organizations adviser.

Step Two opened in March, 1976, and has four new buildings. There are two buildings for student organizations and student co-ops, a large dining and lounge facility building and a building for student affairs units, which include OASIS, EOP, Off-Campus Employment, Arts and Lectures, Student Legal Services, Career Planning and Placement and the Off-Campus Services Office.

**Student Information Center: EDNA, University Student Center. Telephone: 452-3362. Hours: 8 a.m.-12 a.m., Monday-Thursday; 8 a.m.-1 a.m., Friday; 9 a.m.-1 a.m., Saturday; 10 a.m.-12 a.m., Sunday.** The Student Information Center is a central information and referral point for students. If the EDNA staff cannot answer your question, they will refer you to the proper person or agency. Some of their functions are the following:

1. Explaining operations of campus offices and maintaining information on student, staff, and faculty locations.
2. Maintaining information on all campus events from major concerts to departmental seminars, and information on events in San Diego County, from other college campus activities to schedules for the Civic Theater.
3. Answering questions regarding academic matters, e.g., classes, registration, academic advisers, and library hours.
4. Referring students with personal problems to the appropriate office or center.
5. Maintaining information on current issues of interest to the UC community, such as general elections, campus referenda, and special projects on campus.
6. Obtaining medical assistance for students at any time of the night or day.
7. Providing ride board, buy-and-sell service, and recommendations on various services in the area such as restaurants, barbershops, beauty parlors, stores of all kinds, dentists, doctors, legal aid, abortion counseling, drug counseling, draft counseling, auto insurance, bus schedules, plan schedules, etc. They also give suggestions for recreational activities and have information on the San Diego Zoo, Disneyland, Sea World, etc.

**Student Organizations, Phone: 452-4450. Open: 8:30-4:30, Monday-Friday. Location: Second floor north, Student Center** The Office of Student Organizations registers all UC San Diego student organizations each year in the fall. Students who are interested in forming new student organizations should contact this office for registration forms.

The student organizations adviser approves registration forms for all organizations and assists student groups with planning programs. The student organizations adviser works with the Student Activity Fee Support Group which allocates funds to student organizations, and the adviser approves expenditures of these funds. Student organizations' programs and activities are coordinated with the Office of Arts and Lectures through this office.

For more information on currently registered student groups or general student activity assistance, visit the Office of Student Organizations at the address listed above.

## Miscellaneous Services and Facilities

**The Alumni & Friends, UC San Diego** Former students, their parents, and friends of the University are invited to membership in *The Alumni & Friends, UC San*

*Diego*. More than an alumni association in the customary definition, this organization affords its members broad participation in University programs. It sponsors a number of vital activities including scholarships, legislative relations and student programs of interest to both the community and the University.

Members of *The Alumni & Friends* enjoy many special benefits, including library privileges on all University of California campuses, a subscription to the *Alumni Quarterly*, a discount on the first enrollment in a University Extension course, use of UC vacation centers throughout California, and participation in special-rate tours.

Students and friends are invited to visit the Alumni Affairs Office, 212 Matthews Campus, or call 452-4490 for further information.

**Mandeville Art Gallery Mandeville Center, Extension 2864** Mandeville Art Gallery exhibitions cover a wide range of fields, with an emphasis on changing exhibitions of contemporary works. Gallery hours are from 12 noon to 5 p.m. Sunday through Friday and 7 to 10 p.m. on Wednesday.

**Bookstore 201 Matthews Campus,** The University Bookstore makes available an extensive selection of all types of books including textbooks required for UC San Diego courses, supplementary reading materials, paperback books, technical reference books, medical books and a wide variety of general-interest trade books. In addition, the bookstore carries a full line of sundries and gifts including personal items, snacks, magazines and newspapers, clothing, posters, and school supplies. Hours are 8 a.m. to 4:45 p.m. Monday through Friday, with special hours during rush periods at the first two weeks of every quarter. Phone: 452-3770.

**Center for the Contemporary Crafts** Located in the middle of the campus, the Crafts Center offers studios and art/crafts instructional facilities in ceramics, jewelry, mime, weaving, drawing, crafts, woodworking, quilting, enameling, glass arts, and a photographer's workshop.

The Center provides personal enrichment and creative educational opportunities to individuals wishing to develop artistic skills in an active studio-classroom situation.

Classes are offered without University credit (0 units), enabling students the freedom to explore creative expression in many art media without academic pressures. Registration is at the Crafts Center building, and takes place the first week of each quarter. Specific times, fees and scheduled course offerings can be obtained by coming to the Center, or telephoning 452-2021.

**Check Cashing** With proper identification, students may cash personal checks up to \$25 for a small

charge at the Central Cashier's Office, Building 401 Warren College, (Hours: Monday through Friday, 8 a.m.-3 p.m.), the University Bookstore, Building 201 Warren College, (Hours: Monday through Friday, 8 a.m.-4:45 p.m.), and the Central Box Office, Student Center (Hours: Monday through Friday, 10 a.m.-2 p.m.).

**Day Care Center** The UC San Diego Day Care Center offers full day care (part-time also available) for UC San Diego affiliated children from as soon as they walk to age 5½. The Center is open five days a week from 7:45 a.m. to 5:15 p.m. For information call Extension 2768, Ms. Foulks, or visit the Center, which is located across the street from Graphics and Reproduction Services, Building 510, Warren College.

**Duplicating Services Building 510 Warren College, Extension 3020** Several kinds of duplicating services are available on the campus. In the Central, Biomedical, Science and Engineering, SIO and Cluster I Libraries, self-service duplicating machines are available at five cents a copy. The bookstore has a self-service duplicating machine which makes copies for ten cents a page.

Students may also use the Graphics and Reproduction Services on a cash basis when the work is directly related to the individual's studies. Requests should be made to Graphics and Reproduction Services, Building 510 Warren College, or to any of the Quick Copy Centers located at 3301 Building 2A, *Muir*; 1001-B Urey Hall, *Revelle*; 4050 Basic Science Building, *School of Medicine*; Central Storehouse/Receiving, *SIO*; and 302 South Annex, *University Hospital*, accompanied by a signed statement that the work is directly related to the academic program. Payment may be made by submitting a check payable to the Regents of the University of California or presenting a cashier's receipt from the Central Cashier's Office, Building 401 Warren College, in the amount of the total cost of the work performed.

The copier machine located in Graphics and Reproduction Services, Building 510 Warren College, is especially good for thesis work requiring excellent copy quality. Copies cost five cents each and students are required to book in advance for the use of the machine. Payments may be made as stated above.

**Lost and Found Building 500, Warren College, Extension 4361** Lost and Found is located at the Police Department. Any article found on campus should be taken to the Police Department where it will be placed in Lost and Found. The *Triton Times* office, and the Student Information Center also have lost and found offices.

**Parking on Campus Building 400, Warren College, Extension 4223** Parking permits are required on the UC San Diego main campus from 7 a.m. to 5 p.m. Monday through Friday and at Scripps Institution of Oceanography from 7 a.m. to 5 p.m. every day. This requirement is enforced through the issuance of parking citations payable to the San Diego Municipal Court.

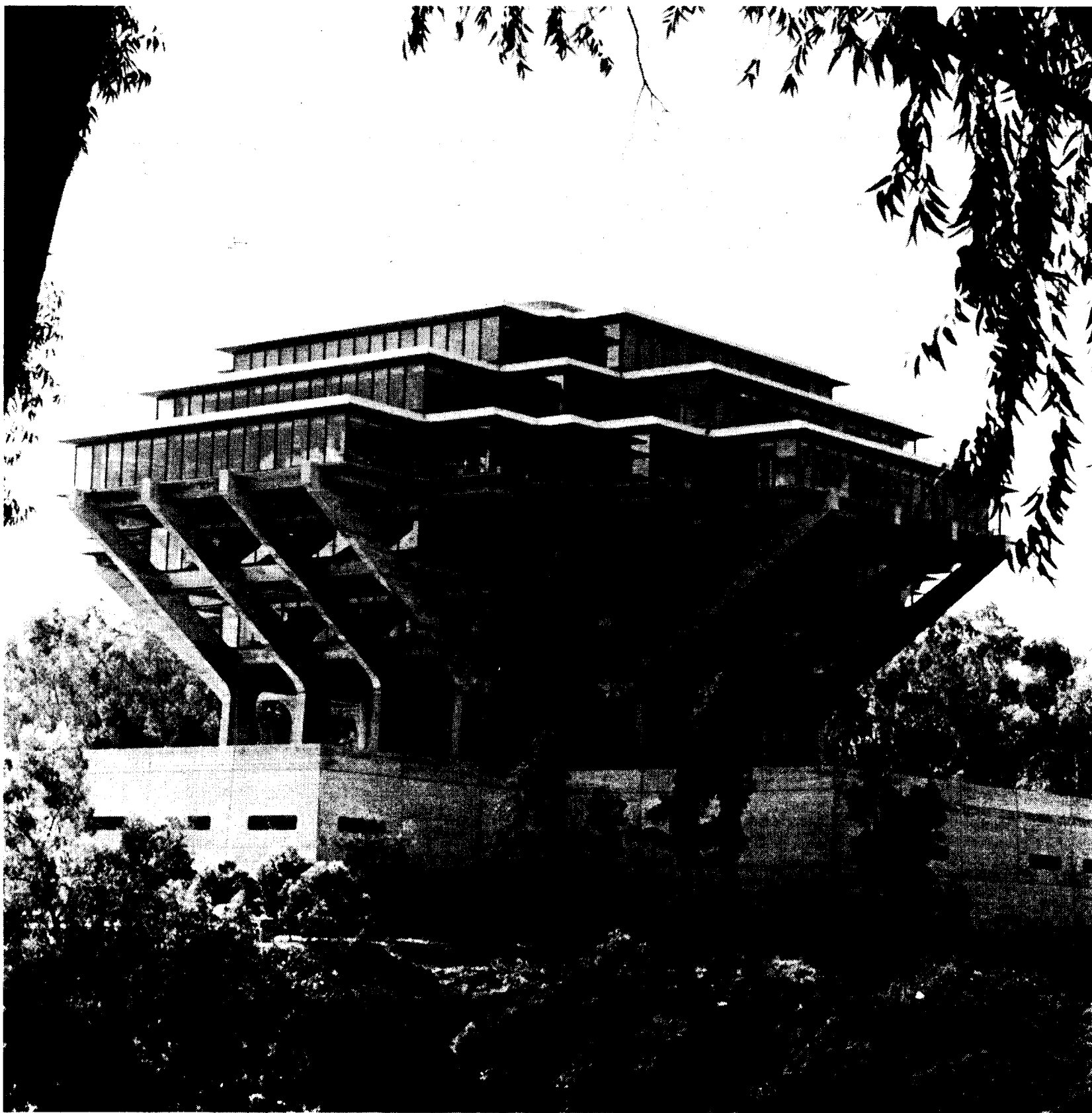
Parking permits are available at the Central Cashier, Building 401, Warren College, upon proof of vehicle ownership. Rates are the equivalent of \$4 per month and must be paid in advance from date of purchase through June 30. A grace period of approximately one (1) week is granted at the beginning of the fall quarter 1978 (starting September 18, 1978). Students who intend to purchase a parking permit when required may park in student parking areas (identified by yellow stripes) without a permit during the grace period. No other grace periods are granted during the year.

**Post Office 104 Argo Hall, Reville Campus, Extension 2052** The Argo Hall Post Office is a contract station operated under the rules and regulations of the U.S. Postal Service, where stamps, money orders, etc. may be purchased, and parcels and letters mailed. It is open from 10:30 a.m. to 4:00 p.m., Monday-Friday.

The post office provides Monday through Saturday distribution of mail to resident students during the academic year.

**University Police Department Building 500, Warren College, EMERGENCY ON-CAMPUS, DIAL HELP (4357), OFF-CAMPUS DIAL, 452-HELP Telephone for Routine Business 452-4360** The University Police Department provides round-the-clock coverage. Along with police duties, officers have advanced first-aid training and are equipped with one of the finest ambulances in San Diego County.

The University Police Department is service-oriented. Its purpose is to promote and protect the individual rights of students, faculty and staff alike by reasonable enforcement of University regulations as well as state and federal laws.





# Research at UC San Diego



Several institutes, centers and projects at UC San Diego promote advanced research programs and provide opportunities for graduate-student support in several broad disciplines, often spanning the areas of knowledge encompassed by several academic departments. The senior staff of these units are faculty members in related academic departments. The study programs of graduate students supported by institutes and centers are administered by the academic departments in which the students are enrolled. Institutes and centers presently in operation at UC San Diego are described below.

## Organized Research Units — University-Wide Institutes

**Institute for Geophysics and Planetary Physics (IGPP)** was established in 1960. Present research concentrates on the study of the earth's strain field by measurements of gravity, tilt, displacement, and longitudinal strain; of earthquake mechanisms; of seismicity of the oceans; of the normal modes of the earth; and of tides, waves, turbulence, circulation, and sound in the oceans. 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, Applied Mechanics and Engineering Sciences, and Physics.

**Institute of Marine Resources (IMR)** was established in 1954 to provide a center at the University of California concerned with marine resources. The broad objective of the Institute is to acquire and disseminate knowledge of the sea's resources, not only the contents and nature of the ocean and its boundaries, but also the social, legal, economic, and political aspects and constraints of its uses. The Institute's programs involve research, education and public service in relation to man's uses of marine resources, including food science, marine products, transportation, recreation, waste disposal, and production of energy, and the processes and conflicts that extend or limit these uses. There are a great many opportunities for graduate students, as the diversity of these subjects indicates.

Within the Institute, the Sea Grant College Program offers traineeships to California graduate students in the physical, biological and social sciences to provide experiences in the performance of marine research while completing thesis requirements through their own campus or department. Further information on this and other IMR programs is available from the Scripps Institution of Oceanography Graduate Department.

**Institute for Research at Particle Accelerators** is an intercampus research unit to facilitate the use of large national laboratory particle accelerator centers by individual University of California campuses. The principal activity at these particle accelerator centers is concerned with high energy and elementary particle physics. Other disciplines are also finding more uses for the radiation from these accelerators, and hence the Institute includes individuals engaged in biophysics research. There is at present no direct graduate program in the Institute; however, graduate students in physics and biophysics can participate in the activity of the Institute through their respective campus departments.

## Organized Research Units — Campus-Wide Institutes

**Institute for Information Systems (IIS)** is a center for collaborative research for departments concerned with all aspects of information theory, computer science and engineering, communications, systems analysis, and related topics. The cooperating units currently include the Departments of Applied Physics and Information Science, Mathematics, Neurosciences, and Psychology. The work of IIS is concerned with such topics as human information processing, advanced software for microcomputers, communications and education applications of small computers, the coding of information in the nervous system, and brain models. Projects of the Institute provide facilities and support for graduate students and postdoctoral fellows to conduct interdisciplinary research, and for independent study projects of undergraduates.

**Institute for Pure and Applied Physical Sciences (IPAPS)** is an interdisciplinary research unit which brings together members of the Departments of Ap-

plied Mechanics and Engineering Sciences, Physics, and Scripps Institution of Oceanography. The Institute is concerned with nuclear physics, hydrodynamics, molecular and solid-state physics, theory of liquids, catalysis, and numerical methods. Specific subjects of research include superconductivity, ferromagnetism, ferroelectricity, phase stability and melting points, plasma physics, hydromagnetics, high-temperature gas dynamics, turbulence, fluid mechanics, nuclear structure and reactions, laser physics, atomic and molecular structure and reactions, and numerical analysis.

## Centers

**The Center For Art/Science Studies** was formed to facilitate research in a number of areas where scientific principles and advanced technologies could be brought to bear upon various problems in and around the arts. Active research projects now involve the application of laser technology to art conservation, the uses of holography as a documentation medium, the computer modelling of human creative behavior, and the use of the computer as a tool for the artist.

**Center for Developmental Biology** promotes teaching and research in the field of developmental biology. Various disciplinary groups within the biomedical sciences are associated with the Center. The common aim of these groups is to study developmental problems in different types of organisms, with approaches ranging from the molecular to the behavioral. Current research and instructional programs are in the field of developmental genetics, photobiology, reproductive biology, cytodifferentiation, biochemical embryology, tissue-tissue interactions, and morphogenesis of subcellular components.

**The Energy Center** initiated graduate research programs and graduate and undergraduate courses on energy-production techniques and energy policy in 1972-73. These interdisciplinary activities are being coordinated by faculty members including representatives from the Departments of Applied Mechanics and Engineering Sciences, Applied Physics and Information Science, Biology, Chemistry, Economics, and Physics. A limited number of graduate research assistantships are available for work on energy-related programs. For further information, write to the chairperson of the academic department in which graduate study is to be performed.

**Center for Human Information Processing** provides facilities for research and supports research-related activities of psychological and interdisciplinary projects in the areas of perception, psychophysics, psycholinguistics, attention, memory, detection theory, judgment and choice, information integration, and cognitive functions. The work of the Center concentrates on theoretical and research projects, postdoctoral studies, workshops, conferences, and discussion groups.

**Center for Iberian and Latin American Studies (CILAS)** coordinates and assists interdisciplinary research and instruction as they relate to the cultures of the Spanish, Catalan, Portuguese, and Judeo-Spanish speaking peoples. Participating faculty includes members from the Departments of Anthropology, Community Medicine, Drama, History, Literature, Political Science, Psychiatry, Scripps Institution of Oceanography, Sociology, and Visual Arts, and from the Communications Program. The Center operates across these traditional departmental boundaries to encourage inquiry in four sub-areas: the historical cultures of Iberia, the varied experiences of Latin America, the past and present life of the Chicanos of the Southwest United States, and the problems of interaction of the "Frontera", or borderland region societies of Southern California and Baja California, Mexico.

CILAS will undertake a number of specific activities to carry out its objectives.

A major aspect of the Center is a long-term arrangement between UC San Diego and the University of Madrid, which allows teams of professors, post-doctoral fellows and graduate students to work at the Catedra Seminario Menendez Pidal, a research institute of the University of Madrid. The Center coordinates joint study projects with other institutions, encourages groups of scholars on campus to coordinate individual research projects, disseminates the results of current research, and sponsors and coordinates special conferences and symposia in CILAS-related fields.

**Center for Music Experiment and Related Research (CME)** was initiated through a grant from the Rockefeller Foundation and is evolving as a continuous process based on four concepts:

Studio for Technical Research — Those engaged in this area will examine the relationship between various aspects of technology and the needs of the arts, both through experiment with existing equipment and through the construction of custom devices.

Studio for Extended Performance — This component will establish a practical interplay between the research of the artist and of the scientist, concentrating on performance as evidence of its efforts.

Colloquium — The colloquium will focus on current interdisciplinary expertise in musico-theatrical activity, technological innovation and human behavior. The focus will underlie colloquia, lectures, discussions and demonstrations which will be held on an occasional basis.

Documentary Unit — Two functions are envisioned for this unit: recording and archiving the activities of the Center, and providing public access to these materials through publication.

CME attempts to act as a generator of basic questions and as a deliberate experimental station, trying

out various routes and reporting on their character to the public and the profession.

**Center for Research in Language Acquisition** is an independent unit of the Institute for Information Systems. The focus of the Center is on first and second language acquisition and the many disciplines it involves (e.g., linguistics, psychology, sociology and anthropology). The Center's facilities are designed to accommodate laboratory research projects by the faculty and graduate students. Present research interests are concerned with variables that affect foreign language

acquisition, the psycholinguistic characterization of the process of acquisition of sign by deaf children, and the designing of lexicons and language teaching materials.

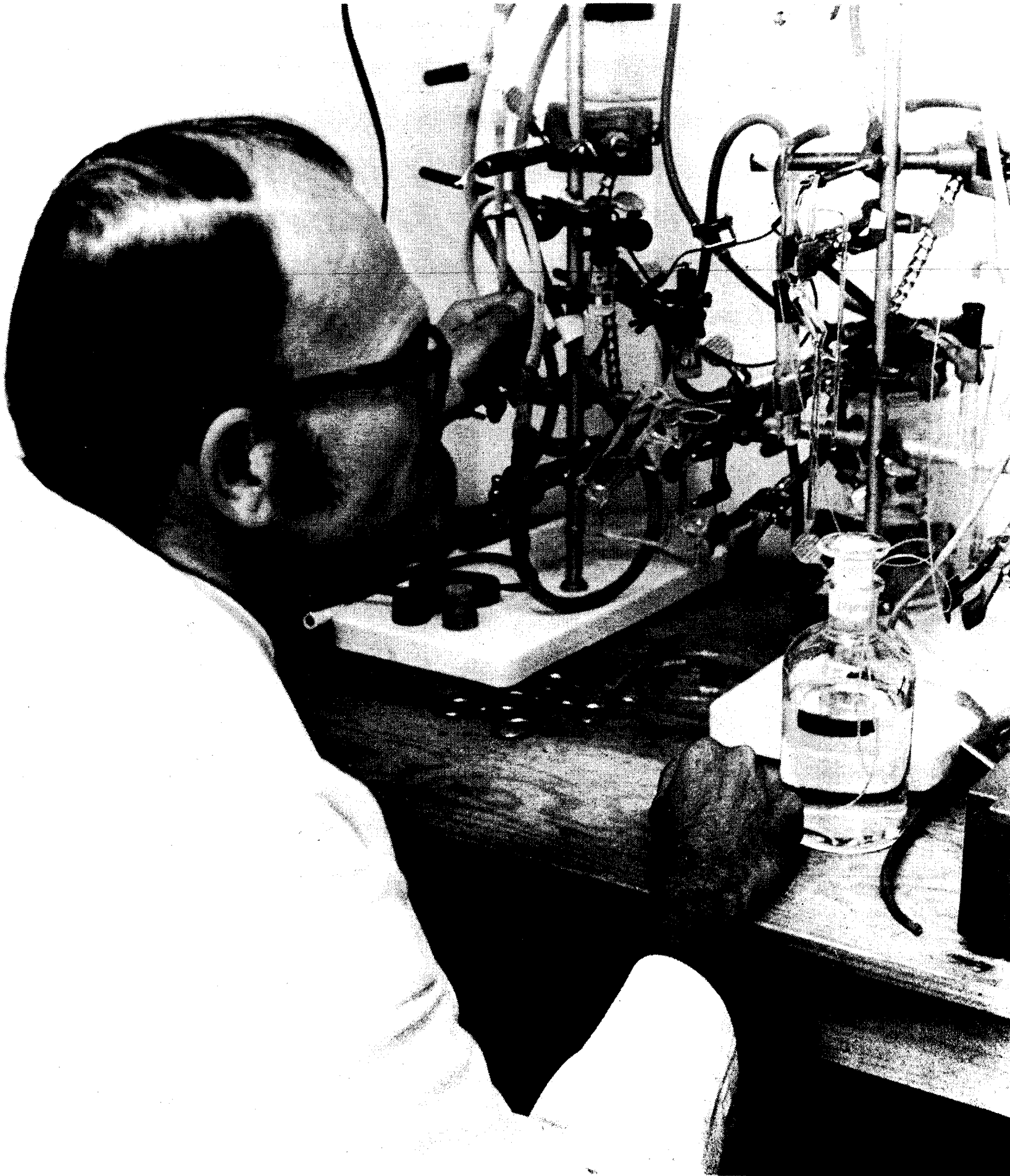
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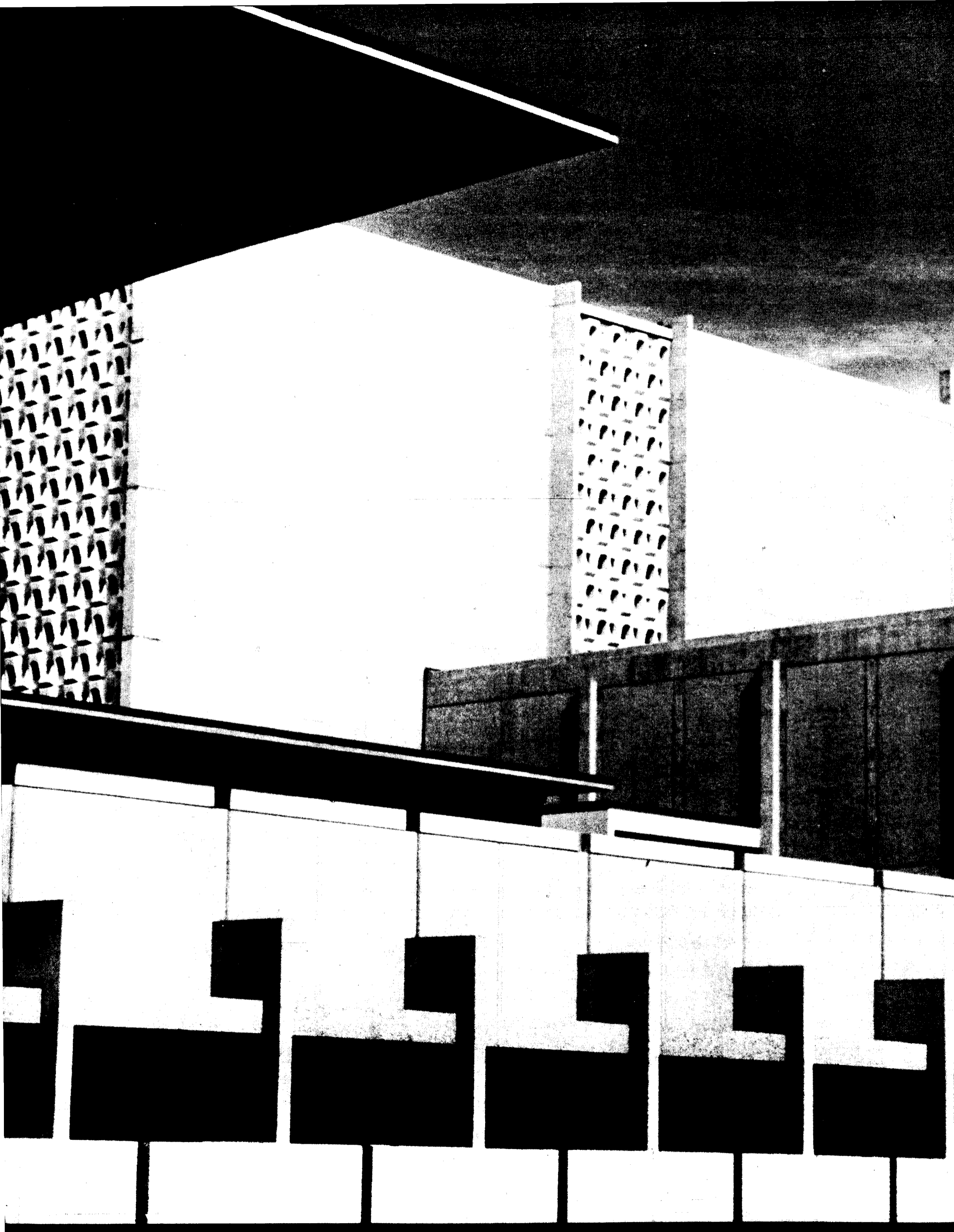
### Campus-Wide Research Facilities

**The Computer Center** See page 84.

**The University Library** See page 83.

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# The School of Medicine



The School of Medicine's unique, interdisciplinary approach to medical education enables students to benefit from a diversity of laboratory facilities, clinical opportunities and faculty talent and knowledge. Because the School of Medicine and the UC San Diego general campuses are developing simultaneously, a close interdisciplinary cooperation has developed. Teaching and research therefore are well-integrated on this campus. Faculty positions for scientists whose interests relate to medicine and human biology are assigned to various departments throughout the general campus including Applied Mechanics and Engineering Sciences, Biology, Chemistry, Economics, Mathematics, Physics, Psychology, the Scripps Institution of Oceanography, and Sociology. These faculty members also occupy space in the School of Medicine and teach in the medical curriculum, creating special courses which emphasize those areas of their disciplines most useful to medical students. Another unique feature of the School of Medicine's curriculum is its emphasis on the human being as an inextricable part of the social milieu. All instruction in medicine and related sciences considers humans not merely as physical organisms, but as complex beings who exist in a complex physical, social and psychological environment.

The settings for clinical instruction and experience comprise a variety of hospitals and clinics ranging from rural, outlying facilities and county urban centers to the University of California Medical Center. These affiliated hospitals and clinics include the 380-bed University Hospital and variety of outpatient clinics; the 646-bed (expandable to 820 beds) Veteran's Administration Hospital adjacent to the La Jolla campus; the 1,200-bed Naval Regional Medical Center, which is the largest military medical complex in the United States, and eight other affiliated medical facilities. Two additional major facilities are presently under construction and due for completion in 1978: a clinical teaching facility located at the University of California Medical Center, and a medical teaching facility adjacent to the Basic Science Building, Administrative Wing and the Biomedical Library on the School of Medicine campus.

The goal of the medical curriculum, clinical experience and faculty-student interactions is to develop in-

dividual, 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 specialized areas of interest for eventual development into careers in the broadly diversified medical community. All students have access to the best facilities and personalized counseling. The curriculum provides flexibility; form and content are adapted to the individual needs and goals of each student.

The curriculum is divided into two major components: the core curriculum and the elective programs. These are pursued concurrently, with the core curriculum predominating in the early years. Elective opportunities comprise one-fourth of classes during the first two years, and one-half during the last two years. The core curriculum includes those aspects of medical education deemed essential for every medical student regardless of background or ultimate career direction. The integrated core curriculum of the first two years is designed to provide each entering student with 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, out-patient situations, and relevant extended-care facilities. At faculty option, students with advanced training in a core area may take advanced work in this or another area, begin independent study, or accelerate their progress through medical school. A Medical Scientist Training Program has been designed for a limited number of students to provide the opportunity to earn both the M.D. and Ph.D. degree over a six-to-seven-year period of study.

Each student is expected to select an elective and highly individualized concentration area related to career objectives. Students are graded on a pass or fail basis and receive individual evaluations by the faculty.

The School of Medicine enrolled its charter class of undergraduate medical students in September, 1968. This class graduated in June, 1972. The tenth freshman class was enrolled in September, 1977. Freshman stu-

## School of Medicine

dents enrollment increased to 96 in 1974, and a total annual enrollment of almost 430 medical students is expected by 1978.

### **Selection Factors:**

Selection is based on the applicant's scholastic record, letters of recommendation, performance on the Medical College Admission Test, and personal interviews.

The Admissions Committee gives serious consideration only to those applicants with a GPA greater than 3.0, above average scores on the New MCAT, with the exceptions of applicants from unusual or disadvantaged backgrounds. The School of Medicine is actively recruiting students from disadvantaged backgrounds who have shown determination to pursue careers in medicine and who have demonstrated personal promise for becoming dedicated physicians.

A complete catalog and information on the foregoing programs are available upon request. Write or call:

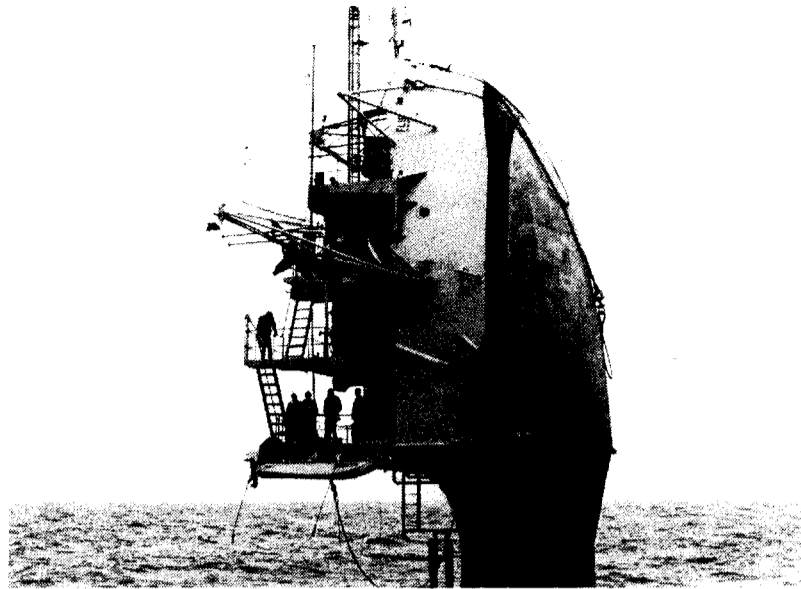
The Office of Admissions  
School of Medicine M-006  
University of California, San Diego  
La Jolla, California 92093  
(714) 452-3880

### **Programs for Prospective Medical Students**

UC San Diego offers no special premedical major. An undergraduate student considering medicine as a career may choose any major or concentration leading to the bachelor's degree, provided 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-Education Planning Services.



# The Scripps Institution of Oceanography



Scripps Institution of Oceanography enjoys a worldwide reputation as one of the oldest, largest, and most important centers for research, graduate training, and public service in the marine sciences. In all, the Institution occupies 64 buildings on 230 acres. The staff numbers approximately 1,200, including 185 graduate students. The Institution's budget approaches \$40 million annually.

The Scripps Institution was originally an independent biological research laboratory. It became an integral part of the University of California in 1912 and at that time was given the Scripps name in recognition of the interest and financial support of Miss Ellen Browning Scripps and Mr. E. W. Scripps. The scientific scope of its research has grown to embrace physical, chemical, geological and geophysical studies of the oceans as well as biological studies. Continuing investigations are conducted of the topography and composition of the ocean bottom, of waves and currents, and of the flow and interchange of matter between seawater and the ocean bottom or the atmosphere. Its own research ships have extended the geographic scope from the Institution's beach and the adjacent coastal waters to all of the world's oceans.

The education program has grown hand in hand with the research program. Instruction is on the graduate level only, and students are not usually admitted except as candidates for the Ph.D. Their studies are marked by a high degree of interdisciplinary and international collaboration. Many nationalities are represented among the staff and student body. Academic work is conducted through an organizational segment of the Institution known as the SIO Department and its seven curricular groups: biological oceanography, physical oceanography, marine biology, geological sciences, marine chemistry, geophysics, and applied ocean sciences. Approximately eighty professors are complemented by an academic staff of more than a hundred research scientists, many of whom have a regularly scheduled part in the instructional program.

Scripps maintains four ships at sea, which operated some 1,200 days and logged 195,026 kilometers (105,276 n.m.) in the year ending June 30, 1977. The fleet sails on limited-objective trips and far-flung exped-

itions. For example, R/V *Alpha Helix* concluded twelve months of biological-physiological investigations in the Amazon River Basin in June 1977. After an additional nine months of similar studies in the Caribbean, she will return home in April 1978. In September 1977, *Melville*, Scripps's largest ship, sailed on a nineteen-month cruise to conduct geological-geophysical investigations from San Diego to Panama, across the Atlantic and into the Mediterranean and Red seas en route to geochemical-geophysical research in the Indian Ocean for the first half of 1978, then to operate in the Mediterranean and South Atlantic prior to geophysical work off Central America early in 1979. After short cruises near San Diego, R/V *Thomas Washington* will sail in May 1978 on a complex biological-geological-geophysical examination of the equatorial eastern and western Pacific, until mid-1979. *Ellen B. Scripps*, smallest of the fleet, makes one-day-to-a-fortnight sorties off San Diego, testing and developing equipment; examining short, lead-time phenomena; and collecting specimens, often under graduate-student direction. A newly constructed vessel, *New Horizon*, will join the fleet in mid-1978. Fifty-two meters long and capable of operating throughout tropical and temperate regions, she will carry out, in large part, state-funded research in biology and physical oceanography off the west coast of the United States and Baja California.

Investigations supported by contracts and grants funded from extra-University sources, primarily federal, cover a wide latitude of marine research. The general research effort is conducted by three divisions, designated Marine Biology Research Division; Geological Research Division; and Ocean Research Division, including the Geochemical Ocean Sections Study (GEOSECS), North Pacific Experiment (NORPAX) and the Climate Research Group. The diversity of their work is extended by three special-purpose laboratories: the Marine Physical Laboratory, the Physiological Research Laboratory, and the Visibility Laboratory, and by other specialized groups such as the Deep Sea Drilling Project and by the Marine Life Research Group, sponsored by the State of California. A ship operations and marine technical support unit provides essential services and facilities to all research units of the Institution, and also administers the scientific collections.

## Scripps Institution of Oceanography

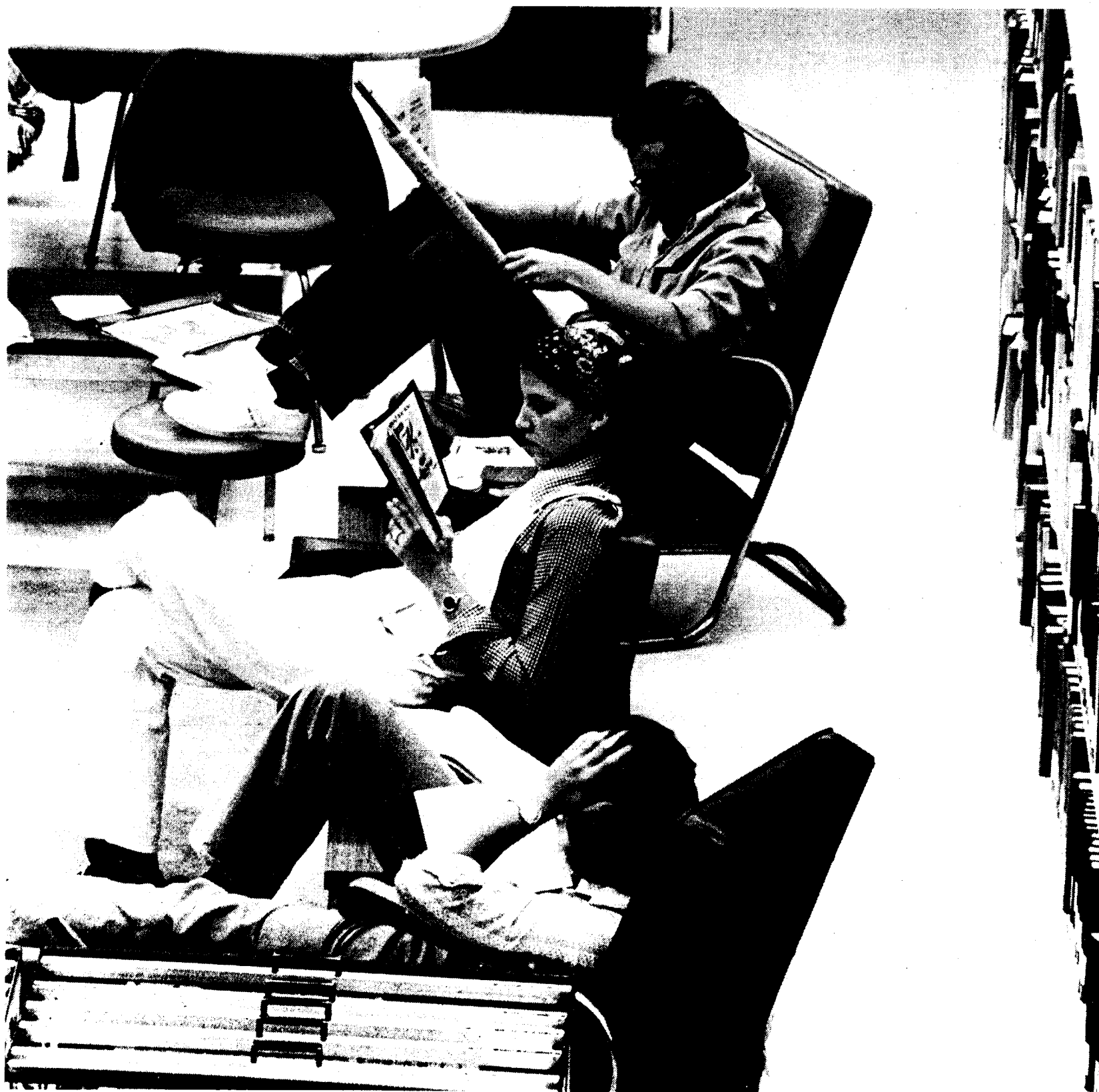
Organizationally separate, but closely affiliated and in proximity to Scripps, are the La Jolla Laboratory of the University of California's Institute of Geophysics and Planetary Physics and the Institute of Marine Resources. The Institute of Marine Resources administers two programs in addition to its regular research programs: UC's Sea Grant College Program, with fifty-seven projects and seventy-four trainees supported on California campuses; and the Food Chain Research Group. The Southwest Fisheries Center, located on the San Diego 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. SFC also is headquarters for the Inter-American Tropical Tuna Commission. There is also a developing relationship with the UC San Diego School of Medicine, as exemplified by joint faculty appoint-

ments, the establishment of a neurobiology unit, and the developing marine biomedical program.

The combination of a large scientific staff and extensive facilities provides an extraordinary opportunity for the small student body (approximately 185) to enjoy close contact with existing oceanographic concepts and active participation in research.

See "Scripps Institution of Oceanography" in "Courses, Curricula, Programs of Instruction" for further details regarding programs of study, requirements, degrees and courses. For additional information, write:

Graduate Student Information  
Scripps Institution of Oceanography  
1166 Ritter Hall, A-008  
University of California, San Diego  
La Jolla, California 92093



## Administration of Scripps Institution of Oceanography

Director.....	William A. Nierenberg
Deputy Director.....	Charles J. Merdinger
Associate Directors .....	Robert L. Fisher
	George G. Shor, Jr.
	Fred N. Spiess
Assistant Directors.....	Jeffery D. Frautschy
	George L. Matson

## Research/Academic Divisions of Scripps Institution of Oceanography

Geological Research Division.....	Joseph R. Curray
Marine Biology Research Division .....	Robert R. Hessler
Ocean Research Division .....	William A. Newman
Marine Physical Laboratory .....	Fred N. Spiess
Visibility Laboratory .....	James L. Harris, Sr.
Physiological Research Laboratory .....	Fred N. White
Marine Life Research Group .....	Joseph L. Reid
Deep Sea Drilling Project.....	Melvin N. A. Peterson
Graduate Department of SIO.....	Michael M. Mullin

## University of California Associated Institutes

Institute of Geophysics and Planetary Physics.....	Walter H. Munk
	J. Freeman Gilbert
Institute of Marine Resources .....	John D. Issacs

## Special Groups, Facilities, and Collections

Geochemical Ocean Sections Study, Neurobiology Unit, North Pacific Experiment; Analytical Facility, Cardiovascular Research Facility, Climate Research Group; Collections — Core, Vertebrate, Invertebrate, and Seawater; Diving Facility, Echo-Sounding Records, Electron Microprobe Laboratory, Electron Microscope Laboratory, Experimental Aquarium, Geological Data Center, Hydraulics Laboratory, Kendall-Frost Mission Bay Reserve, Marine Science Development and Outfitting Shop, Marine Technology Group, Mass Spectrographic Equipment, Mt. Soledad Radioisotope Laboratory, Nimitz Marine Facility (ship-operating base), Oceanographic Data Archives, Physiological Research Laboratory Pool Facility, Piñon Flat Geophysical Laboratory, Radio Station WWD (for ship communications), and San Vicente Lake Calibration Facility.

## The Faculty of Scripps Institution of Oceanography

<b>NAME</b>	<b>TITLE</b>	<b>DEPARTMENT</b>
Anderson, Victor C., Ph.D.	Professor	APIS
Arrhenius, Gustaf O., Ph.D., D.Sc.	Professor	SIO
Arthur, Robert S., Ph.D.	Professor	SIO
Backus, George E., Ph.D.	Professor	SIO
Bada, Jeffrey, Ph.D.	Associate Professor	SIO
Benson, Andrew A., Ph.D.	Professor	SIO
Berger, Wolfgang H., Ph.D.	Associate Professor	SIO
Bradner, Hugh, Ph.D.	Professor	AMES
Brune, James N., Ph.D.	Professor	SIO
Bullard, Edward C., Ph.D.	Professor Emeritus	SIO
Bullock, Theodore H., Ph.D.	Professor	Neurosciences
Cox, Charles S., Ph.D.	Professor	SIO
Craig, Harmon, Ph.D.	Professor	SIO
Curry, Joseph R., Ph.D.	Professor	SIO
Davis, Russ E., Ph.D.	Professor	SIO
Dayton, Paul K., Ph.D.	Associate Professor	SIO
Duntley, Seibert Q., Sc.D.	Professor Emeritus	SIO
Engel, A. E. J., Ph.D.	Professor	SIO
Enright, James T., Ph.D.	Professor	SIO
Faulkner, D.J., Ph.D.	Associate Professor	SIO
Fox, Denis L., Ph.D.	Professor Emeritus	SIO
Gibson, Carl H., Ph.D.	Associate Professor	AMES/SIO
Gieskes, Joris M. T. M., Ph.D.	Associate Professor	SIO
Gilbert, J. Freeman, Ph.D.	Professor	SIO
Goldberg, Edward D., Ph.D.	Professor	SIO
Goodman, Daniel, Ph.D.	Assistant Professor	SIO
Guza, Robert T., Ph.D.	Assistant Professor	SIO
Hammel, Harold T., Ph.D.	Professor	SIO/Medical
Haubrich, Richard A., Ph.D.	Professor	SIO
Hawkins, James W., Jr., Ph.D.	Professor	SIO
Haxo, F.T., Ph.D.	Professor	SIO
Heiligenberg, Walter F., Ph.D.	Professor	SIO
Hendershott, Myrl C., Ph.D.	Professor	SIO
Hessler, Robert R., Ph.D.	Professor	SIO
Holland, Nicholas D., Ph.D.	Associate Professor	SIO
Hubbs, Carl L., Ph.D.	Professor Emeritus	SIO
Inman, Douglas L., Ph.D.	Professor	SIO
Isaacs, John D., B.S.	Professor	SIO
Johnson, Martin W., Ph.D.	Professor Emeritus	SIO
Jordan, Thomas H., Ph.D.	Associate Professor	SIO
Kastner, Miriam, Ph.D.	Associate Professor	SIO
Keeling, Charles D., Ph.D.	Professor	SIO
Lal, Devendra, Ph.D.	Professor	SIO
Lange, G. David, Ph.D.	Associate Professor	Neurosciences
Lewin, Ralph A., Ph.D., Sc.C.	Professor	SIO
Maccougall, J. D., Ph.D.	Assistant Professor	SIO
McGowan, John A., Ph.D.	Professor	SIO
Menard, H. William, Ph.D.	Professor	SIO

Mudie, John D., Ph.D.	Associate Professor	SIO
Mullin, Michael M., Ph.D.	Professor	SIO
Munk, Walter H., Ph.D.	Professor	SIO
Nealson, Kenneth, Ph.D.	Assistant Professor	SIO
Newman, William A., Ph.D.	Professor	SIO
Nierenberg, William A., Ph.D.	Professor, Director of the Institution	Physics
Parker, Robert L., Ph.D.	Professor	SIO
Peterson, Melvin N.A., Ph.D.	Associate Professor	SIO
Phleger, Fred B., Ph.D.	Professor Emeritus	SIO
Raitt, Russell W., Ph.D.	Professor Emeritus	SIO
Rakestraw, Norris W., Ph.D.	Professor Emeritus	SIO
Reid, Joseph L., M.S.	Professor	SIO
Revelle, Roger R., Ph.D.	Professor, Recalled to Active Duty	SIO
	Director Emeritus	
Rosenblatt, Richard H., Ph.D.	Professor	SIO
Salmon, Richard L., Ph.D.	Assistant Professor	SIO
Scholander, P. F., M.D., Ph.D.	Professor Emeritus	SIO
Shepard, Francis P., Ph.D.	Professor Emeritus	SIO
Shor, George G., Jr., Ph.D.	Professor	SIO
Somero, George N., Ph.D.	Associate Professor	SIO
Spiess, Fred N., Ph.D.	Professor	SIO
Suess, Hans E., Ph.D.	Professor Emeritus	Chemistry
Thierstein, Hans R., Ph.D.	Assistant Professor	SIO
Vacquier, Victor, M.A.	Professor Emeritus	SIO
Van Atta, Charles W., Ph.D.	Professor	AMES/SIO
Volcani, Benjamin E., Ph.D.	Professor	SIO
Wheelock, Charles D., M.S.	Professor Emeritus	SIO
White, Fred N., Ph.D.	Professor	Medicine
Winant, Clinton D., Ph.D.	Assistant Professor	SIO
Winterer, Edward L., Ph.D.	Professor	SIO
ZoBell, Claude E., Ph.D.	Professor Emeritus	SIO





# Courses, Curricula, 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.

### 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]

## Afro-American Literature

See Literature

## Anthropology

OFFICE: 8012 Humanities and Social Sciences Building, Muir College

### Professors:

F. G. Bailey, Ph.D.  
Roy G. D'Andrade, Ph.D.  
Robert I. Levy, M.D.  
Gananath Obeyesekere, Ph.D.  
Theodore Schwartz, Ph.D. (*Chairman*)  
Melford E. Spiro, Ph.D.  
Marc J. Swartz, Ph.D.

### Associate Professors:

David K. Jordan, Ph.D.  
Michael Meeker, Ph.D.  
Donald F. Tuzin, Ph.D.

### Assistant Professors:

Shirley C. Strum, Ph.D.  
Julie M. Taylor, Ph.D.

### Lecturer with Security of Employment:

Joyce E. Justus, Ph.D.

### Associated Faculty:

Lola Romanucci-Ross, Ph.D. *Associate Professor, Community Medicine*

Anthropology, the "study of man", is a humanistic social science dedicated to understanding physical and cultural diversity in the species. With generally increased awareness of the importance of cultural 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. At UC San Diego, the concentration is on cultural, social and psychological anthropology, with theoretical emphasis on such topics as culture process and identity, social systems, politics, the family and — to an extent that is unusual among anthropology departments — cognitive and personality psychology. Specialties are also available in urban and applied studies, and in primatology and physical anthropology. Courses utilize a comparative perspective, drawing on materials from a wide variety of cultural settings, especially Sub-Saharan Africa, the Near East, Asia, Europe, the Caribbean, Latin America and the islands of the Pacific. The department offers an undergraduate major program, a senior honors program, and a graduate program leading to the doctoral degree.

**Lower Division** Lower-division offerings in anthropology are concentrated in a series of four courses, offered annually, and numbered AN 22, AN 23, AN 24, and AN 25. Collectively, the 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. Whereas any three of these fulfill the social science requirement for the various colleges, students who anticipate majoring in anthropology are particularly advised to take AN 22, which is the prerequisite for most upper-division courses offered by the department.

Students who have already completed Anthropology 105, 106 and 107 may not receive academic credit for AN 22, 23, or 24.

**The Major** To receive a B.A. degree with a major in anthropology, the student must meet the requirements of Revelle, Muir, Third or Warren College, including the following requirements of the Department of Anthropology:

1. A minimum of twelve upper-division courses in the Department of Anthropology must be completed.
2. AN 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 Analysis of Social Systems  
106 Cultural Systems  
107 Personality Systems in Anthropological Theory.
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) and one directed group study course (198). However, this exception does not extend to AN 105, 106, and 107, or to transfer credits accepted in lieu of them. These *must* be taken for a grade.)
4. For the B.A. degree, a minimum average of 2.0 (C) is required, both as an overall average in all anthropology courses and in the AN 105-106-107 sequence considered separately.
5. Majors will be required to have at least seven of their twelve anthropology courses at University of California, San Diego. The seven normally must include AN 105, 106, and 107. A transfer course may be accepted in lieu of one of the systems 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.

### Department Honors Program

Students are awarded departmental honors upon successful completion of a senior honors thesis, undertaken in addition to the regular major requirements. The thesis is prepared during three successive quarters of AN 196 (Honors Thesis Research) under supervision of a faculty committee. Students are admitted to the program by approval of the anthropol-

## Anthropology

ogy faculty. Under normal circumstances eligibility for the program requires that the student (1) complete eight upper-division anthropology courses by the end of the junior year, three of which must be the core sequence (AN 105, AN 106, AN 107), and (2) achieve grade-point averages of at least 3.60 (overall) and 3.80 (anthropology) by the end of the junior year. Interested students should apply to the department's honors adviser by the end of the sixth week of the quarter prior to their advancement to senior standing.

**The Graduate Program** The Department of Anthropology offers training in social, cultural, and psychological anthropology. The aim of the graduate program is to give the student the theoretical background and 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 intention of proceeding to the doctoral degree; however this is achieved in two stages, the master's degree and the doctoral degree itself.

### The Master of Arts Degree

Admission to the graduate program occurs in the fall quarter only, save by special waiver.

Students entering the graduate program must complete a master's degree before being approved to continue toward the doctorate. Entering students who already have a master's degree in anthropology are barred by the University from taking a second master's degree, but they are nonetheless required by the department to complete coursework described below as preparatory for the master's degree, to take the same statistics examination, and to write a qualifying paper sufficient to judge their capacity for scholarship and their ability to handle conceptual and analytic tasks.

### Requirements for Master's Degree:

#### 1. Specified Courses:

- 205\* Analysis of Social Systems
- 206\* Theory and Analysis of Cultural Systems
- 207\* Personality Systems in Anthropology Theory
- 210 Ethnographic Fields Methods
- 230A Departmental Colloquium (five quarters)
- 295 Master's Thesis Preparation Seminar (five quarters)

\*Attendance at correspondingly numbered upper-division courses (AN 105, 106, 107) and completion of the upper-division examinations is a mandatory adjunct to these courses

**2. Elective Courses:** Four courses are required in addition to the courses specified above. These may be at the graduate or upper-division level (100-199), but no more than two may be taken outside the Department of Anthropology.

**3. Statistics Examination:** All graduate students are required to pass a departmental examination in elementary

statistics. If it is necessary to prepare for this examination by taking a course in statistics, that course may be counted as one of the elective (non-departmental) courses mentioned above.

**The Master's Thesis** Upon completion of requirements 1, 2, and 3, above, the student may be advanced to master's candidacy. When this happens (normally during the fifth quarter in residence), a thesis committee is appointed by the department chairman with the approval of the Dean of Graduate Studies. This committee consists of two faculty members from the Department of Anthropology and one, preferably tenured, from a different department. A library thesis, approximately 50 to 150 pages in length, must be submitted to this committee, which must approve the thesis unanimously. Acceptance of the thesis by the University Librarian represents the final step in completion of all requirements for a Master of Arts degree. (In the case of students submitting qualifying papers, as described above, the papers and their approval are handled by informal committees appointed by the department chairman, and they need not be submitted to the University Librarian.)

**Evaluation** by the faculty is made early in the spring quarter of the students' first year to determine whether they should continue in the program, and again early in the winter quarter of the second year. Each time, a written progress assessment is provided to the students by the faculty and includes the best prediction of their successfully completing the M.A. program. This progress assessment is intended to help students evaluate their overall progress toward the master's degree and to identify any points of conspicuous weakness as early as possible.

### The Doctor of Philosophy Degree

Admission to the doctoral portion of the graduate program is open on the basis of faculty review of students who:

- 1) formally request such admission in writing.
- 2) have completed a master's thesis or qualifying paper judged to be of superior quality, and
- 3) have completed the M.A. coursework at a level of excellence which shows good promise of professional success in anthropology.

### Requirements for Doctoral Candidacy:

#### 1. Specified Courses:

- 209 Research in Psychology Anthropology
- 231 Social Theory and Social Anthropology
- 253 History of Anthropology
- \* One course in linguistics (a number of options are provided each year in the Department of Linguistics)

\*This requirement may be waived for students with prior training in linguistics.

**2. Foreign Language Examination.** All students are 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.

**3. Prefield Qualifying Examination.** After completion of the above-mentioned requirements the student stands for the doctoral qualifying examination, as required by the Office of Graduate Studies. 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: "Committees") Successful completion of this examination marks the student's advancement to doctoral candidacy.

**Committees** The student normally selects a departmental adviser at the time of admission to the doctoral portion of the graduate program. Some time during the first quarter of the doctoral portion, the student will form a departmental committee consisting of three department faculty members (including the adviser) and begin to prepare a dissertation research proposal. Selection of the committee is done in consultation with the adviser. Typically, during the first year after admission to the doctoral portion of the program, the student presents the research proposal to the members of the departmental committee. The dissertation research proposal sets forth a specific plan of research, normally involving intensive fieldwork. The research proposal may or may not build upon the student's M.A. thesis.

If the proposal is informally judged by committee members to be ready to be defended, an oral qualifying examination is scheduled. This is administered by the student's doctoral committee, consisting of the members of the departmental committee plus two faculty members from outside the department, one of whom must be tenured. This expanded committee is chaired by the student's principal adviser.

### 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. 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.

### Teaching

In order to acquire adequate teaching experience, each student in the graduate program is required to participate as an assistant

in the teaching activities of the department during one quarter in each of the student's first three years in residence. This obligation is discharged under the auspices of the course entitled "Anthropology 500: Apprentice Teaching." This is not considered part of the elective course requirements (see above).

## Courses

NOTE: For changes in course offerings or additions made after publication of the *General Catalog*, check the *Schedule of Classes* issued fall 1978, winter 1979, and spring 1979.

### Lower Division

#### 12. Chinese Society and Culture (4)

A description and interpretation of the major institutions and culture patterns of traditional China. (May not be offered in 1978-79.)

#### 22. Introduction to the Study of Man (4)

An introduction to the anthropological approach to the understanding of human behavior, with an examination of data from a selection of societies and cultures.

#### 23. Social Structure and Change (4)

Examination of the problem of the maintenance of and change in human societies and other groups: factionalism, acculturation, assimilation, social evolution, urbanization, religious movements, and economic development.

#### 24. Religion, Symbolism, Ideology and Personality (4)

Examination of the roles of symbolism and ideology in human life with particular attention to religion and other organized systems of belief and practice.

#### 25. Introduction to Human Evolution (4)

As an introduction to human evolution from the perspective of physical anthropology, this course considers evolutionary theory and time, evolution of the primates, evolution of the hominids. Emphasis placed on evidence from fossil remains and from behavioral studies of living primates.

### Upper Division

#### 100. Development of Primate Perspectives (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:* AN 25 or 159; not open to students who have completed AN 154. (May not be offered in 1978-79.)

#### 101. Models of Social Behavior in Animals and Man (4)

An overview of theories of animal social behavior with attention to new developments in primate behavior. Evaluation of current popular books on human behavior. *Prerequisite:* AN 100 or 154.

#### 102. Seminar in Applied Anthropology (4)

Survey of anthropological studies intended for application to policy, planning or evaluation of programs for sociocultural change. In addition to theory and method, special consideration will be given to social, political and ethical-moral problems in applied social science. *Prerequisites:* anthropology major, at least three anthro courses, and department approval. (May not be offered in 1978-79.)

#### 103. Problems in Chinese Ethnology (4)

This course considers a different general area of the ethnology of China each year. May be taken for credit three times. *Prerequisite:* permission of instructor.

#### 105. Analysis of Social Systems (4)

A systematic analysis of social systems and of the concepts and constructs required for cross-cultural and comparative study of human societies. *Prerequisite:* AN 22 or introductory anthropology at another university.

#### 106. Cultural Systems (4)

This course considers the nature of culture, its evolution, forms and processes; the variation and distribution of its content among the individuals of a society; the evaluation of cultures as adaptive and fulfilling systems. *Prerequisite:* AN 22 or 105

or introductory anthropology at another university or consent of instructor

#### 107. Personality Systems in Anthropological Theory (4)

This course considers the inter-relationships of aspects of both individual personality and sociocultural systems. Emphasis will be placed on the relation of sociocultural contexts to motives, values, cognition, personal adjustment, stress and pathology, and to qualities of personal experience. *Prerequisites:* AN 22 or 105, and 106.

#### 110. Issues in Physical Anthropology (4)

This is a seminar for students who wish to explore special topics in physical anthropology. The course focus will change from year to year. May be repeated one time for credit. *Prerequisites:* AN 25 or 100, one other course in physical anthropology and instructor's permission. (May not be offered in 1978-79.)

#### 112. Quantitative Techniques in Anthropology (4)

An introduction to the use of statistics and computers in the analysis of social and cultural data, including discussion of problems involved in the verification of social science theories. *Prerequisite:* AN 22 or introductory anthropology at another university.

#### 114. Family, Childhood and Society (4)

A comparative and analytic study of the relationships between family structure and childhood experience, and their effects on social and cultural systems. *Prerequisite:* AN 22, 23, or 24 or introductory anthropology at another university.

#### 115. Culture and Politics in the Nuclear Family (4)

Consideration of how families in different societies around the world arrive at goals and how members use resources to influence one another. *Prerequisite:* AN 22 or introductory anthropology at another university.

#### 116a. Urban Anthropology (4)

The evolution, form systemics and culture of the city as artifact and environment for its component individual groups and communities, explored in terms of the methods and perspectives of anthropology. *Prerequisite:* AN 22 or one upper-division course in anthropology. 116a is prerequisite to 116b. 116a not open for credit to students who have taken AN 116. (May not be offered in 1978-79.)

#### 116b. Urban Anthropology Research Seminar (4)

This course will broach the application of social science theory and methods to the planning and realization of the growth, form and quality of urban life in the San Diego area. The seminar will involve research, field trips, and discussions with diverse participants in the urban growth process. *Prerequisites:* AN 116a and permission of instructor. (May not be offered in 1978-79.)

#### 117. Religious Cults and Social Movements (4)

Religious cults and social movements will be studied particularly as they enter into rapid cultural and social change. Relations between cults and movements in form and process will be examined in a variety of specific cases. *Prerequisite:* AN 22 or introductory anthropology at another university. (May not be offered in 1978-79.)

#### 118. Cognitive Anthropology (4)

This course will consider the relation between cultural behavior and cognitive processes. Selected topics from the fields of ethno-science, semantic and grammatical analysis, decision-making, and belief systems will be discussed. *Prerequisite:* AN 22 or introductory anthropology at another university. (May not be offered in 1978-79.)

#### 119. Social and Cultural Change (4)

Theories of social evolution, diffusion, acculturation, pattern dynamics, innovation, revitalization and revolution, and modernization are examined, and illustrated with cross-cultural materials. *Prerequisites:* AN 22 or 23 and upper-division standing. (May not be offered in 1978-79.)

#### 120. Buddhism and Society (4)

Buddhism as an ideology and an institution in relationship to the society, culture, and personality in which it is found. *Prerequisites:* upper-division standing, major in social science or humanities. (May not be offered in 1978-79.)

#### 121. Women in Cross-Cultural Perspective (4)

A comparative and analytic study of the ways women function in a variety of settings. Particular attention will be given to the cultural aspects of women's roles. *Prerequisite:* AN 22 or introductory anthropology at another university.

#### 124. Sex and Culture (4)

This course will deal with cultural and psychological factors in sexual behavior and sex-related roles both within and beyond the social context of the family. The course will have an evolutionary and cross-cultural perspective and will also examine cultural trends in sexual behavior and sex roles in our own society. *Prerequisites:* one lower-division course in anthropology and at least one upper-division course in anthropology. (May not be offered in 1978-79.)

#### 125. Language and Culture (4)

This course explores language acquisition, idiolects, social dialects, levels of linguistics usage, language and world view, the role of language in cultural interaction and social structure, and planned language change, including language problems in new nations and at an international level.

#### 127. Race, Culture and Identity (4)

Consideration of race, ethnicity, and culture as these are conceived and used by men in various societies to form the bases of individual and group identities. *Prerequisite:* AN 22 or introductory anthropology at another university. (May not be offered in 1978-79.)

#### 128. The Anthropology of Medicine (4)

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 Tradition" 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. (May not be offered in 1978-79.)

#### 129. Prehistory and Culture (4)

A review of human culture from the Neanderthals through the growth of Bronze Age empires, focusing on major cultural "inventions" such as agriculture, metallurgy, and writing. *Prerequisite:* AN 22 or introductory anthropology at another university. (May not be offered in 1978-79.)

#### 131. Social Theory (4)

The course will deal with the social theories of some major figures in social science: Marx, Weber, Pareto, Simmel, Durkheim, G. H. Mead. Their relevance for current theory will be discussed in detail. *Prerequisites:* AN 22 or introductory anthropology at another university; AN 105, 106, 107; major in anthropology; senior standing, and permission of instructor. (May not be offered in 1978-79.)

#### 135. Indian Society (4)

A study of the social structure of India, with particular reference to caste and political organization. *Prerequisite:* upper-division standing. (May not be offered in 1978-79.)

#### 136. Caribbean Society and Culture (4)

A study of the comparative implications of migration, slavery and colonialism, and of the contributions of various immigrant groups to the development of national cultures. (May not be offered in 1978-79.)

#### 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 in that area. *Prerequisite:* AN 22 or introductory anthropology at another university. (May not be offered in 1978-79.)

#### 139. Symbolic Classification (4)

An examination of themes related to symbolic classification carried out in the context of the classics of the French sociological and British social anthropological schools. Frequent short essays or oral presentations required in lieu of final paper or exam. *Prerequisite:* instructor's permission.

#### 141. Religion and Society (4)

A comparative study of religion as a cultural system. The analysis will focus on the relationship between religion and its social and psychological determinants, and its social and psychological functions. Materials are drawn from Western and non-Western, primitive and high religions alike. *Prerequisite:* AN 22 or introductory anthropology at another university.

#### 147. Ritual and Symbolism (4)

An examination of the place of symbols in the ritual systems of large- and small-scale societies, and a critical evaluation of theoretical models commonly applied to their analysis and interpretation. *Prerequisite:* AN 22 or introductory anthropology at another university. (May not be offered in 1978-79.)

## Anthropology

### 149. Tantric Hinduism (4)

This course will consider Hinduism from an anthropological and psychological perspective, with an emphasis on the Tantric Hinduism of Nepal. The emphasis is on the symbolic and communicative dimensions of Hinduism, and their meanings for community and individual life in Nepal. (May not be offered in 1978-79.)

### 153. History of Anthropology (4)

An overview of the development of anthropology with particular emphasis on developments centering around the concepts of "culture," "society," and "personality." *Prerequisite: previous upper-division work in anthropology.* (May not be offered in 1978-79.)

### 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 developmental psychology. *Prerequisite: AN 22 (or equivalent).* (May not be offered in 1978-79.)

### 158. Psychoanalytic Anthropology (4)

A critical examination of the anthropological works of Freud and of selected Freudian anthropologists and an assessment of their influence on anthropological theory. *Prerequisites: upper division, AN 22, 23 or 24.* (May not be offered in 1978-79.)

### 159. Biological Anthropology (4)

A discussion of the major areas of interest to physical anthropology. Emphasis is on the synthesis of evolutionary theory and evidence from primate and hominid fossils and primate behavior for an understanding of human evolution. *Prerequisite: AN 22 or introductory anthropology at another university, not open to students who have completed AN 25.* (May not be offered in 1978-79.)

### 160. Ecstatic Religion (4)

This course deals with the analysis of such phenomena as spirit possession, shamanism, prophecy, trance and related topics. Emphasis will be on the relationship between the individual's motives and the cultural form in which they are expressed. The cultural and social contexts of ecstatic religion as well as the sociological factors underlying the transformation of one type of ecstatic religion into another will also be considered. *Prerequisite: permission of instructor.* (May not be offered in 1978-79.)

### 162. Ethnology of the Near East (4)

An introduction to the social and political traditions of the tribal and peasant peoples of the Near East. Some attention will be devoted to an interpretation of the oral literature of these peoples as a means for understanding these traditions. *Prerequisite: one course in anthropology here or elsewhere.* (May not be offered in 1978-79.)

### 163. Politics and Culture (4)

The problems of analyzing political events within a specific cultural context are explored. The readings include political ethnographies and political literature from the Mediterranean area, the Near East, Africa, Southeast Asia, and Mexico. *Prerequisite: one course in anthropology here or elsewhere.* (May not be offered in 1978-79.)

### 164. Political Myth in Latin America (4)

Methods and theory of recording and analyzing political myth and symbolism in urban society, emphasizing the role of mythic patterns in current politics. Examination of political symbolism in contexts of ideology, history, myth, and political culture. *Prerequisite: AN 22 or introductory anthropology at another university.* (May not be offered in 1978-79.)

### 166. Islam and Islamic Societies (4)

An introduction to the historical and sociological study of societies with Islamic traditions and a discussion of the social and political problems associated with such societies. *Prerequisite: AN 22 or introductory anthropology at another university.*

### 167. Anthropological Perspective on History (4)

This course will consider relations between the two fields illustrated by contemporary Latin American popular versions of history and contrasting academic versions. Concentration on the relative "reality" of tradition, history, and myth. *Prerequisite: AN 22 or introductory anthropology at another university.* (May not be offered in 1978-79.)

### 190. Culture/Personality and the Education Process (4)

Theories and societal assumptions about the teaching-learning process will be examined both from an interdisciplinary and cross-cultural perspective. Field observation tech-

niques will be an adjunct to the lectures. (May not be offered in 1978-79.)

### 196. Honors Thesis Research (4)

Independent preparation of a senior honors thesis under the supervision of a faculty committee. This course may be repeated twice in succession during the senior year. *Prerequisite: prior admission to the department's undergraduate honors program.*

### 198. Directed Group Study (2 or 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. (P/NP grades only.) *Prerequisites: consent of instructor and upper-division standing.*

### 199. Independent Study (2-4)

Independent study and research under the direction of a member of the staff. (P/NP grades only.) *Prerequisite: special permission of instructor.*

## Graduate

### 201. Seminar in Theories of Aggression (3)

Current behavioral science theories of aggression and their application to the comparative analysis of society. *Prerequisite: graduate standing.* (May not be offered in 1978-79.)

### 202. History of American Ethnology (3)

Theoretical, philosophical and historical view of development of American ethnology. Particular attention will be paid to the development of the bureau of American ethnology, Lewis Henry Morgan, Franz Boas, the American Historical School, and later developments. *Prerequisite: graduate standing.* (May not be offered in 1978-79.)

### 203. Cultural Analysis of Interpersonal Behavior (3)

A variety of approaches to the study of interpersonal behavior will be examined, with an emphasis on the way in which interpersonal behavior is perceived and understood. Videotape and other recording techniques will be employed. *Prerequisite: graduate standing in anthropology or consent of instructor.* (May not be offered in 1978-79.)

### 204. Applied Anthropology (3)

This seminar will deal concretely with the application of anthropological theory and method to issues of public policy and public concern. It will particularly deal with the role of the anthropologist in such settings and the ethical concerns of applied social science. *Prerequisite: graduate standing.* (May not be offered in 1978-79.)

### 205. Analysis of Social Systems (6)

A systematic analysis of social systems, and of the concepts and constructs required for cross-cultural and comparative study of human societies. *Prerequisite: graduate standing in social science or humanities.*

### 206. Theory and Analysis of Cultural Systems (6)

The course will intensively survey theories of the nature of culture, its forms and transformations, and the analysis of culture in behavior. *Prerequisite: AN 205.*

### 207. Personality Systems in Anthropological Theory (6)

Consideration of inter-relationships of aspects of individual personality and various aspects of sociocultural systems. The relation of sociocultural contexts to motives, values, cognition, personal adjustment, stress and pathology, and to qualities of personal experience will be emphasized. *Prerequisites: AN 205 and 206.*

### 209. Research in Psychological Anthropology (1-6)

An introduction to a wide range of techniques including interview, observation, and testing leading to psychological inferences about groups and individuals in a cross-cultural context. *Prerequisite: graduate standing in anthropology.* (Not offered in 1978-79.)

### 210. Ethnographic Field Methods (1-6)

This seminar provides graduate students with an opportunity to use and discuss the main field methods in social and cultural anthropology and to consider the problems associated with these methods. The genealogical method, various types of interviewing, and observational techniques will be among those discussed and employed by students in the practicum which is part of the course. *Prerequisite: graduate standing in anthropology.*

### 211. Medical Anthropology (3)

Lecture course. An analysis and synthesis of the growing body of anthropological concepts and investigations concerned with illness and curing events from primitive cultures to com-

plex urban societies, and their relevance to medical practice (May not be offered in 1978-79.)

### 212. Topics in Formal Analysis (3)

Examination of selected problem areas with respect to the application of formal techniques of analysis. *Prerequisites: graduate standing in anthropology; a basic course in statistics and computer science or consent of instructor.*

### 216. Theory and Methods in Urban Anthropology (3)

This course will survey relevant theory, methods, opportunities and needs in the comparative, systemic, or problem-related research on both Western and non-Western urban settlements. (May not be offered in 1978-79.)

### 217. Current Theoretical Issues in Anthropology (3)

An examination of current literature to determine issues and assumptions motivating modern research in anthropology. Analysis of the empirical relations between anthropological research findings and theoretical development will be emphasized. *Prerequisite: graduate standing in anthropology.* (May not be offered in 1978-79.)

### 218. Cognitive Anthropology (3)

This course will consider the relation between cultural behavior and cognitive processes. Selected topics from the fields of ethno-science, semantic and grammatical analysis, decision-making, and belief systems will be discussed. *Prerequisite: graduate standing in anthropology or psychology.* (May not be offered in 1978-79.)

### 219. Thinkers in American Anthropology (3)

A consideration of the theoretical writings of a series of major figures in American anthropology in the twentieth century. (May not be offered in 1978-79.)

### 220. Buddhism and Society (3)

Buddhism as an ideology and an institution in relation to the society, culture and personality in which it is found. *Prerequisite: graduate standing in social science or humanities.* (May not be offered in 1978-79.)

### 224. Selected Research Topics in Culture and Cognition (3)

This course will allow students to participate in the analysis and interpretation of data on cognitive development and acculturation from a non-Western society, in the review of related cross-culture literature on cognition and in the collection, locally, of comparable data. *Prerequisites: advanced background in relevant disciplines and an interview with the instructor.* (May not be offered in 1978-79.)

### 225. Aspects of Linguistic Anthropology (3)

Designed to follow an introduction to general linguistics, this course focuses on the use made of linguistic methods, theories, and data by anthropologists from about 1920 to date, with particular emphasis on contemporary studies of the social use of language. *Prerequisite: an introductory course in linguistics.* (May not be offered in 1978-79.)

### 228. The Nuclear Family in Cross-Cultural Perspective (3)

This course is a seminar which will deal with the ways family statuses work in different societies regarding the distribution of authority, the presence or absence of conflict in various areas of life, and how resources from outside the family are brought to bear on family problems by different members of the group. *Prerequisite: graduate standing in anthropology or permission of instructor.* (May not be offered in 1978-79.)

### 229. Seminar on Religion (3)

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.*

### 230A. Department Colloquium (1)

Forum for presentation of papers by students, faculty and guests will be offered quarterly. *Prerequisite: graduate standing in anthropology at pre-M.A. level.*

### 230B. Department Colloquium (1)

Forum for presentation of papers by students, faculty and guests. Course will be offered quarterly. *Prerequisite: graduate standing in anthropology at pre-fieldwork level (Ph.D. candidacy).*

### 230C. Department Colloquium (1)

Forum for presentation of papers by students, faculty and guests. *Prerequisite: graduate standing in anthropology at post-fieldwork level (dissertation writeup level).*

**231. Social Theory and Social Anthropology (3)**

This seminar will discuss the impact of the major social theorists on social anthropological thinking. Emphasis will be on Marx, Weber, and Durkheim. Selected anthropological monographs showing the influence of these theorists will also be discussed. *Prerequisite: graduate standing in anthropology or instructor's permission.* (Not offered in 1978-79.)

**238. Culture, Cognition and Intelligence (3)**

This seminar will consider the now extensive literature on the effects of culture on cognition in their bearing on the controversial question of possible group differences in intelligence. *Prerequisites: AN 106, 107 or AN 206, 207 or permission of instructor.* (May not be offered in 1978-79.)

**241. Religion and Society (3)**

A structural-functional analysis of religious belief and ritual, with special emphasis on modes of explanation. Readings will stress the anthropological classics. *Prerequisites: graduate standing, major in social sciences or humanities.*

**242. Religion, Social Change and Secularization (3)**

The seminar will critically examine a popular view in social science that certain conditions — the development of science, secular education and rationality — will result in the erosion of religion and the emergence of secular society. Alternative theoretical approaches to religious change will be discussed. *Prerequisite: graduate standing.* (May not be offered in 1978-79.)

**245. Anthropological Perspectives on Symbolism and Ritual (3)**

Through a critical review of prevailing anthropological perspectives, this seminar explores the nature of symbols — their social, cultural and psychological dimensions, and their incorporation into ritual performances. *Prerequisite: graduate standing in anthropology or consent of instructor.* (May not be offered in 1978-79.)

**246. Special Topics in Primate Behavior (3)**

Specialized topics of interest to students of human behavior will be considered in relationship to information on non-human primates. *Prerequisite: graduate standing in anthropology.*

**247. History as Cultural Myth (3)**

An anthropological approach to history in cross-cultural and diachronic comparative perspectives. Ideas such as historicism will be seen as basic cultural myths in our society. Relevance of these areas of study to fieldwork in historically complex societies will be considered. *Prerequisite: graduate standing.* (May not be offered in 1978-79.)

**248. Physical Anthropology for Social Sciences (3)**

This seminar will discuss how an appreciation of the biological foundations of social behavior can contribute to understanding problems that interest social anthropologists. Topics may include the behavioral biology of sex difference but will vary depending on students' interest. *Prerequisites: graduate or advanced undergraduate standing in anthropology and permission of instructor.* (May not be offered in 1978-79.)

**249. Tantric Hinduism (3)**

This seminar will consider Hinduism from an anthropological and psychological perspective, with an emphasis on the Tantric Hinduism of Nepal. The emphasis is on the symbolic and communicative dimensions of Hinduism, and their meanings for community and individual life in Nepal. *Prerequisite: graduate standing in social science or humanities.* (May not be offered in 1978-79.)

**251. Conflict and Collusion: Some Themes in Political Anthropology (3)**

An examination of political processes at the local level with emphasis on examining supports for various aspects of the processes considered (e.g., leadership, factionalism, etc.). Readings will stress case studies and theory. *Prerequisites: graduate standing and major in social science.*

**253. History of Anthropology (1-6)**

A treatment of selected themes in the intellectual history of anthropology with a review of various approaches that have been used to analyze the emergence of man's modern ideas about himself. *Prerequisite: graduate standing in anthropology.*

**255. The Anthropology of Modernization (3)**

Theories of modernization with reference to particular case studies. Methodological considerations in the study of modernization from the perspective of anthropology. *Prerequisite: graduate standing.* (May not be offered in 1978-79.)

**258. Selected Topics in Psychoanalytic Theory (3)**

A critical survey of the psychoanalytic approach to selected topics in anthropology, such as totemism, religion, social character. *Prerequisite: graduate standing.* (May not be offered in 1978-79.)

**259. Semiotics and the Science of Society (3)**

The seminar will consist of a detailed discussion of some of the key writings of Durkheim, Mauss, and Levi-Strauss. The works of these authors which have been most influential in anthropology have linked the study of society and a theory of signs. By understanding how this is so, the significance of semiotics as a trend of modern social thought can be gauged. *Prerequisite: graduate standing in social science or humanities.*

**260. Ecstatic Religion (3)**

This course deals with the analysis of such phenomena as spirit possession, shamanism, prophecy, trance and related topics. Emphasis will be on the relationship between the individual's motives and the cultural form in which they are expressed. The cultural and social contexts of ecstatic religion as well as the sociological factors underlying the transformation of one type of ecstatic religion into another will be considered. *Prerequisite: graduate standing in anthropology and permission of instructor.* (May not be offered in 1978-79.)

**270. Psychiatry and Anthropology (3)**

Introduction to interviewing and diagnostic techniques in psychiatry and their application to anthropological research. Content will vary from quarter to quarter and the course may be repeated three times for credit. (Satisfactory/Unsatisfactory grades only.) *Prerequisites: graduate standing in anthropology and consent of instructor.* (May not be offered in 1978-79.)

**271A. Advanced Practicum in Field Research (3)**

This course is a seminar in which students will consider the issues receiving particular attention in current anthropological journals and monographs. Grading will be on the basis of library research papers. *Prerequisite: graduate standing in anthropology.*

**271B. Advanced Practicum in Field Research (3)**

Continuation of AN 271A examining issues receiving particular attention in current anthropological journals and monographs. *Prerequisite: graduate standing in anthropology.*

**271C. Advanced Practicum in Field Research (3)**

Continuation of 271A and 271B examining issues receiving particular attention in current anthropological journals and monographs. *Prerequisite: advanced standing in anthropology.*

**295. Master's Thesis Preparation (1-12)**

The student will work on the master's thesis under the direction of the departmental committee chairman. The course will normally be taken fall and winter quarter of the student's second year of residence. *Prerequisite: graduate student in anthropology.*

**296. Fieldwork Proposal Preparation (3)**

The student will work in cooperation with his or her departmental committee to develop a research proposal for the doctoral research project. The course will normally be taken in the winter and/or spring quarters of the second year, and may not normally be taken more than twice. (Satisfactory/Unsatisfactory grades only.) *Prerequisites: graduate standing in anthropology and permission of instructor.*

**297. Research Practicum (1-4)**

Supervised advanced research studies with individual topics to be selected according to the student's special interests. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: graduate standing.*

**298. Independent Study (1-12)**

(Satisfactory/Unsatisfactory grades only.)

**299. Thesis Research (1-12)**

*Prerequisite: Ph.D. candidacy.* (Satisfactory/Unsatisfactory grades only.)

**500. Apprentice Teaching (1-4)**

The course, designed to meet the needs of graduate students who serve as TA's, includes analyses 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 Ph.D. degree. The amount of teaching required is

equivalent to the duties expected of a 0.50 teaching assistant for one quarter in each of the student's first three years as a graduate student in the department. Enrollment for 4 units in this course documents the requirement. (Satisfactory/Unsatisfactory grades only.)

## Applied Mechanics and Engineering Sciences (AMES)

OFFICE: 5202 Urey Hall, Revelle College

**Professors:**

H. Bradner, Ph.D.  
A. T. Ellis, Ph.D.  
Y. C. Fung, Ph.D.  
G. A. Hegemier, Ph.D.  
M. Intaglietta, Ph.D.  
P. A. Libby, Ph.D.  
S.-C. Lin, Ph.D.  
J. S. Miles, Ph.D.  
W. Nachbar, Ph.D.  
D. B. Olfe, Ph.D.  
S. S. Penner, Ph.D.  
E. Reissner, D. Eng., Ph.D.  
R. E. Roberson, Ph.D. (Chairman)  
A. M. Schneider, Sc.D.  
H. W. Sorenson, Ph.D.  
D. D. Sworder, Ph.D.  
C. W. Van Atta, Ph.D.  
F. A. Williams, Ph.D.  
B. W. Zweifach, Ph.D.

**Associate Professors:**

C. H. Gibson, Ph.D.  
J. E. Luco, Ph.D.  
D. R. Miller, Ph.D.  
S. Rand, Ph.D.

**Assistant Professors:**

D. A. Gough, Ph.D.  
A. V. Sebald, Ph.D.  
W. B. Bush, Ph.D., *Research Engineer and Lecturer (1976-present)*  
F. H. Champagne, Ph.D., *Associate Research Engineer*  
J. W. Covell, M.D., *Associate Professor of Medicine and Bioengineering*  
D. L. Franklin, Ph.D., *Associate Adjunct Professor of Medicine and Bioengineering*  
C. A. Friehe, Ph.D., *Associate Research Engineer*  
A. Fronek, M.D., Ph.D., *Professor of Surgery and Bioengineering*  
K. Fronek, M.D., Ph.D., *Research Physiologist*  
A. S. Gordon, Ph.D., *Adjunct Professor of Engineering Chemistry*  
W. K. Harrison, Ph.D., *Associate Adjunct Professor of Anesthesiology and Bioengineering*  
K. N. Helland, Ph.D., *Assistant Research Engineer and Lecturer*  
J. P. Howe, Ph.D., *Adjunct Professor of Nuclear Engineering*  
J. C. LaRue, Ph.D., *Assistant Research Engineer and Lecturer*  
R. M. Peters, Ph.D., *Professor of Surgery and Bioengineering*  
J. G. Pinto, Ph.D., *Assistant Research Engineer*  
S. S. Sobin, M.D., Ph.D., *Adjunct Professor of Physiology*

K. G. P. Sulzmann, Ph.D., *Research Engineer*  
C. P. Wang, Ph.D., *Associate Adjunct Professor*

J. B. West, M.D., Ph.D., *Professor of Medicine and Bioengineering*

S. L.-Y. Woo, *Associate Professor of Surgery and Bioengineering in Residence*

M. R.-T. Yen, *Assistant Research Bioengineer*

The current instructional and research programs emphasize bioengineering, gas dynamics, engineering physics, fluid mechanics, solid mechanics and structures, and systems science. The graduate program is characterized by strong interdisciplinary relationships with the Departments of Physics, Mathematics, Biology, Chemistry, and Applied Physics and Information Sciences, with the School of Medicine, and with associated campus institutes such as the Institute for Geophysics and Planetary Physics, the Institute for Pure and Applied Physical Sciences, and the Scripps Institution of Oceanography.

### THE UNDERGRADUATE PROGRAM (GENERAL)

The Department of Applied Mechanics and Engineering Sciences offers two separate undergraduate programs: one, an upper-division major in applied science; the other, a four-year program in engineering. Either Bachelor of Arts or Bachelor of Science degrees are awarded for each program, depending on the student's collegiate affiliation. The details of these programs are described separately below; here, we present general information for AMES undergraduates.

All AMES undergraduates with suitable academic standing are encouraged to plan their academic programs to provide for a fifth year of study leading to an M.S. degree. For students matriculating in the applied sciences program, the M.S. degree should be considered a first professional degree. In some cases, AMES students may be able to take several first-year graduate courses during their senior year. AMES faculty advisers are able to advise students in this regard.

AMES faculty are assigned for each class of students and for each AMES program; a record of advisers' names may be obtained from the chairman's office. These advisers, as far as possible in view of leaves of absence, remain with the same set of students during their undergraduate careers at UC San Diego. Students must meet with their faculty adviser to design a study plan as soon as AMES has been designated as a major. This plan may be revised in subsequent years, but such a revision must be approved by the faculty adviser. An "Individual Program" form must be signed by the adviser and kept up-to-date.

More flexible undergraduate programs can be arranged, but deviations from any program requirements listed below require a petition approved by the AMES faculty adviser and the AMES department chairman.

AMES students may take AMES 199, Independent Study for Undergraduates, as an

elective course under the guidance of an AMES faculty member. Students may propose to a faculty member a research or study topic or may avail themselves of the list of suitable topics issued by the department each fall quarter. After obtaining the faculty member's concurrence on the topic and scope of the study, the student must execute an authorization form available from the departmental office. Generally, such courses may not be used to satisfy the minimum eighteen-course requirement for the major.

The department requires that AMES students must maintain at least a C grade in each required course (minimum graduation requirement) in the undergraduate programs, in addition to an overall grade-point average of at least 2.0.

Graduates of junior colleges may enter either the applied sciences or engineering program in their junior year. Transfer students should be mindful, when planning their program, of the lower-division course requirements for meeting their collegiate and major requirements.

AMES offers several minors for Warren College students. In collaboration with the Department of Physics, a minor for non-science students entitled Scientific Perspectives is offered. In addition, for students in the social sciences and in the pure and applied sciences, minors in applied mechanics and systems science are available.

Undergraduate students wishing to arrange a sequence of AMES courses to satisfy minor requirements or to meet particular academic interests are urged to consult the AMES chairman for referral to the relevant AMES faculty member.

In addition to the above programs of study and minors offered by the department, AMES also participates in the engineering physics program. This program is jointly offered by the Departments of AMES, APIS and Physics and is administered by the Department of APIS. See "Engineering Physics Program" under APIS for details.

### The Undergraduate Program (Upper-Division Major in Applied Science)

The Department of AMES offers programs of study at the upper-division level\* in applied sciences. These programs emphasize engineering science and thus provide basic training for engineers in aerospace, civil and mechanical engineering, systems engineering, and bioengineering and for students intending to use undergraduate training in engineering as preparation for postgraduate professional training in business administration, law, and medicine.

There are three distinct options within the applied sciences program. The *applied mechanics program* provides training in solid and fluid mechanics and in dynamics with application to the engineering fields based on mechanics, i.e., aerospace, and civil and

mechanical engineering. The *systems science program* provides the student with the fundamental concepts and tools required for the analysis and/or optimal synthesis of complex and broad engineering, physical, and social systems. Such problems, often involving automatic control, arise in numerous industrial and public contexts. The *bioengineering program* prepares the student either for the engineering aspects of medical care and research or for professional training in medical school.

*Program Preparation* All students who expect to major in one of these programs are strongly advised to prepare themselves beforehand in each of five areas: mathematics, computer programming, physics, chemistry, biology. A solid foundation in mathematics is essential, requiring:

Mathematics: Mathematics 2A, 2B, 2C, 2DA, 2EA

(It should be noted here that Mathematics 2D and 2E do not give proper preparation for upper-division AMES courses.) Use of the digital computer in all major programs requires:

Programming competence: AMES 10, or FORTRAN programming competence equivalent to that achieved in AMES 10

Science preparation in the lower-division involves: a minimum of three quarters of physics, including at least one quarter devoted entirely to mechanics; two quarters of chemistry plus one quarter of chemistry laboratory (chemistry laboratory requirement is waived for students preparing for the AMES systems science program); one quarter of biology (only for students preparing for the AMES bioengineering program). Approved sequences that satisfy departmental requirements include the following:

Physics: Natural Science 2A-B-C; Science 4A-B-C; Physics 2A-B-C; Physics 3A-B-C

Chemistry: Natural Science 2D, 2F and 2DL; Science 3A-B and 3AL; Sci./Tech. 12A-B and 12AL; Chemistry 4A-B and 4AL

Biology: Natural Science 2E; Sci./Tech. 11A

Lack of proper prerequisites could mean, at the least, that more than six quarters of residence would be needed to satisfy the major program requirements. All students having special problems with regard to prerequisites should consult with an AMES faculty adviser as soon as possible.

Students anticipating enrollment in the AMES upper-division major and wishing to strengthen their preparation in the engineering sciences relevant for such a major, should take AMES 16A-B in their sophomore year.

\*While in lower-division, properly qualified students may elect certain courses in upper-division AMES programs and may be admitted to an AMES major upon approval by the AMES faculty adviser

Third College students planning to take an AMES upper-division major should consult with the AMES adviser in Third College as soon as possible after enrollment at UC San Diego. Prerequisite courses are assigned on an individual basis by the AMES/Third College adviser.

**Degree Requirements** As a minimum graduation requirement, a student qualifying for a major in AMES must pass eighteen (18) upper-division courses. Normally, fifteen (15) of these courses must be in the AMES department (or in biology or chemistry, in the case of bioengineering). The requirement of fifteen (15) AMES courses is satisfied by the required courses in each regular AMES undergraduate program. Applied mechanics majors may count AMES 12 as one required course. The remainder of these courses in these programs are to be chosen from electives that may be selected either from the list of approved technical electives, or in other areas selected in consultation with the AMES faculty adviser. (Normally, Biology 195, AMES 195, 198 and 199 courses are not allowed as technical electives in meeting the eighteen (18) course requirement.) Students with superior records are encouraged to take courses beyond the minimum number, including graduate courses, with special emphasis on the offerings of the Departments of Applied Physics and Information Science, Biology, Chemistry, Mathematics, Physics, and Economics. Advisers should be consulted on suitable courses.

Transfer students who have taken equivalent courses elsewhere may have transfer credit approved towards the minimum graduation requirement, but they must pass at least six upper-division or graduate courses (each graduate course having three or more quarter units) in AMES. More than six AMES courses may be required of transfer students at the discretion of the AMES faculty adviser.

**Degree Designations** Upon satisfactory completion of AMES' upper-division major requirements and of the students' collegiate requirements, the following degrees are awarded:

Revelle College: B.A. in Applied Mechanics or Bioengineering or Systems Science

Muir College: B.A. in Applied Mechanics or Bioengineering or Systems Science

Third College: B.A. or B.S. (approval pending) in Applied Mechanics or Bioengineering or Systems Science

Warren College: B.A. or B.S. (approval pending) in Applied Mechanics or Bioengineering or Systems Science

(In all colleges awarding the B.A., the total unit requirement is 180, fifteen courses of which must be at the upper-division level in the major; in colleges awarding the B.S., the total unit requirement is 192, fifteen courses of which must be at the upper-division level in the major.)

**Applied Mechanics Program** A student following the applied mechanics program

is required to take a coordinated group of ten courses: fluid dynamics (AMES 101A-B), solid mechanics and structures (AMES 130A-B), particle and rigid-body dynamics (AMES 121A), thermodynamics (AMES 12), linear systems analysis (AMES 163A), and problem solving methodology in applied mechanics (AMES 105A-B-C). The applied mechanics program also requires five more advanced courses, AMES 142A, 150A, 175A-B, 121B and a choice of 101C, 130C or 132.

**Applied Mechanics**

FALL	WINTER	SPRING
<b>Junior Year †</b>		
AMES 105A‡	AMES 105B	AMES 105C*
AMES 130A	AMES 130B	AMES 12
AMES 142A	AMES 163A	AMES 121A
<b>Senior Year</b>		
AMES 101A	AMES 101B	AMES 101C* or
AMES 121B*	AMES 150A	AMES 130C* or
AMES 175A	AMES 175B	AMES 132*
<b>Technical Electives</b>		
AMES 111	AMES 102	AMES 101C
AMES 141A	AMES 141B	AMES 130C AMES 132 AMES 141C AMES 142B AMES 149A AMES 150B
AMES 162A	AMES 162B AMES 171 AMES 173	AMES 162C AMES 163B AMES 172 AMES 175C
AMES 180A APIS 131A	AMES 180B APIS 131B APIS 133	AMES 180C APIS 131C
Chem 130	Chem 131	Chem 132 Chem 150
Math 131 Math 170A Math 180A	Math 132A Math 172B Math 180B Math 181A	Math 132B Math 170C Math 180C Math 181B
Phys 100A Phys 116 Phys 130A	Phys 100B Phys 130B	Phys 100C Phys 130C

†While in lower division, properly qualified students may elect certain courses in upper-division AMES programs and may be admitted to an AMES major upon approval by the AMES faculty adviser.

‡Mathematics 2DA must be taken prior to enrollment in AMES 105A; also Mathematics 2EA must be taken during winter quarter of the junior year if not already completed by the end of the sophomore year.

\*A student normally is required to take AMES 101C or AMES 130C or AMES 132 (AMES 130C or AMES 132 may be taken in the spring quarter of either the junior or senior year). However, a student may petition to replace any of AMES 101C, 105C, 121B, 130C and/or 132 by alternative courses with approval of the AMES faculty adviser.

**Bioengineering Program** A student following the engineering program in bioengineering is required, during the junior year, to take a sequence in applied mathematics, AMES 105A-B, and a sequence in mechanics, with applications to biology and physiology, AMES 100, 172, 173. A systematic overview of biology is essential and preferably should be taken during the junior year. This would then allow the student to take additional electives in biology, such as Mammalian Physiology 149A-B during the senior year. It is important that bioengineers have a working knowledge of electronic circuits, so AMES 163A-B is required during the senior year. AMES 175A, C is also required during the senior year. AMES

180A-B-C, Principles of Bioengineering, includes the application of electronic system analysis and chemical techniques to biomedical measurements and is required for those who follow the bioengineering engineering major. Other listed electives are intended to provide some depth in biology, chemistry, or information science and should be selected in consultation with a faculty adviser. Students may petition to make certain substitutions for required courses.

The premedical program is intended primarily to meet the minimum requirements for a student planning to enter medical school. The curriculum is also suitable for a student planning to enter graduate school in bioengineering, physiology, or neurosciences.

**Bioengineering: Engineering**

FALL	WINTER	SPRING
<b>Junior Year †</b>		
AMES 100	AMES 173	AMES 172
AMES 105A‡	AMES 105B	AMES 121A
Bio 129		Bio 143
<b>Senior Year</b>		
AMES 175A	Bio 139	AMES 175C
AMES 180A	AMES 180B	AMES 180C
AMES 142A	AMES 163A	AMES 163B
<b>Technical Electives</b>		
AMES 101A	AMES 101B	AMES 12 AMES 101C AMES 105C
APIS 146A 146AL	AMES 271B APIS 146B 146BL	AMES 271C APIS 146C 146CL
Bio 105R or Bio 137	Bio 105T or Bio 149B	Bio 105M Bio 143
Bio 149A Math 170A or	APIS 166	
Chem 130 Chem 140A	Chem 131 Chem 140B	Chem 132

†While in lower division, properly qualified students may elect certain courses in upper-division AMES programs and may be admitted to an AMES major upon approval by the AMES faculty adviser.

‡Mathematics 2DA must be taken prior to enrollment in AMES 105A; also Mathematics 2EA must be taken during winter quarter of the junior year if not already completed by the end of the sophomore year.

**Bioengineering: Premedical**

FALL	WINTER	SPRING
<b>Junior Year †</b>		
AMES 105A‡	AMES 105B	
Bio 129	Bio 139	Bio 143
Chem 140A Chem 143A	Chem 140B	
<b>Senior Year</b>		
AMES 100	AMES 173	AMES 172
AMES 175A		AMES 175C
Bio 149A	Bio 149B	
<b>Technical Electives</b>		
AMES 101A	AMES 101B	AMES 101C AMES 105C
AMES 142A AMES 180A Bio 105R or	AMES 180B Bio 105T or Bio 106	AMES 142B AMES 180C Bio 105M
Chem 130 Phys 100A	Chem 131 Phys 100B	Chem 132 Phys 100C

†While in lower division, properly qualified students may elect certain courses in upper-division AMES programs and may be admitted to an AMES major upon approval by the AMES faculty adviser.

‡Mathematics 2DA must be taken prior to enrollment in AMES 105A; also Mathematics 2EA must be taken during winter quarter of the junior year if not already completed by the end of the sophomore year.

**Systems Science Program** Students following the systems science program are required, in their junior year, to take a two-quarter sequence AMES 163A-B dealing with linear circuits and systems. They are also required to take a one-year sequence, AMES 105A-B-C to extend their knowledge of the mathematical tools utilized in AMES 163A-B. A third sequence is satisfied by AMES 100, 121A, and students are urged to take 121B as a technical elective. Students may petition to substitute for these sequences with the consent of the AMES faculty adviser.

In the senior year students study linear control systems in AMES 141A-B-C. The study of stochastic systems is provided in AMES 162A-B-C. The student learns experimental techniques in AMES 175A-B.

Because of the similarity of the two programs, an AMES/APIs double major in the systems science option is not permissible for AMES students. Any other AMES/APIs double majors require six additional AMES (or AMES/APIs) courses that are not offered in satisfaction of requirements for any non-AMES majors.

**Systems Science**

FALL	WINTER	SPRING
<b>Junior Year †</b>		
AMES 100*		AMES 121A*
AMES 105A**	AMES 105B	AMES 105C*
AMES 142A	AMES 163A	AMES 163B
<b>Senior Year</b>		
AMES 141A	AMES 141B	AMES 141C
AMES 162A	AMES 162B	AMES 162C
AMES 175A	AMES 175B	
<b>Technical Electives ‡</b>		
		AMES 12
AMES 101A	AMES 101B	AMES 101C
AMES 121B***		
AMES 130A	AMES 130B	AMES 130C
		AMES 142B
AMES 146A	AMES 146B	AMES 146C
	AMES 150A	AMES 150B
APIS 152A	APIS 152B	APIS 152C
APIS 154A	APIS 154B	APIS 154C
APIS 159A	APIS 159B	APIS 159C
APIS 160A	APIS 160B	
	APIS 166	
Econ 172A	Econ 172B	Econ 172C
Math 131	Math 171A	Math 171B
Math 170A	Math 170B	Math 170C

†While in lower division, properly qualified students may elect certain courses in upper division AMES programs and may be admitted to an AMES major upon approval by the AMES faculty adviser.

\*Students may petition to replace AMES 100, 121A or 105C by alternative courses with approval of the AMES faculty adviser.

\*\*Mathematics 2DA must be taken prior to enrollment in AMES 105A, also. Mathematics 2EA must be taken during winter quarter of the junior year if not already completed by the end of the sophomore year.

\*\*\*AMES 121B is not required for the systems science program, but is a strongly recommended elective.

‡No more than one of the sequences AMES 146A-B-C, Economics 172A-B-C and Mathematics 171A-B may be used as electives; nor may APIS 166 be used in addition to Mathematics 170A-B-C.

**Undergraduate Program (Engineering)**

The department offers a four-year program corresponding to a more traditional engineering curriculum. Students of the Third and War-

ren Colleges are awarded the degree of Bachelor of Science in Engineering Sciences or Chemical Engineering. Students of Muir College may pursue the same curriculum and receive the degree of Bachelor of Arts in Engineering Sciences or Chemical Engineering. Finally, Revelle College students with sufficient advance standing to meet their lower-division requirements may also pursue either of these programs and be awarded one of the aforementioned B.A. degrees.

The engineering program involves three essential components: nine quarter courses are reserved for electives in the humanities and social sciences and should be used by students to fulfill their collegiate requirements. The second component involves a sequence of courses in the pure, applied, and engineering sciences. The final component consists of technical courses leading to specialization in either engineering sciences or chemical engineering.

In the first two years both engineering programs provide the student with the basic courses in mathematics and the pure sciences, with an introduction to the use of the computer, and with introductory courses in mechanics and thermodynamics. In addition, six quarter courses are required in the humanities and arts and social sciences, to be selected to permit the student to meet collegiate requirements.

In the upper division, both of the programs provide for three additional quarter courses in the humanities and arts and social sciences, a course in linear systems, and sequences of courses in the application of computing to engineering problems and in experimental techniques.

Students undertaking the *engineering sciences program* of study may select their technical electives from courses offered by AMES and other science departments. The purpose of this flexibility is to permit students to develop programs especially designed to meet perceived goals of their undergraduate engineering education. Thus, students may elect courses which prepare them for careers in either bioengineering, civil, mechanical, or systems engineering; they may develop a sequence of courses emerging from the current research interests of the faculty of AMES and other departments, e.g., sequences in the earth sciences, in transportation, and in energy related studies. Students intending to do postgraduate professional work in non-technical fields such as business administration, law, or medicine may develop an appropriate sequence of courses. Clearly, students should consult their advisers to develop a sound course of study to fulfill the requirements of this component of the program.

**ENGINEERING SCIENCES**

FALL	WINTER	SPRING
<b>Freshman Year</b>		
Math 2A	Math 2B	Math 2C
AMES 10	Physics 3A or NS 2A	Physics 3B or NS 2B

Chem 4A HSS†	Chem 4B HSS	Chem 4C, 4AL HSS
<b>Sophomore Year</b>		
Math 2DA	Math 2EA	Math 80A
Physics 3C or NS 2C	Physics 3D or TE‡	AMES 12
AMES 11 HSS	AMES 17 HSS	NS 2E HSS
<b>Junior Year</b>		
AMES 105A AMES 130A	AMES 105B AMES 130B	AMES 105C* AMES 130C* or AMES 132*
AMES 142A HSS	AMES 163A HSS	TE** HSS
<b>Senior Year</b>		
AMES 175A AMES 101A TE TE	AMES 175B AMES 101B AMES 150A TE	TE AMES 101C* AMES 150B TE

†Humanities and Social Sciences.  
‡The technical elective must be selected with the approval of the AMES faculty adviser.  
\*Students may petition to replace AMES 101C, 105C, 121B, 130C, or 132 by alternative courses with approval of the AMES faculty adviser.  
\*\*Technical electives taken during the junior and senior years must be upper-division or graduate courses in the engineering sciences, natural sciences, or mathematics, selected with the approval of the AMES faculty adviser.

Students undertaking the *chemical engineering program* of study have only a few free technical electives. The field of chemical engineering involves the application of the pure and engineering sciences on an industrial scale to the chemical modification of materials in order to produce other materials. Examples of such applications are in the petroleum, food, mining, environmental control, and pharmaceutical industries. The required technical courses in this program include organic and physical chemistry, fluid mechanics, heat and mass transfer, and professional courses associated with unit and plant design.

**CHEMICAL ENGINEERING**

FALL	WINTER	SPRING
<b>Freshman Year</b>		
Math 2A	Math 2B	Math 2C
AMES 10	Physics 3A or NS 2A	Physics 3B or NS 2B
Chem 4A HSS†	Chem 4B HSS	Chem 4C, 4AL HSS
<b>Sophomore Year</b>		
Math 2DA	Math 2EA	Math 80A
Physics 3C or NS 2C	AMES 17	AMES 12
Chem 141A HSS	Chem 141B HSS	Chem 143A HSS
<b>Junior Year</b>		
Chem 130 AMES 142A AMES 101A HSS	Chem 131 AMES 163A AMES 101B HSS	Chem 105A AMES 101C HSS
<b>Senior Year</b>		
AMES 175A AMES 112 AMES 130A TE	AMES 175B AMES 113 AMES 130B TE	AMES 175D AMES 114 TE* TE

†Humanities and Social Sciences.  
\*Technical electives must be upper-division or graduate courses in the engineering sciences, natural sciences, or mathematics, selected with the approval of the AMES faculty adviser.

**THE GRADUATE PROGRAM**

Admission is in accordance with the general requirements of the graduate division. Candidates with bachelor's or master's degrees in mathematics, the physical sciences, or any



branch of engineering are invited to apply. The department strongly recommends that all applicants submit scores from the Graduate Record Examination. This is essential if they seek financial aid.

While students are welcomed to seek enrollment in AMES courses via UC Extension's concurrent registration program, an extension student's enrollment in an AMES graduate course must be approved by the department's Graduate Admissions Committee.

The Department of Applied Mechanics and Engineering Sciences offers graduate instruction leading to the M.S. and Ph.D. degrees in Engineering Sciences with specialization in each of Aerospace Engineering, Applied Mechanics, Bioengineering, and Engineering Physics. The additional degree title of Engineering Sciences (Systems Science) is awaiting approval.

A number of AMES faculty participate in a program in applied ocean sciences conducted jointly with some faculty in the Scripps Institution of Oceanography and Department of Applied Physics and Information Sciences. AMES students in this program receive the Ph.D. with specialization in Engineering Physics upon completion of normal departmental requirements. Plans to formalize the program and to establish within AMES M.S. and Ph.D. degrees in Engineering Sciences (Applied Ocean Sciences) are now in progress. Students who contemplate work in applied ocean sciences are advised to take courses in physical science and mathematics and to seek admission into some of the Scripps core courses, such as 210A (Physical Oceanography), 240 (Marine Chemistry), and 270A (Biological Oceanography).

*Bioengineering students* who intend to obtain the M.S. and/or the Ph.D. degree in Bioengineering are required to take the bioengineering core graduate courses, AMES 271A-B-C and AMES 272, 273, 278 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 AMES 105A-B, 100, 172, 173 in the first year and AMES 272, 273, 278 in the second year. A student deficient in biology and chemistry may have to take Biology 129, 139, 143 in the first year and AMES 217A-B-C in the second year.

The instructional and research programs are characterized by strong interdisciplinary relationships with the Departments of Mathematics, Physics, and Chemistry, and with associated campus institutes such as The Institute for Pure and Applied Physical Sciences and the Institute of Geophysics and Planetary Physics, Scripps Institution of Oceanography, and the School of Medicine.

**Master's Degree Program** The department offers the M.S. degree under both the Thesis Plan I and the Comprehensive Exami-

nation 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.

Students with baccalaureate degrees may wish to round out their professional training by taking a fifth year of study and by considering the M.S. degree as terminal. Other students may obtain the M.S. degree on the way toward the doctorate.

Students who are admitted for a master's degree only and subsequently wish to continue towards a Ph.D., must be re-evaluated by the department's Graduate Admissions Committee before the departmental Ph.D. qualifying examination may be taken.

Course requirements are left flexible in order to permit students and their advisers to develop the most beneficial programs. (Bioengineering students have specific core course requirements; see above for details.) The department accepts a maximum of four units of extension courses at the 100 level towards the M.S. degree provided that (a) approval of the Graduate Council and the student's adviser is obtained and (b) the courses have either an exact counterpart in AMES or else are approved by faculty members in AMES who have professional competence in the particular field. Specific departmental requirements for the M.S. degree are as follows:

1. A course of study must include thirty-six units of credit and must be approved by the student's adviser. Credit must be obtained for at least twelve quarter-units of AMES 200-level courses, not including AMES 206, 281, or 299. Students studying under Plan I also must obtain credit for exactly six units of AMES 299 (research). Students studying under Plan II may not apply AMES 299 units toward the M.S. degree. No more than twelve units of upper-division, 100-level courses may be taken for the M.S. degree.
2. Students must have an average of B or higher in the courses taken to fulfill requirements for the M.S. degree.
3. The thesis under Plan I is reviewed by a thesis adviser and two other faculty members appointed by the Dean of Graduate Studies. The review is normally an oral defense of the thesis.
4. The comprehensive examination under Plan II is conducted by the adviser and at least two other faculty members appointed by the department chairman. The examination committee normally conducts an oral or written examination in the candidate's discipline of specialization. A student working toward the Ph.D. degree who has successfully passed one area of the department's Ph.D. examination need not take the comprehensive examination for the M.S. degree.

Successful candidates receive the M.S. de-

gree in Engineering Sciences with a designated specialization in Aerospace Engineering, Applied Mechanics, Engineering Physics, Bioengineering, or Systems Science (pending approval).

**Doctoral Degree Program** The AMES Ph.D. program is intended to prepare students for a variety of careers in research and teaching. Therefore, research is initiated as soon as possible, commensurate with the student's background and ability. There are no formal course requirements for the Ph.D. (Bioengineering students have specific core course requirements; see above for details.) However, most students in consultation with their advisers, develop course programs that will prepare them for the AMES departmental examination and for their dissertation research.

A departmental examination is given to each Ph.D. candidate prior to his or her formal Ph.D. qualifying examination. This departmental examination normally is taken after the completion of three quarters of full-time graduate work and seeks to examine the student's academic and research ability. It is administered by a committee which includes at least four AMES faculty members, appointed by the department chairman on the basis of nominations made by the student's adviser. To insure breadth, each student must specify four areas of specialization, with each area defined as the subject material taught in a specified group of three or more related graduate courses. Proficiency in one area may be satisfied by grades of A or B in the courses. The departmental examination must include at least three areas, with at least two of the areas being defined by AMES graduate courses. The same AMES course cannot be used in the definition of more than one AMES area. Normally, subject material covered in AMES 281, 296, 297, 298, or 299 courses is not considered acceptable for the satisfaction of the AMES area requirement.

After satisfactory completion of the departmental examination, a graduate student in AMES must pass the formal Ph.D. qualifying examination administered by the student's doctoral committee (see "Graduate Studies: 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.

Departmental policy requires all Ph.D. students to spend a minimum of three consecutive quarters as a "full-time student" in AMES following completion of the departmental qualifying examination. Full-time employment outside the department is not consistent with the department's interpretation of full-time student. A Ph.D. thesis should represent research actually performed at UC San Diego and may not be acceptable if any significant portion has been printed or listed elsewhere as an industrial report. Further details on these policies may be obtained from the department.

Successful candidates are awarded the

Ph.D. degree in Engineering Sciences, with one of the special fields—Bioengineering, Aerospace Engineering, Engineering Physics, or Applied Mechanics or Systems Science (pending approval)—designated.

### Candidate in Philosophy Degree

AMES Ph.D. students who have passed their Ph.D. qualifying examinations and have advanced to candidacy are awarded the Candidate in Philosophy Degree. (See "Graduate Studies: Candidate in Philosophy Degree".)

## Courses

### Lower Division

#### 10. FORTRAN Programming (4)

Essentials of FORTRAN programming with application to solving problems in mathematics, engineering, and science. Introduction to various computer job input/output facilities at UC San Diego. Use of batch and interactive processing. Structured programming.

#### 11. Elements of Materials Science (4)

The structures of engineering materials and how these structures can be controlled to produce desired, useful properties. Environmental effects: corrosion and oxidation. *Prerequisites: Physics 3A-B and Mathematics 2A-C.*

#### 12. Thermodynamics (4)

First and second laws and selected applications, e.g., thermochemistry, heat capacities and heats of reaction, engine cycles, etc. *Prerequisites: Natural Science 2D/2DL or equivalent and Mathematics 2EA.*

#### 16A. Introduction to Engineering Mechanics (4)

Statics of particles and rigid bodies, forces in beams, cable structures, submerged structures and machine elements. Analysis of truss structures in two and three dimensions. Friction. Applications to engineering problems. *Prerequisites: Sci. Tech. 15A, or Physics 2A or 3A, or Science 4A, or equivalent; Math 2EA or Math 2E (or concurrent registration).*

#### 16B. Introduction to Circuit Analysis (4)

Steady-state and transient analysis of circuits composed of linear electrical elements; electromechanical analogy, acoustic and hydraulic elements. Applications to engineering problems. *Prerequisites: Sci. Tech. 15B, or Physics 3B, or Science 4B, or equivalent; Math 2DA or Math 2D (or concurrent registration).*

#### 17. Engineering Mechanics (4)

Dynamic response of discrete systems with one or more degrees of freedom and of continuous systems. Elements of continuum mechanics with applications in elasticity and fluid mechanics. *Prerequisites: Physics 3D and Mathematics 2DA or equivalent.*

#### 33. Management of the Air Environment (4)

Definition of problems involving man's alteration of the chemistry of the atmosphere, relative contributions of man and of natural inputs, health effects and research needed. Structure and uses of air-pollution models. Air-pollution control decision-making and the role of the citizen.

#### 34. Energy: Demands, Resources, Technology and Policy (4)

A survey course on energy stressing the following topics: the manner in which our energy demands are defined at the local, regional, national and international levels; the total (currently used and potential) resources available for satisfying energy demands; highlights of technological challenges concerning new energy production and utilization techniques. Energy policy, with emphasis on potential environment and economic impacts.

#### 35. Society and the Sea (4)

Introduction to the oceans and their relationship to man. Selected topics include living and non-living resources, sea-ports and sea travel, legal, economic, military and social aspects, coastal zone management, scientific research, and the sea and weather.

#### 90. Freshman Seminar (0)

Freshman seminars organized around the research interests of various faculty members. *Prerequisites: freshman standing and consent of instructor.*

## Upper Division

#### 100. 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. Four hours' lecture. *Prerequisites: completion of the natural sciences sequence or science sequence and co-registration of AMES 105A.*

#### 101A-B-C. Fluid Mechanics (4-4-4)

Hydrostatics with application to submerged surfaces and structure of atmospheres. Bernoulli's equation, its extension and application. Elements of viscous, heat conducting flows. Integral momentum and energy theorems, similitude and dimensional analysis. Potential flow, boundary layers, compressible flow including shock waves, generalized one-dimensional flow. Calculation of transport coefficients for momentum, heat, and mass transfer, laminar and turbulent flow. *Prerequisites: Mathematics 2DA or equivalent mathematics and AMES 12 (or co-registration) or equivalent thermodynamics.*

#### 102. Mechanical Behavior of Materials (4)

Mechanical tests, elasticity and anelasticity, dislocations and micro-plasticity of crystals, plastic deformation and creep, fracture and strengthening mechanisms, ceramics and other inorganic nonmetallics, polymers. Laboratory demonstrations of selected topics. *Prerequisites: one year of calculus and completion of a natural sciences sequence, or equivalent, in physics and chemistry, or consent of instructor.*

#### 105A-B-C. Introduction to Mathematical Physics (4-4-4)

Ordinary differential equations, Fourier series, Sturm-Liouville theory, elementary partial differential equations, complex variables, and integral transforms with applications to problems in particle and rigid-body dynamics, vibrations, wave motion, electric circuits, heat conduction and fluid dynamics. AMES 105A-B-C is equivalent to APIS 105A-B-C. *Prerequisites: Mathematics 2DA and Natural Science 2A-B, or equivalent.*

#### 111. Thermodynamics II (4)

Introduction to statistical mechanics and statistical thermodynamics. The most probable distribution and maximum entropy for systems in equilibrium. Bose-Einstein, Fermi-Dirac, and Boltzmann statistics. Definition of partition function and its relationship to various thermodynamic quantities. Examples of applications. *Prerequisite: AMES 12 or equivalent course in classical thermodynamics.*

#### 112. Separation Processes (4)

Analysis and design of separation processes; binary and multicomponent mass transfer principles in single stage batch and multi-stage counter current flow processes, including distillation, liquid-liquid extraction, gas absorption and evaporation; equilibrium and rate-limited processes. *Prerequisite: Chemistry 102A or AMES 12 or equivalent, or Chemistry 131 concurrently. (Not offered in 1978-79.)*

#### 113. Chemical Reactor Engineering (4)

Analysis of chemical reactors, flow and non-flow processes; homogeneous and heterogeneous chemical kinetics; catalysis. *Prerequisites: Mathematics 2DA and Chemistry 132 or equivalent. (Not offered in 1978-79.)*

#### 114. Design of Chemical Engineering Systems (4)

Engineering and economic analysis of integrated chemical processes, equipment and systems. Cost estimation, heat and mass transfer equipment design and costs, materials selection, optimum designs, major design project. *Prerequisite: senior standing in the chemical engineering program or consent of instructor. (Not offered in 1978-79.)*

#### 121A. Dynamics I (4)

Kinematics of particles and rigid bodies; acceleration in noninertial frames; particle dynamics, motion in central force fields, orbital mechanics; conservation laws for energy, linear and angular momentum, generalized coordinates and Lagrange's equations. Examples oriented towards engineering problems. Four hours' lecture; coordinated experiments and demonstration. *Prerequisite: Mathematics 2DA.*

#### 121B. Dynamics II (4)

Introduction to rigid-body dynamics; planar motion of rigid bodies, three-dimensional motion of axially symmetric bodies, stability of motion, matrix analysis of small oscillations in multidegree-of-freedom systems, eigenvalue and eigenvector determination, forced oscillations, oscillations in continuous elastic systems. Four hours' lecture. *Prerequisites: AMES*

121A and AMES 105A or Mathematics 110A, Mathematics 2EA recommended.

#### 130A. Solid Mechanics I (4)

Equilibrium of particles and rigid bodies. Statically determined trusses. Elasticity and strain in one-dimensional tension and compression. Statically indeterminate problems. One-dimensional visco-elasticity and plasticity. Plastic limit design. Pressure vessels. Torsion or circular shafts. Stresses and deflections in beams. Limit design of beams. Four hours' lecture; coordinated experiments and demonstrations.

#### 130B. Solid Mechanics II (4)

Two-dimensional stress and strain. Transformation laws, field equations and constitutive relations. Exact solutions for simple beam problems. Polar coordinate problems. Extremum principles. St. Venant torsion theory. Three-dimensional stress and strain. Four hours' lecture. *Prerequisite: AMES 130A.*

#### 130C. Solid Mechanics III (4)

Linear and non-linear one-dimensional theory of beams. Symmetric bending of circular plates and shells. Small deflections of plates. Solutions for small deflections of rectangular plates. Four hours' lecture. *Prerequisite: AMES 130B.*

#### 132. Structural Analysis (4)

Principles of matrix analysis of elastic truss and frame structures, introductory treatment of finite element analysis of structures and use of general-purpose, finite-element, structural analysis computer programs. Four hours' lecture. *Prerequisites: Mathematics 2EA and AMES 130A-B.*

#### 141A. Linear Control System Theory (4)

Linear continuous feedback control systems, emphasizing frequency-domain and Laplace transform methods. Sinusoidal-input and transient response. Error constants. Stability. Routh-Hurwitz test. Root-locus, Bode, and Nyquist plots. Computer solution of typical systems problems. *Prerequisite: AMES 163B.*

#### 141B. Linear Control System Theory (4)

Extension of 141A. Emphasis on time-domain methods of analysis and synthesis. Use of state-variable feedback in system design. The resolvent and state-transition matrices. Controllability and observability. The Z-transform and its application to analysis of sampled-data systems. *Prerequisite: AMES 141A.*

#### 141C. Problems in System Synthesis (4)

Translation of task requirements into practical system models. Consideration of such problems as stability of continuous and sampled systems, word length and sampling rate of digital controller, accuracy, disturbance immunity and human factors requirements. Application of above concepts to a real project of current interest in engineering practice. *Prerequisite: AMES 141B.*

#### 142A. Computer Methods in Engineering Science (4)

Review of FORTRAN programming, principles and practice of program construction at various levels of complexity, use of library programs, application to illustrate both engineering problems and numerical techniques. *Prerequisites: AMES 10, or equivalent knowledge of FORTRAN.*

#### 142B. Computer Methods in Engineering Science (4)

Analysis of physical systems leading to ordinary and partial differential equations, with their digital-computer solutions. The physical context is the dynamics of discrete and continuous electrical and mechanical systems. *Prerequisite: AMES 142A.*

#### 146A-B-C. Introduction to Optimization (4)

Linear and nonlinear programming, Kuhn-Tucker conditions, simplex method, search procedures for unconstrained and constrained minimization; dynamic programming, principle of optimality, performance measures, calculus of variations, Euler-Lagrange equations, Pontryagin maximum principle, linear optimal control problems, bang-bang control, linear-quadratic controller, two-point boundary value problems.

#### 149A. Chemistry and the Air Environment (4)

Sources, control, chemistry, meteorology, dynamics and effects of air pollution. Legal and economic aspects. Relation to growth and energy usage. *Prerequisite: any introductory sequence in mathematics, chemistry and physics.*

#### 149B-C. Chemistry and the Air Environment (4-4)

Sources, components, chemistry, dynamics, and medical effects of air pollution. Laws, standards, control, and testing. The role of energy. Mass transit as a partial solution. Economic incentives as a control strategy. The decision-making process -- the role of the citizen, government, industry. *Prerequisite: AMES 149A.*

**150A. Topics in Applied Mechanics I (4)**

Presentation of series of problems from various branches of applied mechanics illustrating methodology. Examples are: structural stability, aeroelastic response, non-linear oscillations, heat conduction and moving boundaries. Four hours' lecture. *Prerequisites:* AMES 101A, AMES 105A-B-C, AMES 121B and AMES 130B.

**150B. Topics in Applied Mechanics II (4)**

Continuation of AMES 150A taking up additional examples. Four hours' lecture. *Prerequisites:* AMES 101B and AMES 150A.

**162A-B-C. Statistical Communication Theory (4-4-4)**

Review of probability theory, combinatorial analysis, generating functions, random variables, distributions, expectations, limit theorems. Stochastic processes, correlation functions, spectral densities, the Gaussian process, orthonormal expansions, meansquare filtering. Elements of information theory: entropy, mutual information, channel capacity, coding. *Prerequisite:* 163B.

**163A. Linear Circuits (4)**

Lumped circuits, Kirchhoff's laws, circuit elements, first and second order circuits, steady-state sinusoidal response; computational topics. *Prerequisites:* Mathematics 2DA, AMES 105A, AMES 142A or equivalent.

**163B. Linear Systems (4)**

Network graphs, node and mesh analysis, loop and cutset analysis, state equations, natural frequencies, network theorems, two-ports, computational topics. *Prerequisites:* Mathematics 2EA, AMES 163A.

**170. AMES Laboratory (0)**

Introduction to apparatus design and fabrication. Instruction includes practical operation of machine tools and measuring instruments. Strength of materials and their machinability are considered. *Prerequisite:* consent of instructor. (F-S)

**171. Advanced AMES Laboratory (4)**

Principles of instrumentation. Mechanical, electrical, chemical and optical transducers. Analog and digital recording, on-line data processing. *Prerequisite:* consent of instructor.

**172. Biomechanics (4)**

Application of mechanics to biological systems. Basic mechanical properties of living tissues such as the blood, mucus, blood vessels, tendons, skin, muscles, bone cartilage. Mechanics of organs such as the heart, the lung, the arteries. Fluid and solid mechanics of flying, swimming and locomotion. *Prerequisite:* AMES 100.

**173. Bioengineering: Transport Phenomena (4)**

Transport phenomena in biological systems treated from the viewpoint of statistical mechanics and fluid dynamics. Diffusion through biological structures. The mechanisms of transport in the cardiovascular system. Porous media. The osmotic effect. Suitable for students in biology interested in engineering analysis of biological systems. *Prerequisite:* AMES 100.

**175A. Experimental Techniques I (4)**

Principles and practice of measurement and control, and of the design and conduct of experiments. Lectures relate to dimensional analysis, error analysis, signal-to-noise problems, filtering, data acquisition and data reduction, as well as background of experiments. Experiments relate to the use of electronic devices and sensors. *Prerequisite:* senior standing.

**175B. Experimental Techniques II (4)**

Continuation of AMES 175A; with lectures and additional experiments which relate to electronic devices and to a selection of experiments having direct application of such devices for measurements in applied mechanics, bioengineering, and systems science. *Prerequisite:* AMES 175A.

**175C. Experimental Techniques III (4)**

A course designed to demonstrate basic concepts of the bioengineering curriculum through experimental procedures. Experiments include: nerve action, electrocardiography, mechanics of muscle, membranes and noninvasive diagnostics in man. *Prerequisites:* senior standing, AMES 175A.

**175D. Experimental Techniques IV (4)**

Experiments in momentum, heat, and mass transfer, including chemical reactors, relevant to chemical engineering processes. Examples are internal and external flow heat exchangers; flow through fixed and fluidized beds; boiling heat transfer; gas-liquid adsorption and evaporation; heterogeneous and homogeneous reactors, batch and flow. Laboratory reports will include application of data to design of large scale industrial components. *Prerequisites:* AMES 175A-B, AMES 112 and AMES 113. (Not offered in 1978-79.)

**180A. Principles of Bioengineering I (4)**

General principles of electronics related to biomedical instrumentation. Basic circuits. Specialized amplifiers. Electrocardiography. Encephalography. Ultrasonic instruments. Electrical safety hazards. *Prerequisites:* upper-division standing, medical school or consent of instructor.

**180B. Principles of Bioengineering II (4)**

Analytical approach to biological systems with emphasis on modeling, computer simulation. Biomedical problems will include fluid flow resistance, storage and compliance, use of transfer functions, impedance, various types of biological signals. *Prerequisites:* AMES 180A and AMES 105A-B during the junior year.

**180C. Principles of Bioengineering III (4)**

Biomaterials and artificial organs: an overview of the fundamentals of materials science as applied to medical engineering. Natural and synthetic polymers. Ceramics and metals. Phenomena occurring at the interface between implanted materials and the body. Illustration of these basic principles by examples from current research. *Prerequisite:* AMES 180A-B. Organic and physical chemistry suggested.

**195. Teaching (1-4)**

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 grade only.) *Prerequisites:* B average in major and permission of department chairman.

**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.

**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.

## 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, bioengineering, systems science, applied ocean sciences, or energy. (Satisfactory/Unsatisfactory grades only.)

**206. Physical Principles and Problems (1)**

Principles of applied science illustrated by problems in mechanics, dynamics, electricity, optics, thermodynamics, etc. Presentation of individual research. Preparation for inter-departmental oral examination.

**210A-B-C. Introductory Fluid Mechanics (3-3-3)**

Physical properties of fluids; kinematics; potential flow; wing theory; surface waves; Navier-Stokes equations; boundary layers; turbulence; heat and mass transfer. *Prerequisites:* AMES 101A-B and AMES 12 or equivalent or consent of instructor.

**211A. Introductory Compressible Flow (3)**

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; method of characteristics. *Prerequisites:* AMES 101A-B and AMES 12 or equivalent.

**211B-C. Mechanics of Propulsion (3-3)**

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; performance and optimization; mission analysis. *Prerequisites:* AMES 101A-B, AMES 211A and AMES 12 or equivalent.

**220A. Physical Gas Dynamics (3)**

Kinetic theory of neutral gases, transport properties; principles and applications of statistical mechanics. *Prerequisites:* AMES 210A-B-C, AMES 105A-B-C, Physics 140, or consent of instructor.

**220B. Physical Gas Dynamics (3)**

Principles of electrodynamics and quantum mechanics; theories of atomic and molecular structure; perturbation method in quantum mechanics; semiclassical treatment of radiation; scattering phenomena; transition probabilities; vibrational relaxation; dissociation, ionization, and recombination. *Prerequisites:* AMES 220A, Physics 130A-B, or consent of instructor.

**220C. Physical Gas Dynamics (3)**

Shock waves and detonation waves, explosions and hypersonic flow; experimental methods in high-temperature gases; shock tubes; atomic and molecular beams; selected topics such as chemical reactions and relaxation processes in turbulent flow, interaction of radiation with ionized gases and gas lasers. *Prerequisite:* AMES 220B, or consent of instructor.

**221A. Opacity Calculations (3)**

Basic laws for radiant-energy emission from gases, liquids and solids; spectral absorption coefficients, line shapes, curves of growth, theoretical and experimental methods for estimating opacities of uniform and non-uniform gases. *Prerequisite:* consent of instructor.

**221B. Radiative Transfer Theory (3)**

Fundamental quantities and the equation of transfer; methods of solving radiative transfer problems for gray and non-gray gases; nonstationary problems. *Prerequisite:* AMES 221A, or consent of instructor.

**222A-B-C. Advanced Fluid Mechanics (3-3-3)**

Contemporary problems in broad areas of fluid mechanics, e.g., turbulent flows, hydrodynamic stability, geophysical fluid dynamics, transport phenomena, acoustics, boundary layers, etc. *Prerequisites:* AMES 105A-B-C and AMES 210A-B-C or equivalents, or consent of instructor.

**224A-B-C. Reactive Gas Dynamics: Combustion (3-3-3)**

This course covers 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 include deflagrations, detonations, diffusion flames, ignition, extinction, and propellant combustion, among others. (Satisfactory/Unsatisfactory grades permitted.) *Prerequisites:* AMES 210A-B-C.

**226A. Laser Theory and Kinetics (3)**

Introduction to laser physics. Principle of light amplification by stimulated emission of radiation. Methods of excitation and inversion generation in solid, liquid, and gaseous media. Oscillators and amplifiers. Optical cavities. Frequency selection and mode control. *Prerequisites:* AMES 220A-B-C or equivalent. (Satisfactory/Unsatisfactory grades permitted.)

**226B. Laser Theory and Kinetics (3)**

Semiclassical treatment of coherent electromagnetic wave propagation in a laser-active medium. Line broadening and gain saturation. Kinetic processes in electrical discharges and in rapidly expanding gas flows. Review of current theories on electrical and gas dynamic lasers. *Prerequisites:* AMES 220A-B-C or equivalent. (Satisfactory/Unsatisfactory grades permitted.)

**226C. Laser Theory and Kinetics (3)**

Chemical kinetics in the gas phase. Vibrational inversion in rearrangement reactions. Chain initiation and chain branching. Premixed and un-premixed chemical systems. Review of current theories and practice on chemical lasers. *Prerequisites:* AMES 220A-B-C or equivalent. (Satisfactory/Unsatisfactory grades permitted.)

**231A. Foundations of Solid Mechanics (3)**

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 (3)**

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 (3)**

Mechanical models of viscoelastic, plastic, and viscoplastic behavior in simple shear or uniaxial stress. Constitutive laws for three-dimensional states of stress and strain. Application to selected technological problems. *Prerequisite:* AMES 231B, or consent of instructor.

**232. Finite-Element Methods in Solid Mechanics (3)**

Review of matrix analysis and variational principles. Construction of finite elements for plates, shells and three-dimensional bodies. *Prerequisites:* AMES 231B or consent of instructor.

**233A-B-C. Advanced Solid Mechanics (3-3-3)**

Contemporary problem areas of research in solid mechanics. Fundamental aspects and recent developments. Examples include finite elasticity, finite plasticity, thermoviscoplasticity.

constitutive relations for ductile and brittle solids, static and dynamic fracture processes, contact problems, micropolar continua, mixture theories for composite materials and multiphase systems, asymptotic methods in the theory of plates and shells, complex variable methods in plane elasticity, applications of the calculus of variations to approximate solution techniques and structural optimization. *Prerequisites:* AMES 231A-B-C, or consent of instructor.

### 234. Experimental Mechanics (3)

Theory and technique of standard and newly developed methods; laboratory experience using modern instrumentation such as strain gauges, capacitive piezoelectric and piezoresistive devices, and surface coatings; application of photoelasticity, laser interferometry, and holography to problems in static and dynamic elasticity and plasticity. Ultra-high-speed measurements will be emphasized. *Prerequisite:* consent of instructor.

### 235A-B. Theory of Shells (3-3)

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. *Prerequisite:* AMES 231B, or consent of instructor.

### 236. Structural Stability (3)

Stability analysis of structural elements under steady, oscillatory, and impulsive loadings. Elastic and anelastic stability problems. *Prerequisite:* AMES 235A, or consent of instructor.

### 237. Structural Dynamics (3)

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 (3)

Linear wave propagation; plane waves, reflection and refraction; dispersion induced by geometry and by material properties. Application of integral transform methods. Selected topics in non-linear elastic, anelastic and anisotropic wave propagation. *Prerequisites:* AMES 231A-B-C, or consent of instructor.

### 241A-B-C. Linear and Nonlinear Systems (3-3-3)

Linear spaces, equilibrium equations, linearization, contraction maps, state transition matrix, stability theory, controllability, observability and realizability, pole placement, observers, sensitivity analysis, singularly perturbed systems, nonlinear differential equations, Liapunov and Popov stability, describing functions, Krylov-Bogoliubov asymptotic method. *Prerequisites:* AMES 141A-B and Mathematics 2EA or equivalent.

### 246A-B-C. Optimal Control Theory (3-3-3)

Linear vector spaces, Hilbert spaces, minimum norm problems, dual spaces, optimization of functionals, global and local theories, linear optimal control, controllability, sets of attainability, time-optimal control, integral cost criteria, Pontryagin maximum principle, singular control, game theory, matrix difference, differential games, pursuit-evasion, homicidal chauffeur. *Prerequisites:* AMES 146A-B-C.

### 248A-B-C. Methods for Time Series Analysis (3-3-3)

Discrete-time signals and linear systems; discrete, finite and fast Fourier transforms, digital filter design methods; effects of finite register length; harmonic analysis; stationary random processes; spectral representation, power spectrum estimators and their bias and consistency; cross spectral estimators; coherence and multiple coherence. *Prerequisites:* AMES 162A-B-C, AMES 105A-B.

### 262A-B-C. Stochastic Process in Dynamic Systems (3-3-3)

Second order stochastic processes, stochastic integrals and stochastic differential equations, diffusion equations, linear and nonlinear estimation and detection, random fields, optimization of stochastic dynamic systems, applications of stochastic optimization to problems. *Prerequisite:* AMES 162A-B-C.

### 264A-B-C. Estimation and System Identification (3-3-3)

Parameter estimation, least-squares, bias consistency, efficiency, mean-square and maximum likelihood estimators, numerical solutions for estimates, estimators for linear dynamic systems, Wiener filter and Wiener-Hopf equation, Kalman filter, Riccati equation, filter stability, smoothing, extended Kalman filter, divergence and divergence control, system identification methods, ARMA and transfer function identification, input signal synthesis, Akaike's criterion. *Prerequisite:* AMES 162A-B-C.

### 271A. Structure and Function of Tissue (3)

A general survey will include examples of structure-function relationships at the cell and tissue level. Emphasis will be placed on components of the vascular system and related structures such as endothelium, erythrocytes, leucocytes, cardiac, smooth and skeletal muscle, connective tissue, basement membranes, and peripheral nerve cells. *Prerequisite:* consent of instructor.

### 271B. Cardiovascular Physiology (3)

Physical concepts of behavior of heart, large blood vessels, vascular beds in major organs and the microcirculation. Included will be the physical and physiological principles of blood flow, blood pressure, cardiac work, electrophysiology of the heart, descriptions of special vascular beds including their biological and hemodynamic importance. Integration of separate components through nervous and humoral controls will be analyzed. *Prerequisite:* Biology 129.

### 271C. Respiratory Physiology (3)

Broad course in the principles of respiratory physiology including structure-function relationships of the lung, ventilation, diffusion, pulmonary blood flow, pulmonary gas exchange, blood-gas transport, mechanics of breathing, control of respiration, unusual environments, pulmonary function tests. *Prerequisite:* Biology 129.

### 272. Biomechanics and Transport Phenomena (3)

An introduction to biomechanics and transport phenomena in biological systems at the graduate level. Biorheology, bioviscoelastic fluids and solids, muscle mechanics, mass transfer, momentum transfer, energy transfer. The courses 272, 273, 278 form a core sequence in bioengineering. *Prerequisites:* AMES 100, 172, 173 or equivalent.

### 273. Transport Phenomena in Membranes (3)

Non-equilibrium thermodynamic analysis of transport phenomena. The osmotic effect. Diffusion and exchange in biological systems. *Prerequisite:* AMES 272.

### 274. Advanced Cell Physiology (3)

An advanced course in selected areas of cell physiology for bioengineering, medical, and biology students. Discussion of several special types of cells; endothelium, smooth-muscle cells, lymphocytes, neutrophils, platelets, macrophages, etc. The ultrastructure and biochemical characteristics of these cell types will be considered. Emphasis will be placed on quantitative measurements and analyses based on mathematical and physical principles. *Prerequisite:* consent of instructor.

### 276. Laboratory Projects in Bioengineering (3)

Theory of statistical inference, analysis, and design of experiments, data handling by digital computers, video tape recording, etc. Theory and application of optical and electronic instrumentation. The course will consist of lectures, conferences, and demonstrations, as well as the student's own selected laboratory project for study in depth. *Prerequisite:* consent of instructor.

### 277. Microcirculation in Health and Disease (2)

Structural and functional aspects of transport and blood-tissue exchange in key organs during states such as circulatory shock, bacterial toxemia, hypertension. Also physical and ultrastructural techniques used to analyze small vessel dynamics. *Prerequisite:* consent of instructor.

### 278. Advanced Biomechanics (3)

Modern development of biomechanics at an advanced mathematical level. Treatment of problems of current interest in greater depth. Problems will be selected from circulation, micro-circulation, cardiac and pulmonary mechanics, muscle mechanics. *Prerequisites:* AMES 272, 273.

### 279. Selected Topics in Biophysics (3)

Selected topics in biophysics with emphasis on the structure and function of biological membrane, fluid and ion transport, excited states, wave propagation, muscle contraction. *Prerequisites:* AMES 272, 273.

### 280. Techniques in Experimental Cardiovascular Physiology and Microcirculatory Research (2)

Basic cardiorespiratory experimental procedures; application of anesthesia, artificial respiration, dissection of the most frequently used arteries and veins, open-chest preparation, heart and large-vessel exposure, catheterization, long-term implantation, isolated organ perfusion, quantitative evaluation of microvascular phenomena. *Prerequisites:* AMES 271A-B-C. (Satisfactory/Unsatisfactory grades permitted.)

### 281. Seminar in Bioengineering (1)

The course involves weekly seminars given by faculty, visitors,

postdoctoral research fellows, and graduate students concerning research topics in bioengineering and related subjects. Students report their own research. May be repeated for credit. (Satisfactory/Unsatisfactory grades only)

### 294A-B-C. Methods in Applied Mechanics I, II, III (3-3-3)

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 nonlinear problems. 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:* AMES 105A-B-C.

### 296. Independent Study (3)

*Prerequisite:* consent of instructor.

### 297. Research Techniques (1-6)

A course designed to present the techniques of research through organized lectures, special assignments, and instruction on the techniques of selected research projects. *Prerequisite:* consent of instructor. (Satisfactory/Unsatisfactory grades permitted.)

### 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. (Satisfactory/Unsatisfactory grades permitted.)

### 299. Graduate Research (1-12)

(Satisfactory/Unsatisfactory grades only.)

## Applied Physics and Information Science (AP&IS)

OFFICE: 3216 Applied Physics and Mathematics Building, Muir College

### Professors:

Hannes Alfvén, Ph.D.  
Victor C. Anderson, Ph.D.  
Henry G. Booker, Ph.D.  
Kenneth L. Bowles, Ph.D.  
Carl W. Helstrom, Ph.D.  
T. C. Hu, Ph.D.  
†Robert Lugannani, Ph.D.  
Manuel Rotenberg, Ph.D. (*Dean of Graduate Studies and Research*)  
M. Lea Rudee, Ph.D. (*Provost, Earl Warren College*)  
Victor H. Rumsey, D.Eng., D.Sci. (*Chairman*)

### Associate Professors:

William A. Coles, Ph.D.  
Michael L. Fredman, Ph.D.  
Sing H. Lee, Ph.D.  
George J. Lewak, Ph.D.  
Huey-Lin Luo, Ph.D.  
Elias Masry, Ph.D.  
Barnaby J. Rickett, Ph.D.  
Walter J. Savitch, Ph.D.

### Assistant Professors:

Walter A. Burkhard, Ph.D.  
†William E. Howden, Ph.D.  
Terrence L. Miller, Ph.D.  
Laurence B. Milstein, Ph.D.  
Richard L. Sites, Ph.D.

### Adjunct Professor:

Andrew J. Viterbi, Ph.D.

### Associate Faculty:

Gustaf O. S. Arrhenius, Ph.D., *Professor, Scripps Institution of Oceanography*  
Seibert Q. Duntley, Sc.D., *Professor Emeritus, Scripps Institution of Oceanography*

**Lecturer:**

James L. Harris, Sr., M.S.  
 †On leave Winter, Spring 1979

**The Major Programs for Undergraduates**

The department offers four-year programs in electrical engineering, engineering physics, and computer engineering. Upon completion of one of them, students in Revelle and Muir Colleges receive the B.A. degree and students in Third and Warren Colleges receive the B.S. degree. These programs prepare students for employment in the electrical, electronics, computer, or communications industries, and for graduate work in those fields. In addition, the department offers programs leading to the B.A. degree in applied physics, computer science, and information science. These are intended for students desiring more time for undergraduate studies outside their major subject. They prepare students for graduate study in their respective fields, as well as for certain types of employment.

The electrical engineering curriculum features three specializations: communication systems, electronics, and systems and control. The computer engineering and computer science programs treat compiler design, analysis of algorithms, computer architecture, operating systems, programming languages, and the application of computers to engineering, information retrieval, and scientific research. The engineering physics program provides a strong background in physics and mathematics and permits specialization in acoustics, optics, continuum mechanics, or materials science. This program is conducted in cooperation with the Departments of Physics and Applied Mechanics and Engineering Sciences.

Applied physics treats electromagnetism, electronics, optical information processing, and acoustical signal processing. Information science concentrates on communication systems and the processing of information. The B.A. curricula allow individual programs that may involve a combination of the fields in which the department offers instruction.

APIS 61 is recommended for all AP&IS majors. All students intending to do experimental work after graduation, whether in industry or in graduate school, are advised to take APIS 50A-B-C, APIS 146A-B-C, and APIS 175B. A grade of C or higher is required in all courses included in the major program.

A total of at most four units of APIS 197, 198, and 199 may be applied to fulfilling requirements for a major program in the Department of Applied Physics and Information Science. These must be taken on a pass/not pass basis.

Students enrolled in the departmental programs who maintain a distinguished scholastic record through their junior year are encouraged to apply for the five-year B.S.-B.A./M.S. program. Applications for admission to the graduate program may be made in the spring quarter of the junior year. In their senior year such students may enroll in graduate courses

and can complete the requirements for the master's degree within one year after receiving the bachelor's degree. If the student's eventual aim is to take a Ph.D., he or she will be able to begin research earlier and spend a shorter time in completing the degree. The student's choice of electives must be discussed with his or her adviser.

**The Engineering Programs** The department offers programs in computer engineering, electrical engineering, and engineering physics. Third and Warren College students who complete these programs receive the B.S. degree in computer engineering, electrical engineering, or engineering physics; Revelle and Muir College students who complete these programs receive the B.A. degree in computer engineering, electrical engineering, or engineering physics. Because of Revelle College's extensive general-educational requirements, Revelle students will normally be unable to complete the electrical engineering or computer engineering program in four years. Students wishing to transfer to another college should see their college adviser. Students are urged to discuss their curriculum with the appropriate AP&IS adviser no later than the spring quarter of their freshman year.

Graduates of junior colleges may enter these programs in the junior year. Transfer students should be mindful of the sophomore-year course requirements when planning their programs.

**Computer Engineering** 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.

The required lower-division courses are:

**Freshman Year**

- (a) Math 2A-B-C
- (b) Science 4A-B-C or Physics 3A-B
- (c) APIS 61

**Sophomore Year**

- (a) Math 2DA-2EA or Math 2D-2E
- (b) Natural Science 2C/Physics 3C-3CL-3D-3DL, Natural Science 2D, Natural Science 2E/2F
- (c) APIS 50A-B-C
- (d) APIS 63, 64, 70
- (e) Math 80A

The required upper-division courses are:

**Junior Year**

- (a) APIS 160A-B
- (b) APIS 161A-B-C
- (c) APIS 173, 175C, 179
- (d) APIS 175A
- (e) technical elective (3 quarters)

**Senior Year**

- (a) APIS 170A-B
- (b) APIS 171A-B
- (c) APIS 165
- (d) APIS 175B
- (e) technical elective (3 quarters)

**Electives**

APIS 105A-B-C	APIS 198
APIS 131A-B-C	APIS 199
APIS 140A-B-C	AMES 141A-B-C
APIS 141A-B-C	AMES 142A
APIS 146A-B-C	MATH 102
APIS 152A-B-C	MATH 160A-B
APIS 154A-B-C	MATH 170A-B-C
APIS 159A-B-C	MATH 171A-B
APIS 177	MATH 180A-B-C
APIS 197	MATH 181A-B

**Electrical Engineering** The electrical engineering program comprises studies in communication systems, electronics, and systems and control; an option in any one of these fields may be selected by the student.

Students intending to major in electrical engineering should begin Science 4 and Science 4L in the fall quarter of the freshman year. Those who have mastered calculus and physics in high school may substitute Physics 3A-B-C-CL-D-DL for Science 4A-B-C, Science 4AL-BL-CL, and Natural Science 2C.

The required lower-division courses for all options are:

**Freshman Year**

- (a) Math 2A-B-C
- (b) Science 4A-B-C-AL-BL-CL or Physics 3A-B
- (c) APIS 61

**Sophomore Year**

- (a) Math 2DA-2EA
- (b) Nat Sci 2C or Physics 3C-3CL-3D-3DL, Nat Sci 2D, and Nat Sci 2E/2F
- (c) APIS 50A-B-C
- (d) APIS 64, APIS 70
- (e) Math 80A

The upper-division course requirements depend on the option selected by the student.

**Communication Systems Option****Junior Year**

APIS 105A-B-C, APIS 152A-B-C  
 APIS 140A-B-C or APIS 161A-B-C,  
 APIS 170A-B, APIS 175B

**Senior Year**

APIS 154A-B-C, APIS 146A-B-C  
 technical elective (3 quarters)

**Electronics Option****Junior Year**

APIS 105A-B-C, APIS 152A-B-C  
 APIS 140A-B-C, APIS 170A-B,  
 APIS 175B

**Senior Year**

APIS 131A-B-C or Physics 100A-B-C,  
 APIS 146A-B-C  
 Twelve units of technical electives including six units of laboratory courses.

**Systems and Control Option****Junior Year**

APIS 105A-B-C, APIS 152A-B-C  
APIS 161A-B-C, APIS 170A-B,  
APIS 175B

**Senior Year**

AMES 141A-B-C, APIS 159A-B-C  
Technical elective (3 quarters) (AMES  
146A-B-C recommended)

**Electives for all options**

Any APIS upper-division courses; other  
upper-division courses with the approval of  
the adviser.

**Engineering Physics** The engineering  
physics program comprises studies in acous-  
tics, optics, continuum mechanics, and mate-  
rials science. An option in any one of these  
fields may be selected by the student.

The required lower-division courses for all  
options are:

**Freshman Year**

- (a) Math 2A-B-C
- (b) Physics 3A-B or Science 4A-B-C-AL-  
BL-CL, or Nat Sci 2A-B
- (c) APIS 61

**Sophomore Year**

- (a) Math 2DA-2EA
- (b) Physics 3C-3CL-3D-3DL, or Nat Sci 2C;  
Nat Sci 2D; and Nat Sci 2E or 2F
- (c) APIS 50A-B-C
- (d) APIS 64

The upper-division course requirements  
depend on the option selected by the student.

**Acoustics Option****Junior Year**

APIS 105A-B-C or AMES 105A-B-C  
APIS 131A-B-C or Physics 100A-B-C  
APIS 140A-B-C or APIS 152A-B-C  
Physics 110A-B, AMES 12(\*)

**Senior Year**

APIS 142AL-BL-CL  
Physics 130A-B, APIS 135 or Physics 152  
APIS 146A-B-C  
APIS 152A-B-C or AMES 101A-B-C

**Optics Option****Junior Year**

APIS 105A-B-C or AMES 105A-B-C  
APIS 131A-B-C or Physics 100A-B-C  
APIS 140A-B-C or APIS 152A-B-C  
Physics 110A-B, AMES 12(\*)

**Senior Year**

APIS 141A-B-C  
Physics 130A-B, APIS 135 or Physics 152  
APIS 146A-B-C  
APIS 152A-B-C or APIS 154A-B-C or APIS  
146AL-BL-CL, APIS 175B

**Continuum Mechanics Option****Junior Year**

AMES 130A-B-C  
APIS 105A-B-C or AMES 105A-B-C  
APIS 131A-B-C or Physics 100A-B-C  
Physics 110A-B or AMES 121A-B(\*)

**Senior Year**

AMES 101A-B-C  
Physics 130A-B, APIS 135 or Physics 152

Physics 140A-B

APIS 146A-B-C or AMES 175A-B, AMES 112

**Materials Science Option****Junior Year**

Mat Sci 101, 102, 103  
APIS 105A-B-C or AMES 105A-B-C  
APIS 131A-B-C or Physics 100A-B-C  
Physics 110A-B, AMES 121A-B(\*)

**Senior Year**

Mat Sci 104, 105, 106  
Physics 130A-B, APIS 135 or Physics 152  
Physics 140A-B  
APIS 146A-B-C

(\*) Warren College students may take the se-  
quence marked (\*) in the sophomore year  
in order to have time in the junior year for  
the upper-division sequence in their non-  
contiguous minor. Alternatively they may  
petition to take this upper-division noncon-  
tiguous sequence in the sophomore year.

**B.A. Program in Applied Physics**

The required lower-division courses are  
Mathematics 2A-B-C-DA-EA, APIS 61, APIS  
64, APIS 50A-B-C, and one of the following  
sequences:

- (a) Science 4A-B-C, 4AL-BL-CL, Natural  
Science 2C, or
- (b) Natural Science 2A-B-C-D  
or
- (c) Physics 3A-B-C-CL-D-DL.

A total of fifteen (15) upper-division courses,  
approved as a coherent program by the ad-  
viser, must be passed with a grade "C" or  
better in order to satisfy the requirements of the  
major program. Of those fifteen (15) the follow-  
ing are required of all applied physics majors:

- (a) APIS 105A-B-C
- (b) At least two sequences from the follow-  
ing:  
APIS 131A-B-C  
APIS 140A-B-C  
APIS 146A-B-C  
Physics 130A-B and APIS 135
- (c) At least eight units of undergraduate  
laboratory courses selected from the fol-  
lowing:  
APIS 130  
APIS 141A-B-C  
APIS 142AL-BL-CL  
APIS 146AL-BL-CL  
APIS 175B  
Physics 120A-B-C

Electives may be any upper-division  
physical-science or mathematics courses ap-  
proved by the adviser. The electives should  
include at least one three-course sequence.  
Components of four typical major programs  
are listed.

**Acoustics**

APIS 105A-B-C, 131A-B-C, 140A-B-C,  
142AL-BL-CL, 152A-B-C

**Electronics**

APIS 105A-B-C, 131A-B-C, 146A-B-C-  
AL-BL-CL, 170A-B, 175B

**Optics**

APIS 105A-B-C, 131A-B-C, 140A-B-C,  
141A-B-C, 152A-B-C or Physics 130A-B  
and APIS 135

Solid State

APIS 105A-B-C, 131A-B-C, 133, 146A-  
B-C, Physics 130A-B and APIS 135

**B.A. Program in Computer Science**

The required lower-division courses are:

- (a) Mathematics 2A-B; Mathematics 2D-E  
or 2DA-EA
- (b) Science: three courses in physics,  
chemistry, biology, economics, or  
psychology
- (c) APIS 61, 70

A total of fifteen (15) upper-division courses  
must be completed in order to satisfy the major  
requirements. The following eleven courses  
are required: APIS 160A-B, 161A-B-C, 165,  
170A, 171A, 175A-B, 179.

Four electives should be chosen from the  
following list: APIS 146A-B-C, 159A-B-C, 166,  
170B, 171B, 173, 175C, 177, 178, 198, 199,  
Mathematics 160A-B, Mathematics 170A-B-C,  
Economics 172A-B-C, Psychology 133.

Transfer students who have not completed a  
course equivalent to APIS 70 (assembly-  
language programming) may have difficulty  
completing this B.A. program in four years.

**B.A. Program in Information Science**

This program is less intensive than the pro-  
grams in electrical engineering listed above.  
The required lower-division courses are:

- (a) Math 2A-B-C-DA-EA
- (b) Science 4A-B-C-CL and Natural Sci-  
ence 2C; or Natural Science 2A-B-C-D;  
or Physics 3A-B-C-CL-D-DL
- (c) APIS 50A-B-C
- (d) APIS 61

A total of 15 upper-division courses must be  
passed in order to complete the major pro-  
gram. As early as possible, preferably before  
the beginning of the junior year, the student  
must discuss the curriculum with the informa-  
tion science faculty adviser. Options in com-  
munication systems, electronics, and systems  
and control are available. See the electrical  
engineering program for suggested courses in  
these options.

**Minor Programs**

The following sets of six courses represent a  
variety of minor programs in the three main  
areas of applied physics, computer science,  
and information science. All course numbers  
refer to AP&IS courses except as otherwise  
noted. The prerequisites for these minors do  
not involve any other upper-division courses.  
They do require certain lower-division prereq-  
uisites, which must therefore be anticipated in  
the student's lower-division program. Revelle  
students should consult their provost's office  
concerning their non-contiguous minor.

**Acoustics**

140A-B-C and 142AL-BL-CL

**Computer Science**

61, 70, 160A, and 161A-B-C

**Diffraction Informatics**

105A-B-C and 140A-B-C, or 50A-B-C and  
140A-B-C

Electromagnetics  
50A-B-C and 131A-B-C  
Electromagnetic waves  
131A-B-C and 140A-B-C  
Electronics  
50A-B-C and 146A-B-C  
Optics  
140A-B-C and 141A-B-C  
Solid State  
Physics 130A-B and APIS 135, 146A-B-C

### Computing for Students in the Humanities and Social Sciences

An introduction to the structure and use of automatic digital computers is provided in APIS 61, Introduction to Computer Science and APIS 63, Digital Computers: Non-Numeric Applications.

## The Graduate Programs

There are four main divisions of study:

### 1. Applied Physics

This division includes the following areas of study:

- (a) *Radio Astronomy and Space Physics*  
The theoretical and experimental investigation of physical processes relating to the structure of the sun and planetary bodies. Current studies related to planetary atmospheres, ionospheres, magnetospheres, the nature of the solar wind and solar corona, comets, asteroids, interplanetary dust, and condensation of matter in space.

The department has available the facilities of several radio astronomical observatories. In addition a large local radio observatory has been established to observe the structure of the solar wind by means of radio-star scintillations.

- (b) *Materials Science, particularly Applied Solid State Physics*  
This field includes material analysis (X-ray techniques, optical and electron microscopy, metallography), and when fully developed will also comprise material purification, crystal growth and the study of metals, semiconductors, dielectrics, and ceramics. Areas of current research interest include the study of superconductors and the physics of metals and alloys.

- (c) *Applied Optics*  
This field includes laser development and applications. Current studies concern tunable lasers of high output power and good spectral and spatial properties, nonlinear optical materials and threshold devices, fast modulators, integrated optical circuits and fiber optics.

The department has available a number of lasers (e.g. argon, krypton, dye, helium-neon and gallium arsenide lasers), a considerable amount of high quality optics, several optical benches, and vibration-isolated tables. There is

also an optical shop for fabrication of specialized optics.

### 2. Computer Science

This program accepts both beginning and advanced graduate students for study and research leading to the degree of Doctor of Philosophy; the program also offers a Master of Science degree. The program is concerned with fundamental properties of digital information processing systems. Emphasis is placed on the design of computer systems, especially compilers, architecture, programming languages, operating systems, and the analysis of algorithms. The M.S. degree (Plan II - Comprehensive Examination) is designed to serve as a terminal master's degree for students who wish to seek immediate employment in the computer field. Although it is specifically designed to serve as a terminal program, students who complete the program are in an excellent position to go on to study for the Ph.D. degree. Students with a good undergraduate background can complete the M.S. program in one year of full-time study. Special provisions are made to integrate this program into a five-year combined bachelor's-master's program.

### 3. Information Science

Information science in AP&IS involves the detection of signals and the transmission and processing of information in the acoustic, radio, and optical domains, the prediction and filtering of random processes, communication theory, and the propagation of acoustic and electromagnetic waves. Applications are made to such fields as communications, radar, sonar, oceanography, holography, image processing, and visibility in air and water. Information processing is carried out by electronic, acoustic, and optical filtering, photographically, and by digital computers. Both theoretical and practical aspects of information processing are studied. Both the Master of Science and the Doctor of Philosophy degrees are offered.

### 4. Interdepartmental Curriculum in Applied Ocean Science

The Graduate Department of the Scripps Institution of Oceanography and the Department of Applied Physics and Information Science offer an interdepartmental program in applied science related to the oceans. All aspects of man's purposeful and useful intervention into the sea are included. Students who enroll will receive the degree of Ph.D. upon completion of normal departmental requirements and certain others stipulated by an interdepartmental faculty committee.

**Preparation** Applications will be considered from students who have taken undergraduate majors in one of the following disciplines: applied mathematics, applied physics, computer science, electrical engineering, engineering physics, engineering science, mathematics, and physics. Applications will

also be considered from students who wish to take interdisciplinary programs.

## Master's Degree Programs

The general requirements for the degree of Master of Science are stated in the Graduate Studies section of the catalog. Normally, no financial support is offered to students enrolled in the M.S. program.

**A. Applied Physics** The M.S. program in applied physics is a flexible program that allows the students to deepen their understanding in the field of their choice.

### Course Requirements

Math 210A-B-C or AMES 294A-B-C and any two sequences from the following:

APIS 232A-B-C  
APIS 241A-B-C  
APIS 242A-B-C

**B. Computer Science** In order to receive the M.S. degree in computer science, a student must complete the course requirements listed below and pass a comprehensive examination. The examination consists of two parts. Part I of the examination can normally be passed with a thorough knowledge of the topics covered in an undergraduate computer science major. Part II of the examination covers more advanced graduate topics.

### Course Requirements

- (a) APIS 264A-B-C  
(b) APIS 269 (3 units)  
(c) Two of the following three sequences  
(i) APIS 270A-B  
(ii) APIS 268A-B-C  
(iii) APIS 265A-B-C

All the above courses must be completed with a grade-point average of 3.0.

Additional graduate courses to complete a total of thirty-six (36) units may be taken in AP&IS mathematics, psychology, linguistics, and economics. A list of acceptable courses is available in the department office. The Plan I M.S. degree is not available in computer science.

**C. Information Science** The M.S. program in information science stresses the mathematical principles and the analysis and design of modern communication systems. To complete the program, a student must satisfy the course requirements and pass a comprehensive examination. The comprehensive examination, which is held once a year late in the spring quarter, consists of a written part and an oral part. Students with a good undergraduate background can complete the program in one year of full-time study.

### Course Requirements

Math 210A-B-C,  
APIS 250A-B-C or APIS 256A-B-C,  
and APIS 254A-B-C or APIS 258A-B-C

In addition, three quarters of elective courses must be taken. Any AP&IS, AMES, or mathematics graduate course or upper-division course is acceptable, subject to the consent of the graduate adviser.

## The Doctoral Programs

The department has established a set of requirements applying to the first two years of the Ph.D. program as described below. Ph.D. students are expected to maintain, on an annual basis, a 3.4 grade-point average for the core courses. They must pass a comprehensive examination.

In the second year graduate students are expected to devote at least half their time to research and must present the results of their research before a committee of three faculty members in a research examination.

Ph.D. students entering with a Master's degree may petition for waiver of the core courses or for substitution of alternative courses. Students who have satisfied these departmental graduate requirements may register for any AP&IS course on a satisfactory/unsatisfactory basis.

### A. Applied Physics

1. Core Courses:  
Mathematics 210A-B-C or AMES 294A-B-C, APIS 232A-B-C, and one of the following sequences:  
APIS 241A-B-C  
APIS 242A-B-C  
Physics 200A, 212A-B
2. Comprehensive Examination:  
Students majoring in applied physics are required to take a written comprehensive examination after completing one year of graduate study at UC San Diego. The examination is based on the student's first-year graduate courses. It is offered twice a year, at the beginning of the fall and spring quarters, and lasts for two days, four hours per day. The examination may be repeated once. Students intending to take it must notify their graduate adviser before the fifth week of the winter quarter or the last week of the spring quarter.

### B. Computer Science

1. Core Courses:  
APIS 264A-B-C,  
APIS 265A-B-C, and  
three quarters chosen from:  
APIS 268A-B-C  
APIS 270A-B  
APIS 250A-B-C  
Mathematics 200A-B-C  
Mathematics 260A-B-C  
Mathematics 270A-B-C
2. Comprehensive Examination:  
Ph.D. students are required to take the same examination as the master's degree candidates, but must pass it with a higher level of performance than that required of master's candidates. Students are expected to take this examination after completing one year of graduate study at UC San Diego.

### C. Information Science

1. Core Courses:  
Mathematics 210A-B-C,

APIS 250A-B-C or APIS 256A-B-C, and  
APIS 254A-B-C or APIS 258A-B-C

2. Comprehensive Examination:  
Written and oral comprehensive examinations on upper-division and graduate material in communication theory, signal analysis, and random processes must be passed after the first year of graduate study. They will be given in the spring quarter.

### D. Applied Ocean Sciences

1. Core Courses:  
Mathematics 210A-B-C or AMES 294A-B-C, SIO 210A, 240, 260, 280, and one additional three-course sequence listed under "Core Courses" for Applied Physics or Information Science. Continuing enrollment in the Applied Ocean Science Seminar (SIO 208) is required.
2. Comprehensive Examination:  
Students are required to pass the written applied ocean science examination covering the applied ocean sciences core courses. This examination is given during the second year. Upon successful completion of the written examination the student will be given an oral examination by an interdepartmental committee composed of two AP&IS faculty members and one faculty member from SIO or AMES.

**Dissertation** In order to be admitted to the university qualifying examination, a student must have satisfied the departmental graduate requirements and have been accepted by a faculty member as a Ph.D. thesis candidate. A candidate for the Ph.D. will write a dissertation and defend it in a final oral examination conducted by the doctoral committee.

**Financial Aids** Financial support is available to qualified graduate students in the form of fellowships, traineeships, loans, and assistantships. Stipends for half-time assistantships are about \$472 per month, with the possibility of full-time employment during the summer months. Requests for application forms for admission and financial support should be directed to the Department of Applied Physics and Information Science.

### Courses

All courses marked with an asterisk (\*) are not offered in 1978-79. They are listed to help students plan for later years.

### Lower Division

The Department of Applied Physics and Information Science teaches and administers the Science 4 and 4L sequences. (See course listings: "Science").

#### †35. The Nature of the Earth (4)

Descriptive introduction to earth science. Emergence of our present knowledge of the earth's interior, mantle, crust, oceans, and atmosphere through the study of gravity, seismology, magnetism, radioactive dating, heat flow, dynamics, and chemistry. Relations to environment and to space exploration. Three hours' lecture, one hour's recitation. (W) Mr. Bullard

#### 50A-B-C. Linear System and Circuit Analysis (4-4-4)

Network analysis. Kirchhoff's laws, transients and the steady-state, step and impulse response, convolution integral. Sinusoidal steady-state analysis, complex network impedance, Thevenin and Norton theorems. Concept of state, Fourier series, Fourier and Laplace transforms, applications. Three hours' lecture, three hours' laboratory. *Prerequisites:* Sci 4C or Physics 3C, and for APIS 50C, Mathematics 2C is required. Staff

#### 61. Introduction to Computer Science (4)

Introduction to problem solving by means of algorithmic processes; their implementation on digital computers. Topics include algorithms, transforming problem statements into algorithmic procedure, flowcharts, principles of programming languages and computing machines; principles of good programming, structured programming; data structures; PASCAL. Three hours' lecture, one hour's recitation. (A student who has taken APIS 10, 10A, or 13A may not take APIS 61 for credit.) (F,W,S) Mr. Bowles

#### 63. Non-Numeric Applications of Computers (4)

Study of the use of computers for non-mathematical applications such as the accessing and processing of files and data bases. Areas of study include text processing, business data processing, graphics and communications. Students interested in business applications will have the option of learning to program in and of completing homework problems using COBOL. Students interested in other areas of non-numeric processing will use PASCAL. Three hours' lecture, two hours' recitation. *Prerequisite:* APIS 61 or equivalent course emphasizing structured programming approved by the instructor. (A student who has taken APIS 10B or APIS 11 may not take APIS 63 for credit.) (W) Mr. Boles

#### 64. Scientific Application of Computers (4)

Introduction to elementary numerical analysis with emphasis on computer applications. Systems of linear equations, interpolation, extrapolation, polynomial fits to data, root finding, numerical differentiation and integration. Three hours' lecture, two hours' recitation. The recitation sections will be divided into two sets, those which use FORTRAN as the course programming language and those which use PASCAL. *Prerequisites:* Mathematics 2B and APIS 61 or equivalent course emphasizing structured programming approved by the instructor. (A student who has taken APIS 12, APIS 13B or APIS 62 may not take APIS 64 for credit.) (S) Staff

#### 65. Introduction to Programming Theory (4)

Introduction to algorithm design and computer programming. Topics include structured programming, data structures, analysis of algorithms and elementary topics in numerical analysis. Designed to emphasize the mathematical aspects of algorithms, their applications and theoretical foundations of computer science. Three hours' lecture, one hour recitation. *Prerequisite:* Math 2A, concurrent registration permissible. (A student who has taken APIS 10, 10A or 13A may not take APIS 65 for credit. A student may not receive credit for both APIS 61 and APIS 65.) (F)

#### 69. Computers and Society (4)

An introduction to computers, their applications, and their impact on people and social institutions. Factual and technical information for making objective judgments about computer use. Social problems created by the use of computers and the tools for solving them. Constructive and creative thought about technology and its social impact. The course has no prerequisites, it is based on the hypothesis that the computer affects all of us and is important for everyone to understand. Three hours' lecture. (F) Mr. Sites

#### 70. Introduction to Systems Programming (4)

Introduction to assembly language and machine language programming. Basic machine structure. Topics include assemblers, pseudo-operations, macros, loaders, relocatable programs, sub-routines, recursion, and interrupts. Three hours' lecture. *Prerequisites:* APIS 61 or consent of instructor. (F,W,S) Staff

### Upper Division

#### 105A-B-C. Introduction to Mathematical Physics (4-4-4)

Fourier series, elementary partial differential equations, ordinary differential equations, complex variables, and integral transforms with applications to problems in particle and

†Earth Sciences 1 (The Oceans), APIS 35 (The Nature of the Earth), and Physics 5 (The Skies) form a three-quarter sequence of science courses for students of the humanities and social sciences.



rigid-body dynamics, vibrations, wave motion, electric circuits, heat conduction, and fluid dynamics. Four hours' lecture. *Prerequisites: Science 4A-B-C or equivalent and Mathematics 2A-B-C-DA-EA or equivalent.* Mr. Lewak

### 130. Applied Physics Laboratory (4)

Individual and small group laboratory projects in various areas of applied physics. Projects may be chosen in electronics, radio physics, materials science, acoustics, or optics. Students will use existing apparatus and construct new apparatus. One hour's lecture, four hours' laboratory. *Prerequisite: consent of instructor.* (S) Staff

### 131A. Electromagnetism (4)

(E,D) fields, Gauss's law, electrostatic potential, Divergence, curl, (B,H) fields, Ampere's law, Similarities and differences between electric and magnetic fields, Biot-Savart law, Displacement current, Electromotance, Faraday's law, Maxwell's equations, Scalar, vector, and Hertzian potentials, Current elements as dipoles, Radiation, Three hours' lecture, one hour's recitation. *Prerequisites: Natural Science 2B or Science 4C and Mathematics 2C or consent of instructor.* (F) Mr. Booker

### 131B. Electromagnetism (4)

Electromagnetic equations in materials, Boundary conditions, Conductivity, electric and magnetic susceptibility, Real and complex dielectric constants and refractive indices, Refraction and reflection of plane waves at a plane interface, Evanescent waves, Models of dielectric, magnetic and conducting materials, including plasma, Three hours' lecture, one hour's recitation. *Prerequisite: APIS 131A.* (W) Mr. Booker

### 131C. Electromagnetism (4)

Electromagnetic energy, energy density, Poynting's vector and theorem, Storage and flow of energy in oscillatory circuits and oscillatory electromagnetic fields, Resistive, reactive and complex power, complex Poynting vector, Circuit and field impedance, The Lorentz transformation, Electromagnetic fields in moving materials, Three hours' lecture, one hour's recitation. *Prerequisite: APIS 131B.* (S) Mr. Booker

### 133. Structure of Solids (4)

Atomic structure, properties and growth of ordered and disordered solids, Laboratory work includes generation of x-ray spectra, symmetry determination by Laue-technique, structure determination by single crystal and powder techniques, electron diffraction and radial distribution analysis, Four hours' lecture. *Prerequisite: consent of instructor.* (Part of Materials Science Program, which see.) (W) Mr. Arrhenius

### 135. Quantum and Semiconductor Physics (4)

Quantum statistics, quantum theory of electrons in periodic lattices, Theory of semiconductors, Three hours' lecture. *Prerequisites: Science 4C, APIS 105A-B-C, and Physics 130B.* (S) Mr. Luo

### 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. (Part of Materials Science Program, which see.) (S) Four to six hours' laboratory. *Prerequisite: some background in solid state physics or consent of instructor.* Mr. Luo

### 140A. Diffraction Informatics (4)

Acoustic and electromagnetic waves in one dimension, Reflection and transmission at a boundary, Multiple boundaries and design of impedance transformers, Reciprocity, Waves in three dimensions, Resonances of rectangular cavities, Transmission along rectangular waveguides, Dispersion of electromagnetic, acoustic and other waves, Three hours' lecture, two hours' recitation. *Prerequisites: Mathematics 2D or 2DA and APIS 50C. Concurrent registration in APIS 105A recommended.* Mr. Rumsey

### 140B. Diffraction Informatics (4)

Fraunhofer patterns of arrays of point sources, Diffraction patterns as Fourier transforms and Huygens' Principle, Design of interferometers, telescopes, microscopes, antennas and acoustic radiators, Lenses as Fourier transformers, Fresnel diffraction and occultation, Three hours' lecture, two hours' recitation. *Prerequisites: APIS 140A or consent of instructor. Concurrent registration in APIS 105B recommended.* Mr. Rumsey

### 140C. Diffraction Informatics (4)

Fourier transforms and the angular spectrum of plane waves, Fresnel transforms and spherical waves, Elements of information processing using coherent and incoherent diffraction pat-

terns, Images, Information stored in X-ray, optical, radio and acoustic diffraction patterns, Holography, Three hours' lecture, two hours' recitation. *Prerequisites: APIS 140B or consent of instructor. Concurrent registration in APIS 105C recommended.* Mr. Rumsey

### 141A. Optical Signal Processing (4)

Optical transformations with various lens systems, Design of a Fourier spectrum analyzer, Imaging and information processing with coherent and incoherent illuminations, Partial coherence, impulse response, and transfer function concepts, Optical spatial filtering and spatial filter synthesis, Production of optical components such as a lens or a spherical mirror, Two hours' lecture, four hours' laboratory. *Prerequisite: APIS 140C or consent of instructor.* Mr. Lee

### 141B. Lasers and Holography (4)

Lensless holograms, multiple beam holograms, bleached holograms, computer-generated binary holograms, color holograms, Laser principles, Solid-state lasers, liquid (or dye) lasers, gas lasers, Laser resonator designs, Laser parameter measurements, Two hours' lecture, four hours' laboratory. *Prerequisite: APIS 140C or consent of instructor.* Mr. Lee

### 141C. Optical Electronics and Communications (4)

Principles and performance characteristics of important devices and components in optical electronics and communication systems, which include light sources (laser diodes and light emitting diodes), modulators (electro-optic and acousto-optic), waveguides or transmission media for light (fibers and integrated optical guides) and optical detectors, Engineering design considerations for optical electronic circuits and optical communication systems, Two hours' lecture, four hours' laboratory. *Prerequisite: consent of instructor.* Mr. Lee

### 142AL-142BL-142CL. Acoustics Laboratory (4-4-4)

Experiments in acoustics, Vibrations and waves in strings and bars, Response of electro-mechanical systems, Transducer calibrations, Propagation, reflection, refraction, and scattering of underwater sound waves, Four hours' laboratory, one hour's lecture. *Prerequisite: concurrent registration in APIS 140A-B-C or consent of instructor.* Mr. Anderson

### 146A. Electronic Systems and Circuits (4)

Stability of feedback systems and design of active circuits, Theory of semiconductor devices, design of analog integrated circuits, Analog instrumentation, Three hours' lecture, three hours' laboratory. *Prerequisites: APIS 50A-B-C and APIS or AMES 105A-B-C. Concurrent registration in APIS 146AL recommended.* Mr. Coles

### 146B. Electronic Systems and Circuits (4)

Electronic characteristics of digital hardware, Design of hybrid systems, Analog-digital conversion techniques, Phase-locked systems, Design of modems, Transmission line effects in digital systems, Three hours' lecture, three hours' laboratory. *Prerequisite: APIS 146A. Concurrent registration in APIS 146BL recommended.* Mr. Coles

### 146C. Electronic Systems and Circuits (4)

Design of RF/IF and microwave electronics, Low noise systems, Frequency translation and modulation, Distributed systems, Microwave semiconductor devices, Three hours' lecture, three hours' laboratory. *Prerequisite: APIS 146A. Concurrent registration in APIS 146CL recommended.* Mr. Coles

### 146AL-BL-CL. Electronics Laboratory (2-2-2)

Laboratory projects on material covered in APIS 146A-B-C, Four hours' laboratory. *Prerequisite: concurrent registration in APIS 146A-B-C, required.* Mr. Coles

### 152A-B-C. Signal Analysis (4-4-4)

Fourier series and integral, sampling representation, linear systems, filters, Digital systems and z-transforms, Feedback systems, Random variables, probability distributions, expectations, limit theorems, Correlation functions and spectral densities of stochastic processes, the Gaussian process, Linear systems and random noise, Three hours' lecture, one hour's recitation. *Prerequisite: APIS 50A-B-C.* Mr. Helstrom

### 154A-B-C. Communications Systems (4-4-4)

Review of probability and random processes, Optimum filtering, prediction, and signal detection, Analog modulation and demodulation, AM, FM, PM, signal-to-noise ratio, performance analysis, Digital communication systems, sampling, quantizing, PAM, PCM, PSK, probability of error, quantizing errors, intersymbol interference, Three hours' lecture, one hour's recitation. *Prerequisite: APIS 152A-B-C.* Mr. Milstein

### 159A-B-C. Queuing Systems (4-4-4)

Introduction to queuing theory and its applications in the areas

of management science, computer and communication systems, Review of probability theory, Analysis of queuing systems; queue length, waiting time and busy period, Bulk queues and priority disciplines, Economic models and parameter optimization, Applications to industrial waiting line problems, inventory systems, computer timesharing models, telephone systems, Three hours' lecture. *Prerequisite: Mathematics 2D or consent of instructor.* Mr. Masry

### 160A-B. Foundations of Computer Science (4-4)

Permutations and combinations; generating functions; recurrence relations; introduction to graph theory; introduction to rings and fields; Polyá's theory of counting; predicate calculus; applications to topics in computer science including the design and analysis of algorithms, Three hours' lecture. *Prerequisite: consent of instructor.* (F,W) Mr. Hu

### 161A-B-C. Digital System Software (4-4-4)

Principles of software design, Assemblers, macro processors, input-output, information structures, linear structures, sequential and linked allocations, searching techniques, scatter storage, trees, traversals, AVL trees, Huffman trees; sorting; compilers, lexical analysis, symbol tables, context-free grammars, parsing, syntax-directed translation, code optimization, Three hours' lecture, two hours' recitation. *Prerequisites: APIS 61, APIS 70, APIS 160A (may be taken concurrently).* Staff

### 165. Algorithms, Automata and Formal Languages (4)

Introduction to the notions of formal computations; Turing machines, register machines, recursive functions, the halting problem, minimal instruction sets which realize a universal computer, introduction to Turing machine time and tape hierarchies, Three hours' lecture. *Prerequisites: APIS 61 and consent of instructor.* (S) Staff

### \*166. Numerical Algorithms (4)

Computational error, Taylor series, interpolation, solution of equations, numerical integrations, systems of equations, eigenvalue problems, some applications to numerical solution of ordinary differential equations, introduction to partial differential equations; practice in programming applications of these topics, Three hours' lecture. *Prerequisites: APIS 61, and Mathematics 2C-2D-2E or 2DA-2EA.* (W)

### 170A-B. Principles of Computer System Design (4-4)

Combinational and sequential digital logic design, Data representations and computer arithmetic, Register-transfer language, implementation of micro-operation sequences using standard integrated circuits, CPU organization, busses, micro processors, Micro-program control, Memory organization, Input-output, interrupts, direct memory access, Three hours' lecture. *Prerequisite: APIS 70 or consent of instructor.* (F,W) Mr. Sites

### 171A-B. Principles of Computer Operating Systems (4-4)

Batch systems, multiprogramming, procedure implementation, processes, parallelism, critical sections, deadlocks, communication, multiprocessing, multi-level memory management, binding, name management, file systems, protection, resource allocation, scheduling, Three hours' lecture. *Prerequisite: APIS 170A.* (W,S) Mr. Miller

### 173. Comparative Study of Programming Languages (4)

Introduction to and use of several high-level programming languages, Features of high-level languages appropriate to particular problem areas, Course will involve a substantial programming project for each language studied, (e.g. COBOL, and PLI) Three hours' lecture. *Prerequisites: APIS 61, and APIS 70 or consent of instructor.* (F) Mr. Miller

### 175A. Computer Science Laboratory (4)

Director manipulation of a small computer in a laboratory environment, Assembly language programming, One hour's lecture, three hours' laboratory. *Prerequisite: APIS 161A.* (W) Staff

### 175B. Digital Hardware Laboratory (4)

Introduction to standard integrated circuits: gates, flip-flops, shift registers, counters, latches, Construction and debugging techniques, Design of digital systems such as fixed- and floating-point arithmetic modules, video displays, digital stopwatch and tachometer, One hour's lecture, six hours' laboratory. *Prerequisite: APIS 170A (may be taken concurrently) or consent of instructor.* (F,S) Staff

### 175C. Microprocessor Systems Design (4)

Writing and debugging programs on a microprocessor development system, Timing and loading considerations in system hardware design, A critical comparison of addressing modes, I/O structures, interrupt capabilities, and direct mem-

ory access techniques. Two hours' lecture, four hours' laboratory. *Prerequisites:* APIS 170B (may be taken concurrently), APIS 70 or equivalent and APIS 175B or equivalent. (W) Mr. Miller

**178. Artificial Intelligence (4)**

Steps toward intelligent machine behavior. General problem-solving heuristics, tree-searching algorithms, theorem-proving programs, game-playing programs. Appropriate programming languages. Three hours' lecture. *Prerequisites:* APIS 61 and consent of instructor. (W) Mr. Fredman

**179. Analysis of Algorithms (4)**

Methods for designing measures of computational cost, for computing the cost of algorithms and for computing the intrinsic costs of common computational tasks. Tasks considered include sorting, tree searching, matrix manipulations and polynomial evaluation. Three hours' lecture. *Prerequisites:* APIS 160A-B and 161A-B. (S) Mr. Fredman

**195. Teaching (2 or 4)**

Teaching and tutorial activities associated with courses and seminars. Not more than four units of APIS 195 may be used for satisfying graduation requirements. (P NP grades only.) Three hours' lecture. *Prerequisite:* permission of department chairman.

**197. Field study in Applied Physics and Information Science**

Directed study and research at laboratories and observatories away from the campus. *Prerequisites:* consent of the instructor and approval of the department.

**198. Directed Group Study (2 or 4)**

Topics in applied physics or information science 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**

**232A-B-C. Applied Electromagnetic Theory (3-3-3)**

General solution of Maxwell's equations and the transmission and reception of electromagnetic waves via antennas, waveguides and representative homogeneous and inhomogeneous media, at radio and optical wavelengths. Propagation via the atmosphere, ionosphere, troposphere, and magnetosphere and the interplanetary and interstellar media. Reciprocity and equivalence theorems. Mr. Rickett

**\*235A. Advanced Plasma Physics I (3)**

The Liouville equation, the BBGKY hierarchy, kinetic equations, Vlasov, Boltzmann, Fokker-Planck, Balescu-Lenard. Applications: Plasma equilibrium solutions, transport properties, instabilities. *Prerequisite:* consent of instructor

**\*235B. Advanced Plasma Physics II (3)**

Weakly non-linear wave-wave interaction. The decay instability, many wave interaction in the random phase approximation. Wave-particle interaction; quasi-linear theory, electron plasma oscillation turbulence. *Prerequisite:* consent of instructor

**236. Space Research and the New Astrophysics (3)**

Survey of new approach to astrophysics based on results of space research. Relations between laboratory physics and astrophysics. Electric and magnetic fields, magnetosphere, jet streams of solid bodies in space, asteroids, comets, meteoroids. Evolution of solar system. Galactic plasmas. Cosmology. (W) Mr. Alfvén

**241A. Optics I (3)**

Propagation of waves and rays in various media: homogeneous, inhomogeneous (e.g. media with gradient index or lens-like media), anisotropic, nonlinear media. Optical dielectric waveguides, fiber optics, electro-optics, nonlinear optics, acousto-optics. Optical resonators and mode stability criteria. *Prerequisite:* APIS 140C or consent of instructor. (F) Mr. Lee

**241B. Optics II (3)**

Optical information processing. Space bandwidth product, super-resolution, 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. *Prerequisite:* consent of instructor. (W) Mr. Lee

**241C. Optics III (3)**

Laser and holography. Laser oscillation and amplification. Q-switching and mode locking of lasers, some specific laser systems. Optical display and memory, holography, computer holography, color holography, real-time holography. Imaging through fog with holography, holographic microscopy, non-destructive testing with holography. *Prerequisite:* consent of instructor. (S) Mr. Lee

**242A. Advanced Acoustics I (3)**

Boundary value problems in vibrating systems, wave propagation in strings, bars, and plates. Fundamentals of acoustical transducers. *Prerequisite:* concurrent registration in 142AL recommended. Mr. Anderson

**242B. Advanced Acoustics II (3)**

Theory of radiation, transmission and scattering of sound with special application to ocean acoustics. *Prerequisites:* concurrent registration in 142BL recommended. APIS 242A or consent of instructor. Mr. Anderson

**242C. Advanced Acoustics III (3)**

Signal processing in underwater acoustics. Theory and hardware embodiments. *Prerequisites:* concurrent registration in 142CL recommended. APIS 242B or consent of instructor. Mr. Anderson

**243A-B. Optical Systems (3-3)**

Fundamentals of optical systems which provide visual information, including photographic and electronic imagery. Geometrical, physical, and physiological optics; radiometry, photometry, colorimetry, atmospheric optics, visibility, coherence, spatial frequency analysis, transfer functions, resolution, image evaluation, image reconstruction. Ultimate capabilities of optical systems. *Prerequisite:* consent of instructor. (W.S)

**\*244. Introduction to Radio Astronomy (3)**

Radio telescopes. Antennas for measurement of celestial brightness distribution. Receivers for detection of stochastic signals. Effects of aperture size, bandwidth and integration time. Radio continuum and line spectra. Partial coherence and Stokes's polarization parameters. Interferometric methods and synthesis of sky maps. *Prerequisite:* consent of instructor. (Given in alternate years)

**\*245. Signal Processing (3)**

Time-series analysis, sampling, spectral analysis, covariance and cross-covariance estimation. Digital filtering, optimal filters, signal detection, parameter estimation. Measurement of random fields, angular spectra, detector arrays, synthetic apertures. *Prerequisite:* consent of instructor. (APIS 152 and APIS 244 desirable). (Given in alternate years).

**\*246. Wave Propagation through Random Media (3)**

Theory of scintillations due to refractive-index fluctuations at radio wavelengths in the solar wind, the ionosphere, and the interplanetary medium, and at optical wavelengths in the earth's atmosphere. Connection between the refractive index spectrum, the angular spectrum, and the intensity spectrum. *Prerequisite:* consent of instructor. (Given in alternate years).

**\*248A-B. Electromagnetic Propagation in Stratified Atmospheric Layers (3-3)**

Propagation in a plane-stratified ionosphere without and with the Earth's magnetic field. Real and complex ray theory. The WKB approximation. The mode theory of propagation between the Earth and the ionosphere. Refraction and diffraction in the troposphere. Scattering. *Prerequisite:* APIS 232 or consent of instructor

**250A-B-C. Mathematical Models for Random Processes (3-3-3)**

Study of random processes emphasizing their relationship to the models that generate them. Characterization of probability laws, filtering, estimation, limit theorems. Brownian motion, Poisson processes, shot noise, Markov processes, counting processes, and linear processes. *Prerequisite:* APIS 152C or equivalent or consent of instructor. (Given in alternate years). (F.W.S) Staff

**254A-B-C. Detection Theory (3-3-3)**

Hypothesis testing, detection of signals in white and colored Gaussian noise; Karhunen-Loève expansion; estimation of signal parameters, maximum-likelihood detection; resolution of signals; detection and estimation of stochastic signals; applications to radar, communications, and optics. *Prerequisite:* APIS 152C. (Given in alternate years) Mr. Helstrom

**\*256A-B-C. Time Series Theory and Applications (3-3-3)**

Second order random processes, processes with orthogonal

increments, spectral representation, series expansion. Time series analysis; covariance and spectral estimation. Mean-square recursive and nonrecursive filtering; Wiener-Hopf and Kalman-Bucy filters. *Prerequisites:* APIS 152A-B-C and Mathematics 210A-B-C (Mathematics 210 may be taken concurrently). (Given in alternate years) Mr. Masry

**\*258A-B-C. Communication Systems (3-3-3)**

Fundamental concepts of information theory, including information measures, source encoding with and without distortion, channel encoding, noisy channel coding theorem. Digital communication theory including basic modulation techniques, performance of digital systems, effects of and equalization techniques for intersymbol interference, spread-spectrum communications. *Prerequisite:* APIS 154A-B-C or consent of instructor. (Given in alternate years.) Mr. Milstein

**264A. Software Engineering (3)**

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:* APIS 161A-B-C, APIS 171A, or consent of instructor. Staff

**264B. Advanced Operating Systems (3)**

Software engineering principles and techniques which are specifically related to the design and implementation of operating systems. Topics include cooperating sequential processes, resource protection, recoverability and systems programming languages. *Prerequisites:* APIS 171A-B or consent of instructor. Staff

**264C. Advanced Compiler Design (3)**

Advanced material in programming languages and translator systems. Topics include compiler compilers, code optimization and debugging interpreters. *Prerequisites:* APIS 161A-B-C or consent of instructor. Mr. Miller

**265A-B-C. Automata, Formal Languages, and Complexity Theory (3-3-3)**

Finite-state machines; context-free languages, pushdown automata, parsing theory, Turing and register type machines, halting problem, time and tape complexity; Blum axioms; analysis of the computational cost of specific tasks such as sorting, matrix manipulation and polynomial evaluation. *Prerequisite:* consent of instructor. Mr. Fredman and Mr. Savitch

**268A-B-C. Combinatorial and Searching Algorithms (3-3-3)**

Combinatorial and searching algorithms and their computer implementation. Network flow problems such as the analysis of multi-terminal network flows, decomposition algorithms for shortest paths, advanced data structures for information retrieval, optimal search trees, geometrical search algorithms, and other current problems. *Prerequisite:* consent of instructor. Mr. Hu and Mr. Fredman

**269. Special Project in Computer Science (1-6\*)**

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. \*1-6 units; may be repeated to a total of 9 units. *Prerequisite:* admission to the M.S. program in Computer Science. Staff

**\*270A-B. Concepts in Computer Architecture (3-3)**

Computer arithmetic, instruction look-ahead, and pipelining, paging and segmentation, cache memories and associative memories, I/O controllers, graphic displays, multi-processors and distributed processors, stack and high-level-language machines, array and parallel processing. *Prerequisite:* APIS 170A or consent of instructor. (Given in alternate years.) Mr. Sites

**280. Special Studies in Computer Science (1-3\*)**

Topics of special interest in computer science to be presented by staff members and graduate students under faculty direction. Subject matter to be announced before each quarter. \*May be repeated for credit. *Prerequisite:* consent of instructor

**281. Special Topics in Computer Science. (1-6\*)**

A course to be given at the discretion of the faculty at which topics of current interest in computer science will be presented by visiting or resident faculty members. \*May be repeated for credit. (Satisfactory-Unsatisfactory grades optional). *Prerequisite:* consent of instructor

**M285. Special Topics in National Security for Science Students (3)**

The seminar will consist of two parts: first, a presentation of what our National Security policy is, and second, a discussion of how various current science and technology programs and policies relate to it. Mr. York

**287A-B-C. Special Studies in Information Science (1-3)**

Topics of special interest in information science to be presented by staff members and graduate students under faculty direction. Subject matter to be announced before each quarter. One to three hours' lecture. *Prerequisite: consent of instructor.*

**288. Special Topics in Applied Physics (1-6)**

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. (Satisfactory/Unsatisfactory grades optional). *Prerequisite: consent of instructor.*

**289. Special Topics in Information Science (1-6)**

A course to be given at the discretion of the faculty at which topics of current interest in information theory or signal processing will be presented by visiting or resident faculty members. (Satisfactory/Unsatisfactory grades optional). *Prerequisite: consent of instructor.*

**290. Observatory Field Course (1-12)**

Methods of measurement, observation and data processing used at radio, radar and optical observatories in astronomy and solar system physics; establishment and use of equipment for a current research investigation at an observatory; analysis and interpretation of result with a report. *Prerequisite: consent of instructor.*

**291. Graduate Seminar in Applied Physics (1-1-1)**

Weekly discussion of current research literature. Staff

**292. Graduate Seminar in Solar System and Space Physics (1-1-1)**

Research topics in radio astronomy and solar system physics (Satisfactory/Unsatisfactory grades only). Mr. Rickett

**293. Graduate Seminar in Information and Computer Science (1)**

Research topics in information and computer science. Staff

**294. Graduate Seminar in Applied Solid State Physics (1)**

Research topics in applied solid state physics and quantum electronics. Mr. Luo

**295. Graduate Seminar on Space Research and the New Astrophysics (1)**

A survey is given of the new approach to astrophysics that is based on the results of space research. Mr. Alfvén

**296. Graduate Seminar in Optical Signal Processing (1)**

Research topics of current interest in holography. Mr. Lee

**298. Independent Study (1-12)**

Open to properly qualified graduate students who wish to pursue a problem through advanced study under the direction of a member of the staff. (Satisfactory/Unsatisfactory grades permitted). *Prerequisite: consent of instructor.*

**299. Research (1-12)****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. *Prerequisite: consent of department chairman.*

See also "Science".

\*Not offered in 1977-78. Listed to help students plan for later years.

## Biochemistry

OFFICE: 2132 Urey Hall, Revelle College

**Professors:**

John N. Abelson, Ph.D. (Chemistry)

Andrew A. Benson, Ph.D., (Marine Biology)

Warren L. Butler, Ph.D. (Biology)

Russell F. Doolittle, Ph.D. (Chemistry)

Richard W. Dutton, Ph.D. (Biology)

Morris E. Friedkin, Ph.D. (Biology)

E. Peter Geiduschek, Ph.D. (biology)

Murray Goodman, Ph.D. (Chemistry)

Mehran Goulian, M.D. (Medicine)

Melvin H. Green, Ph.D. (Biology)

Francis T. Haxo, Ph.D. (Marine Biology)

Masaki Hayashi, Ph.D. (Biology)

Donald R. Helinski, Ph.D. (Biology)

John J. Holland, Ph.D. (Biology)

Harvey Itano, M.D., Ph.D. (Pathology)

Nathan O. Kaplan, Ph.D. (Chemistry)

Joseph Kraut, Ph.D. (Chemistry)

Steven E. Mayer, Ph.D. (Medicine)

William D. McElroy, Ph.D. (Biology)

Stanley L. Miller, Ph.D. (Chemistry)

Stanley E. Mills, Ph.D. (Biology)

Xuong Nguyen Huu, Ph.D.

(Biology, Chemistry)

William L. Nyhan, M.D., Ph.D. (Pediatrics)

John O'Brien, M.D. (Neurosciences)

Paul D. Saltman, Ph.D. (Biology)

Gordon Sato, Ph.D. (Biology)

Gerhard N. Schrauzer, Ph.D. (Chemistry)

J. Edwin Seegmiller, M.D. (Medicine)

Melvin I. Simon, Ph.D. (Biology)

S. Jonathan Singer, Ph.D. (Biology)

Daniel Steinberg, M.D., Ph.D. (Medicine)

Herbert Stern, Ph.D. (Biology)

Teddy G. Traylor, Ph.D. (Chemistry)

Silvio S. Varon, M.D. (Biology)

Benjamin Volcani, Ph.D.

(Marine Microbiology)

Bruno H. Zimm, Ph.D. (Chemistry)

**Associate Professors:**

William S. Allison, Ph.D. (Chemistry)

Stuart Brody, Ph.D. (Biology)

Willie C. Brown, Ph.D. (Biology)

Maarten J. Chrispeels, Ph.D. (Biology)

Marlene A. DeLuca, Ph.D. (Chemistry)

Edward A. Dennis, Ph.D. (Chemistry)

Robert Fahey, Ph.D. (Chemistry)

D. John Faulkner, Ph.D. (Marine Chemistry)

Stephen P. Howell, Ph.D. (Biology)

Elvin Harper, Ph.D. (Chemistry)

Oliver W. Jones, M.D. (Medicine, Pediatrics)

William F. Loomis, Jr., Ph.D. (Biology)

Paul A. Price, Ph.D. (Biology)

Percy J. Russell, Ph.D. (Biology)

Immo Scheffler, Ph.D. (Biology)

Douglas W. Smith, Ph.D. (Biology)

**Assistant Professors:**

Jack Kyte, Ph.D. (Chemistry)

John Leong, Ph.D. (Chemistry)

Ramon Piñon, Ph.D. (Biology)

Susan S. Taylor, Ph.D. (Chemistry)

\*\*\*

Lemuel Bowie, Ph.D., Assistant Adjunct Professor of Chemistry

Melvin Cohn, Ph.D., Adjunct Professor of Biology

Francis H. C. Crick, Ph.D., Adjunct Professor of Biology and Chemistry

Walter Eckhart, Ph.D., Associate AEAAC Professor of Biology

Nathan Gochman, Ph.D., Associate Adjunct Professor of Chemistry

Robert Holley, Ph.D., Adjunct Professor of Chemistry

Yasuo Hotta, Ph.D., Research Biologist

Frank M. Huennekens, Ph.D., Adjunct Professor of Biology

Leslie E. Orgel, Ph.D., Adjunct Professor of Chemistry

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**The Undergraduate Program**

The Departments of Biology and Chemistry both offer undergraduate courses in biochemistry. The specialization in biochemistry for biology majors and the recommended courses are discussed in the biology section of this catalog. The Department of Chemistry offers a major in chemistry with a concentration in biochemistry described below. This program is designed for those wishing to major in chemistry but with an emphasis on biochemistry. With the options indicated, it is suitable for premedical students. The core biochemistry offering is a three-quarter plus laboratory sequence in the junior year followed by four advanced biochemistry courses in the senior year; these latter courses may be substituted by other courses in biology and chemistry. A minimum amount of organic, physical, and inorganic chemistry is necessary as indicated in the chart.

**Major Program in Chemistry For Premedical\* and Biochemistry Concentrators**

FALL	WINTER	SPRING
<b>Junior Year</b>		
(Bio) Chem 114A	(Bio) Chem 114B	(Bio) Chem 114C
(Org) Chem 141A	(Org) Chem 141B	(Org) Chem 141C
-----	(Phy) Chem 131	(Phy) Chem 132
(Org L) Chem 143A	(Org L) Chem 143B	(Bio L) Chem 112****
-----	(Phyl) Chem 105**	-----
<b>Senior Year</b>		
(Bio) Chem 113***	(Bio) Chem 116***	(Bio) Chem 121***
(Inorg) Chem 120A	(Bio) Chem 122***	(Bio) Chem 117***
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\*Premedical students are advised to take three upper-division biology courses. These may be counted as electives in place of \*\*\*courses and should include Biology 101 (Genetics) fall of the junior year.

\*\*May be taken senior year.

\*\*\*Elective courses: Only four elective courses must be taken from among the five indicated in the chart or any of the following: Chemistry 120B, 130, 145, 146, and 147 or Biology 101, 114, 117, 147 and 156. Chemistry 199 may not be substituted for required or elective courses. Students are encouraged to also take Chemistry 199 in the senior year.

\*\*\*\*Chemistry 105B or 143C may be substituted.

Students following this program need not consult an adviser for approval of course choices. Students with questions should contact the Department of Chemistry Student Affairs Office, 2132 Urey Hall.

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**The Graduate Program**

The Departments of Biology and Chemistry offer an integrated program of research training, courses, and seminars leading to the Ph.D. degree in either biology or chemistry with emphasis on biochemistry. Each student selects a graduate research problem in the field of interest of a member of the faculty listed below. Normally, a

student will select a faculty member in his or her department, but may, with permission of the departmental person, choose an adviser from another department.

Scripps Institution of Oceanography and the School of Medicine are integral parts of the University, and several of their faculty are active participants in the biochemistry program. In addition, the University is close to the Salk Institute for Biological Studies and the Scripps Clinic Medical Institutions. Several members of these institutions are adjunct professors at the University and are involved in the teaching aspects of the graduate program. Fully equipped, modern research facilities and libraries permit study in all major fields in biochemistry.

A student must meet the degree requirements of the department to which he or she is admitted; these are discussed separately by the Departments of Biology and Chemistry. A program of integrated biology/chemistry course offerings is described herein; other courses in biochemistry and related fields are listed in the course offerings of the Departments of Biology and Chemistry.

Interested students may obtain application forms and further information from the Interdepartmental Committee on Biochemistry (Departments of Biology or Chemistry), University of California, San Diego, La Jolla, California, 92093. If possible, the students should indicate a preference for either the Department of Biology or of Chemistry in applying for this program.

### Graduate Program in Biochemistry 1978-79

The following schedule of course offerings is available for first-year graduate students in the Department of Chemistry:

FALL	WINTER	SPRING
213 Macro-molecules	216 Enz. Cat. React.	217 Human
219 Adv. Topics	222 Evolution	221 Energy 267 Lipids

(1) Students who do not have sufficient background should take a beginning course such as Chem. 211 in the fall or Chem. 114A and 114B in the fall and winter of the first year. A placement exam will be given to advise those students who are deficient in biochemistry.

(2) Normally, students are encouraged to take three of the above courses before their Ph.D. qualifying exam, although the actual program should be worked out individually in consultation with the adviser.

(3) The Biochemistry Seminar (Chem. 295) is given each quarter. All graduate students should attend regularly and enroll in it all quarters after the first year.

(4) Chem. 210, Seminar in Biochemistry, will be offered most quarters. All students should take this at least one quarter each year after the first year.

### Courses

The following courses in biochemistry and related fields are listed in the course offerings of either the Departments of Biology or Chemistry.

#### Undergraduate

##### 102. Biochemical Techniques (4)

A laboratory-lecture course in the application of biochemical methods to biological problems. Ten hours' laboratory, one

hour's lecture and one hour's recitation. *Prerequisite: Biology 106 (may be taken concurrently).* (F)

##### 105M-105T-105R. Biochemistry I

See Biology listing. (F,W,S)

##### 106. Biochemistry II

See Biology listing. (W)

##### 110A. Biochemistry (4)

General biochemistry. *Prerequisite: organic chemistry (Science 140A-B or equivalent).* (F)

##### 110. Physical Biochemistry (4)

Physical chemical properties of biological molecules and their reactions. Equilibrium and irreversible thermodynamics, reaction kinetics, characterization of biopolymers. Required core course for Muir biology majors. Three hours' lecture. *Prerequisite: organic chemistry.* (F)

##### 112. Molecular Biochemistry Laboratory (4)

The application of techniques including electrophoresis, peptide mapping and sequencing, affinity chromatography, amino-acid analysis, gas liquid chromatography, and enzyme kinetics to the study of the chemistry of protein structure and function and the chemistry of lipids, carbohydrates, and nucleic acids. *Prerequisites: Chemistry 141A, B and C, 143A-B and 114A-B (Some of these may be taken concurrently.)* (S)

##### 113. Chemistry of Biological Macromolecules (4)

A quantitative discussion of the structure of biologically important macromolecules and the techniques used in their study. *Prerequisites: organic chemistry, biochemistry and at least two quarters of upper-division physical chemistry.* (F)

##### 114A. Biochemical Structure and Function (4)

Introduction to biochemistry from a structural and functional viewpoint. *Prerequisites: elementary organic and physical chemistry (which may be taken concurrently).* (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, carbohydrate purines, pyrimidines, proteins, nucleic acids. *Prerequisite: Chemistry 114A.* (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: Biochemistry 114B.* (S)

##### 116. 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. *Prerequisites: elementary physical chemistry, organic chemistry and biochemistry.* (W)

##### 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.* (S)

##### 121. Energy Transduction (4)

Discussion of current understanding of mechanisms of muscle contractions, photosynthesis, bioluminescence, chemiluminescence and active transport will be presented. *Prerequisites: organic chemistry and introductory biochemistry.* (S)

##### 122. Biochemical Evolution (4)

The 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, introductory biochemistry.* (W)

##### 199. Independent Study in Biology or Chemistry (2 or 4)

Independent literature or laboratory research by arrangement with, and under the direction of, a member of the biology or chemistry faculty. *Prerequisites: permission of instructor and department. (Pass/Not Pass grades only.)* (F,W,S)

#### Graduate

The integrated course offerings of the De-

partments of Biology and Chemistry are listed below:

##### 210. Seminar in Biochemistry (1)

Seminars presented by advanced graduate students which will explore topics in specialized areas of biochemistry and provide opportunities for students to gain experience in the organization, critical evaluation and oral presentation of information from the literature. Each quarter a different topic is discussed. recent topics have included: lipids, membranes, oxidative phosphorylation, nucleic acid structure, function, and synthesis, protein structure and function, history of biochemistry. *Prerequisite: one year of graduate study.* (F,W,S)

##### 211. Biochemistry I (3)

A comprehensive course in introductory biochemistry. The course is intended for entering graduate students, including those who have not previously had a formal course in biochemistry. *Prerequisite: physical and organic chemistry.* (F)

##### 213. Chemistry of Biological Macromolecules (3)

A quantitative discussion of the structure of biologically important macromolecules and the techniques used in their study. *Prerequisite: physical chemistry.* (F)

##### 214. History of Biochemistry (2)

A summary of the contributions which led to the major concepts in the field of biochemistry. Emphasis will be placed on the research approach taken by eminent individuals. *Prerequisite: Chemistry 211 or consent of instructor.*

##### 216. Chemistry of Enzyme Catalyzed Reactions (3)

The chemistry of representative enzyme catalyzed reactions is presented. Enzyme reaction mechanisms and coenzyme chemistry are emphasized. *Prerequisite: organic chemistry.* (W)

##### 217. Human Biochemistry (2)

An advanced course in biochemistry dealing primarily with the molecular basis of human disorders. *Prerequisite: Chemistry 211 or equivalent, which may be taken concurrently.* (S)

##### 218. Biochemistry II (3)

Advanced topics and recent advances in biochemistry for students already familiar with the subject matters of elementary courses. *Prerequisites: physical and organic chemistry and Chemistry 211 or equivalent.* (F)

##### 219 A-B-C. Special Topics in Biochemistry (3, 3, 3)

Recent topics have included: techniques in experimental biochemical dynamics, topics in biophysics.

##### 221. Energy Transduction (3)

Discussion of current understanding of mechanisms of muscle contractions, photosynthesis, bioluminescence, chemiluminescence and active transport will be presented. *Prerequisite: organic chemistry and introductory biochemistry.* (S)

##### 222. Biochemical Evolution (3)

The 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.* (W)

##### 267. Biochemistry of Lipid and Lipoprotein Diseases (2)

This course will cover the metabolism of lipids and lipoproteins from the basic biochemistry to human disease implications. The aim of the course will be to first develop a broad understanding of the basic biochemical aspects of lipid metabolism including structural aspects of lipids and lipoproteins and mechanistic aspects of the enzymes that act upon them. Then the regulation of lipid metabolism and the implications for disease states will be considered. Finally, the application of these ideas to the treatment of specific human diseases will be discussed. (S)

##### 268. Biochemistry of Neoplastic Diseases (3)

Special emphasis will be placed on basic aspects of chemo- and immuno-therapy, mechanism of action of anticancer agents, rational and empirical approaches to the inhibition of malignant cells. Theories relating to viral and chemical carcinogenesis will be discussed. *Prerequisite: introductory biochemistry.* (S)

##### 277. Clinical Correlates (2)

Clinical correlates will stress the close ties between clinical

medicine and the basic sciences and the two-way interactions among practicing doctors and research scientists. Most sessions will 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 standing, Chemistry 211, 217.* (F)

**295. Biochemistry Seminar (2)**

**299. Research in Biology or Chemistry (1-12)**

## Biology

OFFICE: 2130 Bonner Hall, Revelle College

### Professors:

Warren L. Butler, Ph.D.  
 Richard W. Dutton, Ph.D.  
 Morris E. Friedkin, Ph.D.  
 E. Peter Geiduschek, Ph.D.  
 Melvin H. Green, Ph.D.  
 Clifford Grobstein, Ph.D.  
 Masaki Hayashi, Ph.D.  
 Donald R. Helinski, Ph.D.  
 John J. Holland, Ph.D.  
 Harvey Itano, Ph.D.  
 Dan L. Lindsley, Ph.D. (*Chairman*)  
 William D. McElroy, Ph.D. (*Chancellor*)  
 Stanley E. Mills, Ph.D.  
 Xuong Nguyen-Huu, Ph.D.  
 Paul D. Saltman, Ph.D. (*Vice Chancellor-Academic Affairs*)  
 Gordon H. Sato, Ph.D.  
 Melvin I. Simon, Ph.D.  
 S. Jonathan Singer, Ph.D.  
 Herbert Stern, Ph.D.  
 Kiyoteru Tokuyasu, Ph.D. (*in Residence*)  
 Silvio S. Varon, M.D.

### Associate Professors:

Stuart Brody, Ph.D.  
 Willie C. Brown, Ph.D.  
 Maarten J. Chrispeels, Ph.D.  
 Stephen H. Howell, Ph.D.  
 S. Ian T. Kennedy, Ph.D.  
 William F. Loomis, Jr., Ph.D.  
 Maurice Montal, M.D., Ph.D.  
 Muriel N. Nesbitt, Ph.D.  
 Paul A. Price, Ph.D.  
 Percy J. Russell, Ph.D.  
 Milton H. Saier, Ph.D.  
 Immo E. Scheffler, Ph.D.  
 Allen I. Selverston, Ph.D.  
 Douglas W. Smith, Ph.D.  
 Michael E. Soule, Ph.D.  
 Nicholas C. Spitzer, Ph.D.  
 Christopher Wills, Ph.D.  
 Juan Yguerabide, Ph.D.

### Assistant Professors:

Bruce S. Baker, Ph.D.  
 Darwin K. Berg, Ph.D.  
 Jack W. Bradbury, Ph.D.  
 Adelaide T.C. Carpenter, Ph.D.  
 Richard A. Firtel, Ph.D.  
 P.A.G. Fortes, M.D., Ph.D.  
 Michael E. Gilpin, Ph.D.  
 Daniel K. Hartline, Ph.D.  
 William B. Kristan, Jr., Ph.D.  
 Ramon Piñon, Ph.D.

### Lecturer:

Meredith G. Somero, Ph.D., *Assistant Research Biologist*  
 Sandra L. Vehrencamp, Ph.D.

\*\*\*

Yasuo Hotta, Ph.D., *Research Biologist*  
 Suzanne Bourgeois, Ph.D., *Adjunct Professor*  
 Melvin Cohn, Ph.D., *Adjunct Professor*  
 Irving P. Crawford, M.D., *Adjunct Professor*  
 Walter Eckhart, Ph.D., *Associate Adjunct Professor*  
 Frank M. Huennekens, Ph.D., *Adjunct Professor*  
 David Kohne, Ph.D., *Adjunct Professor*  
 William O. Weigle, Ph.D., *Adjunct Professor*

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## Major Programs

Several types of undergraduate programs leading to a bachelor of arts degree in biology are offered on the campus. The biology major program in each of the colleges has a core of its own. In addition, as an extension of the regular biology major within each college, the department offers *concentration areas* in various fields of biology. Currently, these areas are: cell biology, genetics, human biology, physiology, population biology, microbiology and biochemistry. Each of these new programs forms a coordinated group of courses which is designed to help the student achieve a fuller understanding of a particular area among the major biological disciplines. Students wishing to elect a particular concentration area should first consult with the adviser for that area, then submit a petition to the departmental secretary for student affairs for their college. The degree received will be a degree in biology "with a concentration in . . ." A joint biology-chemistry concentration area in biochemistry is also available (see "Biochemistry"). Students in some colleges may not find it practical to elect certain concentration areas, because of heavy core requirements.

A student who prefers to maintain a more flexible curriculum without added specialization will of course pursue one of the regular major programs offered in the colleges. A minimum of twelve upper-division courses in biology and related disciplines is required for the biology major, regardless of college affiliation. Generally, three hours of preparation per week is required for each undergraduate unit of credit in the lecture courses listed.

Majors who enroll in either a 198 or 199 course (see catalog descriptions) may do so on a pass/not pass basis only, regardless of the department in which the particular course is given.

## Revelle College

The Revelle biology major is intended for those who have a strong interest in cellular and molecular biology. In order to fulfill this objective, biology majors are required to take a substantial part of the course work which is required for chemistry majors. The program is

suitable for pre-medical students and provides a basis for pursuing a variety of careers in cellular and molecular biology.

**Lower-division requirements** Students who have completed either the Natural Sciences 1 or 2 sequence are qualified for the major program. In addition, biology majors are strongly advised to take Natural Sciences 2D, 2DL, 2F and 2FL. Mathematics 2D should be taken as an elective by students who have completed Mathematics 2C.

**Upper-division requirements** Revelle biology majors are required to take the courses listed in the recommended schedule for the upper-division years. The following lab courses may be substituted for the Physical Chemistry Lab (Chemistry 105A) requirement: Biology 107L, 112, 119, 143L, 149AL, 149BL, 152, 177.

Science 140A, 140B and 140BL may be substituted for the corresponding organic chemistry requirements.

## Honors Program for Revelle Biology Majors

**Description** The program covers the senior year of undergraduate study and primarily involves twelve units of senior thesis research (Biology 196). Research is conducted under the supervision of a faculty member of the Department of Biology in concert with a committee consisting of the adviser plus two other members of the faculty of the Department of Biology. One member must be from the Revelle faculty. The research will culminate in a senior thesis prepared in conformity with rigorous standards and an oral report to an audience which includes the student's senior thesis committee. 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 credit for four units/quarter of Biology 199. Students may also withdraw voluntarily from the program and, if eligible, receive appropriate credit for Biology 199.

**Eligibility** Students must have a GPA of 3.7 in the following upper-division science courses at the end of the junior year: Chemistry 140A, 140B, 143A, 131, 132, and Biology 101R and 105R. Credit for Biology 102 is also recommended.

## Procedure for entry into program

Potential candidates will be notified during the spring quarter of the junior year. Students interested in the program who are eligible at the end of the spring quarter must find a faculty member willing to act in the capacity of thesis adviser. After an adviser is selected, a petition should be sent to the Revelle biology faculty. The petition should contain the research proposal as defined in consultation with the adviser and a GPA certificate, which may be obtained from Mrs. Macpherson in Room 2246, Bonner Hall. Approval may be obtained at the beginning of the summer session by students

## Biology

wishing to start the program during the summer preceding the senior year.

### Recommended Schedule:

FALL	WINTER	SPRING
<b>Junior Year</b>		
Biology 101R Chemistry 140A Chemistry 143A (½ course)	Biology 173 Chemistry 140B Chemistry 131	Biology 102 Biology 105R Chemistry 132 Chemistry 105A (½ course)
<b>Senior Year</b>		
Biology 111R	Biology 123	Biology 124

NOTE: Biology 123 or 124 can be taken to fulfill the requirement for a developmental biology course of Revelle.

**Other considerations** All Revelle biology majors must have their study-cards approved and signed by a faculty major adviser, who will be assigned by the department secretary of student affairs. In addition to the courses listed, a student is encouraged to elect other courses offered by the biology and chemistry departments to broaden his or her knowledge in the natural sciences, or to pursue an area of special interest. Additional information on the Revelle biology program can be obtained from the Revelle biology office, Bonner Hall, Room 2130.

**Non-Majors: Noncontiguous Minor Biology** Students majoring in a field outside the natural sciences may complete a noncontiguous minor in biology by taking some such combination as: Natural Sciences 2F or 2FL, Biology 101, 117, 121, 129 and 173. Additional upper-division biology courses will be available, and any six biology courses will complete the minor.

### Muir College

The Muir biology program is designed so that students will have maximum flexibility in their upper-division years. Students normally can fulfill all their required courses by the end of the junior year, leaving an entire year for specialization through course work or independent study. Possible areas of specialization are listed under "concentration areas". Students selecting this major get their basic chemistry preparation, including organic chemistry, during the lower-division years. In the upper-division years, the core program may be combined with one of a number of concentration areas.

**Lower-division requirements** Prerequisites for the junior year biology course in Muir College are Science 3A, 3B, 3C (students who want to continue in biology must have a GPA of 1.66 or more in this three-quarter chemistry sequence), Science 3AL and 3BL, Organic Chemistry 140A-B, 140BL, Mathematics 2A-B-C or Mathematics 1A-B-C. All of these prerequisites should be taken in the first two years. (Science 4A-B-C is required but can be taken at any time before graduation.)

**Upper-division biology requirements** All students must take twelve upper-division biology courses. These courses can be taken in the biology department or in other

departments. Courses taken in other departments must be clearly biological in content. A list of approved courses not given by biology faculty members can be obtained from the Muir biology office.

All students must take a course in genetics and a course in biochemistry.

All students must choose at least one course in each of three of the following four subjects.

1. Molecular Biology
2. Cellular Biology
3. Population Biology
4. Organismic Biology

This requirement can be satisfied in the following way:

Molecular Biology — Biology 111M or 111R  
Cellular Biology — Biology 114M or 114R  
Population Biology — Biology 122, 155 or 173  
Organismic Biology — Biology 10 and Biology 11  
or Biology 136  
or Biology 139  
or Biology 141  
or Biology 151  
or Biology 149A  
or Biology 149B

All students must take one course in which biological problems are dealt with in a mathematical way. The two recommended courses are Physical Biochemistry (Biology 110D) and Systems Biology (Biology 167). Other alternatives are available.

Students must take an upper-division lab course in biology. The following laboratories are acceptable.

Biology 102 — Biochemical Techniques  
Biology 112 — Cell Biology  
Biology 143L — Neurobiology  
Biology 152 — Microbial Genetics  
Biology 149AL — Physiology  
Biology 149BL — Physiology  
Biology 107L — Microbiology  
Biology 119 — Genetics  
Biology 161 — Field Ecology and Behavior

### Recommended Schedule: †

FALL	WINTER	SPRING
<b>Sophomore Year</b>		
		Genetics
<b>Junior Year</b>		
Biochemistry	Molecular Biology* Population Biology*	Cell Biology*
<b>Senior Year</b>		
Physical Biochemistry*	Systems Biology*	

\*See above for alternate courses

†Courses classified as organismic biology can be taken anytime in the junior or senior year

**Other considerations** Biology majors should seriously consider taking Biology 10 and/or 11, particularly in their sophomore year. These courses provide material about the biology of plants and animals which are not necessarily covered in the upper-division courses. In addition, these two courses are useful introductory courses. In their senior year, Muir biology majors may choose any combination of upper-division courses appropriate to their educational and career goals, or they may take one of the concentration areas

currently offered. More extensive information about electives, course substitutions, and courses not allowed as biology electives can be obtained from the Muir biology office, Muir Biology Building, Room 1218.

### Third College

The Third College biology programs are designed for students interested in medical school or medically related areas. After a thorough exposure to the basic sciences, subjects essential to the study of medicine are presented. Students receive much of their basic physics, chemistry, mathematics and biology preparation in the lower division. In the upper division, the student first takes a sequence of "core" courses which are necessary to understand medical subjects from a modern perspective. To complete the major, the student may choose any one of these concentration areas: human biology, physiology or microbiology, or the student may decide to complete a general biology major. The latter is a combination of upper-division courses, chosen with the assistance of an adviser, appropriate to the student's educational or career goals.

**Lower-division requirements** Prerequisites for entering the major biology programs in Third College are: Science and Technology 12A, 12AL, 12B, 12BL, 12C, 15A, 15B, 15C, 11A, or equivalent, Math 1A-B-C or 2A-B-C, Biology 15 and 21. All of these prerequisites should be taken in the first two years so that the student can enter the major program in the junior year.

**Upper-division requirements** Third College biology majors are required to take the courses listed in the recommended schedule in the upper-division years. Under certain circumstances, students may substitute equivalent courses from Revelle, Muir or Warren Colleges. These substitutions must have the approval of the faculty adviser.

### Recommended schedule:

FALL	WINTER	SPRING
<b>Junior Year</b>		
Biology 134 Chemistry 140A Chemistry 143A	Biology 101T Biology 105T Chemistry 140B	Biology 102 Biology 138
<b>Senior Year</b>		

Students may complete the curriculum for a biology major either by electing a particular concentration area or by fulfilling the requirements for general biology major.

1. For the general biology major students should take enough upper-division courses so that they will have completed a total of twelve upper-division courses in biology by the end of their senior year. (The five core biology courses count toward that minimum.)
2. The concentration areas of human biology, physiology and microbiology are well suited for completion of the Third College biology major; however, Third College students may elect any of the concentration areas offered by the Department of Biology. Details are provided under "Concentration Areas".

**Other considerations** Additional information about the Third College program can be obtained from the Third College biology office, Muir Biology Building, Room 1208.

## Warren College

The Warren College biology major offers a broadly based and flexible curriculum with an emphasis on whole-organism biology. The disciplines of physiology and population biology, with their focus on quantitative thinking, will build on the quantitative courses required in the lower division. The core requirements will nevertheless be sufficiently broad to allow a student to concentrate in most biological disciplines.

### Lower-division requirements

Mathematics up to differential equations (e.g. Math 1A, 1B, 1C or Math 2A-B-C).

Two quarters of physics (Science 4A and 4B or C).

Three quarters of inorganic chemistry (Chemistry 4ABC and Science 3AL, 3B and 3BL or equivalent).

At least one lower-division biology course (Biology 4, 10 or 11; Natural Science 1C or 2E).

Organic chemistry in the sophomore year (Chemistry 140A-B and laboratory, or Chemistry 141A-B-C and one laboratory or equivalent).

### Upper-division requirements

#### Junior Year:

Biochemistry I 105R, 105T, or 105M  
Genetics 101R, 101T or 101M  
Molecular Biology 111R, 111M or 138

#### Senior Year:

Physiology 139 or 149 (A or B)  
Population Biology 172 or 173  
One upper-division laboratory course.

**Other considerations** Additional information on the Warren College biology program can be obtained from the Warren College biology office, Muir Biology Building, Room 1208.

## CONCENTRATION AREAS

These are campus-wide programs which provide intensive instruction in specific areas of the biological sciences. Biology majors in the various colleges may request to enroll in any one of the programs. Students planning to do so should consult the appropriate area adviser.

### Cell Biology Concentration Area

Adviser: Milton Saier  
(Muir Biology Building, Room 4216)

Program: Any core, but including cell biology (Biology 110C, 114 or 138) plus at least four courses from among:

FALL	WINTER	SPRING
Biology 151	Biology 127	Biology 112
Biology 156	Biology 145	Biology 117
	Biology 147	Biology 125
		Biology 142

### Genetics Concentration Area

Adviser: Dan L. Lindsley  
(Bonner Hall, Room 2230)

Program: Any core, but including cell biology (Biology 114R, 114M or 138) plus Biology 172 or 173, plus five courses, including one laboratory (designated by \*) from among:

FALL	WINTER	SPRING
Biology 133	Biology 119*	Biology 117
Biology 137	Biology 125B	Biology 125A
Biology 152*	Biology 127	Biology 142
		Chemistry 119
Biology 227A(P)	Biology 227B(P)	Biology 227C(P)

Math 80A-B is also recommended

### Microbiology Concentration Area

Adviser: Willie C. Brown  
(Muir Biology Building, Room 3216)

Program: Any core plus:

FALL	WINTER	SPRING
Biology 157	Biology 158	Biology 159
	Biology 107L	

Plus three courses from the following list:

SIO 287A	Biology 127	Biology 126
	Biology 147	Biology 152
		SIO 287C*
		SIO 287D*
		SIO 291
		Biology 270

\*SIO 287C and SIO 287D offered alternate spring quarters.

### Population Biology Concentration Area

Adviser: Christopher J. Wills  
(Muir Biology Building, Room 3268)

Program: Any core plus

Biology 173 plus:

FALL	WINTER	SPRING
<b>Junior Year</b>		
APIS 61	Math 80A or	Math 80B or
Biology 122	SIO 276A(P)	SIO 276B(P)

#### Senior Year

SIO 280(P)	Biology 139	Biology 174
	Plus at least one course from among:	
Biology 133	Biology 136	Biology 155
Chemistry 117	Biology 167	Biology 172
Biology 163	SIO 275(P)	Biology 175
SIO 275A(P)	Biology 161	Biology 260
		SIO 275B(P)

### Physiology Concentration Area

Adviser: for Muir, Warren and Revelle majors:  
Allen I. Selverston  
(Bonner Hall, Room 2309)

Advisers: for Third College majors:  
P. A. G. Fortes  
(Muir Biology Building, Room 3256)  
and William B. Kristan  
(Bonner Hall, Room 1309)

Program: Any core, but including one quarter of thermochemistry or physical chemistry, plus:

FALL	WINTER	SPRING
<b>Junior Year</b>		
Biology 129	Biology 139	Biology 166†
<b>Senior Year</b>		
Biology 149A	Biology 149B	Biology 143*
Biology 149AL*	Biology 149BL*	Biology 143L*
Biology 169†		

\*one of three required

†two of three required

### Human Biology Concentration Area

Adviser: Ramon Pinon  
Bonner Hall, Room 2402

Program: Third College core equivalent, plus:

FALL	WINTER	SPRING
Biology 149	Biology 146	Biology 141
	Biology 149B	
	Plus three courses from among:	
Biology 129	Biology 127	Biology 145
Biology 137	Biology 147	Biology 153
Biology 148	Biology 149BL	Biology 172
Biology 149AL	Biology 173	

Some of these electives may be taken during the junior year

## Biochemistry Concentration Area

Adviser: Paul A. Price  
(Bonner Hall, Room 4430)

Program: Any core, but including Biology 102, 106, and 114 plus two quarters of physical chemistry (Chemistry 126 and 127) and at least one course from the following:

FALL	WINTER	SPRING
Biology 110	Biology 116	Biology 168
Biology 117	Chemistry 119	
Biology 113		

## The Graduate Program

Graduate studies for a Ph.D. degree in the Department of Biology are oriented mainly toward the development of the capacity for independent research and for teaching in the biological sciences.

There are no inflexible requirements for entrance to graduate study in the Department of Biology, 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 molecular and cell biology, biochemistry and biophysics, genetics and regulation, developmental biology, neurobiology, population biology, and immunology.

**Doctoral Degree Program** 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 graduate committee 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 and molecular biology. The only other course requirement is four units of Biology 500 (Apprentice Teaching in Biology) for the second and each succeeding year of graduate study. 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. By the end of the third year, the student is required to complete a two-part oral examination in order to be admitted to candidacy for the Ph.D. degree. The purpose of these 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.

## Biology

Close collaboration with members of the Department of Chemistry and the School of Medicine is a vital and stimulating aspect of the biology program. Additional strength and breadth in biology is gained by collaboration 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. Students may carry out dissertation research in collaboration with members of these groups.

### Graduate Program in Biochemistry

Please refer to "Biochemistry" in the course listings.

**Courses in Marine Biology** The following courses given at the Scripps Institution of Oceanography are highly recommended for qualified upper-division undergraduate biology majors and graduate students:

273A-B	Animal Behavior
275	Community Ecology
280	Marine Communities/Environments
281	Environmental Physiology and Biochemistry of Marine Organisms
289	Marine Plants
292	Developmental Biology of Marine Organisms
292L	Laboratory in Developmental Biology
293A	Advanced Invertebrate Zoology
294A	Biology of Fishes

A description of the courses can be found under Scripps Institution of Oceanography listings. Interested students should consult with the instructors well in advance of the first day of classes. In all cases **permission of the instructors must be secured prior to enrollment**. Each of the courses can accommodate only a limited number of students. An advisory program is available to undergraduates interested in marine biology: contact Daniel K. Hartline, Bonner Hall, Room 2325.

## Courses

### Lower Division

The Department of Biology cooperates in the teaching and administration of the natural sciences sequences for Revelle College students and the science sequence for Muir College students and the science and technology sequence for Third College students. (See course listings: "Natural Sciences" or "Science" or "Science and Technology.")

#### 4. Introductory Biology (4)

General introduction to the structure and function of animals, plants and microorganisms, with emphasis upon common cellular, biochemical and genetic mechanisms. This is an introductory course for biology majors, lower-division students only. *Not open to non-majors. Prerequisite: completion of one year of college chemistry.* (S)

#### 5. Plants, Food and People (4)

Biological principles of human nutrition, plant growth and agricultural food production necessary to understand the possibilities and the limitations of agriculture to feed the rapidly growing world population. Three hours lecture. *No prerequisites. Not open to biology majors.* Chrispeels (W)

#### 6. The Chemistry and Genetics of Cells and Organisms (4)

For non-biology majors, an introduction to elementary chemis-

try, genetics, and evolution. One hour voluntary contact with instructor on Saturdays. *Not open for course credit to biology majors.* (F)

#### 7. Fundamentals in Human Biology (4)

Course introduces elements of human physiology. Topics include human evolution, nutrition, disease and environmental adaptation. *Not open to biology majors.* (F)

#### 8. General Microbiology (4)

General principles of microbiology for non-scientists, with emphasis on the cell biology of microorganisms and of the cells with which they interact in causing diseases of man and animals. The microbiology of infection by bacteria, fungi and viruses, and host responses to infection. Three hours lecture. *Not open to biology majors.* (S)

#### 10. Introductory Plant Biology (4)

Principles of plant anatomy, morphology, physiology, growth and development. *Prerequisite: freshman chemistry.* (F)

#### 11. Introduction to Animal Biology (4)

Diversity in form and function in animals and the fundamentals of genetics, development and evolution. Three hours lecture. *No prerequisites.* (W)

#### 12. Preview of Biology (2)

A general preview of areas of experimental biology important to current research interests of Muir biology faculty. Background, questions under study and methods of investigation are discussed. Limited to biology majors. Pass/Fail grades recommended. *Prerequisites: one year calculus, Science 3A, 3B, 3C; Organic Chemistry 140A; Organic Chemistry 140B; prior to or concurrently with Biology 12.*

#### 14. Biology of 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. Each lecture-discussion period will be given by an invited lecturer who is prominent in cancer research. Three hours lecture. Pass/Not Pass grades recommended. *Prerequisite: lower-division general biology.* Saltzstein/Staff (F)

#### 15. Vertebrate Zoology II (4)

Continuation of Vertebrate Zoology I (Science/Tech 11A). An introduction to the vertebrate way of life through the examination of selected topics in anatomy, physiology, environmental adaptation and evolution. Three hours lecture and one hour recitation. *Prerequisite: Science and Technology 11A.* (W)

#### 16. The Biology of Reproduction (4)

A survey and analysis of sexual reproduction in various organisms with special emphasis on humans. *Not open for course credit to biology majors.* Three hours lecture. *Prerequisite: general introductory biology.* (W)

#### 21. Introduction to Cell Biology (4)

Introduction to the basic concepts of organization, energetics and flow of information in biological cells. Three hours lecture. *Prerequisites: Science and Technology 11A and Biology 15, and two quarters college chemistry.* (S)

#### 22. Introductory Neurobiology (4)

(Formerly Biology 121)  
Introduction to the organization and functions of the nervous system. Topics will include molecular, cellular, developmental, systems, and behavioral neurobiology. Three hours lecture and one hour recitation. *Prerequisite: general biology.* (W)

#### 90. Freshman Seminar (0)

Freshman seminars organized around the research interests of various faculty members. One hour lecture. *Prerequisites: freshman standing and consent of the instructor.* Staff (F,W,S)

### Upper Division

R-M-T designate courses designed to fit the schedules of Revelle, Muir and Third biology majors. Biology majors in Warren College may choose any one of the above in accordance with their schedules.

#### 101R-101T-101M. Genetics (4)

(Formerly Biology 101, 110X and 132)  
An introduction to the principles of heredity, primarily in diploid organisms, including chromosome behavior in cell division, Mendelian inheritance, population genetics, linkage, sex determination, and behavior of chromosome aberrations. Three hours lecture and one hour recitation. *Prerequisite: general biology or equivalent.* (F,W,S)

#### 102. Biochemical Techniques (4)

A laboratory-lecture course in the application of biochemical methods to biological problems. Preferential registration will be given to Revelle students in the fall and spring, Muir students in the winter and Third College students in the spring. One hour lecture and ten hours laboratory. *Prerequisite: biochemistry lecture (may be taken concurrently).* Staff (F,W,S)

#### 104. Introduction to Human Genetics (4)

The principles of genetics as they apply to human beings. Normal and abnormal human chromosomes; Mendelian inheritance in man; human biochemical genetics; genetics of human population. *Not open to biology majors.* A student can not receive credit for both this course and 101. Three hours lecture and one hour recitation. *Prerequisites: general biology and consent of the instructor.* (F) (Not offered fall 1978 only.)

#### 105M-105T-105R. Biochemistry I (4)

(Formerly Biology 106, 110A, and 144)  
The metabolism of organisms with respect to energetics, biosynthesis and nutrition. Three hours lecture and one hour recitation. *Prerequisite: two quarters of organic chemistry. Revelle majors also required to take organic chemistry laboratory.* (F,W,S)

#### 106. Biochemistry II (4)

Continuation of Biochemistry I. Topics will include biosynthesis and oxidation of amino acids and nucleotides; nitrogen fixation; photosynthesis; hormones and vitamins; vision; complex carbohydrates; collagen and elastin; serine proteases; and blood coagulation. Three hours lecture and one hour recitation. (Offered in alternate years.) *Prerequisite: one quarter of introductory biochemistry.* (W)

#### 107L. Laboratory in Microbiology (4)

Fundamental properties of microorganisms will be emphasized such as comparative morphology, pure culture techniques, bacteriophage infection, replication and release. The life cycle of a fungus, neurospora will be analyzed with emphasis on spore dormancy and germination. One hour demonstration and seven hours laboratory. *Prerequisites: Biology 157 and consent of the instructors.* (W)

#### 110. Physical Biochemistry (4)

Concepts and uses of physical techniques in biology. EM radiation; UV, IR, CD, ORD, x-ray diffraction, fluorescence. Irreversible thermodynamics: sedimentation, electrophoresis. Electrolytes in solution. Photochemistry: action spectra, energy transfer. Isotopes. Three hours lecture. *Prerequisite: organic chemistry, basic physics, calculus.* (F)

#### 111R-111M. Molecular Biology (4)

(Formerly Biology 106 and 110B)  
Molecular analyses of biological phenomena with special emphasis on genetics and metabolic regulation. Three hours lecture and one hour recitation. *Prerequisites: Biology 101 and 105.* (F,W)

#### 112. Molecular and Cell Biology Laboratory (4)

A laboratory course in the application of cellular techniques to biological problems. Ten hours laboratory. *Prerequisite: cell biology. Biochemistry recommended.* (S)

#### 113. Chemistry of Biological Macromolecules (4)

A quantitative discussion of the structure of biologically important macromolecules and the techniques used in their study. *Prerequisites: organic chemistry, biochemistry, and at least two quarters of upper-division physical chemistry.* (F)

#### 114R-114M. Cell Biology (4)

(Formerly 114 and 110C)  
The structure and function of cells. Cellular control mechanisms, cell division, cell differentiation and specialization. Three hours lecture and one hour recitation. *Prerequisite: Biology 111.* (W,S)

#### 116. The 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. *Prerequisites: elementary physical chemistry, organic chemistry and biochemistry.* (W)

#### 119. Cytology and Genetics Laboratory (4)

This course emphasizes the principles of Mendelian inheritance and will require the student to apply the principles of cytology and genetics to the solution of problems of transmission genetics. One hour lecture and nine hours laboratory. *Prerequisite: Biology 101.* Lindsley (W)

#### 122. Population Ecology (4)

The growth and interaction of populations in ecosystems. Em-



phasis is placed on the evolution of such interactions and the development and unity of ecosystems. Game-theory thinking is stressed. Analytical and computer mathematics are used. *Prerequisite: calculus or equivalent.* (F)

### 123. Developmental Biology I (5)

Analysis of morphogenesis and differentiation at the structural, physiological and molecular levels. Topics will include gametogenesis, fertilization, cleavage and early embryogenesis. One hour recitation per week, three hours laboratory every other week. *Prerequisite: Biology 111 or 114 or 138, or equivalent or consent of the instructor.*

### 124. Developmental Biology II (4)

Analysis of morphogenesis and differentiation with emphasis on physiological and molecular approaches. Topics will include later embryogenesis, terminal differentiations (i.e., metamorphosis, regeneration, specialized cell differentiation, etc.), and hormonal regulation of differentiation. One hour recitation per week. NOTE: Biology 124 can be taken without Biology 123. *Prerequisite: Biology 111 or 114 or 138, or equivalent or consent of the instructor.*

### 125A. Chromosome Organization (4)

A review of current knowledge on the molecular and cytological organization of chromosomes. Topics to be discussed include chromosomal DNA, sequence organization, chromosomal proteins, chromosome replication, chromosome condensation, and chromosome recombination. Emphasis will be placed on the analysis of original research papers in chromosome biology. Will alternate with 125B. Three hours lecture. *Prerequisites: Biology 101 and 106 (106 may be taken concurrently).* (S)

### 125B. Chromosome Behavior (4)

A review of chromosome behavior in both mitosis and meiosis. Topics to be discussed include pairing, crossing over, disjunction, chromosome rearrangements, non-random disjunction, and transposable elements. Emphasis will be placed on original research papers on chromosome cytology and genetics. Will alternate with 125A. Three hours lecture. *Prerequisite: Biology 101.* (W)

### 126. Special Topics in Microbiology (4)

Recent developments in prokaryotic and eukaryotic microbial research. Topics will vary from year to year, but will include plasmid and chromosome replication, cell surface biogenesis, cellular differentiation, viral development, biorhythms, energy interconversions, solute transport, motility and taxis, metabolic regulation, microbial ecology. *Prerequisite: open to seniors with consent of instructor.* (F) (Not offered in 1978-79 only.)

### 127. Virology (4)

Molecular aspects of viral structure and development. Three hours lecture. *Prerequisite: Biology 111.* (W)

### 129. Structure and Function of Tissues (4)

Introduction to physiological systems with emphasis on structure of major tissues and organs. Examples of gross and microscopic makeup of components of the blood, cardiovascular, muscular, autonomic nervous, and gastrointestinal systems will be used to establish the basic principles underlying different functional activities of the body. Three hours lecture. *Prerequisite: consent of the instructor.* Zweifach (F)

### 131. Marine Biology (4)

An introduction to life in the sea with emphasis on ecology and phylogenetic relationships. Five hours laboratory. *Prerequisite: Biology 11 or permission of instructor.* (S)

### 133. 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 experiment, etc.) Students will program in FORTRAN and will learn to use a calc/comp plotter to present their results. One hour lecture, two hours computer laboratory and about ten hours homework per week; limited enrollment. *Prerequisite: APIS 10 or Introduction to FORTRAN offered by the Computer Center or knowledge of FORTRAN or ALGOL language.* (F)

### 134. Physical Chemistry of Biological Systems (4)

Elementary principles of thermodynamics and chemical kinetics and their application to equilibria, reaction mechanisms and other aspects of biological systems. Three hours lecture. *Prerequisites: calculus and organic chemistry (may be taken concurrently).* (F)

### 136. Invertebrate Zoology (4)

Introduction to the functional morphology, anatomy and embryology of the invertebrates. Theories of invertebrate

phylogeny. Three hours lecture and three hours laboratory optional. *Prerequisite: lower-division biology* (W)

### 137. Human Genetics (4)

A detailed examination of a particular topic within the realm of human genetics, with readings of original research papers. The topic may change from year to year. Past examples: 1) structure and organization of the human chromosomes, 2) X chromosome inactivation and mosaicism. Students are expected to evaluate assigned readings and to participate in class discussions. (F)

### 138. Cell and Molecular Biology (4)

Detailed study of the mechanisms of synthesis of DNA, RNA and proteins. *Prerequisites: biochemistry and physical chemistry.* (S)

### 139. Comparative Physiology (4)

Structure and function of invertebrate and vertebrate physiological systems. Three hours lecture. *Prerequisites: lower-division biology and chemistry.* (W)

### 141. Human Reproduction and Development (4)

An analysis of human reproduction and development. The lecture series is concerned with the physiology of reproduction including gametogenesis, fertilization and implantation. The lecture-lab series covers embryonic development with special emphasis on the reproduction system. Basic experimental techniques for study of development and practical demonstration of developmental events are part of the laboratory program. *Prerequisites: biochemistry and genetics or consent of instructor.* (S)

### 143. Systems Neurophysiology (4)

Integration of sensory and motor mechanisms related to perception and behavior. Emphasis will be given to those studies of simple and complex nerve cell assemblies for which functional models can be constructed and tested. Three hours lecture. *Prerequisite: Biology 169 or consent of the instructor.* (S)

### 143L. Laboratory in Neurobiology (4)

Current electrophysiological techniques used to study nervous systems will be taught through exercises and individual projects. One hour lecture, ten hours laboratory. *Students must be interviewed by instructors before registering in this course. Prerequisites: Biology 166 and 143 (concurrently).* (S)

### 145. Endocrinology (4)

This course will cover the endocrine physiology of mammals with emphasis on human endocrinology. Topics covered will be neuroendocrinology, reproductive physiology and mechanism of hormone action. Three hours lecture. *Prerequisite: approval of instructor.* (S)

### 146. Pathology (4)

A review of the principles of cell biology with a view to defining disease at the cellular level. Also includes a description of disorders of the major body systems. Three hours lecture. *Prerequisites: biochemistry, cell and molecular (e.g. Biology 138) or permission of the instructor.* (W)

### 147. Immunology (4)

The course will deal with antibody structures, antigens, antigen-antibody interactions, immune response, immunological unresponsiveness, *in vivo* and *in vitro* consequences of antigen-antibody interactions, delayed hypersensitivity, control of the immune response and transplantation immunities. *Prerequisite: biochemistry.* (W)

### 148. Introduction to Drug Action and Pharmacology (4)

An introductory study of the actions of drugs and chemicals in animals (including humans) in modifying the physiological responses of tissues in isolation and *in situ*. This course is particularly appropriate for students interested in human biology. *Prerequisite: biochemistry.* (F)

### 149A. Mammalian Physiology (4)

Lecture course covering the respiratory, cardiovascular, nervous, and hormonal systems. Three hours lecture. *Prerequisites: physical chemistry, biochemistry.* (F)

### 149AL. Physiology Laboratory (4)

Topics covered will include membrane physiology, nerve-muscle function and cardiovascular physiology. Cell and organ functions will be studied in humans and experimental animals. One hour lecture and ten hours laboratory. *Prerequisite: Biology 149A (may be taken concurrently).* (F)

### 149B. Mammalian Physiology (4)

A study of the ways in which organ systems—cardiovascular, respiratory, renal, gastrointestinal, endocrine, skeletal,

muscular, and nervous—function and interact to regulate the internal environment of the mammalian body. Three hours lecture. *Prerequisite: Biology 149A, or consent of the instructor.* (W)

### 149BL. Physiology Laboratory (4)

Experiments using mammalian organ systems. Physiological observations of humans to study kidney, digestive, respiratory and hormonal function, will be included. One hour lecture and ten hours laboratory. *Prerequisite: Biology 149B, taken previously or concurrently.* (W)

### 151. Plant Physiology (4)

Various aspects of the physiology and biochemistry of lower and higher plants will be discussed. Photosynthesis, the role of hormones in plant growth, the effect of light on plant growth and the biochemistry of seed germination will be emphasized. Three hours lecture. *Prerequisite: biochemistry.* (F)

### 152. Microbial Genetics Laboratory (4)

A laboratory-lecture course emphasizing the genetics of bacteria, bacterial viruses, and microbial eucaryotes. One hour lecture, one hour discussion, ten hours laboratory. Optional laboratory for Third College biology majors and for those students electing the microbiology concentration area. *Prerequisite: genetics, biology 157 and or 107L are recommended.* (S)

### 153. Nutrition (3)

Emphasis is on the biochemical aspects of nutrition. The known functions of vitamins, minerals, fats, carbohydrates and protein will be discussed in terms of experiments in nutrition and an evaluation of the relationship of the knowledge to nutrition in man. Three hours lecture. *Prerequisite: biochemistry.* (S)

### 154. Marine Ecology (4)

An introduction to the interrelationships of species in the marine realm, including the environmental and biological factors which influence their abundance and distribution. Three hours lecture. *Prerequisite: general biology or consent of the instructor.* (W)

### 155. Plant Ecology (4)

Interactions of plants with their physical and biotic environments are reflected in patterns of physiological ecology, reproduction, and community structure. In this course, principles and generalizations governing these patterns will be examined in light of case studies selected from the current literature. Three hours lecture and one hour recitation. *Prerequisite: Biology 10.* (Not offered every year.) (S)

### 156. Membrane Biology (4)

Examines biogenic and functional aspects of biological membranes in prokaryotic and eukaryotic cells: biosynthesis and assembly of membrane constituents, mechanisms of bulk transport including phagocytosis, secretion, molecular basis of solute transport, energy coupling in electron transport, biochemical basis of membrane electrical potentials, regulation of membrane enzymes and transport systems, cellular motility and chemotaxis, cellular recognition, adhesion and fusion. *Prerequisite: seniors with consent of instructor.* (F) (Not offered in 1978-79 only.)

### 157. Microbiology of Prokaryotes (4)

A discussion of the structure, growth 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 lecture and one hour recitation. *Prerequisite: biochemistry (may be taken concurrently).* (F)

### 158. Microbiology of Eucaryotes (4)

A discussion of the structure, growth and physiology of eukaryotic microorganisms with emphasis on the activities and environmental interactions of algae, fungi, slime molds and protozoa and an introduction to the structure and biological properties of animal viruses. Three hours lecture and one hour recitation. *Prerequisite: biochemistry (may be taken concurrently).* (W)

### 159. Medical Microbiology (4)

An analysis of microbial infectious diseases from the standpoint of basic principles underlying microbial spread, host response, immunity and recovery. Emphasis to be placed on viral and bacterial disease including molecular principles of antibiotic action, drug resistance, and of plasmid and viral replication. Three hours lecture. *Prerequisites: junior or senior standing, biochemistry, molecular biology, genetics, and prokaryotic microbiology.* (S)

### 161. Field Ecology and Behavior (4)

A laboratory in field techniques for ecology and behavior, with an emphasis on hypothesis testing and statistical methods.

## Biology

Several weekend field trips. Limited to twenty-five students. *Prerequisite: one upper-division course in population biology, evolution or sociobiology.* (W)

### 163. Sociobiology (4)

A survey of the patterns of social behavior in invertebrates and vertebrates, including man, and a discussion of the ecological principles underlying the evolution of animal societies. Three hours lecture and one hour recitation. *Prerequisite: biology 173.* (F)

### 164. Poisons - Natural and Man-Made - and Their Mechanisms of Action (4)

An introduction to the effects of environmental agents on biologic systems, particularly emphasizing effects on humans. Emphasis will be placed on the biochemical mechanisms by which toxic agents affect organisms, and these mechanisms will be correlated with physiologic changes. Three hours lecture, one hour discussion. *Prerequisite: biochemistry.* (S)

### 165. Immunochemistry (4)

Discussion of antibodies, antigens complement and their interactions. Three hours lecture. *Prerequisite: biochemistry.*

### 166. Membrane Physiology (4)

Biophysical and biochemical properties of membranes. Membrane structure and dynamics, kinetics, equilibria, and mechanisms of solute permeability. Active and passive transport. Topics will include model systems, red cells, epithelial, excitable and energy-transducing membranes. Three hours lecture. *Prerequisites: physical chemistry, organic chemistry, biochemistry I (concurrently).* (S)

### 167. Systems Biology (4)

Introduction to the mathematical analysis of control and communication in biological systems. Models of genetic, neurophysiological, developmental and ecological systems will be constructed and simulated. Statistical tests and regression analysis will be treated. Pass/Not Pass grades permitted. Three hours lecture. (W)

### 168. Photobiology (4)

Basic principles of photobiology and photochemistry. Photochemical mechanisms in photosynthesis. Photoreceptor pigment systems and photobiological control mechanisms in living organisms. *Prerequisites: physical chemistry and biochemistry.* (S)

### 169. Cellular Neurobiology (4)

An examination of the molecular and cellular events underlying nerve function and synaptic transmission. Synaptic neurochemistry. Neuronal development and synapse formation *in vivo* and *in vitro*. Three hours lecture. *Prerequisite: biochemistry, cell biology recommended.* (F)

### 172. Evolution (4)

Evolutionary processes are discussed in the genetic and ecological contexts. Emphasis on recent literature. Modern field and museum techniques are practiced. Two hours lecture and two hours seminar (field projects and field trips). *Prerequisite: Biology 173.* (Offered alternate years beginning spring 1977.)

### 173. Population Biology and Evolution (4)

Evolution will be dealt with at the organismal, chromosomal and molecular levels, with particular emphasis on modes of adaptation and the behavior of genes in populations. Three hours lecture and one hour recitation. *Prerequisite: genetics.* (W)

### 174. Ethology (4)

Ethological analysis of animal behavior, invertebrate, vertebrate and including man. Stimulus filtering, releasers, motivation, development, feeding, communication, aggression, territoriality, reproductive behavior. Three hours lecture and three hours field observation. *Prerequisites: lower-division biology, physics and chemistry, Biology 22 desirable.* (S)

### 175. Human Evolution (4)

Course will consider the nature of evidence for evolution by natural selection, then focus on origins of mammals, primates and humans, emphasizing our current understanding of the factors that have influenced the course of human evolution. Three hours lecture, three hours outside preparation. *Prerequisite: genetics, development, or physiology, or consent of the instructor.* (Not offered spring 1979.) (S)

### 177. Problems in Marine Biology (15)

An intensive course at Bodega Marine Lab. Students will choose research problems, design experiments, and do them under the guidance of instructors from Berkeley and other UC campuses. Ten hours lecture and fifteen hours laboratory

*Prerequisites: consent of instructor (application forms must be filed with instructor by January 10). Desirable preparation: Biology 11, 90, 108, 208, 131, 136, SIO 275, 280, and/or 289.* (S)

### 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 only) *Prerequisites: seniors only, concurrent enrollment in Biology 199, or approval of instructor.* (F,W,S)

### 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 will be assigned one class section and will meet one time per week with the section. A student will also be required to attend the lecture in the course and to meet at least one time per week with the instructor of the course. Limited to senior students who have a B average or better in the upper-division biology courses. Three hours lecture. *Prerequisite: consent of the instructor.* (P/NP grades only.) (F,W,S)

### 196. Honors Thesis Research for Revelle Biology Majors (4)

Senior thesis research for those students who are accepted for the Honors Program for biology majors in Revelle College. *Prerequisites: prior selection for the program by the Revelle biology faculty.*

### 198. Directed Group Study (2 or 4)

This course will cover a variety of directed group studies in areas not covered by formal departmental courses. This course will be Pass/Not Pass only. *Prerequisite: upper-division standing.* (F,W,S)

### 199. Independent Study for Undergraduates (4)

Independent reading or research on a problem by special arrangement with a faculty member. Pass/Not Pass only. *Prerequisite: consent of instructor.* (F,W,S)

## Graduate

### 203A-B-C. Laboratory Projects in Biology (3-12,3-12,3-12)

An introduction to contemporary laboratory techniques and research interests through independent, original projects under the direction of individual faculty members. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (F,W,S)

### 204A. Techniques in Electron Microscopy I (3)

Practical training in basic techniques in electron microscopy. *Prerequisite: consent of the instructor.* Limited enrollment; eight. (Satisfactory/Unsatisfactory grades only.) (S)

### 204B. Techniques in Electron Microscopy II (3)

Training in high resolution, ultracryomicrotomy or kleinschmitting to meet individual needs. Ten hours laboratory. Students may be interviewed by instructor before registering in this course. *Prerequisite: consent of the instructor.* Limited enrollment; eight. (Satisfactory/Unsatisfactory grades only.) (S)

### 205. Current Topics in Cell and Molecular Biology (2)

A course organized around the biology departmental seminars. The class will meet to criticize and evaluate material presented by seminar speakers. (Satisfactory/Unsatisfactory grades only.) (W)

### 206. Topics in Biophysics and Physical Bio-Chemistry (3)

Application of physical methods to bio-chemistry, e.g. X-ray diffraction, optical rotatory dispersion and circular dichroism, magnetic resonance (same as Physics and Chemistry 206). *Prerequisite: consent of the instructor.* (Satisfactory/Unsatisfactory grades permitted.) (W)

### 207. Genetics Journal Club (1)

At each meeting two papers from the current genetics literature will be presented and critically discussed. Responsibility for presenting the papers will rotate among participants, with each person having to present not more than once per quarter. (Satisfactory/Unsatisfactory grades only.)

### 209. Advanced Biology Seminar (1)

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. (Satisfactory/Unsatisfactory grades only.)

### 210. Seminar in Biochemistry (7)

Seminars presented by advanced graduate students which will explore topics in specialized areas of biochemistry and provide opportunities for students to gain experience on the organization, critical evaluation and oral presentation of information from the literature. Each quarter a different topic is discussed, recent topics have included lipids, membranes, oxidative phosphorylation, nucleic acid structure, function and synthesis, protein structure and function, history of biochemistry. *Prerequisite: one year of graduate study.* (Satisfactory/Unsatisfactory grades permitted.) (F,W,S)

### 211. Biochemistry I (3)

A comprehensive course in introductory biochemistry taught by members of the Departments of Chemistry, Biology and Medicine. The course is intended for entering graduate students, including those who have not previously had a formal course in biochemistry. Same as Chemistry 211. *Prerequisite: physical and organic chemistry.* (Satisfactory/Unsatisfactory grades only.) (S)

### 213. The Chemistry of Macromolecules (3)

A quantitative discussion of the structure of biologically important macromolecules and the techniques used in their study. Same as Chemistry 213. *Prerequisites: elementary physical and organic chemistry.* (Satisfactory/Unsatisfactory grades permitted.) (F)

### 216. Chemistry of Enzyme Catalyzed Reactions (3)

A discussion of the chemistry of representative enzyme catalyzed reactions is presented. Enzyme reaction mechanisms and coenzyme chemistry are emphasized. *Prerequisite: organic chemistry.* (Satisfactory/Unsatisfactory grades permitted.) (W)

### 217. Human Biochemistry (2)

An advanced course in biochemistry, which will primarily deal with the molecular basis of human disorders. *Prerequisite: Biology 211 or its equivalent.* (Satisfactory/Unsatisfactory grades permitted.) (S)

### 218. Biochemistry II (3)

Advanced topics and recent advances in biochemistry for students already familiar with the subject matter of elementary courses. *Prerequisites: physical and organic chemistry and Chemistry 211 or equivalent.* (Satisfactory/Unsatisfactory grades only.) (F)

### 219A-B-C. Special Topics in Biochemistry (3)

This is a special course in comprehensive biochemistry to be given in a three-quarter sequence. Some of the topics to be included are as follows: protein chemistry, enzyme kinetics, lipids and lipoproteins, nucleic acid chemistry, vitamins and nutrition, etc. (Satisfactory/Unsatisfactory grades permitted.)

### 220. Special Topics in Genetics (2)

Different restricted aspects of genetics will be discussed in detail each quarter, students will participate in the presentation of material, student presentations being prepared in consultation with the responsible faculty member. (Satisfactory/Unsatisfactory grades permitted.) *Prerequisite: consent of the instructor.* (F,W,S)

### 225. Assembly and Function of Cellular Components (3)

A critical analysis of structural-functional relationships and self-assembly properties of selected organelles and subcellular particles. (This course will be offered every third year only.) Satisfactory/Unsatisfactory grades permitted. *Prerequisites: senior standing and consent of instructor.* (W) (Not offered in 1978-79.)

### 226. Special Topics in Microbiology (3)

Recent developments in prokaryotic and eukaryotic microbial research. Topics will vary from year to year, but will include plasmid and chromosome replication, cell surface biogenesis, cellular differentiation, viral development, biorhythms, energy interconversions, solute transport, motility and taxis, metabolic regulation, microbial ecology. Satisfactory/Unsatisfactory grades permitted. (Not offered in 1978-79.)

### 227A. Advanced Genetics and Molecular Biology (6)

Designed to expose first-year graduate students to a broad coverage of molecular biology and genetics at a more advanced level than an introductory course. Topics covered include structure and sequence organization of DNA, structure of chromatin, DNA replication, mutation and repair. Text materials are assigned readings from the original research literature. *Prerequisites: Biology 101, 106, and 111 or their equivalent.* (Satisfactory/Unsatisfactory grades permitted.) (F)

**227B. Advanced Genetics and Molecular Biology (6)**

Designed to expose first-year graduate students to a broad coverage of molecular biology and genetics at a more advanced level than an introductory course. Topics covered include recombination, translation, transcription, genes and proteins, immunogenetics and tumor viruses. Text materials are assigned readings from the original research literature. *Prerequisites: Biology 101, 106, and 111 or their equivalent.* (Satisfactory/Unsatisfactory grades permitted.) (W)

**227C. Advanced Genetics and Molecular Biology (6)**

Designed to expose first-year graduate students to a broad coverage of molecular biology and genetics at a more advanced level than an introductory course. Topics covered include subcellular assembly, somatic cell genetics, chromosome behavior, sex determination, developmental genetics, and population genetics. Text materials are assigned readings from the original research literature. *Prerequisites: Biology 101, 106, and 111 or their equivalent.* (Satisfactory/Unsatisfactory grades permitted.) (S)

**228. Virology (3)**

Molecular aspects of viral structure and development. Three hours lecture. *Prerequisite: Biology 111 or the equivalent.* (Satisfactory/Unsatisfactory grades only.) (W)

**230. Seminar in Developmental Biology (1)**

Seminars presented by graduate students which will explore topics in specialized areas of developmental biology and provide opportunities for students to gain experience in the organization, critical evaluation and oral presentation of information from the literature. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (F,W,S)

**237. Human Genetics (3)**

A detailed examination of a particular topic within the realm of human genetics, with readings of original research papers. The topic may change from year to year. Past examples: 1) Structure and organization of the human chromosomes, 2) X chromosome inactivation and mosaicism. Students are expected to evaluate assigned readings and to participate in class discussions. (Satisfactory/Unsatisfactory grades permitted.) *Prerequisite: Biology 101 or permission of the instructor.* (F)

**241A. Chromosome Organization (3)**

A review of current knowledge on the molecular and cytological organization of chromosomes. Topics to be discussed include chromosomal DNA, sequence organization, chromosomal proteins, chromosome replication, chromosome condensation, and chromosome recombination. Emphasis will be placed on the analysis of original research papers in chromosome biology. Will alternate with 241B. *Prerequisites: genetics and biochemistry* (Satisfactory/Unsatisfactory grades permitted.) (S)

**241B. Chromosome Behavior (3)**

A review of chromosome behavior in both mitosis and meiosis. Topics to be discussed include pairing, crossing over, disjunction, chromosome rearrangements, non-random disjunction, and transposable elements. Emphasis will be placed on original research papers on chromosome cytology and genetics. Will alternate with 241A. *Prerequisite: genetics* (Satisfactory/Unsatisfactory grades permitted.) (W)

**242. Immunology (3)**

The course will deal with antibody structure, antigens, antigen-antibody interactions, immune response, immunological unresponsiveness, *in vivo* and *in vitro* consequences of antigen-antibody interactions, delayed hypersensitivity, control of the immune response and transplantation immunities. *Prerequisite: Biology 173.* (Satisfactory/Unsatisfactory grades permitted.)

**243. Systems Neurophysiology (3)**

Integration of sensory and motor mechanisms related to perception and behavior. Emphasis will be given to those studies of simple and complex nerve cell assemblies for which functional models can be constructed and tested. (Satisfactory/Unsatisfactory grades permitted.) *Prerequisites: lower division math, physics, chemistry.* (S)

**243L. Laboratory in Neurobiology (2)**

Current electrophysiological techniques used to study nervous systems will be taught through exercises and individual projects. One hour lecture, ten hours laboratory. *Students must be interviewed by instructors before registering in this course. Prerequisites: Biology 166 and 243 (may be taken concurrently.)* (No Satisfactory/Unsatisfactory grades permitted.) (S)

**248. Introduction to Drug Action and Pharmacology (3)**

An introductory study of the actions of drugs and chemicals in animals (including humans) in modifying the physiological response of tissues *in solution* and *in situ*. The course is similar to Biology 148, but in addition it requires a written report by each student on a specific problem in drug action. (Satisfactory/Unsatisfactory grades permitted.) (F)

**250. Seminar in Immunology (1)**

The course involves weekly seminars given by faculty, postdoctoral research fellows, advanced graduate students, concerning current research in immunology and immunochimistry. One hour lecture. *Prerequisite: approval of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (S)

**251. Combined Human Immunology (3)**

A multiple-discipline course in human immunology is planned with review of basic immunologic principles and immunopathologic mechanisms correlated to human disease. Lectures, demonstrations and case presentations will be used. Faculty will consist of basic scientists and clinicians from five departments, who will relate their specialty to the problems of human immunobiology and disease. (Satisfactory/Unsatisfactory grades permitted.) (S)

**253. Molecular Biology I (3)**

Explores topics in specialized areas of molecular biology: structure and organization of DNA, replication of DNA, recombination of DNA, repair of DNA, mutations and mutagenesis, gene transfer, transcription, protein synthesis and the code, viruses. *Prerequisite: biochemistry.* (Satisfactory/Unsatisfactory grades only.) (F)

**254. Genetics I (3)**

Genetic properties with application to human polymorphisms and genetic diseases. Topics covered will be chromosome aberrations, linkage and cell hybridization, mutations and evolution of common proteins such as hemoglobin, blood groups and other human polymorphisms from the standpoint of immunology and population genetics, and finally some recent approaches to genetic counseling. *Prerequisite: consent of the instructor. Not open to undergraduates.* (Satisfactory/Unsatisfactory grades only.) (F)

**255. Immunology I (3)**

Graduate students will explore topics in specialized areas of immunochimistry and cellular immunology, antigenic and molecular structure of immunoglobulin molecules, antigen-antibody interactions, cellular events in the humoral and cellular immune response, transplantation immunology. *Prerequisite: consent of the instructor. Not open to undergraduates.* (Satisfactory/Unsatisfactory grades only.) (F)

**256. Membrane Biology (3)**

Examines biogenic and functional aspects of biological membranes in prokaryotic and eukaryotic cells: biosynthesis and assembly of membrane constituents, mechanisms of bulk transport including phagocytosis, secretion, molecular basis of solute transport, energy coupling in electron transport, biochemical basis of membrane electrical potentials, regulation of membrane enzymes and transport systems, cellular motility and chemotaxis, cellular recognition, adhesion and fusion. *Prerequisite: consent of instructors.* (Satisfactory/Unsatisfactory grades permitted.) (S) (Not offered in 1978-79)

**257. Cellular Immunology (3)**

The course covers the cellular events and interactions of the humoral and cellular responses to antigen. The course is a graduate course not open to undergraduates. *Prerequisite: consent of the instructor. Not open to undergraduates. Biology 137, 242 or equivalent advisable.* (S)

**258. Advanced Cellular Neurobiology (3)**

Neural cell types and systemic relationships. Developmental concepts and survey of selected parts of the nervous system. Determination versus expression of neuronal characteristics. Extrinsic cues from cellular and humoral environments, culture approaches. Bioelectric and biochemical properties of neurons and glia. Axonal growth and formation of synapses. Neuron-glia interactions. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (F)

**260. Seminar in Population Ecology (1)**

Students will discuss papers on life history strategies, competition theory, predation and population extinction. The development of a coherent theoretical framework will be stressed. *Prerequisites: consent of instructor and Biology 122.* (Satisfactory/Unsatisfactory grades only.) (W or S)

**261. Environmental Physiology and Biochemistry of Marine Organisms (3)**

Emphasis on adaptation to environmental factors such as

temperature, pressure, and salinity. *Prerequisites: consent of instructor. Background in biochemistry and an interest in biology.* (3)

**264. Poisons - Natural and Man-Made - and Their Mechanisms of Action (3)**

An introduction to the effects of environmental agents on biologic systems, particularly emphasizing effects on humans. Emphasis will be placed on the biochemical mechanisms by which toxic agents affect organisms, and these mechanisms will be correlated with physiologic changes. (Graduate students will be expected to write a paper in addition to the final exam.) Three hours lecture, one hour discussion. *Prerequisites: Biology 106, 110A or 144 or consent of the instructor.* (Satisfactory/Unsatisfactory grades permitted.) (S)

**266. Membrane Physiology (3)**

Biophysical and biochemical properties of membranes. Membrane structure and dynamics. Kinetics, equilibria, and mechanisms of solute permeability. Active and passive transport. Topics will include model systems, red cells, epithelial, excitable, and energy-transducing membranes. (Satisfactory/Unsatisfactory grades permitted.) *Prerequisites: knowledge of thermodynamics and kinetics or consent of the instructor.* (S)

**269. Cellular Neurobiology (3)**

An examination of the molecular and cellular events underlying nerve function and synaptic transmission. Synaptic neurochemistry. Neuronal development and synapse formation *in vivo* and *in vitro*. (Satisfactory/Unsatisfactory grades permitted.) *Prerequisites: biochemistry, cell biology recommended.* (F)

**270. Seminar in Microbial Physiology (1)**

Weekly seminars and discussions led by faculty, postdoctoral fellows and graduate students concerning recent research in the areas of structure and function of microbial cell surfaces and morphogenesis in microorganisms. Material covered will include such topics as cell wall metabolism, bacterial L-forms, spore formation and germination. (Satisfactory/Unsatisfactory grades permitted.) *Prerequisite: consent of the instructor.* (S)

**274. Membrane Biology (3)**

This course is a survey covering current subjects in membrane biology relevant to medicine. Subjects to be included: 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.* (Satisfactory/Unsatisfactory grades only.) (F)

**275. Genetics II (3)**

A survey of advanced topics in human and mammalian cytogenetics, and the genetics of cultured cells. Emphasis will be on readings in the original literature, with critical interpretations required. *Prerequisite: undergraduate genetics.* (Satisfactory/Unsatisfactory grades only.) (F)

**276. Molecular Biology II (3)**

Lectures deal with the following topics: intra and interspecific transfer of genetic material, gene cloning and genetic analysis, without sex, general properties of animal viruses, interactions of tumor viruses with cells, regulation of gene expression in eucaryotes. *Prerequisite: consent of the instructor.* (Satisfactory/Unsatisfactory grades only.) (F)

**277. Clinical Correlates (2)**

Clinical correlates will stress the close ties between clinical medicine and the basic sciences and the two-way interactions among practicing doctors and research scientists. Most sessions will 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. Biology 211, 217, 253, 254, 255, 256 or the advanced alternatives to these courses taken simultaneously.* (Satisfactory/Unsatisfactory grades only.) (F)

**278. Immunology II (3)**

A series of lectures in immunology to be given at the advanced level by scientists working in the areas to be covered. *Prerequisite: undergraduate course in immunology.* (Satisfactory/Unsatisfactory grades only.) (F)

**280. Biology and Biochemistry of Cancer Cells (2)**

This course will cover 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 UC San Diego will be brought in to discuss the most recent evidence and interpretations in key areas of cancer research. This course will meet two hours per week for lectures and discussion. This course will be at an advanced graduate level but will be open to a limited number of seniors (with permission of instructor) on a pass-fail basis. (Satisfactory/Unsatisfactory grades only.) (W)

**290. Seminar in Sociobiology (1)**

Students will present seminars and lead discussions on current topics in sociobiology such as social organization, territoriality, determinants of group size, mating systems, parental investment strategies, and kin selection. Critical analysis and synthesis of the literature will be stressed, as well as the development of a theoretical framework for hypothesis testing and field experimentation. *Prerequisite: consent of the instructor.* (Satisfactory/Unsatisfactory grades only.) (W)

**299. Research in Biology (1-2)**

(F.W.S)

**500. Apprentice Teaching (4)**

Participation in the undergraduate teaching program is required of all students working toward a Ph.D. degree. In general, students are not required to teach in the first year, but are expected to serve as teaching assistants fifty per cent of the time for one quarter in each subsequent year. (Satisfactory/Unsatisfactory grades only.) (F.W.S)

**Biophysics**

OFFICE: 3430 Mayer Hall, Revelle College

This is an undergraduate and graduate program within the Department of Physics, which prepares the students for a career in biophysics.

A grade-point average of 2.0 or higher in the upper-division major program is required for graduation.

**Physics Major with Specialization in Biophysics** The upper-division program 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 rearrangement of the upper-division program will be devised by consultation between the student and the departmental adviser for biophysics.

The following courses are required for the physics major with specialization in biophysics:

## (a) Lower division:

- (1) Physics: Natural Science or Physics 2A-B-C-CL; or Physics 3A-B-C-CL-D-DL; or Science 4A-B-C and 4BL or 4CL. (2) Chemistry: Natural Science 2D-DL-F-FL; or Science 3A-AL-B-BL; or Chemistry 4A-AL-B-BL. (3) Biology: Natural Science 2E. (4) Mathematics: Mathematics 2D-E or 2DA-EA.

## (b) Upper division:

- (1) Physics: Physics 100A-B-C, 110A, 120A-B, 130A-B, 153. (2) Chemistry: Chemistry 131, 140A-B, 143A. (3) Biology: Biology 101, 102, 105, 111, 114. (4) Mathematics: Mathematics 110. (5) Re-

stricted Elective: Mathematics 120A or Frontiers of Science 128 is recommended.

## (c) Suggested schedule:

FALL	WINTER	SPRING
<b>Junior Year</b>		
Physics 100A Physics 110A	Physics 100B Math 110	Physics 100C Restricted Elective Physics 120A
Chemistry 140A Chemistry 143A	Chemistry 140B Biology 101	
<b>Senior Year</b>		
Physics 130A Physics 120B Biology 105	Physics 130B Biology 111 Chemistry 131	Biology 102 Biology 114 Physics 153

**Physics Major with Specialization in Biophysics-Premedical**

The upper-division program 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 rearrangement of the upper-division program will be devised by consultation between the student and the departmental adviser for biophysics.

The following courses are required for the physics major with specialization in biophysics-premedical:

## (a) Lower Division:

- (1) Physics: Natural Science or Physics 2A-B-C-CL; or Physics 3A-B-C-CL-D-DL; or Science 4A-B-C and 4BL or 4CL. (2) Chemistry: Natural Science 2D-DL-F-FL; or Science 3A-AL-B-BL; or Chemistry 4A-AL-B-BL. (3) Biology: Natural Science 2E. (4) Mathematics: Mathematics 2D-E or 2DA-EA.

## (b) Upper division:

- (1) Physics: Physics 100A-B-C, 110A, 120A-B, 130A, 153. (2) Chemistry: Chemistry 126 or 131, 140A-B, 143A. (3) Biology: Biology 101, 105, 111, 114, 117. (4) Restricted elective: upper-division or graduate course in natural sciences or mathematics.

## (c) Suggested schedule:

FALL	WINTER	SPRING
<b>Junior Year</b>		
Physics 100A Physics 110A Chemistry 140A	Physics 100B Biology 101 Chemistry 140B	Physics 100C Physics 120A Chemistry 143A Biology 105
<b>Senior Year</b>		
Physics 120B Physics 130A Biology 111	Chemistry 126 or 131 Biology 114 Restricted elective	Physics 153 Biology 117

**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. Students interested in working toward a graduate degree in an area of biophysics receive their degrees from the department of their thesis supervisor.

Graduate students specializing in the area

of biophysics within the Department of Physics receive the Ph.D. in Physics (Biophysics). While the requirements for the degree parallel those for the regular Ph.D. in Physics, biophysics students substitute certain courses in the life sciences for the normal second-year graduate courses in physics. Please refer to the Department of Physics section of this catalog for a detailed description of the graduate program.

**Chemistry**

OFFICE: 2112 Urey Hall

Student Information: 2132 Urey Hall, Revelle College

**Professors:**

John N. Abelson, Ph.D.  
James R. Arnold, Ph.D.  
Russell F. Doolittle, Ph.D.  
Murray Goodman, Ph.D. (*Chairman*)  
Martin D. Kamer, Ph.D. (*Professor Emeritus*)  
Nathan O. Kaplan, Ph.D.  
David R. Kearns, Ph.D.  
Joseph Kraut, Ph.D.  
Joseph E. Mayer, Ph.D. (*Professor Emeritus*)  
Trevor C. McMorris, Ph.D.  
Stanley L. Miller, Ph.D.  
Xuong Nguyen Huu, Ph.D.  
G. N. Schrauzer, Ph.D.  
Kurt E. Shuler, Ph.D.  
Hans E. Suess, Ph.D. (*Professor Emeritus*)  
Teddy G. Traylor, Ph.D.  
Harold C. Urey, Ph.D. (*University Professor, Emeritus*)  
Kent R. Wilson, Ph.D.  
Bruno H. Zimm, Ph.D.

**Associate Professors:**

William S. Allison, Ph.D.  
F. Thomas Bond, Ph.D.  
Leigh B. Clark, Ph.D.  
Marlene A. DeLuca, Ph.D.  
Edward A. Dennis, Ph.D.  
Robert C. Fahey, Ph.D.  
Elvin Harper, Ph.D.  
Robert G. Linck, Ph.D.  
Katja Lindenberg, Ph.D.  
Kurt Marti, Ph.D.  
Hans Oesterreicher, Ph.D.  
Charles L. Perrin, Ph.D.  
Robert L. Vold, Ph.D.  
Joseph W. Watson, Ph.D. (*Provost of Third College*)  
John H. Weare, Ph.D.  
John C. Wheeler, Ph.D.

**Assistant Professors:**

Michael E. Garst, Ph.D.  
Jack E. Kyte, Ph.D.  
John Leong, Ph.D.  
Douglas Magde, Ph.D.  
Susan S. Taylor, Ph.D.

Francis H. C. Crick, Ph.D., *Adjunct Professor*  
Robert W. Holley, Ph.D., *Adjunct Professor*  
Leslie E. Orgel, Ph.D., *Adjunct Professor*  
Nathan Gochman, Ph.D., *Associate Adjunct Professor*  
Lemuel Bowie, Ph.D., *Assistant Adjunct Professor*

**The Undergraduate Program** The undergraduate major in chemistry is intended to enable a student to pursue further studies in chemistry or in related fields of science, engineering, or medicine. The program combines a thorough preparation in the fundamentals of chemistry and related fields with an opportunity for more advanced work in particular areas of chemistry.

### Lower-Division Requirements

Lower-division chemistry requirements vary slightly with the college as described later, but in general should include general chemistry including laboratory, one year of physics, and calculus through Mathematics 2D (Differential Equations). Transfer students should take particular note of these requirements.

**Revelle College** The Natural Science 2 sequence is advised; Natural Science 2D, 2DL, 2F, and 2FL are essential and should be taken in the sophomore year by students who have begun in the 1 sequence.

**Muir College** Science 3A, 3AL, 3B, 3BL, and 3C are essential along with a year of physics (Science 4A, 4B, 4C). Students who have done well in 3A and 3B may start organic chemistry (Chem 141A) in the fall of the sophomore year. Others may take Chemistry 140A, 140B, 143A, but will need a third quarter of organic chemistry, Chem 141A.

### Third College and Warren College

Lower-division and upper-division requirements are stated in following pages.

**Upper-Division Requirements** Except as noted below for special concentrators, the department's requirements are:

- 1 year of physical chemistry (130, 131, 132)
- 1 year of organic chemistry (141A, 141B, 141C) or (140A, 140B, 141A)
- 2 quarters of inorganic chemistry (120A, 120B)
- 4 lab courses: 143A, 143B, 105A and one of the following (143C or 105B, or 112).
- 5 additional upper-division or graduate courses in chemistry or related areas.

The minimum passing grade in these courses is a D, and a minimum of a C average in the major is required for the degree. Except for independent research (Chem 199) departmental courses may not be taken on a "Pass/Not Pass" basis by chemistry majors. Chemistry 199 must be taken on a "Pass/Not Pass" basis and may count toward the additional course requirement, but may not replace required courses. Substitution for these requirements may be made by students wishing to concentrate in biochemistry, earth sciences, or chemical physics as spelled out below.

### Major Program in Chemistry

FALL	WINTER	SPRING
<b>Junior Year</b>		
Chemistry 141A	Chemistry 141B	Chemistry 141C
Chemistry 130†	Chemistry 131†	Chemistry 132†

Chemistry 143A (½)	Chemistry 143B (½)	Advanced Laboratory***
Chemistry 120A*	Chemistry 120B*	
**	Chemistry 105A (½)	

### Senior Year

Upper-division or graduate courses: consult with an adviser, assigned in the Student Affairs Office of the Department of Chemistry, if necessary.

\*Chemistry 120A, 120B may be delayed until the senior year.

\*\*Premedical students are advised to take Biology 101 in the fall of the junior year and two additional upper-division biology courses.

\*\*\*Either Chemistry 105B, 143C, or 112. Students should note that the prerequisites for these courses are strictly enforced.

†Chemistry majors must take Chemistry 130, 131 and 132 except in the biochemistry option which does not require Chem 130.

Note: Students may not receive credit for both Chemistry 128 and 131.

**Biochemistry** The following program is designed for those wishing to major in chemistry, but with an emphasis on biochemistry and with the options indicated, it is suitable for pre-medical students. The core biochemistry offering is a three-quarter plus laboratory sequence in the junior year followed by four advanced biochemistry courses in the senior year; these latter courses may be substituted by other courses in biology and chemistry. A minimum amount of organic, physical, and inorganic chemistry is necessary as indicated in the chart.

### Major Program in Chemistry for Biochemistry Concentrators

FALL	WINTER	SPRING
<b>Junior Year</b>		
(Bio) Chem 114A	(Bio) Chem 114B	(Bio) Chem 114C
(Org) Chem 141A	(Org) Chem 141B	(Org) Chem 141C
	(Phy) Chem 131	(Phy) Chem 132
(Org L) Chem 143A	(Org L) Chem 143B	(Bio L) Chem 112****
	(Phy L) Chem 105A**	
<b>Senior Year</b>		
(Bio) Chem 113***	(Bio) Chem 116***	(Bio) Chem 121***
(Inorg) Chem 120A	(Bio) Chem 122***	(Bio) Chem 117***

\*Premedical students are advised to take three upper-division biology courses. These may be counted as electives in place of \*\*\* courses and should include Biology 101, Genetics in fall of the junior year.

\*\*May be taken senior year.

\*\*\*Elective courses. Only four elective courses must be taken from among the five indicated in the chart or any of the following: Chemistry 120B, 130, 145, 146, and 147 or Biology 101, 114, 117, 147 and 156. Chemistry 199 may not be substituted for required or elective courses. Students are encouraged to also take Chemistry 199 in the senior year.

\*\*\*\*Chemistry 105B or 143C may be substituted.

STUDENTS FOLLOWING THIS PROGRAM NEED NOT CONSULT AN ADVISER FOR APPROVAL OF COURSE CHOICES. STUDENTS WITH QUESTIONS SHOULD CONTACT THE CHEMISTRY DEPARTMENT STUDENT AFFAIRS OFFICE.

**Chemical Physics** That branch of physical science which 1) applies the concepts and quantitative methods of physics, preeminently quantum theory, to the description of atoms

and molecules, 2) presents an analysis of ordinary macroscopic matter as statistical ensembles of these molecular building blocks and 3) develops and exploits physical (largely spectroscopic) experimental tools with which to test and refine such theories. The specialization is designed as preparation for graduate work. It requires completion of the Natural Science 2 sequence and the Mathematics 2 sequence through 2E, or their equivalents, in the sophomore year. Chemistry 141C is not required. Required upper-division electives are Mathematics 110, Physics 110A, 110B or 100A, 100B, and Chemistry 133 or 135, plus two additional courses in physical chemistry or complementary courses in physics, mathematics, AMES, or APIS.

### Major Program in Chemistry for Chemical Physics Concentrators (Typical Program)

FALL	WINTER	SPRING
<b>Junior Year</b>		
Chemistry 130	Chemistry 131	Chemistry 132
Chemistry 141A	Chemistry 141B	
Physics 110A or 100A	Physics 110B or 100B	Mathematics 110 Chemistry 143C*
Chemistry 143A	Chemistry 105A	Chemistry 105B
<b>Senior Year</b>		
Chemistry 120A	Chemistry 120B	Chemistry 133
Chemistry 102A or 133	Mathematics 120A	Mathematics 120B

\*Substituted for Chemistry 143B

**Earth Sciences** A chemistry major with specialization in earth sciences is also available for undergraduates. See "Earth Sciences" for description of this program, which may be arranged by consultation with advisers in the Department of Chemistry and Scripps Institution of Oceanography.

Normally the student does course work for a major in chemistry, physics or mathematics plus additional enrichment courses in geology. The specifically required courses are: ES 101 Introduction to Earth Sciences; ES 103 Introduction to Geophysics; ES 102 Introduction to Geochemistry; ES 120 Mineralogy; and SIO 253 A Igneous and Metamorphic Petrology. At least two other earth sciences courses will be taken. See below. Field geology (SIO 256A) is essential for geology students. It should be taken by students planning to go on to graduate school or to do professional geologic work with their undergraduate degrees. The courses should be taken in the following sequences — beginning in the junior year: ES 101 may be taken by sophomores who have had the equivalent of one year of college level chemistry, math and physics if space is available.

### Major Program in Chemistry for Earth Science Concentrators

FALL	WINTER	SPRING
<b>Junior Year</b>		
ES 101	ES 103	ES 102
Chem 130	Chem 131	Chem 132
Chem 141A	Chem 141B	ES 120
Chem 143A (½)	Chem 105A (½)	Chem 105B (½)

**Senior Year**Chem 120A Chem 120B  
SIO 253A

\*Two other courses are required and may be chosen from the following: SIO 244, 245A, 245B, 256A, Chem 120C, Chem 170, Chem 171, Chem 272

### Third College Typical Major Program in Chemistry

FALL	WINTER	SPRING
<b>Freshman Year*</b>		
Sci Tech 12A (Chemistry)	Sci Tech 12B (Chemistry)	Sci Tech 12C (Chemistry)
Sci Tech 12AL (Chemistry Lab)	Sci Tech 12BL (Chemistry Lab)	
Math 2A (Calculus)	Math 2B (Calculus)	Math 2C (Calculus)
<b>Sophomore Year</b>		
Physics 2A Chemistry 140A**	Physics 2B Chemistry 140B**	Physics 2C Math 2D (Calculus)
<b>Junior Year</b>		
Chemistry 141A**	Chemistry 143B	Chemistry 132
Chemistry 143A	Chemistry 131	
Chemistry 130***		
<b>Senior Year</b>		
Chemistry 120A	Chemistry 120B	Chemistry 112††
Chemistry 142†	Chemistry 105A	Chemistry 117†
Chemistry 114A†	Chemistry 114B†	Chemistry 154†

\*Students whose high school mathematics background does *not* allow for concurrent enrollment in calculus starting with the fall quarter must defer Sci Tech 12 to the sophomore year and should take Sci Tech 11B (Chemistry) and Sci Tech 11C (Physics) during the spring quarter of the freshman year. This will of course involve a readjustment of the entire program that should be discussed with the student's adviser.

\*\*Third College students may take Chemistry 141A, 141B and 141C in lieu of Chemistry 140A, 140B and 141A. If the 141A, 141B, 141C option is chosen it should be taken within a year (i.e. sophomore or junior).

\*\*\*Chemistry 130 may be replaced with Chemistry 129 under certain circumstances. This requires consultation with and approval of the student's adviser.

††Chemistry 112 may be replaced with Chemistry 105B or with Chemistry 143C. The latter can be taken during the spring quarter of the junior year.

†These are elective courses which can be replaced by other upper-division courses in chemistry or related areas. Students must take a minimum of *five* such electives. They may include biochemistry, inorganic chemistry, organic chemistry, natural products chemistry, earth sciences, physical chemistry, clinical chemistry, and Chemistry 199 as well as appropriate courses in other departments or programs. Students who plan to continue in medicine or related fields are required to take three quarters of biochemistry.

The Department of Chemistry major in Third College is designed to meet the academic interests and needs of a broad spectrum of students ranging from those who intend to do graduate study in chemistry and those planning to enter medical and dental schools or related health professions, to those interested in teaching chemistry in secondary schools as well as those wishing employment in chemical or related laboratories upon attainment of the bachelor's degree. The program is designed with the double objective of providing the student with a fundamental understanding of the basic branches of chemistry and the flexibility to tailor a program to meet his or her individual interests and career objectives. The typical program shown here is an example of possible choices. Each student should consult with an adviser to design his or her individual program.

Students who have completed high school

chemistry and physics may be allowed, depending on their performance in a placement examination, to start at the sophomore level. Other students must first complete freshman courses in physics, chemistry, and mathematics. Third College students may take Chemistry 141A, 141B and 141C in lieu of Chemistry 140A, 140B and 141A.

In the senior year, students who plan to continue in medicine or related fields are required to take three quarters of biochemistry. Other students will have a choice of biochemistry or three quarters in materials science. In addition, there will be elective courses in natural products chemistry, clinical chemistry, and Chemistry 199. Third College students should consult their advisers.

**Warren College** The Department of Chemistry offers programs to meet both the major and minor requirements in Warren College. At present, the major leads to a B.A. degree. The major program may be structured to prepare the student to pursue graduate work in chemistry; to pursue graduate work in an allied science such as biochemistry, materials science, or earth, oceanographic or space science; to undertake study in a professional school such as medicine or law; or to pursue a career at the bachelor's level.

The first two years of the major program normally proceed as follows:

FALL	WINTER	SPRING
<b>Freshman Year</b>		
Chemistry 4A	Chemistry 4B	Chemistry 4C
Writing 10A	Writing 10B	Chemistry 4AL
Mathematics 2A	Mathematics 2B	Mathematics 2C
Minor*	Minor*	Minor*
		Elective**
<b>Sophomore Year</b>		
Chemistry 141A	Chemistry 141B	Chemistry 141C
Chemistry 4BL	Chemistry 143A	Chemistry 143C***
Physics 2A or 3A	Physics 2B or 3B	Physics 2C or 3C
Mathematics 2D	Mathematics 2E***	Elective**

\*See the general Warren College requirements. If neither physics nor mathematics is to be used as a minor, it is essential that at least one of the minors be started as early as possible.

\*\*The student undecided among chemistry, biochemistry, and biology should consider the above program with the addition of Biology 4 or the equivalent in the first two years.

\*\*\*Generally recommended, but not required for all specializations.

In the third and fourth years, the student will follow a program consistent with the general chemistry requirements or one of the chemistry specializations, as outlined above. All of those, as described, satisfy the college degree requirements. In addition, the following two options exist in Warren College: the student may major in chemistry and minor in materials science or the student may incorporate some of the materials science courses into a chemistry program to create a major with emphasis in solid state and materials chemistry and still pursue two other minors.

**Warren College Minor Programs in Chemistry** These generally require Chemistry 4A, B, and C with the associated 4AL and 4BL followed by any three upper-division lecture courses in chemistry and one

upper-division half-course in chemistry laboratory.

**The Graduate Program** The department accepts students for study toward the Ph.D. The department usually recommends financial support for students who are seeking the Ph.D. The doctoral program is designed to encourage initiative on the part of the student and to develop habits of independent study. Students with normal preparation start research early.

In order that they may participate effectively in this program, entering graduate students will be required to have a mastery of the subjects usually presented in an undergraduate chemistry curriculum: physical, organic, and inorganic chemistry. So that students may be properly advised, their mastery of these undergraduate subjects will be tested by written examination on their arrival. Deficiencies in undergraduate preparation must be remedied during the first year of graduate study. Physical chemists will be expected to present the equivalent of two years of physics, and mathematicians at least through integral calculus. The appropriate background courses in biology or geology are highly desirable for students interested in biochemistry and geochemistry, respectively, but will sometimes be taken after arrival.

In the first year the student will usually take several of the graduate courses listed below, including Chemistry 250. The student may also take upper-division undergraduate courses. Depending on the student's special interests, he or she may also take courses in other departments. The student will normally select a thesis adviser by the end of the first year of study and begin thesis research. In the second year the student will usually carry a lighter load of formal courses, but will continue to participate in seminars and informal study groups.

Students whose native language is not English must submit TOEFL scores. There is no foreign language requirement, but it is recommended very strongly that a student acquire at least a reading knowledge of one foreign language, preferably German or Russian.

The oral qualifying examination for admission to candidacy must be taken before the end of the fifth quarter of graduate study and will be conducted as follows:

The candidate will present a major and a minor presentation, the former consisting of a statement summarizing an original research problem. The candidate should be prepared to discuss both the theory and the experimental techniques involved, as well as the significance of the proposition and its relation to previous knowledge. The minor presentation consists of a critical analysis of one or more recent research papers assigned by the chairperson of the doctoral committee.

Successful passing of the qualifying examination advances the student to candidacy for the Ph.D. The candidate then devotes most of

his or her time to thesis research and study. A final examination is conducted by the student's doctoral committee upon completion of the dissertation. The examination is oral and deals with the dissertation and its relation to the general field of study.

Every graduate student is required to perform half-time teaching for two quarters in the first year of residence and one quarter out of every three quarters of residence thereafter. Course credit may be obtained for this teaching by registration in Chemistry 500.

The interdisciplinary tradition is strong on the San Diego campus. The chemistry faculty has close ties with the Departments of Applied Mechanics and Engineering Sciences, Biology, and Physics, as well as with the Scripps Institution of Oceanography and the School of Medicine. Opportunities and facilities are thus available to the graduate student for study and research in a wide variety of interdisciplinary fields.

**Graduate Program in Biochemistry** The Department of Chemistry offers a major program in biochemistry in cooperation with the Department of Biology. Please refer to the biochemistry listing in this catalog for details.

**Joint Doctoral Program with San Diego State University** The Department of Chemistry at UC San Diego cooperates with the Department of Chemistry in the Division of the Physical Sciences, San Diego State University, in offering a joint program of graduate study leading to the Ph.D. degree in chemistry.

An applicant must first be admitted to regular graduate standing at the University of California, San Diego and then can apply for classified graduate standing in the Graduate Division of San Diego State University. In seeking admission to the two graduate divisions, the applicant must pay all fees required by each institution and comply with the admission procedures stated in this catalog and in the current edition of the Bulletin of the Graduate Division of San Diego State University, where the program is more fully described.

## Courses

### Lower Division

Revelle College students take the 1 or 2 sequence depending on mathematical preparation: (See course listings: Natural Sciences.)

- 1A. Natural Science: Chemistry
- 1B. Natural Science: Chemistry
- 1BL. Natural Science: Chemistry
- 2D. Natural Science: Chemistry
- 2DL. Natural Science: Quantitative Chemical Analysis
- 2DS. Natural Science: Chemistry
- 2F. Natural Science: Chemistry
- 2FL. Natural Science: Quantitative Chemical Analysis

Muir College students take the following sequence: (See course listings: Science.)

- 3A. General Chemistry
- 3AL. Quantitative Chemical Analysis
- 3B. General Chemistry
- 3BL. Quantitative Chemical Analysis
- 3C. Thermochemistry

Third College students take the following sequence: (See course listings: Science and Technology.)

- 10B. Chemistry
- 11B. Introduction to Chemistry
- 12A-B-C. Chemistry
- 12AL. Chemistry
- 12BL. Chemistry

Warren College students take the following sequence:

#### 4A-B-C. Introductory Chemistry (4)

This course will present the introductory concepts and theories upon which chemical science is based. Topics include atomic structure, periodicity, thermodynamics, kinetics, gases, liquids, solids, solutions, electro-chemistry and organic chemistry. (F,W,S)

#### 4AL. Quantitative Chemical Analysis (2)

A laboratory course that introduces the student to laboratory techniques, analytical procedures and physical measurements. Includes gravimetric, volumetric and instrumental methods of chemical analysis. Emphasis is on accuracy and precision. One hour lecture and two three-hour laboratories. Interchangeable with Natural Science 2DL in Revelle, and Science 3AL in Muir. (S)

#### 4BL. Quantitative Chemical Analysis (2)

A continuation of Chemistry 4AL. One hour lecture and two three-hour laboratories. Interchangeable with Natural Science 2FL in Revelle and Science 3BL in Muir. *Prerequisite:* Chemistry 4AL. (F)

## Upper Division

#### 102A. Thermodynamics (4)

Thermodynamics of chemical systems, the three laws, with emphasis on the formal structure of thermodynamics. Chemical equilibrium, stability theory, heterogeneous equilibrium, Solutions. Intended as a preparation for Chemistry 204A. *Prerequisite:* Chemistry 131, 132 or equivalent. (F)

#### 105A. Physical Chemistry Laboratory (2)

Laboratory course in experimental physical chemistry. *Prerequisite:* Chemistry 130, 131 or equivalent (may be taken concurrently). (F,W,S)

#### 105B. Physical Chemistry Laboratory (2)

Laboratory course in experimental physical chemistry. Students who have taken Chemistry 105A will do more advanced projects. *Prerequisites:* Chemistry 105A, 131, 132 (may be taken concurrently).

#### 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:* Chemistry 131, 141B, or equivalent. (W)

#### 112. Molecular Biochemistry Laboratory (4)

The application of techniques including electrophoresis, peptide mapping and sequencing, affinity chromatography, amino acid analysis, gas-liquid chromatography, and enzyme kinetics, to the study of the chemistry of protein structure and function and the chemistry of lipids, carbohydrates, and nucleic acids. *Prerequisites:* Chemistry 141A, B and C, 143A-B, 114A and 114B (Some of these courses may be taken concurrently.) (S)

#### 113. Chemistry of Biological Macromolecules (4)

A quantitative discussion of the structure of biologically important macromolecules and the techniques used in their study. *Prerequisites:* organic chemistry, biochemistry and at least two quarters of upper-division physical chemistry. (F)

#### 114A. Biochemical Structure and Function (4)

Introduction to biochemistry from a structural and functional viewpoint. *Prerequisites:* elementary organic and physical chemistry (which may be taken concurrently). (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, carbohydrate, purines, pyrimidines, proteins, nucleic acids. *Prerequisite:* Chemistry 114A. (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:* Chemistry 114B. (S)

#### 116. 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. *Prerequisites:* elementary physical chemistry, organic chemistry and biochemistry. (W)

#### 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. (S)

#### 120A. Inorganic Chemistry (4)

The chemistry of the elements is presented in terms of the unifying concepts of atomic structure. Thermodynamic, spectral, and magnetic criteria for structure and occurrence of compounds are discussed, with emphasis on ionic materials. Chemical group theory is introduced. *Prerequisite:* an introductory chemistry course. (F)

#### 120B. Inorganic Chemistry (4)

A continuation of a discussion of structure and bonding of chemical compounds with an emphasis on covalent materials. Thermodynamic and spectral properties are used to examine the properties and reactivities of molecules. *Prerequisite:* 120A. (W)

#### 120C. Inorganic Chemistry (4)

The reactivity of molecules is examined from a kinetic and mechanistic point of view. Properties affecting reactivity are examined and case studies of reactions are discussed in detail. *Prerequisite:* 120B or consent of instructor. (S)

#### 121. Energy Transduction (4)

Discussion of current understanding of mechanisms of muscle contractions, photosynthesis, bioluminescence, chemiluminescence and active transport will be presented. *Prerequisites:* organic chemistry and introductory biochemistry. (S)

#### 122. Biochemical Evolution (4)

The 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, introductory biochemistry. (W)

#### 126. Physical Chemistry (4)

Thermodynamics, chemical equilibrium, phase equilibrium, chemistry of solutions and physical chemistry of biological systems. *Prerequisite:* Natural Science 2D, Mathematics 2C or consent of instructor. Note: Students may not receive credit for both 126 and 128. (W)

#### 127. Physical Chemistry (4)

Chemical statistics, kinetic theory, reaction kinetics and physical chemistry of biological systems. *Prerequisite:* Chemistry 126, Natural Science 2D, Mathematics 2C or consent of the instructor. (S)

#### 128. Physical Chemistry of Biological Systems (4)

Elementary principles of thermodynamics and chemical kinetics and their application to equilibria, reaction mechanisms and other aspects of biological systems. Chemistry majors cannot use Chem 128 Bio 134 as one of the five chemistry electives (because of overlap of material with Chem 131-132). *Prerequisites:* calculus and organic chemistry (may be taken concurrently). (F)

#### 129. Computational Chemistry (4)

An introduction to applied mathematics aimed at preparation for physical chemistry courses, with emphasis on problem-solving. Differential equations, partial differentiation, line integrals, multiple integrals, introduction to probability. Related topics if time permits. *Prerequisites:* Math 2A-B-C or 1A-B-C. (F)

**130. Physical Chemistry (4)**

Quantum mechanics, atomic and molecular spectroscopy, molecular structure. *Prerequisite: Natural Science 2D, Mathematics 2C, or consent of instructor.* (F)

**131. Physical Chemistry (4)**

Thermodynamics, chemical equilibrium, phase equilibrium, chemistry of solutions. *Prerequisite: Natural Science 2D, Mathematics 2C, or consent of instructor.* (Note: Students may not receive credit for both 128 and 131.) (W)

**132. Physical Chemistry (4)**

Chemical statistics, kinetic theory, reaction kinetics. *Prerequisite: Natural Science 2D, Mathematics 2C, Chemistry 131, or consent of instructor.* (S)

**133. Elementary Statistical Thermodynamics (4)**

Equilibrium distribution functions; development of partition functions; derivation of thermodynamic properties of simple systems from partition functions. *Prerequisites: Chemistry 130, 131, 132, Mathematics 2D.* (F)

**135. Spectroscopy and Structure (4)**

The interaction of electromagnetic radiation with molecules and bulk matter; x-ray and optical scattering, electronic, vibrational and rotational spectroscopy; nuclear and electron magnetic resonance. Emphasis will be placed on the interpretation of experimental data. *Prerequisite: Chemistry 130.* (S)

**140A-B. Organic Chemistry (4-4)**

A two-quarter sequence in organic chemistry with emphasis on material fundamental to biochemistry. Topics include: bonding theory, structure, isomerism, conformation, chemical and physical properties; reaction and addition reactions; special topics related to biology. *Prerequisite: two quarters of lower-division chemistry or consent of instructor.* (F,W,S)

**141A-B-C. Organic Chemistry (4-4-4)**

Lectures in organic chemistry for students majoring in chemistry. The lectures will be concerned with (1) structure and properties of covalent molecules, (2) classification of reactions of first-row elements, and properties of covalent molecules, (2) classification of reactions of first-row elements, and (3) reactions of organic compounds, with an introduction to biochemistry. Credit is not given for both Chemistry 141B, C and Chemistry 140A, B, or the equivalent. *Prerequisite: introductory chemistry.* (F,W,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: Chemistry 140A-B or 141A-B-C.* (W)

**143A. Organic Chemistry Laboratory (2)**

Introduction to laboratory techniques needed in organic chemistry. Stresses physical methods including separation and purification, spectroscopy, product analysis and effects of reaction conditions. *Prerequisite: Chemistry 141A or Chemistry 140A (may be taken concurrently).* (F,W,S)

**143B. Organic Chemistry Laboratory (2)**

Continuation of 143A, emphasizing synthetic methods of organic chemistry. *Prerequisites: Chemistry 143A, 141B or 140B (may be taken concurrently).* (W)

**143C. Organic Chemistry Laboratory (4)**

Identification of unknown organic compounds by a combination of chemical and physical techniques. *Prerequisites: Chemistry 143A, 141C (may be taken concurrently).* (S)

**145. 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 simple molecular orbital theory, bond lengths, bond energies, dipole moments, ionization potentials, infrared and ultraviolet spectra, nuclear magnetic resonance and electron spin resonance. *Prerequisites: Chemistry 130, 141B.* (W)

**146. Kinetics and Mechanism of Organic Reactions (4)**

Methodology of mechanistic organic chemistry; integration of rate expressions, determination of rate constants, transition state theory, catalysis, kinetic orders, isotope effects, substituent effects, solvent effects, linear free energy relationships; product studies, stereochemistry, reactive intermediates, rapid reactions. *Prerequisites: Chemistry 132, 141C, or equivalent.* (S)

**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: Chemistry 141C.* (F)

**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: Chemistry 141C or consent of instructor.* (F)

**149A. Chemistry and the Air Environment (4)**

Sources, control, chemistry, meteorology, dynamics and effects of air pollution. Legal and economic aspects. Relation to growth and energy usage. *Prerequisite: any introductory sequence in mathematics, chemistry and physics.*

**154. Clinical Chemistry (4)**

Introduction to the principles and techniques utilized in the chemical analysis of body fluids for diagnostic purposes. Special emphasis will be given to diagnostic enzymology and automated instrumental analysis. *Prerequisite: organic chemistry or elementary biochemistry.* (S)

**170. Cosmochemistry (4)**

Composition of stars, of planets, of meteorites and the earth. Nuclear stability rules and isotopic composition of the elements. Chemical properties of solar matter. Origin of the elements and of the solar system. *Prerequisite: natural science sequence or equivalent, physical chemistry desirable.* (W)

**171. Radiochemistry (4)**

Nuclear chemistry, radioactive decay, stability systematics, neutron activation, radiochemistry, Szilard-Chalmers reactions, hot-atom chemistry, radiation chemistry, effects of ionizing radiation. *Prerequisite: Natural Science 2 sequence.* (S)

**195. Chemistry Instruction (0-4)**

Introduction to the teaching of elementary college chemistry. Each student will be responsible for and teach a class section of one of the lower-division chemistry courses. Limited to senior chemistry majors who have maintained a B average or better in their major course work. One meeting per week with instructor, one meeting per week with assigned class section, and attendance at lecture of the lower-division course in which the student is participating. (P/NP grades only.) *Prerequisites: Chemistry 132, 141C; consent of instructor.* (F,W,S)

**199. Senior Reading and Research (2-4)**

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. *Prerequisite: permission of instructor and department.* (F,W,S)

## Graduate

**200A-B. Molecular Quantum Mechanics (4-4)**

The fundamental concepts and techniques of quantum mechanics which are necessary for the treatment of problems of chemical interest are developed and applied. *Prerequisites: Chemistry 132 and 190 or equivalent.* (F,W)

**202A. Thermodynamics (3)**

Thermodynamics of chemical systems, the three laws, with emphasis on the formal structure of thermodynamics. Chemical equilibrium stability theory, heterogeneous equilibrium, solutions. Intended as a preparation for Chemistry 204A, as well as prerequisite to Chemistry 202B. *Prerequisite: Chemistry 131, 132 or equivalent.* (F)

**204A. Statistical Mechanics of Chemical Systems (4)**

Equilibrium statistical mechanics, derivation of the formal ensemble equations and the laws of thermodynamics from the principles of classical and quantum mechanics, the relations between the different ensembles; the use of the equations for various chemical systems, gasses, crystals and liquids. *Prerequisite: physical chemistry or thermodynamics, or consent of instructor.* (W)

**206. Topics in Biophysics and Physical Biochemistry (3)**

Application of physical methods to biochemistry, e.g., x-ray diffraction, optical rotatory dispersion and circular dichroism, magnetic resonance. Same as Physics 206. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (W)

**207. Synthetic Macromolecules (3)**

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: Chemistry 131 and 141B or equivalent.* (W)

**209. 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, non-equilibrium processes, and advanced topics in statistical mechanics, thermodynamics and chemical kinetics. (F,W,S)

**210. Seminar in Biochemistry (1)**

Seminars presented by advanced graduate students which will explore topics in specialized areas of biochemistry and provide opportunities for students to gain experience in the organization, critical evaluation, and oral presentation of information from the literature. Each quarter a different topic is discussed; recent topics have included: lipids, membranes, oxidative phosphorylation, nucleic acid structure, function, and synthesis, protein structure and function, history of biochemistry. *Prerequisite: one year of graduate study.* (F,W,S)

**211. Biochemistry I (3)**

A comprehensive course in introductory biochemistry. The course is intended for entering graduate students, including those who have not previously had a formal course in biochemistry. *Prerequisites: physical and organic chemistry.* (F)

**213. Chemistry of Macromolecules (3)**

A quantitative discussion of the structure of biologically important macromolecules and the techniques used in their study. *Prerequisite: elementary physical chemistry.* (F)

**214. History of Biochemistry (2)**

A summary of the contributions which led to the major concepts in the field of biochemistry. Emphasis will be placed on the research approach taken by eminent individuals. *Prerequisite: Chemistry 211.*

**216. Chemistry of Enzyme Catalyzed Reactions (3)**

A discussion of the chemistry of representative enzyme catalyzed reactions is presented. Enzyme reaction mechanisms and coenzyme chemistry are emphasized. *Prerequisite: organic chemistry.* (W)

**217. Human Biochemistry (2)**

An advanced course in biochemistry primarily dealing with the molecular basis of human disorders. *Prerequisite: Chemistry 211 or equivalent (may be taken concurrently).* (S)

**218. Biochemistry II (3)**

Advanced topics and recent advances in biochemistry for students already familiar with the subject matter of elementary courses. *Prerequisites: physical and organic chemistry and Chemistry 211 or equivalent.* (F)

**219A-B-C. Special Topics in Biochemistry (3-3-3)**

This is a special topics course in comprehensive biochemistry to be given in a three-quarter sequence. Some of the topics to be included are as follows: protein chemistry, enzyme kinetics, lipids and lipoproteins, nucleic acid chemistry, vitamins and nutrition, etc.

**220. Advanced Inorganic Chemistry (3)**

Introduction to theoretical inorganic chemistry. Chemistry of typical main group and transition elements; coordination compounds; organometallic chemistry, catalysis, experimental techniques. *Prerequisites: Chemistry 120B, 141C, and 131.* (S)

**221. Energy Transduction (3)**

Discussion of current understanding of mechanisms of muscle contractions, photosynthesis, bioluminescence, chemiluminescence and active transport will be presented. *Prerequisites: organic chemistry and introductory biochemistry.* (S)

**222. Biochemical Evolution (3)**

The 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.* (W)



**227. Seminar in Inorganic Chemistry (2)**

Seminars presented by faculty and students on topics of current interest, 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.* (S/U only.)

**229. Special Topics in Inorganic Chemistry (1-3)****242. Natural Products Chemistry (3)**

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: Chemistry 140A-B or 141A-B-C.* (W)

**244. Synthesis of Complex Molecules (3)**

In order to plan the most economic synthesis of an organic molecule, one must consider many possible routes. The arguments used to weigh one route against another will be discussed in detail. The uses of specific reagents and protecting groups will be outlined. The control of stereochemistry during a synthesis will be emphasized. Examples will be selected from the recent literature. *Prerequisites: 148 or 248.* (W)

**245. Structure and Properties of Organic Molecules (3)**

Introduction to the measurement and theoretical correlation of the physical properties of organic molecules. Topics to be covered include simple molecular orbital theory, bond lengths, bond energies, dipole moments, ionization potentials, infrared and ultraviolet spectra, nuclear magnetic resonance and electron spin resonance. (W)

**246. Kinetics and Mechanism (3)**

Methodology of mechanistic organic chemistry: integration of rate expressions, determination of rate constants, transition state theory, catalysis, kinetic orders; isotope effects, substituent effects, solvent effects, linear free relationships, product studies, stereochemistry; reactive intermediates; rapid reactions. (S)

**247. Mechanisms of Organic Reactions (3)**

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 advanced organic chemistry sequence. *Prerequisite: Chemistry 141C.* (F)

**248. Synthetic Methods in Organic Chemistry (3)**

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: Chemistry 141C or consent of instructor.* (F)

**249. Special Topics in Organic Chemistry (1-3)****250. Seminar in Chemistry (1)**

Regularly scheduled seminars by first-year graduate students provide opportunities for practice in seminar delivery and for the exploration of topics of general interest. (F,S)

**251. Research Conference (1)**

Group discussion of research activities and progress of the group members. (Satisfactory/Unsatisfactory grades permitted.) *Prerequisite: consent of instructor.* (F,W,S)

**267. Biochemistry of Lipid and Lipoprotein Diseases (2)**

This course will cover the metabolism of lipids and lipoproteins from the basic biochemistry to human disease implications. The aim of the course will be to first develop a broad understanding of the basic biochemical aspects of lipid metabolism including structural aspects of lipids and lipoproteins and mechanistic aspects of the enzymes that act upon them. Then the regulation of lipid metabolism and the implications for disease states will be considered. Finally, the application of these ideas to the treatment of specific human diseases will be discussed. (S)

**268. Biochemistry of Neoplastic Diseases (3)**

Special emphasis will be placed on basic aspects of chemo- and immuno-therapy, mechanism of action of anticancer

agents, rational and empirical approaches to the inhibition of malignant cells. Theories relating to viral and chemical carcinogenesis will be discussed. *Prerequisite: introductory biochemistry* (S)

**272. Nuclear and Cosmochemistry (3)**

Introduction to cosmochemistry with emphasis on nuclear aspects. Structure and properties of nuclei. Nuclear reactions. Radioactive decay processes. Abundance and synthesis of the elements. Chronology of events in the early solar system. Origin and early history of the solar system. Effects of cosmic-ray bombardment. *Prerequisite: Chemistry 200A or consent of instructor.*

**277. Clinical Correlates (2)**

Clinical correlates will stress the close ties between clinical medicine and the basic sciences and the two-way interactions among practicing doctors and research scientists. Most sessions will 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, Chemistry 211, 217, Biology 253, 254, 255, 256 or the advanced alternatives to these courses taken simultaneously.*

**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.* (Satisfactory/Unsatisfactory 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.* (F,W,S)

**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.* (F,W,S)

**298. Special Study in Chemistry (1-3)**

Reading and laboratory study of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases. (Satisfactory/Unsatisfactory grades permitted.) Credit is limited to three units per quarter. (F,W,S)

**299. Research in Chemistry (1-12)**

*Prerequisites: graduate standing only and consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (F,W,S)

**500. Teaching in Chemistry (4)**

A doctoral student in chemistry is required to teach a four-unit course (50% teaching assistantship) two quarters out of three in his or her first year of residence and one out of every three quarters in each succeeding year of residence up to a total of five quarters. This is an introduction to teaching elementary college chemistry. Each student will be responsible for, and teach a class section from one of the undergraduate chemistry courses. One meeting per week with instructor, one or two meetings per week with assigned class section, and lecture of the undergraduate course in which he or she is participating. *Prerequisites: graduate standing and consent of the instructor.* (Satisfactory/Unsatisfactory grades only.) (F,W,S)

## Chicano Literature

See Literature

## Chicano Studies

OFFICE: 2072 Humanities and Social Sciences Building, Muir College

**Director:**

Ricardo Romo, Ph.D.

**Faculty:**

Carlos Blanco, Ph.D. (*Professor of Literature and Third World Studies*)

Jorge Fortes, Ph.D. (*Assistant Professor of Biology*)

Jorge Huerta, Ph.D. (*Assistant Professor of Drama*)

Claudio Fenner-Lopez, M.F.A. (*Lecturer in Communications*)

Miguel Monteon, Ph.D. (*Assistant Professor of History*)

Ramon Piñon, Ph.D. (*Assistant Professor of Biology*)

Ricardo Romo, Ph.D. (*Assistant Professor of History*)

Rosaura Sanchez, Ph.D. (*Assistant Professor of Literature and Third World Studies*)

Marta Sanchez, Ph.D. (*Assistant Professor of Literature and Third World Studies*)

Faustina Solis, Ph.D. (*Associate Professor of Community Medicine and Urban and Rural Studies*)

**The Major** The Chicano studies major is a joint major. As such, it has a disciplinary emphasis, i.e., it is worked out jointly with a UC San Diego department. The disciplinary emphasis will be the foundation for systematic study of the Chicano experience. Knowledge of the total context of the Chicano experience will also be developed through study in other disciplines and study of the Spanish language. Students may enter the program with a basic knowledge of Spanish (as obtained, for instance, in the language program), but a fluent knowledge of Spanish will be expected of all majors.

Majors will be advised by the Chicano studies staff and departmental staff.

The exact requirements for the major will vary with the disciplinary emphasis, but in every case the number of required upper-division courses will total at least thirteen. These courses will fall into three categories:

1. core disciplinary courses (i.e., basic departmental requirements);
2. Chicano focus courses within the discipline or department. (For example: Sociology 115: The Mexican-American Family);
3. Chicano focus courses in *other* disciplines. (For example: Chicano literature courses if the major is in Chicano studies/history).

Since the specific departmental requirements (history, literature, sociology, political science) vary with each department, prospective majors should consult with the administration of the Chicano studies program.

The program is administered by Mr. Ricardo Romo and a committee composed of students and faculty.

## Courses

**Chicano Studies 14. Indigenous Roots of Chicano Theatre (4)**

This course traces the evolution of Chicano theater from its Meso-American and post-Conquest roots through the Spanish religious theater of the Southwest. (W)

**Chicano Studies 115. The Mexican-American Family (4)**

An analysis of the past and present structure and functions of the Mexican-American family. Special attention is given to variations in family organization, social functions of the family.

## Chinese Studies

and family methods for coping as a minority in American society. *Prerequisites: Sociology 1A, 1B, Sociology 2 or consent of the instructor.*

### Chicano Studies 125A. Chicano Politics (4)

A survey of contemporary Chicano politics. The Chicano community in the American political system; government policies as they affect Chicanos; barrios and movement politics and strategies; social and economic trends as they affect politics. *Prerequisite: sophomore standing. (W)*

### Chicano Studies 125B. Field Work in Chicano Politics (4)

Each student will be required to do field work relating to the Chicano community, in either individual or group projects. The topic should be on some aspect of Chicano politics, broadly defined, and have theoretical significance. Class will meet once a week for two hours and there will be some common reading. *Prerequisites: sophomore standing, Chicano Studies 125A, and consent of the instructor. (S)*

### Chicano Studies 132. La Chicana (4)

A critical perspective of the Chicana's present minority status through an exploration of relevant crucial issues (i.e., employment, education, health, family). *Prerequisite: upper-division standing.*

### Chicano Studies 133. Contemporary Chicano Issues (4)

The course, interdisciplinary in nature, will study the contemporary Chicano experience from cultural, social, and historical perspectives, and provide students with information and understanding of the important characteristics of the Chicano community by exerting a critical analysis of the societal context in which "La Raza" has sought to maintain and develop its culture. *Prerequisite: consent of instructor. (W)*

### Chicano Studies 136. The Chicano Community (4)

Origins of the Mexican-American immigrant in rural Mexico; context of contact; patterns of settlement in the United States; the Mexican community, social structure and social change; acculturation and generational patterns; community leadership and change. *Prerequisites: Sociology 1A and 1B, Sociology 2 or consent of instructor. (W)*

### Chicano Studies 143. Spanish Language in America: Spanish Dialects (4)

A socio-linguistic study of the popular dialects in the USA 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 Southwestern dialects.

### Chicano Studies 153. Introduction to Chicano Literature (4)

This course introduces students to Chicano literary works. Central to this study are 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. *Prerequisite: speaking and reading knowledge of Spanish or consent of instructor. (W)*

### Chicano Studies 155A. Social and Economic History of the Southwest (4)

An introduction to American borderland history with special emphasis on historiography, economic and social developments of the border states during the eighteenth and nineteenth centuries. The course is designed to present various interpretations of American Southwestern history. (F)

### Chicano Studies 155B. Social and Economic History of the Southwest (4)

The course will consider the significant trends in Mexican-American history over the past one hundred years in the Southwest. Special emphasis will be placed upon primary documents relating to Mexican-Americans in economic and social institutions. (F)

### Chicano Studies 159Q. Colloquium in American Ethnic History: Mexican Americans in the United States (4)

Readings for advanced students in the history of minority groups in American society. (W)

### Chicano Studies 198. Directed Group Study (4)

Directed group study on a topic or in a field not included in the regular academic curriculum, by special arrangement with a faculty member. (P/NP grades only.) *Prerequisites: upper-division standing and consent of instructor. (F,W,S)*

### Chicano Studies 199. Independent Study (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 approval of instructor. (F,W,S)*

## Chinese Literature

See Literature

## Chinese Studies

Office: 8004 Humanities and Social Sciences Building, Muir College

### Associate Professors:

Matthew Y-C Chen, Ph.D. (*Linguistics*)

David K. Jordan, Ph.D. (*Anthropology*)  
(*Program Chairman*)

Thomas A. Metzger, Ph.D. (*History*)

Wai-Lim Yip, Ph.D. (*Literature*)

### Assistant Professors:

Paul Pickowicz, Ph.D. (*History*)\*

Susan Shirk, Ph.D. (*Political Science*)

### Lecturer:

Kay A. Johnson, Ph.D. (*Political Science*)

\*Associate Director, University of California Education Abroad Program, Hong Kong, 1977-1978.

\* \* \*

*Chinese studies is an interdisciplinary program. Three features of this program are particularly important: first, study of some aspect of Chinese civilization in terms of a particular discipline; second, a broader approach to Chinese civilization based on a small number of courses drawn from a variety of disciplines; third, a basic knowledge of the Chinese language in terms of one of two major dialects or both of them.*

*The program stresses a creative approach to Chinese civilization through the use of Chinese language in combination with a disciplinary perspective. It readily allows the student to pursue a double major.*

**The Major Program** The major in Chinese studies is intended to prepare a student for graduate work in some aspect of Chinese civilization. The student choosing the major in Chinese studies must decide on a disciplinary focus, and depending on the focus, the course requirement may vary from twelve to fifteen upper-division courses in addition to two years of Chinese language. These courses are divided among the following requirements:

1. Language — a minimum of two years of Mandarin or Cantonese is required, now offered at the lower-division level. In certain disciplines an additional year of upper-division classical Chinese will be required;
2. Chinese focus — two to four courses dealing with China in the chosen disciplinary focus;
3. Chinese spectrum — two to four courses dealing with China but not in the chosen disciplinary focus;
4. Discipline spectrum — three to four courses in the chosen discipline. These courses should be concerned with

theory and methodology in the discipline and not with China;

5. Cross-Cultural Spectrum — Three courses in any cultural area(s) other than China, or equivalent.

## Major Program Course Requirements

Discipline focus	Major Program in Chinese Studies Course Requirement Number of Courses				
	Anthro.	History (Modern)	History (Pre-mod)	Ling.	Lit.
Chinese Studies Requirements Language*					
Modern**	3	3	3	3	3
Classical	0	0	3	0	3
Chinese Focus	3	4	4	2	3
Chinese Spectrum	3	2	2	4	2
Discipline Spectrum	3	3	3	4	3
Cross-Cultural Spectrum	3	3	3	3	3
Total number of upper-division courses	12	12	15	13	14
Lower-division Chinese language prerequisite	6	6	6	6	6

\*Language requirement listed here is in addition to first-year level background of three quarters or equivalent.

\*\*Courses are second-year Chinese. Formerly upper-division, this sequence is now offered as lower-division Language/Chinese 64, 65, 66.

**The Minor Program for Revelle** The Chinese studies minor consists of six courses chosen from any of the courses listed below. They will be selected in consultation with the undergraduate adviser of the program. The content of these courses will determine whether the Chinese studies minor is classified as humanities or social science.

## Courses Committee Sponsored Courses Upper Division\*

### 163. Introduction to Chinese Linguistics (2)

This course will be an introduction to linguistics for students of the Chinese language. It will cover phonological and grammatical structures, dialectology and a brief survey of the history of the language.

### 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: Lang/Chinese 56 or 66 or equivalent.*

### 181B. Introduction to Classical Chinese (4)

Continuation of Chinese 181A. *Prerequisite: Chinese Studies 181A 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.*

### 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 study under the supervi-

sion of a faculty member of the Program in Chinese Studies. (P/NP grades only.) Prerequisite: consent of instructor. (F.W.S.)

\*For a description of lower-division language courses, see Language.

### Chinese Studies Courses in the Departments

For descriptions of courses listed below, see appropriate departmental listing.

- Lang/Ch 61. Elementary Mandarin  
 Lang/Ch 62. Elementary Mandarin  
 Lang/Ch 63. Elementary Mandarin  
 Lang/Ch 64. Intermediate Mandarin  
 Lang/Ch 65. Intermediate Mandarin  
 Lang/Ch 66. Intermediate Mandarin  
 Anthropology 12. Chinese Society and Culture  
 Anthropology 103. Problems in Chinese Ethnology  
 History 182. Modern Chinese Revolutions: 1800-1911  
 History 183. Modern Chinese Revolutions: 1911-1949  
 History 184. People's Republic of China  
 History 185A. Institutional and Economic History of Early Imperial China  
 History 185B. Institutional and Economic History of Late Imperial China  
 History 186. Self and Society in Modern Chinese Thought  
 History 187. Intellectual History of Modern China  
 History 188. Peasant Revolution: Modern China  
 History 189Q. Special Topics in Modern Chinese History  
 Linguistics 164. Language Structures  
 Linguistics 263. Topics in Chinese Linguistics  
 Literature 101. Readings in Contemporary Chinese Literature  
 Literature 150. Chinese Literature in Translation  
 Political Science 103. China in World Politics  
 Political Science 132. Politics in the People's Republic of China

## Classical Studies

OFFICE: 5016 Humanities and Social Sciences Building, Muir College  
 (Department of History)

### Professor:

Edward N. Lee, Ph.D. (*Philosophy*)

### Associate Professors:

Georgios H. Anagnostopoulos, Ph.D.  
 (*Philosophy*)

David K. Crowne, Ph.D. (*English, Comparative Literature*)

Alden A. Mosshammer, Ph.D. (*History*)  
 (*Chairman*)

Sheldon Nodelman, Ph.D. (*Visual Arts*)

### Assistant Professors:

Page Ann duBois, Ph.D. (*Classical and Comparative Literature*)

Richard E. Friedman (*Acting*) (*Hebrew and Comparative Literature*)

Barbara Pavlock (*Acting*) (*Classical and Comparative Literature*)

### Lecturer:

Lawrence Waddy, M.A. (*Classical Languages, Literature*)

This program offers undergraduates an opportunity to study the cultures of Greece, Rome, and the Ancient Near East through the coordinated resources of the Departments of History, Literature, Visual Arts, and Philosophy. Besides training in Greek, Latin, and Hebrew, courses are included in the history, literature, art, and philosophy of Greece, Rome, and the Ancient Near East, using materials in the original languages and in translation.

**The Major Program** A major in classical studies consists of a choice of twelve upper-division courses approved for the program and listed below. Six of the twelve courses must involve some use of materials in the original language, Greek, Latin, or Hebrew. The particular courses making up each student's major will be selected with advice from the program staff. The major will normally include courses from three of the participating departments.

**The Minor Program** A minor in classical studies consists of six courses from those listed below, of which at least three must be upper-division. A knowledge of the ancient languages is not required. The minor will normally include Classical Studies 19A-B-C: The Greco-Roman World, and three other courses from the participating departments.

**Warren College** A Warren College program of concentration in classical studies normally consists of Classical Studies 19A-B-C and three of the upper-division courses listed below.

Graduate courses may be taken by undergraduates with the 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.

## Courses

### Undergraduate

#### Classical Studies 19A-B-C. The Greco-Roman World (4-4-4)

An introductory study of the Greco-Roman world, its literature, myth, philosophy, history, and art. (Not offered in 1978-79.)

#### Humanities 11A-B-C. The Western Tradition (6)

#### Visual Arts 11. Prehistoric and Ancient Art. (4)

#### 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

#### History 100. The Ancient Near East and Israel (4)

(Not offered in 1978-79.)

#### History 101A-B. Greece in the Classical Age (4-4)

(Not offered in 1978-79.)

#### History 101Q. Special Topics in Greek History (4)

(Not offered 1978-79.)

#### History 102A-B. The Roman Republic and Empire (4-4)

#### History 102Q. Special Topics in Roman History (4)

#### History 199. Independent Study in Greek and Roman History

#### Lit/Gr 1. Elementary Greek (4)

#### Lit/Gr 2. Intermediate Greek (4)

Prerequisite: Lit/Gr 1 or equivalent.

#### Lit/He 1-2-3. Beginning and Intermediate Hebrew (4-4-4)

#### Lit/He 51-52. Readings and Interpretations (4,4)

#### Lit/La 1. Elementary Latin (4)

#### Lit/La 2. Intermediate Latin (4)

Prerequisite: Lit/La 1 or equivalent.

#### Lit/Gr 100. Introduction to Greek Literature (4)

Prerequisite: Lit/Gr 2 or equivalent.

#### Lit/Gr 101-102-103. Readings in Greek Literature (4-4-4)

#### Lit/He 100. Introduction to Hebrew Literature (4)

#### Lit/La 100. Introduction to Latin Literature (4)

Prerequisite: Lit/La 2 or equivalent.

#### Lit/La 101-102-103. Readings in Latin Literature (4-4-4)

#### Lit/Gen 120. The Classical Tradition (4)

Topic for fall 1978: The Goddess in Myth and Literature

#### Lit/He 122. Hebrew Prophetic Literature (4)

#### Lit/He 123. Bible: The Narrative Books (4)

(Not offered in 1978-79.)

#### Lit/He 124. Bible: The Poetic Books (4)

(Not offered in 1978-79.)

#### Lit/He 190. Seminar in Biblical Studies (4)

#### Lit 199. Special Studies in Greek and Roman Literature

#### Philosophy 101. History of Philosophy: Greek Philosophy (4)

Greek philosophy from the pre-Socratic philosophers through Plato.

#### Philosophy 102. History of Philosophy: Hellenistic and Roman Philosophy (4)

Greek philosophy from Aristotle to Plotinus including the major schools of Hellenistic philosophy: Stoicism, Epicureanism, Skepticism, and Neo-Platonism

#### Philosophy 108. Mythology and Philosophy (4)

Study of various ancient Near-Eastern mythologies in relation to Greek philosophy

#### Philosophy 199. Independent Study (4)

#### Visual Arts 115M. Greek Art (4)

#### Visual Arts 115V. Roman Art (4)

(Not offered in 1978-79.)

#### Visual Arts 115J. Late Antique Art (4)

**Graduate**

**History 298. Directed Readings in Greek and Roman History (1-12)**

**Lit/CI 210. Classical Studies (4)**

*Prerequisite: working knowledge of either Greek or Latin.*

**Lit/Comp 270. Ancient Literary Theory (4)**

**Lit/CI 297. Directed Studies in Greek or Latin Literature (1-12)**

**Lit/CI 298. Special Projects in Greek or Roman Literature (4)**

**Philosophy 201. Greek Philosophy (4)**

**Philosophy 202. Hellenistic and Roman Philosophy (4)**

**Philosophy 290. Directed Independent Study (1-4)**

**Communications**

OFFICE: 130 Media Center, Communications Building, Third College

**Professors:**

Herbert I. Schiller, Ph.D.  
Jeremy Tunstall, Visiting

**Associate Professor:**

Samuel Popkin, Ph.D.

**Assistant Professors:**

Beryl Bellman, Ph.D. (*Communications/Sociology*)  
Chandra Mukerji, Ph.D. (*Communications/Sociology*)  
Michael R. Real, Ph.D.

**Lecturers:**

Claudio Fenner-Lopez, M.A., (*Communications/Visual Arts*)  
Dan M. Sullivan (*Director, Instructional Media Center*)

**UC San Diego faculty who teach communications-related courses:**

Abraham J. Dijkstra, Ph.D., *Associate Professor (Literature)*  
Benetta Jules-Rosette, Ph.D., *Assistant Professor (Sociology)*

Students in the Communications Program study humans as users of messages and symbols within the social contexts which shape these messages and symbols. Communications systems both reflect the values of a society and determine those values. Thus a central question which is analyzed is to what degree members of a society have access to its mass-communications systems, find a voice — a reflection of themselves therein — and to what degree the society's very nature is altered or maintained by the mass media.

In social contexts and face-to-face interactions, similar questions are analyzed: how are messages, responses, and counter-messages, shaped by context, role, and by the medium itself, whether verbal or non-verbal.

The communications major prepares students for graduate or professional schools in various disciplines and for career opportunities in media-related occupations. The major is not a professional training program in journalism, film or television production but can be used as general preparation in various communicative careers such as, television, radio, film, newspapers, magazines, advertising, public relations, alternative media, etc.

In addition, the internship program (Communications 197) offers undergraduates the unique opportunity to engage in field research and fieldwork under the guidance of individual faculty members — a chance to bridge the gap between communication theory and praxis.

**College Requirements**

**Third College** The communications segment of the Third College general educational requirements may be fulfilled by the satisfactory completion of *one of the two* following options:

*Option A:* two courses — Communications 20, 100A or any course numbered 170 through and including 189.

*Option B:* Communications 20, or 100A or any course numbered 170 through and including 189.

**Warren College** A straight communications program is considered both as a humanities and as a social science discipline, therefore several options are available to Warren College students majoring in communications:

*Option A:*  
1 minor in the social sciences plus  
1 minor in the humanities

*Option B:*  
2 minors in the natural sciences

*Option C:*  
1 minor in *either* the social sciences or the humanities plus a minor in the natural sciences.

A communications/sociology focus is considered as a social science area of concentration.

A communications/visual arts focus is considered as a humanities area of concentration.

All communications minors must complete (A) Communications 100A,B,C, plus *either* (B) a humanities minor consisting of three media courses or (C) a social science minor consisting of three macro courses or three micro courses.

**Majors in Communications** The Communications Program at UC San Diego offers a campus-wide undergraduate major in communications. Most communications courses are available also as electives for any advanced-standing student at UC San Diego. Because communications intersects with a variety of other disciplines it is possible to arrange interdisciplinary majors as well as a major exclusively in communications. Such

additional majors have been arranged with the Departments of Sociology and Visual Arts.

**The Communications Core Curriculum**

Communications 100A (formerly numbered 102B)

Communications 100B (formerly numbered 102A)

Communications 100C (formerly numbered 171)

1 Macro-Communications Course

1 Micro-Communications Course

1 Specialty (that is, two additional courses in one of the three areas — media, macro, or micro)

**The Communications Major (fifteen courses)**

A communications major must satisfactorily complete (A) the communications core curriculum, (see above), (B) additional specialty in one of the three areas (that is, two additional courses in one of the three areas — media, macro or micro), (C) Communications 193 (Advanced Topics in Communications) or Communications 194 (Senior Seminar in Communications), and (D) five additional upper-division courses in communications or related disciplines, the latter (D) to be approved by the communications faculty. Both specialties may be in the same area of concentration.

**The Communications/Sociology Major (fifteen courses)**

To receive credit for a major in communications/sociology, a student must (A) satisfy the communications core curriculum, (B) satisfy the Department of Sociology's lower-division requirements (Soc. 1A,1B,2) and (C) take one upper-division course in each of the five sociology cluster areas. A complete list of applicable courses is available in the Communications Program office and the Department of Sociology office.

**The Communications/Visual Arts Major (nineteen courses)**

This major is designed to develop conceptual, analytical and technical skills in photography, video and film-making by combining courses in history, criticism and production with those of the communications core curriculum. Creative skills as well as aesthetic, analytic and critical skills will be developed. To receive credit for a major in communications/visual arts, a student must complete (A) the communications core curriculum, (B) five courses in criticism and history and (C) seven courses in production/studio. A complete list of applicable courses is available in the Communications Program office and the Department of Visual Arts office.

**Courses**

**Lower Division**

**20. Communications (4)**

(Formerly numbered 20A,B,C) An introduction to communications for non-majors which explores the *macro* level of mass media, images and effects, and the *micro* level of the language and non-verbal interaction. (F,W,S)

**\*Upper Division**

\*Courses numbered: (A) 110 through 120 are media-communications courses; (B) 130

through 139 are media/micro-communications courses; (C) 140 through 159 are micro-communications courses; (D) 160 through 169 are micro/macro-communications courses; (E) 170 through 189 are macro-communications courses; (F) 190 through 199 are specialized courses. (See class schedules for specifics.)

#### 100A. Introduction to Macro Communications (4)

(Formerly numbered 102B.) A critical overview of mass media, social processes, and institutions that shape individual and group consciousness. Introduces areas of macro communications, mass-media systems, social effects, political-economic structures, propaganda, popular culture, critical and descriptive theories. *Prerequisite: upper-division standing or consent of instructor.* (F,W,S)

#### 100B. Introduction to Micro Communications (4)

(Formerly numbered 102A.) An introduction to the analysis of communication from a micro perspective. Emphasis is placed on both verbal and non-verbal processes across social contexts and in different cultures, and the different communication systems and networks. Special focus on how meaning is produced and interpreted during the course of social interactions. *Prerequisites: upper-division standing or consent of instructor.* (F,W,S)

#### 100C. Introduction to Media Communications (4)

(Formerly numbered 171) An introductory course dealing with the theory of communication through portable video recording equipment and super 8 film. The theory of the relationship of camera to eye to viewer is explored. Experimentation is explored through laboratory experiments and projects using 1/2" video tape, 3/4" video cassettes and super 8 film. *Prerequisite: upper-division standing or consent of instructor.* (F,W,S)

### Media-Communications Courses

#### 111A. Television Production and Analysis (4)

(Formerly numbered 101A.) 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. *Prerequisites: Communications 100A,B,C or consent of instructor. Concurrent enrollment in Communications 111AL required.* (F)

#### 111AL. Television Production and Analysis Laboratory (2)

(Formerly numbered 101AL.) Laboratory sessions to provide students with an opportunity to experiment with production elements influencing the interpretation of program content. Concentration on lighting, camera movement, composition and audio support will closely parallel program formats discussed in the lecture (Communications 111A). *Concurrent enrollment in Communications 111A required.* (F)

#### 111B. Television Documentary (4)

(Formerly numbered 101B.) An advanced television course which examines the history, form, and function of the television documentary in American society. Experimentation with documentary technique and style requires prior knowledge of television or film production. *Prerequisites: Communications 111A or consent of instructor. Concurrent enrollment in 111BL required.* (W)

#### 111BL. Television Documentary Laboratory (2)

(Formerly numbered 101BL.) Laboratory sessions to apply theory and methods in the documentary genre via technological process. Integrates research, studio and field experience of various media components. *Concurrent enrollment in 111B required.* (W)

#### 115. Television as a Social Force (4)

(Formerly numbered 101C.) Primarily a research and production course. Students undertake the research, design, and production of a series of video taped programs that serve some pressing social need. *Prerequisite: Communications 111A or 111B or consent of instructor.* (S)

#### 118. Writing for Films and Television Production (4)

(Formerly numbered 113.) Course consists of scripts and scenarios with an eye to their use for film and television production. The first five weeks of the course deals with dramatic fabulation, the second five weeks with documentary, non-dramatic formats. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 120. 8mm Film Workshop (4)

(Formerly numbered 110.) An introduction to the practical and social aspects of 8mm film production. Basic camera, exposure, editing and sound techniques are presented. Each student produces one or two short films during the course. A brief review of film literature. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 122. 16mm Film Workshop (4)

(Formerly numbered 114.) Basic professional methods, crew and equipment operation techniques; double sound system, multiple-track editing, etc. Students write and produce short films. *Prerequisites: Communications 118 and 120 or consent of instructor.* (F,W,S)

#### 125. Video Studio Techniques (4)

(Formerly numbered 173.) The exploration of video as a communications tool, an art form and experimental medium. This course introduces the student to the television studio, its equipment and possibilities. Emphasis is placed on the application of video techniques in the controlled environment of a studio. *Prerequisites: Communications 100A,B,C or Visual Arts 170, or consent of instructor.* (W)

### Media/Micro-Communications Courses

#### 133. Ethnographies: Their Uses and analysis (4)

(Formerly numbered 163.) The analysis of methods and underlying assumptions of field observation and ethnographic reporting. The contrast of various types of written and audio visual ethnographies; a critical examination of their styles, approaches, and uses as a form of sociological analysis; and opportunities for their application. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 134. Use of Audio-Visual Resources (4)

(Formerly numbered 160.) Analysis of and instruction in various uses of video taping and tape recording in data collection, and analysis in the study of communications and face-to-face interaction. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 136. Images of Women (4)

(Formerly numbered 161.) An analysis of American stereotypes of women and their use in media images. Student involvement includes (1) reviewing literature on the sociology of sex-roles; (2) developing media portraits of women to serve as data for class analysis; and (3) writing final paper on the stereotypes employed in generating these portraits. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

### Micro-Communications Courses

#### 140. Language and Society (4)

(Formerly numbered 132.) This course deals with the socio-economic forces affecting the evolution of standardization of language, bilingualism, diglossia and language maintenance. These processes will be studied particularly in relation to the Spanish and English languages in the United States. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 152. Myths and Symbols in Society (4)

A study of the contributions of mythical symbols and narratives to the establishment of social meanings and behavior in primitive and modern societies. Included is a review of different theories of myth and narrative such as those of Levi-Strauss, Cassirer, Propp, etc. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

### Micro/Macro-Communications Courses

#### 165A,B. Statistical Methods/Data Analysis (4,4)

(Formerly numbered 174A,B.) A general introduction to statistical methods and data analysis for students interested in political science, public policy and communications research. Although calculus is not required, it is strongly recommended. The course includes a basic introduction to the theory and practice of statistical inference, sampling theory, measures of association, and linear regression models. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 166. Communications Analysis and Research (4)

(Formerly numbered 190.) Analysis of communication systems, networks within communities for distribution of information, media, and interpersonal face-to-face interaction. Techniques for observing, collecting, processing and implementing data. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 168. Cable Television (4)

(Formerly numbered 108.) An exploration of alternatives to the traditional broadcast media. Research on the development of new program formats that have greater communicative viability. Emphasis on methods for determining how specific kinds of information should be presented to different cultural groups in the society. Students will be involved with public access broadcasting and the introduction of video recording to various communities in the San Diego area. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

### Macro-Communications Courses

#### 170A,B. Voting, Campaigning and Elections (4,4)

(Formerly numbered 107A,B.) 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 efforts are made to develop models of their electoral behavior. Attention is devoted to recent efforts to develop rational choice theories of electoral behavior and to critiques of elections as democratic institutions. The role of mass media and money also will be examined. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W)

#### 175. Popular Communications (4)

(Formerly numbered 188.) An investigation of the relationship between mass communications and popular culture. Historical, esthetic, and political consideration of the evolution of popular expressions of culture, of the interaction between media and society, of characteristic products of mass culture in America and among minorities and non-Western peoples, and of the possibilities of a radically humanistic popular culture. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 176. Mass Communications and Public Opinion (4)

(Formerly numbered 185.) The consideration of the concept of public opinion, its measurement and impact, the possibilities of manipulation and control, polling and the differing role of public opinion in differing social systems. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 177. Comparative Systems of Propaganda (4)

(Formerly numbered 192.) Considers how variant ideologies and cultures create and sustain their value systems through multiple communication patterns. Takes differences between East and West, capitalist and socialist, Caucasian and non-Caucasian peoples and systems; correlates these with variations in media interpersonal, intrapersonal, and socio-cultural communication sets. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 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. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 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. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 184. Media Analysis (4)

(Formerly numbered 150.) A systematic study of the means of contemporary information processing in the advanced industrial state. Institutional approaches to and empirical studies of the processing of information will be explored. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 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. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

#### 187. Films and Society (4)

An analysis of films and how they portray various aspects of American society. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

## Cultural Traditions

### 189. Radio and Society (4)

(Formerly numbered 119.) The social and technological constraints and freedoms of sound broadcasting in the United States. Contrastive analysis of radio communications systems abroad and an examination of radio's potential as a community-oriented system. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

### Specialized Courses

### 191. Special Topics in Non-Western Communication (4)

(Formerly numbered 172.) Participatory workshop which looks beyond mass-mediated industrial societies to explore the underlying unity in patterns of personal communications, consciousness, and culture found in Black American music, or oriental philosophy, or Native American brujos, and other alternatives to Western modes. May be repeated for credit. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

### 193. Advanced Topics in Communications (4)

Specialized study in macro, micro or media communications with topic to be determined by the instructor for any given quarter. May be repeated for credit. *Prerequisite: Communications 100A,B,C or consent of instructor.* (F,W,S)

### 194. Senior Seminar in Communications (4)

A research seminar on special topics of interest to participating staff. Provides communications majors with a context for research done in cooperation with faculty. May be repeated for credit. *Prerequisites: Communications 100A,B,C or consent of instructor.* (F,W,S)

### 195. Instructional Assistance in Communications (4)

Observation and critique of classroom procedures and content. Assisting in the instruction of an undergraduate communications course under the supervision of a faculty member. May be repeated for credit. Pass/Not Pass only. *Prerequisites: attendance in course in a previous quarter and a grade of "B" or better; consent of instructor.* (F,W,S)

### 197. Field Internships in Communications (4,8,12,16)

Supervised experience in developing and implementing projects requiring participation and involvement in a communications media operation in the community. Projects may cover television, newspapers, radio and similar areas. May be repeated for credit. *Prerequisites: Communications 100A,B,C and consent of instructor.* (F,W,S)

### 198. Independent Group Study in Communications (2-4)

Directed group study on regional/local mass communications projects, micro communications projects, and media communications projects involving research and analysis of activities and services. May be repeated for credit. Pass/Not Pass only. *Prerequisites: Communications 100A,B,C and consent of instructor.* (F,W,S)

### 199. Independent Study in Communications (4)

Independent study on regional/local mass communications projects, micro communications projects, and media communications projects involving research and analysis of activities and services. May be repeated for credit. Pass/Not Pass only. *Prerequisites: Communications 100A,B,C and consent of the instructor.* (F,W,S)

## Comparative Studies in Language, Society, and Culture

OFFICE: 1532 Humanities-Library Building, Revelle College

Graduate students in the humanities, social sciences, and arts in this program, and under guidance of an interdepartmental committee, are given the opportunity to design strongly interdisciplinary curricula, on the basis of which they write their dissertations. The program requires that the student be admitted and fundamentally trained in one discipline and that he or she undertake M.A.-level studies in an integrally related discipline or

culture area. The qualifying examination will cover the whole of the student's studies, although its structure will be that designed by the department in which the student is fundamentally trained.

Application to the Program in Comparative Studies may be made during the third quarter of residency in the student's primary department. From the point of entrance into the program, the student's work is under the supervision of an interdisciplinary committee, which conducts the examination for Ph.D. candidacy and must approve all study and research plans, including the dissertation proposal, and forward them to the Graduate Council for final approval. The degree granted will indicate in its title the precise nature of the student's studies and research—e.g., Ph.D. in Comparative Literature and Ethnopoetics, in Linguistics and Literary Studies, in Economics and Chinese Studies, in Philosophy and History of Ideas. Inquiries should be directed, at the earliest during the student's first year of residency at UC San Diego, to the chairperson of the program directors.

### Program Directors:

George Anagnostopoulos, *Department of Philosophy*

H. Stuart Hughes, *Department of History*

Roy Harvey Pearce (Chairman), *Department of Literature*

Roger Reynolds, *Department of Music*

Melford E. Spiro, *Department of Anthropology*

## Contemporary Issues

OFFICE: 2024 Humanities and Social Sciences Building, Muir College

Lola Romanucci-Ross, Ph.D., *Director*

### Lower Division

### 2. Freshman Seminars on Contemporary Issues (4)

Seminars for students of John Muir College directed by members of UC San Diego faculty and visiting professors, and treating in depth one contemporary issue or small group of related issues (Consult the *Schedule of Classes* for possible offerings.) (F,W,S)

### 20. Wilderness and Contemporary Man (4)

The value and significance of the wilderness for contemporary man considered in terms of ecology, anthropology, literature, and recent history. Includes one mandatory field trip lasting several days.

### 21. Contemporary Issues (4)

Designed as a directed "peer-group-leading" situation in which a discussion leader (who will have had a seminar with the director and consulted with a faculty adviser) will work with a group of students on an issue of contemporary concern with the purpose of learning how to analyze, research, discuss, and prepare a presentation. Lectures by the director and guests to the group.

### 22. Human Sexuality (4)

A survey of the nature and problems of human sexuality in the development of the individual, in cultural traditions and values, and in social roles and organizations, particularly with regard to contemporary America. L. Ross/J. L. Stewart

### 50. Information and Academic Libraries (4)

An introduction to research strategies directed at satisfying the information needs of the student using the academic library, with emphasis on the UC San Diego 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. Anthropology of Medicine (4)

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

### 190. Culture/Personality and the Education Process (4)

Theories and societal assumptions about the teaching-learning process will be examined both from an interdisciplinary and cross-cultural perspective. Field observation techniques will be an adjunct to the lectures.

### 195. Discussion Leading in Contemporary Issues (4)

Students (after preparation and training in Contemporary Issues Workshop 196) will lead groups of 10-20 students in discussions of contemporary concern. Students will meet with the director 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.) *Prerequisites: Contemporary Issues 196, and consent of Director of Interdisciplinary Sequences.* L. Ross (spring quarter only)

### 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. Participation in the workshop does not guarantee selection as discussion leader. (fall quarter 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. (P/NP grades only.) *Prerequisite: consent of instructor.*

### 199. Special Studies in Contemporary Issues (2-4)

To be offered during fall, winter and spring quarters. Permission of the Provost of Muir College and 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.)

### Community Medicine 236. Medical Anthropology (3)

An analysis and synthesis of the growing body of anthropological concepts and investigations concerned with illness and curing events from primitive cultures to complex urban societies, and their relevance to medical practice. L. Ross (W)

### Community Medicine 237. Contemporary Issues in Medicine (2)

Seminar concerned with research and analysis of problems of contemporary concern in the practice of medicine. Community and university resources will be used to explore such areas as forensic constraints, health cultures and subcultures, and medical ethics. L. Ross (S)

## Cultural Traditions

OFFICE: 2024 Humanities and Social Sciences Building, Muir College

Lola Romanucci-Ross, Ph.D., *Director*

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Each year several different three-course sequences are offered. The sequences are developed by a special committee of faculty and students in consultation with those who will teach them. The particular cultures to be studied vary from year to year, though some, such as the Afro-American, have attracted such widespread interest that they may be

carried over from one year to the next. Other sequences have recently been offered in or are planned for such cultures as Asian, Latin American, Mediterranean, Black studies, Chicano and Judaic studies.

A descriptive list of the sequences offered for the coming academic year is available in time for the fall enrollment. Inquiries about the program or projected sequences should be addressed to the department.

## Courses

### 1A-B-C. Cultural Traditions (4-4-4)

A three-quarter sequence involving the study of the deep and surface structures of the life styles of one specific culture. The approach from several disciplines addresses itself to analyses of the social, political and economic institutions, the aesthetic structuring through formal artistic expression, and the cultural forms of everyday living. (F,W,S)

### 199. Special Studies in Cultural Traditions (2-4)

Individual reading and projects in the areas of cultural studies in which a particular culture will be viewed in reference to its history, arts, events, literature, music, societal structure. This course given under very special circumstances; e.g., a student is abroad at a time which interrupts his or her CT sequence but provides him or her a special opportunity in another culture, or an upper-division student desiring to do such a study under the personal direction of the director. *Prerequisite: consent of director.* (F,W,S)

## Drama

OFFICE: Building 407,  
Warren College

### Professors:

Michael Addison, Ph.D. (*Chairman*)  
Eric Christmas, R.A.D.A.  
Floyd Gaffney, Ph.D.  
Arthur Wagner, Ph.D.

### Associate Professors:

Mary Corrigan, M.A.  
Luther James (*Acting*)

### Assistant Professors:

Frantisek Deak, Ph.D.  
Jorge Huerta, Ph.D.  
James Sims, M.F.A.  
Yen Lu Wong, M.A.

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**The Undergraduate Program** The curriculum in the Department of Drama has been developed to provide 1) an integrated and meaningful program for those students desiring a drama major; 2) a sequence of courses to fulfill the fine arts and humanities requirements in Revelle, Muir, and Third Colleges; 3) a series of courses fulfilling Revelle and Warren College minor requirements, and 4) elective courses for the general student desiring experiences in the dramatic arts.

**The Drama Major** The program for a drama major is designed to provide a focus of humanistic learning and to prepare those students who wish subsequently to pursue advanced study with the most solid artistic background possible. The drama major consists of eighteen courses, twelve of which are prescribed for all drama majors. The prescribed courses are:

Drama 30. Beginning Acting  
Drama 42. Drama Survey: Tragedy

Drama 43. Drama Survey: Epic  
Drama 44. Drama Survey: Comedy  
Drama 50 A,B,C. Elements of Production  
Drama 135. The Art of Directing  
One Department of Drama course in dance/movement  
Three Department of Drama upper-division dramatic literature courses

The remaining six required upper-division courses may be taken as electives. *In addition*, each student pursuing the drama major must participate in two major productions each year by enrolling in Drama 101 (Performance), 102 (Technical Theatre), or 103 (Costume Construction); and must participate in the major seminar, Drama 193, for two quarters (1 unit each).

**The Graduate Program — M.F.A. in Theatre** Graduate study in drama at UC San Diego focuses upon intensive professional training in the areas of acting, directing, playwriting, and theatre criticism. A carefully limited number of students is admitted each year after audition and interview, chosen on the basis of demonstrated professional potential. The training program is highly integrated, with all graduate students participating in the acting process studio, the graduate theatre seminar, graduate thesis projects and theatre production. In addition, students in the graduate theatre program will be expected to engage in studies in areas related to their creative work, drawing from the humanities, the social sciences, and the arts. Students successfully completing the three-year course of study will be awarded the M.F.A. degree in theatre.

## Courses

NOTE: For changes in course offerings implemented after publication, inquire at the office of the Department of Drama.

### Lower Division

#### 11. Introduction to Theatre (4)

A broad exposure to the experience of theatre. The course involves active participation in and discussion of the multiple elements of living theatre — including examination of the creative contribution of the playwright, the designer, the director, the actor, and the critic.

#### 12. Introduction to Performance (4)

Beginning experiences in the process of acting: observation, concentration, use of objects, use of self, actions and objectives, improvisations, theatre games, preparation of scenes.

#### 13. Introduction to Production Styles (4)

A survey history of theatre production styles and techniques, focusing on elements of production (scenery, costume, lighting, and makeup) as they have evolved into twentieth century theatre production methods. Lecture, discussion, films, and live theatre form the bulk of class content.

#### 14. Indigenous Roots of Chicano Theatre (4)

This course traces the evolution of Chicano Theatre from its Meso-American and post-conquest roots through the Spanish religious theatre of the Southwest.

#### 15. Introduction to Contemporary Chicano Theatre (4)

Continuing study of the history and growth of Chicano theatre, focusing on contemporary Chicano theatros and playwrights.

#### 16. Introduction to Black Drama (4)

This course is designed to provide students with a meaningful and accurate definition of the black artist within the American theatre past, present and future. Some quarters will deal with a single black artist — playwright, director, actor. May be repeated for credit. *Prerequisite: consent of instructor when repeated for credit.*

#### 19. Introduction to Technical Theatre (4)

An introduction to the technical aspects of theatre production — scenery, lights, costume and makeup. Lectures, demonstrations, and workshops will serve to acquaint the student with contemporary production procedures and terminology. Students will be directly involved in technical work on UCSD Theatre productions throughout the term. *Prerequisite: consent of instructor.*

*Note: Drama 11 OR 16 taken together with Drama 12 AND 13 fulfills the Muir College fine arts requirement.*

#### 20A-B. Introduction to Dance (4-4)

Exploration and analysis of dance as an expressive medium through the heightened development of physical, sensory and rhythmic skills in workshop. Study of the history and theory of dance from primitive expression to contemporary trends in lecture.

#### 21. Beginning Jazz Dance (4)

Basic elements of jazz dance and performance. In addition to practical exercises in principles of jazz dance forms and choreography, dance will be discussed as an aspect of culture and human behavior.

#### 25. History of Dance (4)

Study of the concepts, theories, and styles of dance from all cultures as a form of human expression. Lecture material will be supplemented with texts, films, and demonstrations.

#### 30. Beginning Acting (4)

Course designed to equip the actor with the basic tools necessary for further stage work. Lectures, exercises and scene study. This course is prerequisite to Drama 130A, B Intermediate Acting. *Prerequisites: Drama 12 and consent of instructor.*

#### 42. Drama Survey: Tragedy (4)

A close examination of plays that reveal man as over-reacher, as dreamer, as self-destroyer and as both victim and victor in the conflict with the cosmos.

#### 43. Drama Survey: Epic (4)

The theatre as panorama, where broad-reaching human pageants reveal human collisions with man and society. *Prerequisite: sophomore standing.*

#### 44. Drama Survey: Comedy (4)

Comic theatre as a revelation of man's refusal to endure fools and charlatans, and as a celebration of the vital forces of life.

*Note: Drama 42, 43 and 44 fulfill the humanities and fine arts requirements for Revelle, Muir and Third Colleges.*

#### 50 A-B-C. Elements of Production (4-4-4)

A three-quarter sequence in the conception and realization of the scenic and costume elements of production through lectures, outside reading, and practical laboratory experience. Concentrated emphasis and practical experience in technical direction for productions, introductory experiences in stage, costume and lighting design. Production assignments in conjunction with academic work.

#### 51. Advanced Scenic Techniques (4)

A one-quarter course in the theory and methodology of advanced scenic construction for the theatre with emphasis on new materials, metal, scene painting, and drafting as applicable to the theatre. *Prerequisite: 50B.*

#### 52. Theatre Electronics (2)

Basic instruction in the principle elements of electricity and electronics for the theatre. Theory of electricity and practical application to theatrical productions. Lecture material will be supplemented with laboratory sessions. *Prerequisites: basic knowledge of calculus and consent of instructor.*

#### 60. History of Black Drama (4)

This course traces the development of black drama from its African beginnings through the plantation entertainments, minstrel shows and vaudeville, to the theatre forms of today. (Not offered in 1978-79.)

## Upper Division

#### 101. Studies in Performance (0-4)

A course designed for the in-depth study of a particular play, its playwright, his or her times and milieu, culminating in a fully-mounted presentation. *Prerequisite: consent of the instructor.*

#### 102. Studies in Technical Theatre (0-4)

A production/performance-oriented course exercising the fundamental techniques of scenic and properties construc-

## Drama

tion, stage lighting, and sound reproduction for the theatre. Laboratory format culminating in fully-mounted theatrical production. (Students may register in this course only if they have been accepted as a member of a technical crew.) *Prerequisite: consent of instructor.*

### 103. Studies in Costume Construction (0-4)

A production/performance-oriented course exercising the fundamental techniques of costume construction and wardrobe responsibilities for the theatre. Laboratory format culminating in fully-mounted theatrical production. (Students may register in this course only if they have been accepted as a member of a costume crew.) *Prerequisite: consent of instructor.*

Note: a total of eight units for Drama 101, 102 and 103 may be counted toward graduation.

### 122. Studies in Dance Composition (4)

Examination of skills and techniques required by various dance forms from Afro-Cuban to jazz. The course will emphasize compositional studies through the development and presentation of student works. *Prerequisite: consent of instructor.*

### 125. Dances of the World (4)

Course designed for in-depth study of the dance of a particular culture — Afro-Cuban, Bharata-Natyam, Balinese, Korean, etc. Specific topic will vary from quarter to quarter. *Prerequisite: consent of instructor. Drama 20 and 25 recommended.*

### 126. The Art of Movement: an Introduction (4)

Fundamentals of the art of movement as a basis for theatre, dance, the performing and visual arts, and as a research methodology for the analysis of movement. *Prerequisite: consent of instructor.*

### 127. Dances of the World: a Cross-Cultural Study (4)

Using film, videotape and effort/shape movement analysis for cross-cultural study of dance, this course offers an approach to dance as a basis for humanistic knowledge and experience. The selections of world dance cultures will vary each time this course is offered. *Prerequisites: Drama 126 and consent of instructor.*

### 128. Dance: Performance Workshop (4)

Work directed toward solo, duet and group dances. Students will submit choreographic ideas for instructor's approval then proceed with rehearsals. Dances will be performed in the studio. Readings, lectures, laboratory. *Prerequisite: consent of instructor.*

### 130A-B. Intermediate Acting (4-4)

The process of acting, its theory and practice, examined through exercises, text analysis, and the preparations of scenes from the modern repertoire. Audition required. *Prerequisites: Drama 30 and/or consent of instructor.*

### 131. Stage Management: Theory and Practice (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. *Prerequisites: Drama 30, Drama 50A,B,C.*

### 134. Ensemble Theatre (4)

An intensive theatre practicum designed to generate theatre created by an ensemble, with particular emphasis upon the analysis of text, explorations of ensemble rehearsal process, the development of technical self-support systems, the extension of performance modes, and performer/event/audience relationships. Work each term will include one new text and one play of the genre treated in the drama survey series courses: tragedy, epic, or comedy. *Prerequisites: consent of instructor, Drama 42, 43, 44 highly recommended.*

### 135. The Art of Directing (4)

An examination of the director's artistic and interpretive responsibilities in the creation of theatrical productions. This course will culminate in student-directed scenes. *Prerequisites: Drama 130A and B and/or consent of the instructor.*

### 136. Freeing the Voice (4)

Intensive workshop for actors and directors designed to "free the voice," with special emphasis on characterization in a wide range of dramatic texts. This proven method combines experiential and didactic learning with selected exercises, texts, tapes, films, and total time commitment. *Prerequisite: consent of instructor.*

### 137A-B. Development of Chicano Teatro (4-4)

A. Exploration of the theatrical development of the teatro form and experimentation with various modes of realizing the acting

styles, scenic modes, and production techniques of teatro.

B. A teatro production will be molded through intensive rehearsal, culminating in performances on the campus and in the community. *Prerequisites: Drama 15, consent of instructor, working knowledge of Spanish and basic acting instruction. (Not offered in 1978-79.)*

### 138A-B. Advanced Acting (4)

Further studies in the process of acting, theory, and practice, through concentrated work in character. Study and preparation of scenes from historical periods and the avant garde. Audition required. *Prerequisites: Drama 130A and 130B and/or consent of instructor.*

### 139. Advanced Directing (4)

Further examination of the director's artistic and interpretive responsibilities in the creation of theatrical productions dealing with plays from all periods. The course will culminate in student-directed one-act plays. *Prerequisites: Drama 131 and consent of instructor.*

### 141. Modern Black Drama (4)

From Lorraine Hansberry's *Raisin in the Sun* to the latest plays of Ed Bullins, black drama has mirrored and, in some instances, forecast the mood and aspirations of black people in America. The course examines the plays, playwrights and participants in contemporary black theatre, its concerns and influences. (Not offered in 1978-79.)

### 142. Oral Interpretation of Dramatic Literature (4)

The development of stage speech and vocal expression through the interpretation of dramatic literature from black and/or white American writers. *Prerequisite: consent of instructor.*

### 144. The Theatre of Fantasy, Myth, and Dream (4)

A seminar exploration of plays and production styles that employ the art of the theatre to enter imaginative worlds beyond our conscious experience. *Prerequisite: upper-division standing or consent of instructor.*

### 145. Theatre & Society: Satire, Fact & Propaganda (4)

An examination of theatrical forms that probe social structure and human behavior, economics and class relationships, and politics and power. Ranging from the Greek to the modern theatre, plays will be studied in the context of the society for which they were written, and will include examples of social satire, social realism, documentary theatre, agit-prop drama, and didactic epic theatre. *Prerequisite: upper-division standing or consent of instructor.*

### 146. Families and Friends: The Theatre of Private Life (4)

A close examination of theatre informed by a concern for the nature of human interaction and personal interplay, as revealed by conflict within families or small groups. *Prerequisite: upper-division standing or consent of instructor.*

### 147. Shakespeare on Stage (4)

A close look at the performance of Shakespeare's plays in the theatre from the point of view of actor and director, illustrated with scenes presented live and on film.

### 150. Basic Design (4)

Instruction and practice in design. Exercises and studies in line, mass, balance, texture and visual interest. Emphasis on balance, harmony, proportion, scale and color in theatrical design. Instruction in basic layout, design, and graphics. *Prerequisites: Drama 50A, 50B and 50C and/or consent of the instructor.*

### 151. Elements of Costume (4)

An investigation of the basic procedures involved in costuming a theatrical production. Emphasis placed on the integration of theory and practice in costume. Exercises in use of color, line, form and texture in fabric will be utilized in laboratory work.

### 152. Theatrical Makeup (2)

This class is intended to be a workshop in the study of theatrical makeup and its application. Studies in age makeup, character makeup, animal makeup, prosthetic and hairpiece application and construction, etc. should serve to acquaint the student with the basics needed to create the visual elements of an acting role.

### 153. History of Costume (4)

A study of historical dress in relation to its artistic, architectural, and music environment. Emphasis is placed on the evolution of period shapes and forms, as specifically revealed in costume. Discussions involve the relationship of period style and theatrical representation.

### 154. Costume Design (4)

Study in the theory and techniques of costume design. Weekly projects include costume renderings for specific plays. Much emphasis on dramatic interpretation (script and character analysis) as it applies to the art of design. Also work in rendering style, techniques and methods of presentation. *Prerequisite: Drama 151 or 153 or consent of instructor.*

### 155. Scene Design (4)

The elements of stage design, styles of scenery and their application to various types of stage presentation and their relationship to various historical periods. Discussion of various techniques in painting and renderings. Exercises and practical experience in scenic design, model making, elevations and scene painting for productions. *Prerequisite: consent of instructor. (Drama 150 recommended.)*

### 156. Principles of Lighting and Lighting Design (4)

Introduction to stage lighting, including lighting equipment, its structure, purpose, and use, basic physics of light and the principles of light, electricity, color, and artistic control of light. Instruction in the reading, layout, and design of light plots, and the execution of these principles in production. *Prerequisite: consent of instructor.*

### 157. Art of Theatrical Lighting Design (4)

Work to include "modern" design concepts, designing in dramatic time and space, use of light as scenic element, and recent advancements in lighting technology. Practical experience with light plots; execution of design principles; analysis of the execution of a lighting design; practical experience concentrating on movement, color and control. *Prerequisites: Drama 150 and 156 or consent of instructor.*

### 158. Twentieth-Century Scenography (4)

Lecture, discussion, and studio work surveying the development of the art of modern scenography from the early research of DeLouthembourg through Appia to the "new stagecraft," Epic theatre, and contemporary radical eclecticism. *Prerequisites: 53, 150, or consent of instructor. Drama 160 and 161 recommended.*

### 160. History of the Theatre I (4)

Classical period to Shakespeare — analytical and historical development of the theatre, its audience, and its playhouse as products of social, economic, literary, and aesthetic values. Playwrights, staging devices, and specific examples of dramatic literature will be discussed in detail. *Prerequisites: Drama 42, 43, 44.*

### 161. History of the Theatre II (4)

Shakespeare through nineteenth century — analytical and historical development of the theatre, its audience and its playhouse as products of social, economic, literary, and aesthetic values. Playwrights, staging devices, and specific examples of dramatic literature will be discussed in detail. *Prerequisites: Drama 42, 43, 44.*

### 162. History of Avant-Garde Theatre (4)

The course will cover the tradition of the avant-garde theatre performances from the end of the nineteenth century to the Second World War. It will deal with individual artists as well as movements which were the most representative and influential on the culture of the twentieth century. *Prerequisite: Drama 140 or consent of instructor.*

### 163. The History of Musical Theatre (4)

A discussion of the historical development of the form known as "musical comedy" beginning with the works of Gilbert and Sullivan through contemporary examples of Bernstein and Sondheim. An analysis of words and music and the tracing of the "form" as specific genre of theatrical entertainment. Such composers and lyricists as Lehár, Kern, Berlin, Gershwin, Rodgers and Hammerstein and Lerner and Lowe will be discussed and analyzed. (Not offered in 1978-79.)

### 180. Major Project in Acting/Directing (2 or 4)

Course designed specifically for the advanced drama major whose interest is primarily in the area of performance (acting and/or directing). Course work to be individualized for the specific interest and specialization of the student to allow execution of academic training in the production format. *Prerequisites: advanced standing and consent of instructor. In addition, for acting project, student must have completed Drama 130 A,B; for directing, Drama 131.*

### 181. Major Project in Design/Technical Theatre (2 or 4)

Course specifically designed for the advanced drama major whose interest is primarily in the area of design/technical theatre. Course work to be individualized for the specific interest and specialization of the student to allow execution of



academic training in the production format. *Prerequisites: advanced standing and consent of instructor. In addition, student must have completed or be enrolled in one upper-division course related to the project.*

#### 190. Masters of the Theatre (4)

This seminar study will focus on an artist of seminal importance to the development of the theatre. Intensive consideration will be given to theory and practice of the artist under consideration, with emphasis on theatrical realizations that can be reconstructed by integrative research, including biography, major theoretical texts, production records, correspondence, and critical studies. The goal is a newly rounded understanding of a complex theatre artist.

#### 191. Theory of Theatre (4)

The basic objectives of this course are: 1) to survey the most important theories of theatre from Aristotle to present-day structuralism and to establish theoretical terminology, 2) to learn to analyze a theatre production, and 3) to learn to use theoretical material as a part of the creative process for actor, playwright, and director.

#### 192. Contemporary Theatre (4)

Seminar course dealing with the forms of contemporary theatre and principal figures in the contemporary theatre world — playwrights, directors, performers. Specific topic will vary from year to year. *Prerequisites: Drama 42, 43 and 44.*

#### 193. Major Seminar (1)

Required for all drama majors. Seminar designed to provide the student with opportunity to explore a variety of topics relating to the dramatic arts to be presented by drama faculty and distinguished guest lecturers. (Pass/Not Pass grades only.)

#### 194. The Theatrical Event: From Text to Performance (4)

Focused study of the evolution of a theatrical event: from primary textual analysis through rehearsal explorations to final performance evaluation. Model material will be drawn from the work of the Ensemble Theatre, and will include presentations by directors, designers, actors; consideration of literary, social, and historical material that surround the dramatic text; development of critical modes based on knowledge of artistic intent and methods; and, finally, critical evaluation of the theatre events presented by the Ensemble Theatre. *Prerequisites: Drama 42, 43, 44 strongly recommended.*

#### 195. Instructional Assistance (2 or 4)

Assist with instruction in undergraduate drama courses. (P/NP grades only.) *Prerequisite: consent of the instructor.*

#### 196. Senior Projects (2-4)

A course specifically designed for the senior drama major whose interest is primarily in the area of design and technical theatre. The course is individualized for the specific interest and specialization of the student and allows the student to execute academic training in a practical application within the production format. *Prerequisite: consent of instructor.*

#### 197. Field Studies (4)

Course designed for students to expand their academic training through experience outside the University. *Prerequisite: consent of the instructor. P/NP only.*

#### 198. Directed Group Studies (0-2-4)

Group studies, readings, projects and discussions in drama history, problems of production and performance, and similarly appropriate topics (P/NP grades only.) *Prerequisite: consent of the instructor.*

#### 199. Special Projects in Drama (0-2-4)

Qualified students will pursue special projects in reading drama, studying history, or doing research for a production. (P/NP grades only.) *Prerequisite: consent of the instructor.*

## Graduate

#### 210 A-B-C. Theatre Process Studio I (3)

A systematic exploration of the dynamics of the process of acting, employing intensive experiential examination of various approaches, methodologies, genres, and periods to give form and substance to the actor's creative work. (Satisfactory/Unsatisfactory grades only.) *Prerequisites: 210A for B; 210B for C.*

#### 211 A-B-C. Graduate Theatre Seminar I (1-3)

A weekly seminar in which the vital inter-relationships of dramatic theory, text, and performance are probed. In addition to examination of aesthetic and critical formulations, literary analyses, historical models, and cross-cultural patterns of

performance theory, the seminar will strongly relate to the work in the theatre process studio and in theatre production. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: 211A for B; 211B for C.*

#### 212 A-B-C. Theatre Production I (1-3)

Ranging from staged readings of new plays, documentary drama, or synthetically created dramatic texts to totally integrated productions of full-length plays (faculty or student directed) and incorporating the creative contribution of actors, directors, playwrights, and critics, this intensive involvement in multiple forms of theatre will serve as the necessary creative laboratory for the MFA program. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: 212A for B; 212B for C.*

#### 213 A-B-C. Movement for Theatre I (1)

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. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: 213A for B; 213B for C.*

#### 214 A-B-C. Voice for Theatre I (1)

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. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: 214A for B; 214B for C.*

#### 215 A-B-C. Theory: Text/Performance/Design (3)

Three-quarter sequence designed as a coherent sequence of study examining intensively the three primary components of the theatrical event: the text, the performance, and the environment. There will be concentration upon the literature of our discipline, with particular emphasis on historical data, theoretical aesthetic formulations, and analytical and creative models. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: 215A for B; 215B for C.*

#### 220 A-B. Theatre Process Studio II (3)

A systematic exploration of the dynamics of the process of acting, employing intensive experiential examination of various approaches, methodologies, genres, and periods to give form and substance to the actor's creative work. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: 220A for B.*

#### 221 A-B. Graduate Theatre Seminar II (1-3)

A—Seminar focusing on approaches to and the functioning of commercial theatre and the film/television industry. Examination of the skills needed to participate in professional theatre. B—Seminar devoted to extensive examination and analysis of specific plays, in preparation for their presentation as thesis projects in the spring graduate repertory season. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: 221A for B.*

#### 222 A-B. Theatre Production II (1-3)

Ranging from staged readings of new plays, documentary drama, or synthetically created dramatic texts to totally integrated productions of full-length plays (faculty or student directed) and incorporating the creative contribution of actors, directors, playwrights, and critics, this intensive involvement in multiple forms of theatre will serve as the necessary creative laboratory for the MFA program. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: 222A for B.*

#### 223 A-B. Movement for Theatre II (1)

An advanced course in the art of movement for the theatre, building on the knowledge gained in Drama 213. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: 223A for B.*

#### 224 A-B. Voice for Theatre II (1)

Advanced voice training designed to help the actor fuse voice, emotion, and body into a fully-realized reflection of the text. (Satisfactory/Unsatisfactory grades only.) *Prerequisite: 224A for B.*

#### 297. Thesis Research (0-4)

Thesis research for MFA degree. (Satisfactory/Unsatisfactory grades only.)

#### 298. Special Projects (0-4)

Advanced seminar and research projects in theatre. (Satisfactory/Unsatisfactory grades only.)

#### 299. Thesis Project (2-8)

Specific projects in theatre individually determined to meet the developing needs, interests, and abilities of MFA candidates. (Satisfactory/Unsatisfactory grades only.)

#### 500. Apprentice Teaching (1-2)

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by faculty; handling discussions; preparation and grading examinations and other written exercises. All MFA students are required to teach one course per quarter at 25% time after their first year. (Satisfactory/Unsatisfactory grades only.)

## Earth Sciences

OFFICE: Provost, Revelle College

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Developments in the discipline of the earth sciences suggest that the most effective means for undergraduates to enter this fascinating field is for the University to enrich its course work for majors in the Departments of Chemistry and Physics with contemporary and exciting courses in the earth sciences. These enrichment courses are taught by faculty members of the Scripps Institution of Oceanography.

The program in Revelle College is one which is based on the premise that a thorough grounding in one of the above disciplines is necessary. Thus an entering student will for the first two years take the Revelle core curriculum and then elect to enter the Department of Chemistry or Physics. At the beginning of the junior year, a student will select courses in consultation with the earth sciences advisers in the Geological Sciences Group in the Scripps Institution of Oceanography and his or her own department. In most instances the student may be able to substitute earth sciences courses for major requirements or restricted electives.

The degree will be granted by the major department and will indicate that the student's education has been enriched in the earth sciences (e.g., B.A. in chemistry with specialization in earth sciences).

A student who plans to graduate with a specialization in earth sciences must complete ES 101, 102, 103, 120, and SIO 256A and two additional upper-division courses as a minimum course requirement. Additional courses for the earth sciences specialization will be selected with the aid of the earth sciences advisers. Because of course scheduling and prerequisites the normal sequence of courses begins with the series ES 101, 102, 103, 120.

This interdisciplinary program will provide the student with the information to make the choice of a graduate major with the freedom that an undergraduate major in a basic science provides. This program will not impede progress in such a basic science and will provide a concrete example of such sciences applied to earth problems.

## Courses

### Lower Division

*Lower-division courses not intended as substitutes for E.S. 101.*

#### 1. The Oceans (4)

Presents modern ideas and descriptions in the physical.

## Economics

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 wish to become professional scientists. (Previously Interdisciplinary 1) Three hours lecture, one hour discussion. *Prerequisite: some background in high school chemistry recommended.* Mr. Berger and SIO Staff (F)

### 4. The Nature of the Earth. (4)

Descriptive introduction to earth science. Emergence of our present knowledge of the earth's interior, mantle, crust, oceans and atmosphere through the study of gravity, seismology, magnetism, radioactive dating, heat flow, dynamics, and chemistry. Relation to environment and to space exploration. Three hours lecture. Mr. Bullard. (W)

### Upper Division

*Prerequisite for all upper-division earth science courses: one year of the Revelle natural science sequence or equivalent and one year of mathematics.*

### 101. Introductory Geology (4)

The origin and evolution of the earth, especially its crust, and the evolution of life as indicated by the fossil record. Emphasis is on the nature of rocks and minerals, their origin, reconstitution, and decay; the evolution of continents, ocean basins, and mountain belts; processes of vulcanism; and the work of wind, water, and glaciers in modifying the earth's surface, with the aim of creating an awareness in the student of the geological environment in which we live. Three lectures, two laboratory periods, occasional field trips. SIO Staff (F)

### 102. Introductory Geochemistry (4)

The chemistry of the earth and the solar system, and the applications of physical chemistry and nuclear physics to the study of the origin and geological history of the earth. Cosmic and terrestrial abundances of elements, nucleosynthesis, origin of the earth: mineralogy and chemistry of the earth's crust, mantle, and core; geochronology and the geological time-scale; chemistry of the atmosphere and the oceans. Three lectures, one discussion period. *Prerequisite: Earth Science 101.* Mr. Bada and Mr. Macdougall (S)

### 103. Introductory Geophysics (4)

A survey course covering the use of physical measurements to determine the structure and composition of solid earth. Discussions will include an introduction to earthquake seismology, isostasy, the gravity and magnetic fields of the earth, and use of gravity, magnetism, and seismic methods for exploration. Knowledge of the earth's interior as determined from geophysical methods. *Prerequisite: Earth Science 101.* Mr. Shor (W)

### 104. Introduction to Modern Methods in Marine Geophysics (4)

Selected geophysical subjects are treated in some depth. One or more of the following subjects will be treated in a mathematically and physically rigorous way: propagation of seismic waves; gravity; geomagnetism; thermal state of the earth's interior; electrical geophysics. *Prerequisites: Earth Science 101 and Math 2D or consent of instructor.* (W)

### 120. Mineralogy (4)

Lectures and laboratory work on symmetry, morphology, goniometry, crystal structure, elementary x-ray crystallography, physical and chemical properties of minerals and recognition of common rock-forming minerals. Use of the petrographic microscope in the study of rock-forming minerals. Two three-hour periods of laboratory and lecture. *Prerequisites: Earth Sciences 101, and 102 or concurrent registration in 102.* Ms. Kastner (S)

### 128. Modern Methods in Marine Geophysics. (4)

Survey of the various tools available for studying the nature of the oceanic crust and upper mantle including seismology, gravity, magnetism and heat flow. Interpretation methods will emphasize the ambiguity of the solutions resulting from noisy, finite data sets. Nonlinear inversion schemes will be introduced through seismic travel time analysis and linear methods through magnetic profile interpretation. The design of experiments to reduce the ambiguity of the data will be discussed. The current state of marine geophysical research will be briefly reviewed. *Prerequisite: Earth Science 104 or permission of instructor.*

### 198. Directed Group Study (2-4)

This course will cover a variety of directed group studies in areas not covered by formal departmental courses. (Pass/Not pass grades only.) *Prerequisite: consent of instructor.*

### 199. Independent Study for Undergraduates (4)

Independent reading or research on a problem by special arrangement with a faculty member. (Pass/Not pass grades only.) (F,W,S)

Note: Also see "Courses, Curricula, and Programs of Instruction: Scripps Institution of Oceanography."

## Economics

OFFICE: 3434 Humanities-Library Building, Revelle College

### Professors:

Richard Attiyeh, Ph.D.  
John Conlisk, Ph.D.  
Robert F. Engle, Ph.D.  
Clive W. J. Granger, Ph.D.  
John W. Hooper, Ph.D.  
R. Robert Russell, Ph.D.

### Associate Professors:

Donald V. T. Bear, Ph.D. (*Chairman*)  
Walter P. Heller, Ph.D.  
Ramachandra Ramanathan, Ph.D.  
Dennis Smallwood, Ph.D.

### Assistant Professors:

Vincent Crawford, Ph.D.  
David M. Lilien, Ph.D.  
Judith Mann, Ph.D.

\* \* \*

**The Economics Major Program** The undergraduate major in economics 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 are stressed. This program serves to prepare students for graduate work in economics, and in such related areas as business, law, and public administration. It also provides useful training for students who plan to enter careers in business or public administration upon graduation.

Each student majoring in economics will be required to take either Economics 1A-B-C, or 2A-B-C or 3A-B-1C. (Combinations of A, B, and C from more than one sequence are permitted — e.g., 1A-2B-1C or 3A-2B-1C are permissible alternatives.) Mathematics 1A-B-C or 2A-B-C are required for the major and should be taken if possible before beginning upper-division course work in economics. In addition to the lower-division requirements, at least twelve upper-division courses in economics must be taken, including Economics 100A-B, 110A-B, and 120A-B. These courses introduce the major to basic tools and concepts which have applicability to a wide variety of contemporary problems. Two or fewer economic history courses offered by the Department of History may be used in meeting the upper-division course requirement. A 2.0 (C) grade-point average in upper-division economics courses is a degree requirement for students majoring in economics. The only courses that can be taken on a Pass/Not Pass basis and also count toward the twelve upper-division courses required for the major are Economics 195A-B-C, 197, and 199. A maximum of twelve units taken on a P/NP basis can count toward the major.

The economics major is encouraged to discuss elective courses and choice of minor with the undergraduate adviser for economics. Depending on individual interests and career plans, courses in related fields such as political science, history, and mathematics may be appropriate. Graduate work in economics requires a strong mathematics background, which should include Mathematics 2D and 2E and, depending on the student's interests, ought to include certain upper-division mathematics courses.

In planning an upper-division program, the prospective economics major should consult with the undergraduate adviser for economics during the year in which the student takes the Economics 1, 2 or 3 sequence.

The following schedule is recommended for economics majors:

FALL	WINTER	SPRING
<b>Freshman and/or Sophomore Years</b>		
Mathematics 1A or 2A	Mathematics 1B or 2B	Mathematics 1C or 2C
Economics 1B, 2A, or 3A	Economics 1A, 2B or 3B	Economics 1C or 2C
<b>Junior Year</b>		
Economics 100A	Economics 100B	Elective
Economics 120A	Economics 120B	Elective
<b>Senior Year</b>		
Economics 110A*	Economics 110B*	Elective
Elective	Elective	Elective

\*Economics 110A-B may be taken in the junior year along with 100A-B and 120A-B.

**The Management Science Major Program** This program is designed to give the student an understanding of the quantitative techniques that have been designed for managers concerned with making the best use of scarce resources, and of their applications in both private and public enterprise. While the student will gain some familiarity with the traditional functional fields of business management, this program is more tightly focused and more quantitative than the traditional business administration major.

Students with a B.A. in management science will find themselves well prepared for further study in business administration or management science. With appropriate choice of electives, individual programs can also provide excellent preparation for graduate work in economics or public administration. Students interested in law school will normally choose the traditional economics program, though it should be noted that law schools tend to look favorably on students who have had some experience with the precise reasoning required by quantitatively-oriented courses of the type stressed in the management science curriculum. Graduates of this program who elect to seek employment upon graduation will have the advantage of having attained an understanding of the types of problems faced by practicing managers and of the modern techniques available for analyzing them. Consequently, they might have better employment opportunities than graduates of many other liberal arts majors.

Each student majoring in management sci-

ence will be required to take Economics 2A-B and Economics 4, since a good understanding of basic principles of economics, management and accounting is essential to upper-division course work. Mathematics 2A-B-C-D-E is also required, as it is also necessary that the student acquire the mathematical tools needed to understand the quantitative techniques of management science. APIS 61 is also required since many applications of management science techniques involve the use of a computer. In some instances, modification or substitution is possible in this list of lower-division course requirements. The management science adviser should be consulted regarding the acceptability of such changes.

At the upper-division level, fifteen courses are required including Economics 170A-B, Economics 171A-B-C, Economics 172A-B-C and Economics 173. The 170 sequence provides a deeper understanding of the economics of the individual enterprise than is given in lower-division economics and analyzes the nature and interdependence of managerial resource allocation decisions. Economics 171A-B-C presents techniques for analysis and decision-making under conditions of uncertainty, and Economics 172A-B-C provides a general survey of optimization techniques employed by management scientists. Economics 173 treats the structure and language of accounting systems and their use in managerial decision-making. No course work taken on a Pass/Not Pass basis may be counted toward fulfillment of upper-division major requirements.

Of the six management science electives, at least two must be chosen from among Economics 175, Financial Management; 176, Marketing Management; 177, Operations Management; and 178, Business Forecasting. Each of these courses focuses on an important set of managerial problems. The remaining electives must be selected from other upper-division economics offerings and the following courses offered by other departments:

Mathematics	102	AMES	141A-B-C
Mathematics	111A-B	AMES	146A-B-C
Mathematics	131	AMES	162A-B-C
Mathematics	170A-B-C	APIS	159A-B
Mathematics	171A-B	APIS	M162A-B-C
Mathematics	180C	Psychology	141
Mathematics	181B	Sociology	111

The following schedule is recommended:

FALL	WINTER	SPRING
<b>Freshman Year</b>		
Mathematics 2A	Mathematics 2B	Mathematics 2C
<b>Sophomore Year</b>		
Economics 2A	Economics 2B	Economics 4
Mathematics 2D	Mathematics 2E	APIS 61
<b>Junior Year</b>		
Economics 170A	Economics 170B	Economics 173
Economics 171A	Economics 171B	Economics 171C
Economics 172A	Economics 172B	Economics 172C
<b>Senior Year</b>		
Elective	Elective	Elective
Elective	Elective	Elective

Students considering management science as a major should consult the undergraduate adviser prior to beginning upper-division work.

**Minors and Programs of Concentration** Lower- and upper-division courses in economics can be combined to satisfy college requirements for minors or programs of concentration. A Revelle non-contiguous minor may be composed of any six courses, three of which must be upper-division courses and none of which may be used to satisfy the social science requirement. Certain combinations of economics courses may be used to form an optional Muir College or Third College minor or to satisfy the Warren College Program of Concentration requirement. Students seeking further information about an economics or management science minor should inquire at their college provost's office or consult with the economics undergraduate adviser.

**The Graduate Program** The department offers the M.A., C. Phil. and Ph.D. degrees. However, a student must be admitted to the Ph.D. program in order to be eligible for an M.A. or C. Phil. To receive a Ph.D., a student must pass qualifying examinations, complete an empirical project, and prepare an acceptable dissertation. The qualifying examinations consist of four written parts and an oral part. The four written parts cover microeconomics, macroeconomics, econometrics, and an elective special field. The oral part covers all areas.

There are no formal course requirements. However, to prepare for the micro, macro and econometrics qualifiers, nearly all students take the complete 200, 210 and 220 course sequences. Elective lecture courses, workshops, and individualized reading tutorials prepare students for special field qualifiers. Foreign-language proficiency is required only when it is crucial to a student's dissertation research.

Ideally, a student will have finished all qualifying examinations by the end of the second year, and will have a nearly completed dissertation by the end of the third year. In fact, it usually takes longer, though students are discouraged from remaining in residence more than four years.

Prior to entering the program, a student is required to have a knowledge of economics at least through an introductory level, and to have at least the equivalent of a one-year course in calculus. The program emphasizes proficiency in the mathematical methods of modern economic analysis. Some of these methods are taught in the first quarters of the micro, macro, and econometrics course sequences.

A detailed description of the Ph.D. program is available by writing the director of graduate studies, care of the Department of Economics. Residence and other campus-wide regulations are described in the graduate studies section of this catalog.

## Courses

### Lower Division

#### 1A-B-C. Elements of Economics (4-4-4)

The objectives of this survey course are to prepare students for a major or minor in economics, and to give those who will

not specialize in economics an understanding of how the economy functions. Elementary theories of resource allocation and income determination are used to analyze policy issues of major significance. 1A is not required for 1B, but both A and B are required for 1C.

#### 2A-B-C. Introduction to Economics Analysis (4-4-4)

The content of this course is virtually the same as that of the 1 sequence, but mathematical methods of analysis are stressed. 2A is not required for 2B, but both A and B are required for 2C. *Prerequisite: Math 1C.*

#### 3A-B. Principles of Economics (4-4)

The content of this course is virtually the same as that of Economics 1A-B, except that 3A and B emphasize policy issues relating to urban and development economics. 3A is not required for 3B. Economics 1C or 2C can be used with 3A-B to complete the three-quarter lower-division sequence required for all upper-division economics courses.

**Note:** Normally the timing of the sequences will be as follows: fall 1B, 2A, 3A; winter 1A, 2B, 3B; spring 1C, 2C. The A courses are not required for the B courses, but both the A and B courses are required for the C courses. Students with scheduling problems may combine A, B and C courses from different sequences.

#### 4. Introduction to Management and Accounting (4)

An introduction to the concept of management and its functions, with emphasis on accounting as the basic information system of organizations. Topics to be considered include: marketing, production, finance, basic accounting concepts, financial statements (construction and analysis).

## Upper Division

**Note:** All upper-division courses have as prerequisites one of the lower-division sequences: 1A-B-C, 2A-B-C or 3A-B and 1C or 2C or a combination of A, B, and C courses from different lower-division sequences. Additional prerequisites are listed under the course offerings. For courses in sequences, such as 100A-B or 171A-B-C, the A courses are prerequisite to the B courses, and the B courses are prerequisite to the C courses.

#### 100A-B. Microeconomics (4-4)

Household and firm behavior as the foundations of demand and supply. Market structure and performance, income distribution, and welfare economics. *Prerequisites: Economics 1C or 2C, and Mathematics 1C.*

#### 101. International Trade (4)

Analysis of the causes and patterns of international trade and investment, of the scope for increasing national welfare through foreign trade and investment, and of the policies for realizing those gains and for distributing them internationally. *Prerequisite: Economics 1C or 2C.*

#### 103. International Monetary Relations (4)

Balance of payments, international capital movements, and foreign exchange examined in light of current theories, policies, and problems. *Prerequisite: Economics 101.*

#### 105. Industry Organization and Public Policy (4)

Study of the structure and performance of American industry. Dimensions and determinants of market structure and performance, empirical evidence, Anti-trust laws, regulation of industry and other aspects of public policy toward industry. *Prerequisite: Economics 100B or 170B.*

#### 110A-B. Macroeconomics (4-4)

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 1C or 2C and Mathematics 1C.*

#### 111. Financial Institutions and Monetary Policy (4)

A study of the financial structure of the United States economy including analysis of bank behavior and the techniques of central bank monetary control. *Prerequisite: Economics 110B.*

#### 113. Mathematical Economics (4)

Mathematical concepts and techniques used in advanced economic analysis, applications to selected aspects of economic theory. *Prerequisites: Economics 100B or 170B, and Mathematics 2C.*

#### 115A-B. The Evolution of Economic Theory and Policy (4-4)

An examination of the evolution of economic theory and policy in Western Europe and Great Britain during the eighteenth and nineteenth centuries. While attention is given to the works of

## Economics

such individuals as A. Smith, D. Ricardo, T. R. Malthus, J. S. Mill, K. Marx, J. E. Cairnes and others; the primary emphasis is on the development of economic analysis as a response to the economic problems of the times. *Prerequisite: Economics 1C or 2C.*

### 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 1C or 2C.*

### 117. Economic Growth: Problems and Prospects (4)

Problems of economic growth in modern developed economies, with emphasis on population growth, environmental degradation, and resource conservation. *Prerequisite: Economics 110B*

### 118. Law and Economics (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. *Prerequisite: Economics 1C or 2C.*

### 120A-B-C. Statistical Methods in Economics (4-4-4)

Statistical methods of special application to economic problems, and statistical problems commonly encountered in confronting economic models with non-experimental data. Correlation and regression analysis with applications to time-series and cross-section data; estimation of simultaneous equations models. *Prerequisites: Economics 1C or 2C and Mathematics 1C.*

### 130. Public Policy (4)

The application of macroeconomic and microeconomic theory to issues of public policy and the contributions of related disciplines, e.g., political science, sociology, education, history to the solution of these problems. (The student will be required to study one problem intensively.) *Prerequisite: Economics 1C or 2C.*

### 131. Economics of the Environment (4)

Analysis of the causes of pollution (air, noise, water) and non-optimal utilization of certain resources (e.g., fisheries, wilderness areas, air) and of public policies to deal with these problems. *Prerequisite: Economics 1C or 2C.*

### 134. Regional Economics (4)

Location theory, agglomeration economics and diseconomies; transportation; migration; regional modelling. *Prerequisites: Economics 100B or 170B and 120B or 171B.*

### 135. Urban Economic Problems (4)

Analysis of causes of congestion, pollution, housing discrimination and segregation, crime, etc., and of public policies to deal with these problems. *Prerequisite: Economics 1C or 2C.*

### 136. Human Resources (4)

Theoretical and empirical analysis of public and private investment in people, emphasizing the contribution to productivity of education. *Prerequisite: Economics 1C or 2C.*

### 137. Inequality and Poverty (4)

Analysis of inequality in the distribution of income, education, and wealth, causes of poverty and public policies to combat it. *Prerequisite: Economics 1C or 2C and 120A or 171A.*

### 138. Economics of Health (4)

The application of economic analysis to health field, the role of health in income, production, and poverty, supply, demand and price determination in the public and private health sectors. *Prerequisite: Economics 1C or 2C.*

### 139. Labor Economics (4)

A study of labor markets including such topics as collective bargaining, evolution and impact of unions, labor force participation, labor mobility, the effects of technological change on unemployment. The implications for public policy will be given extended consideration. *Prerequisite: Economics 1C or 2C.*

### 150. Economics of the Public Sector: Taxation (4)

An analysis of the effects of government taxation on resource allocation and the distribution of income. The efficiency and equity of alternative forms of taxation. Optimal tax policies. Income redistribution through the fiscal process. *Prerequisite: Economics 1C or 2C.*

### 151. Economics of the Public Sector: Expenditures (4)

An analysis of the effects of government expenditure policies on resource allocation and the distribution of income. Political and economic determinants of optimal public expenditure and

investment policies. An introduction to cost-benefit analysis. *Prerequisite: Economics 100B.*

### 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 1C or 2C.*

### 160. Economic Planning (4)

A development and evaluation of techniques for indicative planning (France) and central direction of the economy (Eastern Europe). *Prerequisite: Economics 1C or 2C.*

### 161. Comparative Economic Systems (4)

Capitalism and socialism, studied as ideal models and in actual performance. *Prerequisite: Economics 1C or 2C.*

### 165. Economic Methodology and Ideology (4)

The individualistic basis of modern Western welfare economics. Alternative tenets (Marxist, radical, Maoist, Fabian, technocratic) and their implications. The roles of scientific method and ethical judgments in economic analysis. Current research and thinking in political economy. *Prerequisite: Economics 1C or 2C.*

### 170A-B. Managerial Economics (4-4)

Microeconomic theory, with special reference to costs and production and the theory of the firm; some applications. Demand analysis and forecasting, costs and production, business conditions analysis, price and other marketing variables, financial analysis. Not open to students who have taken Economics 100A-B. (Students may take 170B after taking 100A in lieu of 170A.) *Prerequisites: Economics 2A-B and Math 2C.*

### 171A-B-C. Probabilistic Systems Analysis (4-4-4)

Basic probability theory; data handling; common distributions and stochastic processes; expectation, moments, and the central limit theorem. Estimators and their properties, hypothesis testing, relations among random variables, regression analysis. Unified approach to decision-making under uncertainty. Bayesian techniques, prior and posterior distributions, value of information and preposterior analysis. 171A-B not open to students who have taken 120A-B. *Prerequisites: Mathematics 2C, Mathematics 2E and APIS 61.*

### 172A-B-C. Introduction to Operations Research (4-4-4)

Deterministic and stochastic optimization techniques. Linear programming, sensitivity, duality, integer programming; network models and related algorithms. Kuhn-Tucker theory, non-linear programming algorithms. Dynamic programming in deterministic and stochastic contexts; queueing and inventory systems and related problems. *Prerequisites: Math 2E, Economics 2A-B. Economics 171B or 120B is required for 172C. APIS 61 is strongly recommended.*

### 173. Managerial Accounting (4)

The structure of accounting systems, their underlying assumptions, and their use by management. Basic techniques for recording, summarizing and evaluating organizational activity; the income statement and balance sheet. Cost accounting and use of accounting for internal control and decision-making. *Prerequisites: Economics 1A-B, 2A-B, or 3A-B, and Economics 4.*

### 174. Advanced Topics in Management Science (4)

Content to vary from year to year; course will focus on a particular set of optimization techniques or managerial decision problems. *Prerequisites: Economics 170B, 171C and 172C, or consent of instructor.*

### 175. Financial Management (4)

Analysis and management of the flow of funds through an enterprise; functions and operations of money and capital markets, management of short-term assets and liabilities, raising long-term funds, selection of investment projects, and determination of the cost of capital. *Prerequisite: Economics 120A or 171A.*

### 176. Marketing Management (4)

The role of marketing in the economy and the functioning of markets. Operational models of buyer behavior, and techniques for demand analysis and sales forecasting. Managerial decisions relating to the marketing mix; promotion, product selection, pricing, and distribution. *Prerequisite: Economics 100B or 170B.*

### 177. Operations Management (4)

Principles and techniques relevant to problems of effective resource use faced by operating managers. Topics include project planning and control, facility design and scheduling,

quality control, maintenance policies and the function and management of inventories. *Prerequisite: Economics 172C.*

### 178. Management Science: Business Forecasting (4)

An examination and evaluation of quantitative forecasting techniques in business and economics. These techniques are applied to demand and price changes, introduction of new products, inventory levels, demographic projections and other areas in business and economics. *Prerequisite: Economics 120B or 171B.*

### 179. Management in the Public Sector (4)

Problems in evaluating the consequences of government actions; applications of cost-benefit and cost-effectiveness analysis, budgeting systems. Problems involved in the management of non-profit enterprises, approaches to their solution. *Prerequisite: Economics 170B or 100B.*

### 190A-B-C. Research Seminar (4-4-4)

Each quarter's seminar will focus on a particular contemporary economic issue. Each student will do independent work on some aspect of that issue. Students will generally be required to present their findings orally and in writing. *Prerequisites: Economics 100B, 110B, and 120B.*

### 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 senior economics majors with at least a 3.5 GPA in upper-division economics work. *Prerequisite: consent of the undergraduate adviser for economics. (Pass/Not Pass grades only.)*

### 197. Field Studies (4)

Individually arranged field studies designed to augment the student's academic training with practical experience outside the University. By special arrangement with a Department of Economics faculty member. (P/NP grades only.) *Prerequisites: consent of instructor and departmental approval.*

### 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.*

## Graduate

### 200A-B-C-D-E-F-G. Microeconomics (4-4-4-4-4-4-4)

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. 200B and 200C will be taught simultaneously in the winter quarter.

### 201A-B. Advanced Economic Theory (4-4)

An intensive examination of the literature on selected topics of current importance in economic theory. *Prerequisites: Economics 200G and 210D or consent of instructor.*

### 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. (S/U grades only.) *Prerequisite: Economics 200G.*

### 210A-B-C-D. Macroeconomics (4-4-4-4)

Neo-classical and Keynesian theories of employment, income, interest rate, price level, and other aggregate variables; macroeconomic policy; growth theory, empirical applications to single aggregate functions.

### 211A-B. Fiscal and Monetary Theory and Policy (4-4)

Macroeconomic models and empirical studies emphasizing the monetary and government sectors, the interaction of fiscal and monetary policies, and their relative impact on aggregate output and the price level; microeconomic foundations of aggregate asset demand and supply, regulation of financial institutions. *Prerequisite: Economics 210D or consent of instructor.*

### 212A-B-C. Workshop in Applied Regional and Macroeconomics (0-4/0-4/0-4)

An examination of recent research in empirical macroeconomic and regional economic models, utilizing both structural econometric and time-series methods; development of related research topics by both graduate students and faculty. (S/U grades only.) *Prerequisite: Economics 210D.*

**220A-B-C-D-E-F-G. 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 & G) are empirical applications to micro and macro economics. These require the completion of an empirical project. Both 220E & F will be offered simultaneously in the winter quarter.

**221A-B. Advanced Econometrics (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 220G, or consent of instructor.*

**230A-B. Public Economics (4-4)**

Impact of the government sector via expenditure and tax policies on resource allocation and income distribution; public goods; theory and applications of benefit-cost analysis; theory of social choice; efficiency and distributional effects of tax policies. *Prerequisite: consent of instructor.*

**232A-B. International Trade (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. Industrial Organization (4-4)**

Non-competitive market structures and their effects on firm behavior and resource allocation. Measurement of monopoly power and its change over time. Antitrust policy. *Prerequisite: Economics 200G or consent of instructor.*

**235A-B-C. Workshop in Applied Microeconomics and Industrial Organization (0-4/0-4/0-4)**

An examination of recent research in applied microeconomics with emphasis on market structure, industrial organization and regulation; development of related research topics by both graduate students and faculty. (S/U grades only.)

**236A-B. Human Resource Economics (4-4)**

Human capital formation and education; income distribution and poverty; the economics of health, the medical sector, and the role of insurance. *Prerequisite: consent of instructor.*

**238A-B. Urban and Regional Economics (4-4)**

Urban models based on location theory will be used to investigate the structure of cities and patterns of land use. The models will be expanded to cover housing, discrimination, urban renewal, transportation planning, and empirical urban modeling efforts. Regional income determination will be discussed from an analytical viewpoint emphasizing both demand and comparative advantage. Factor migration, agglomeration economics, returns to scale, externalities of congestion and pollution, local public finance and empirical regional models will be discussed. *Prerequisite: consent of instructor.*

**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 200G, 210D and 220G 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, both to act as critics and to report on their research. May be repeated for credit. (Satisfactory/Unsatisfactory grades only.)

**290A-B-C. Colloquium in Economics (0-0-0)**

Lectures presented by visiting speakers and resident faculty on research in a variety of topics in both theoretical and applied economics. (S/U only.)

**297. Independent Study (1-6)**

(Satisfactory/Unsatisfactory grades only.)

**299. Research in Economics for Dissertation (1-12)**

(Satisfactory/Unsatisfactory 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. (Satisfactory/Unsatisfactory grades only.)

## Education Abroad Program

OFFICE: International Center, Administrative Complex

Administered for the University of California by the Santa Barbara campus, the Education Abroad Program is now entering its sixteenth year of operation. Study Centers have been established in Austria, Brazil, Egypt, France, Germany, Hong Kong, Israel, Italy, Japan, Kenya, Norway, Peru, Spain, Sweden, and the United Kingdom and Ireland. A special program for students interested in film has been established in Paris. New programs also have been opened recently in Barcelona, Leningrad and in a combination of Pau and Paris. All programs are for a single academic year, except for Hong Kong, where certain qualified students enter the program as seniors and remain for one additional year of graduate study.

**Purpose** The Education Abroad Program was originally designed to give mature, highly motivated, and academically superior upper-division students from all UC campuses rich experience in a new cultural milieu as a part of their normal undergraduate program. Somewhat later, a graduate dimension was added which has now made significant contribution in assisting a small number of selected students in their programs toward advanced degrees.

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, 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 academic program of each student includes: (1) a preparatory course in the language of the country (except for the programs in Egypt, Hong Kong, Africa and United Kingdom and Ireland); (2) a full academic year of credit courses; and (3) a wide-ranging opportunity to audit courses, either in the student's special field of interest or in new fields.

In order to assist students to adjust to different academic requirements of the host university and to provide a link to American university practices, many courses taken by UC students

are supplemented by tutorials. The tutorials are conducted by graduate students or junior staff of the host university, who help UC students to resolve language difficulties, provide cultural background presupposed by the lectures, give opportunities for questioning and discussion, and supplement the lectures by reading assignments, papers and evaluation of progress.

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 graduation. 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 the provost of the college in order to ascertain how participation will affect his or her academic program. Descriptions of individual courses presently approved for UC credit may be found in the *EAP Advisers' Manual* in the International Center office, the four provosts' offices and the Central University Library on campus. Since offerings at the host universities may change rapidly, the listings in the *EAP Advisers' Manual* represent some of the courses UC students have taken in the past. 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 the 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.

Normally, students apply for admission to the program during the fall or winter quarters of their sophomore year. However, a limited number of students are accepted each year to participate as seniors and as graduate students. Such students should make inquiries of the provosts of their colleges as well as with academic advisers in their major departments in order to learn in what ways participation will affect their status.

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.

**Selection** Participants are chosen on each campus by a faculty committee appointed by the chancellor. Basic requirements

are: upper-division standing (84 units) in the University at time of participation, a 3.0 GPA at the time of application, and two years of university-level work in the language of the country with a B average; or the equivalent thereof which constitutes proficiency, as well as registration in two language courses (Literature 10 or 11, or higher) during two quarters of the sophomore year, preferably the winter and spring quarters. In addition to academic criteria for selection, the faculty committee attaches much importance to indications of the student's seriousness of purpose, maturity, and the capacity to adapt to the experience of study abroad. As part of the screening process, students are required to consult with their advisers and to obtain clearance from the University's Student Health Service.

With the exception of students from California junior colleges, transfer students are eligible if they have completed at least one quarter in the University of California at the time of selection. California junior college students may apply for the Education Abroad Program prior to their active enrollment in a campus of the University of California, but only under certain conditions. Such students, considered during their sophomore year, must compete with UC students on the campus on which application for admission is being processed. If selected for EAP, a junior college transfer student must have been clearly admitted to UC prior to departure for the program.

**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. Students participating in the Education Abroad Program are responsible to the director of the Center, to the director of the EAP, to the faculty of the University of California, and to the faculty members of the host university who are related to the program. The director of the EAP reserves the right to terminate the participation in the program of any student whose conduct (in either academic or non-academic matters), after careful consideration and full review, is judged to be contrary to the standards and regulations of the host university.

Participation in the program by minor students 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.

**Cost and Financial Aid** The Regents endeavor to bring the program within the reach of all students, regardless of their financial resources. In most instances, participants may take their University scholarships with them. The NDSL and Regents' loan fund are also available. Costs range between \$3,280 and \$6,500 for the year programs (including tuition, room and board, round-trip transportation, books, health and accident insurance and some travel). Prospective participants who require financial assistance should counsel early with the Financial Aids Office.

**Other Arrangements** The Education Abroad Program arranges transportation to various Study Centers and will assist in finding inexpensive transportation back to the United States at a time and by a means of the student's choosing. In most Study Centers a variety of housing facilities is available, including residence halls and private dwellings.

Application forms for admission to the program are available in the Education Abroad Program Office at the International Center in the Administrative Complex, UC San Diego, and are given to students following a discussion of various aspects of the program with the EAP Counselor. Completed applications are due before: early October, 1978 for USSR (spring semester); November 10, 1978 for Brazil and United Kingdom-Ireland; January 26, 1979 for Austria, Egypt, France, Germany, Hong Kong, Israel, Italy, Japan, Kenya, Mexico, Norway, Peru, Spain, Sweden and USSR (fall semester). All further information, such as course offerings, selection, orientation, withdrawal from the program after selection, schedules of departures and payment of fees may be obtained from the Education Abroad Program Office at the International Center, Administrative Complex, UC San Diego.

## Engineering

The following undergraduate programs in engineering are offered at the University of California, San Diego. Details are to be found in the sections devoted to the sponsoring departments.

Bioengineering — see Applied Mechanics and Engineering Sciences  
 Chemical Engineering — see Applied Mechanics and Engineering Sciences  
 Computer Engineering — see Applied Physics & Information Science  
 Electrical Engineering — see Applied Physics & Information Science  
 Engineering Sciences — see Applied Mechanics and Engineering Sciences  
 Engineering Physics — see Applied Physics & Information Science

## French Literature

See Literature

## Frontiers of Science

OFFICE: Provost, Revelle College

This sequence of courses is designed to be

used as a noncontiguous minor by Revelle College students who are not majoring in the sciences. However, inasmuch as the sequence will be given at the upper-division level, a knowledge of the material covered in a Revelle College lower-division sequence in the natural sciences will be presupposed. (See "Natural Sciences", this section.)

Prerequisite for all Frontiers of Science courses: junior standing, completion of Revelle's natural science sequence (or the equivalent), or consent of instructor.

## Courses

**104. Politics and Technology of the Arms Race (4)**  
 The technological, political and strategic ideas that underlie both the nuclear arms race and the attempts to control it will be discussed in historical perspective. Current attempts to limit strategic armaments also will be examined. *Prerequisites:* junior or senior standing and lower-division science desirable.

**108. Biochemical Anthropology and Individuality (4)**  
 Reconstruction of migrations of different ethnic groups will be discussed with respect to various biochemical tests. Biochemical variations due to genetic differences in human populations will also be discussed from the point of view of both disease and a changing environment. The evolutionary factors which influence biochemical changes in man will be compared to other species. A summary will be made of the concepts of biochemical individuality as related in our society as well as its impact on the practice of medicine.

**112. Quantitative Aspects of Social and Environmental Problems (4)**  
 Scientific and technical aspects of the following topics will be discussed: elements of probability theory and statistics, vital statistics and population growth, mathematical theory of the arms race, mathematical theory of the occurrence of wars, spreading of information (news and rumors), why some people will always be smarter or richer or more productive than others, occurrence of extreme events (how to predict floods and earthquakes), population density in cities, cities as organisms. To find solutions to social and environmental problems it is first necessary to analyze these problems.

**119A. Energy: Demands, Resources, Impact, Technology and Policy (4)**  
 Part and estimated future energy demands. Renewable and non-renewable energy resources. Economic impact of energy use. Environmental impact of energy use. Energy conservation in manufacturing, transportation, home use. Energy policy. *Prerequisites:* completion of lower-division science and mathematics sequence in Revelle College or equivalent (junior standing). (F) This course replaces Frontiers of Science 119.

**119B. Energy: Non-Nuclear Energy Technologies (4)**  
 Oil recovery from tar sands and oil shale. Coal production, gasification, liquifaction. 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. (W) *Prerequisite:* Frontiers of Science 119A.

**119C. 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. (S) *Prerequisites:* Frontiers of Science 119A and 119B. This course replaces Frontiers of Science 121.

**120. History, Science and Technology in Marine Archaeology (4)**  
 History, prehistory, geological and marine science and technology in marine archaeology. Sub-marine search, technologies, ocean currents, marine weather, chemistry, dating techniques, etc. are interrelated with history and prehistory of marine peoples and with discoveries in and the future of marine archaeology.

**126. Introduction to Atmospheric Science (4)**  
 Introduction to topics in the atmospheric sciences. Behavior of gases, thermal radiation, and the heat balance in the atmosphere. The planetary boundary layer, local wind systems,

fronts, cyclones, and anti-cyclones, the general circulation. Clouds and precipitation, hurricanes and tornadoes. Climate, weather and climate modification. *Prerequisites: one year of calculus and completion of a natural science sequence or equivalent in physics and chemistry.*

#### 127. Understanding Earthquake Hazard (4)

This course will deal with elementary physical concepts necessary for understanding earthquake hazard. Topics will include earthquake causes, mechanism, probability, prediction, and ways of reducing earthquake hazard. The course will include discussions of public policy concerning building design, siting of nuclear reactors and other critical structures. *Prerequisites: upper-division standing and completion of Revelle math and science requirements or equivalent.*

#### 128. Frontiers of Biophysics (4)

An introduction to frontier problems in biophysics and current approaches to their solution. Emphasis will be placed on the fundamental physical principles which govern the variety of complex living processes ranging from the molecular and cellular phenomena to the animal and human systems.

#### 129. Metaphysics II (4)

This course aims at cultivating individual students' acquisition, evaluation, and utilization of knowledge from the sciences and humanities for the purpose of addressing some of humankind's principal problems. Has technology improved or worsened the human condition? What can be done to ensure that technology provides a more constructive and progressive social force?

#### 130. Urban and Wildland Fire Phenomenology (4)

This course will emphasize basic aspects of fire as a phenomenon and will touch only peripherally on its economic impact and social implications. Attention will be given to the physics, chemical equilibria, chemical kinetics, fluid dynamics, transport properties and heat and mass transfer that occur in fires. Prediction of fire histories and the development of methods for fire control will be reviewed.

#### 131. The Common Ground of Art and Science (4)

This introductory course will explore some of the ground common to art and science. Archaeological evidence leads to a picture of the development of certain technologies through their connection with art. This relationship will be traced from antiquity to the present with examples from metallurgy, mathematics, alchemy, astronomy and physics.

## German Literature

See Literature

## Greek Literature

See Literature

## Hebrew Literature

See Literature

## History

OFFICE: Room 5024 Humanities and Social Sciences Building, Muir College

### Professors:

†H. Stuart Hughes, Ph.D.  
Gabriel Jackson, Ph.D.  
Thomas A. Metzger, Ph.D.  
†Allan Mitchell, Ph.D.  
Earl Pomeroy, Ph.D., *Chairman*  
†††Armin Rappaport, Ph.D.  
Ramón Eduardo Ruiz, Ph.D.  
Harry N. Scheiber, Ph.D.  
James R. Scobie, Ph.D.

### Adjunct Professors:

Leften S. Stavrianos, Ph.D.

### Associate Professors:

Stanley Chodorow, Ph.D.  
Judith M. Hughes, Ph.D.  
†††Alden A. Mosshammer, Ph.D.  
†Michael E. Parrish, Ph.D.  
Edward Reynolds, Ph.D.

†David R. Ringrose, Ph.D.  
Robert C. Ritchie, Ph.D.

### Assistant Professors:

†Thomas Dublin, Ph.D.  
Robert S. Edelman, Ph.D.  
††David S. Luft, Ph.D.  
John A. Marino, Ph.D.  
\*\*Michael P. Monteon, Ph.D.  
Paul G. Pickowicz, Ph.D.  
\*\*Ricardo Romo, Ph.D.  
\*\*\*Emory J. Tolbert, Ph.D.

### Acting Assistant Professor:

Kathryn Norberg

### Lecturer:

Ingrid Scobie, Ph.D.

\*Leave of absence, 1978/79  
†Leave of absence, fall 1978  
††Leave of absence, winter 1979  
\*\*Leave of absence, fall 1978, winter 1979  
†††Leave of absence, spring 1979

## The Major Program

Students majoring in the Department of History are required to take (1) a three-quarter lower-division course (or the equivalent) and (2) a minimum of twelve upper-division courses in history. The upper-division courses must be distributed among the four fields offered by the department.

**Prerequisites** History 1A-1B-1C  
(Comparative History of the Americas)

or

History 3A-3B-3C (European Society and Social Thought)

or

History 6A-6B-6C (The Third World: The Origins and Consequences of Underdevelopment)

or

History 7A-7B-7C, Race and Ethnicity in the United States: A comparative study

or

Humanities 11A-11B-11C

or

Humanities 12A-12B-12C

### Fields

1. Europe
2. Western Hemisphere (United States and Latin America)
3. Nonwestern History (Africa and Asia)
4. Economic and Social History.

Students will fulfill a distribution requirement as follows:

1. seven quarter courses in one of the three fields;
2. three quarter courses in a field other than the primary one;
3. two quarter courses in the remaining fields;

Students electing IV (Economic and Social History) as their principal field of concentration will fulfill a distribution requirement as follows:

1. Five quarter courses from the following group of economic history offerings:  
112A-112B: Economic History of Europe  
158A-158B: Economic History of the United States

178: Economic History of Africa  
Colloquia in economic history where appropriate.

- II. One colloquium in economic history or social history from a list to be provided (in addition to any colloquia which might be used to satisfy the five-quarter requirement above).
- III. Three quarter courses in social or economic history topics.
- IV. Three quarter-courses which do not fall under any of the economic and social history categories above.

Each year the department will cross-list courses given by other departments making it possible for history majors to use those courses in fulfillment of the requirements for the major. In no case, however, will students be able to use more than two cross-listed courses in fulfilling the department's program.

History majors are urged to take courses in related disciplines to enhance their understanding of the historical process and to strengthen their preparation in the major. Such courses should be selected in consultation with the adviser. A "C" average is required to graduate with a major in history.

**Honors** The department offers a special program for outstanding students leading to the degree of Bachelor of Arts with a major in history honors. 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 upon the student's academic record and the recommendation of professors familiar with the student's work. Interested candidates should complete the application form (available in Department of History office) prior to April 1.

The honors program consists, in addition to regular course work in the department, of a colloquium in history offered in the fall quarter of the senior year and a program of independent study leading to the preparation 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 and the honors committee. During the winter quarter the student pursues a course of independent study devoted to the completion of the honors essay. The award of history honors is based on satisfactory completion of the colloquium in history and the honors essay and upon the maintenance of an average of 3.0 or better in all work taken within the department. In addition, honors candidates are expected to include at least three colloquia in their regular course work.

Candidates for history honors should organize their work as follows:

1. six quarters in one of the major fields offered by the department, of which two or three courses should be colloquia;

## History

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. History 196Q Colloquium in History;
4. History 196A-B (4-4): History Honors-Honors Essay.

### History 196A. History Honors (4)

A program of independent study providing candidates for history honors with an opportunity to develop, in consultation with an adviser, a preliminary proposal for the honors essay.

### History 196B. The Honors Essay (4)

Independent study under the supervision of a faculty member, leading to the preparation of an honors essay.

### History 196Q. 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 permission.

## The Graduate Program

**Master's Degree Program** The Department of History offers work leading to a master's degree with a concentration in the Third World, United States social and ethnic history, or European history. Admission to the master's program is based upon the applicant's undergraduate record, previous graduate work if any, and letters of recommendation. Applicants are required to submit Graduate Record Examination scores and one or two papers written for history courses. The grade-point average ordinarily required for admission is 3.0. Applicants are expected to have attained a somewhat higher average in history and related courses in the humanities and social sciences. Students are ordinarily admitted to the graduate program only to begin in the fall quarter. The deadline for filing applications is January 15th.

**General Requirements** Students admitted to the master's program are expected to finish their degree requirements within one academic year. They must successfully complete a minimum of thirty-six units, of which at least twenty units must be in colloquia. With the permission of the instructor, master's students may enroll in seminars offered for Ph.D. candidates. In addition to meeting these course requirements, each student must pass a comprehensive oral examination. Students in European history and Third World history are required to demonstrate a reading knowledge of at least one foreign language relevant to their course work, a requirement satisfied by a score of at least 600 on the Educational Testing Service (ETS) examination.

### Area of Concentration: Third World

Master's students who pursue this area of concentration should gain an understanding and appreciation of the people of the Third World in their historical development and relationship to the West. In addition to training in historical literature and concepts, students may take appropriate courses offered in other departments. The requirement of nine courses (36 units) is distributed as follows:

1. History 190Q: Colloquium in Third World History (four units to be offered in the fall

quarter; required of all master's students in the Third World area of concentration);

- II. six courses (twenty-four units, of which no more than sixteen may be in any one field) in Chinese, African, or Latin American history;
- III. two additional courses (eight units), approved by the student's graduate adviser, in history or in another department.

### Area of Concentration: United States

Details of the requirements for the master's degree in American history are available from the Department of History on request.

### Area of Concentration: European

Candidates for the master's degree in European history pursue a program concentrating on the impact of industrialization in modern European society. In addition to providing general training in the history of modern Europe, the program requires some background in earlier European history, in order to set the effects of industrialization in historical perspective. Some training in a discipline other than history is also required. The requirement of nine courses (36 units) is normally distributed as follows:

- I. History 106Q-107Q-108Q. Central problems of European history: 1500-1715, 1715-1850, 1850-1945. Above colloquia are required of all entering graduate students in European history.
- II. Two courses in pre-industrial Europe, 1450-1750. 106Q and 107Q may be counted for this distribution requirement.
- III. Two courses in industrial Europe post-1750. 107Q and 108Q may be counted for this requirement.
- IV. A graduate seminar.
- V. One course in a discipline other than history, if relevant to the student's program.

Note: 106Q may be used for the distribution requirement for early modern Europe. 107Q may be used for the distribution requirement for either early modern Europe or modern Europe.

### Area of Concentration: Latin America

The program in Latin American history provides broad background in this world area in preparation for careers in business, education, and government, or for more advanced degree work. Students will have opportunities to specialize further in Mexico, Argentina, Brazil, or Cuba. Advanced work in another discipline related to Latin America may also be included in the program. The nine courses (36 units) normally should be distributed as follows:

1. History 240ABC. Literature of Latin American History (required of all entering graduate students in Latin American history).
2. Four Latin American history courses, in-

cluding graduate seminars if appropriate to the student's plan of work.

3. Two courses, related to Latin America and selected in consultation with the student's adviser, from other areas of history or from other disciplines.

## Ph.D. Program

**Admission** The Department of History offers graduate work leading to the degree of Doctor of Philosophy, with a concentration in European history, Hispanic World, or United States history. Admission to these programs is based upon the applicant's undergraduate preparation, previous graduate record and letters of recommendation. In order to evaluate the applicant's level of preparation, the department requires scores from the Graduate Record Examination and one or two papers. The department prefers papers written for history courses but accepts papers written in other fields. The minimum grade-point average for admission is 3.0, and applicants are expected to have attained a somewhat higher average in history and related courses in the humanities and social sciences. While proficiency in a foreign language is not an absolute requirement for admission, prospective applicants are strongly urged to begin study of a foreign language relevant to the proposed area of concentration as early as possible in their academic careers. Students are ordinarily admitted to the graduate program only for the fall quarter. The deadline for filing applications is the 15th of January.

**Fields of Study** During the first quarter of residence each student, after consulting with a graduate adviser in the area of concentration and obtaining approval of the graduate committee, selects one major field of study and two minor fields. Within the 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. European History
  - A. Major Fields
    1. Modern Europe with a specialty in England, Spain, France, Germany, social history, economic history, diplomatic history, or intellectual history.
    2. Early Modern Europe with a specialty in expansion of Europe or any of the above.
    3. Medieval Europe with a specialty in political theory, canon law, or the politics of the eleventh-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. Greek and Roman history
    2. Medieval Europe
    3. Early Modern Europe



4. Modern Europe
5. England
6. Russia
- C. Second Minor
  1. A geographic area outside of Western Europe
  2. Expansion of Europe
  3. A related discipline
- II. Hispanic World
  - A. Major Fields
    1. The national period of Spanish America with a specialty in Cuba, Mexico, or socio-economic history
    2. Colonial Spanish America with a specialty in economic history, political institutions, or history of Mexico.
  - 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. Spain
    2. United States
    3. Another geographic area outside Spanish America
    4. Expansion of Europe
    5. A related discipline
- III. United States History
  - A. Major Fields
    1. Colonial and Early American period to 1789
    2. National period, 1789-1877
    3. Modern America, 1877 to present
    4. Diplomatic history
    5. Economic history
    6. The American West
    7. Social history
    8. Legal and constitutional history
  - B. First Minor
    1. Any of the fields listed above. Of the two fields required in United States history, one must be a chronological field
    2. Ethnic-urban history of the United States
  - C. Second Minor
    1. A geographic area outside the United States
    2. A related discipline

The department also offers graduate work in African and Chinese history. Students may select minor fields in these areas as appropriate.

### Language Requirements

1. Students ordinarily satisfy the foreign language requirements by passing an Educational Testing Service examination with a score of 600 or better. In some instances, when the graduate committee determines that an ETS examination is not appropriate, the student may be required to pass an examination prepared by the department.
2. Students concentrating in European history must pass two foreign language

examinations. The choice of the two languages must be approved by the graduate committee. A third language may be required when necessary for dissertation research. In the special case of British history, the language requirement may, upon petition, be reduced to one.

3. Students concentrating in Hispanic World must pass one foreign language examination. A second language may be required for purposes of dissertation research.
4. Students concentrating in United States history are not required to pass a foreign language examination. Note: When specifically relevant, language requirements may be set for individual students by their thesis advisers.
5. At least one foreign language examination must be completed by the end of the first year of study. Failure to meet this requirement is grounds for dismissal from the program. Students in European or Hispanic history are not permitted to take the preliminary examination before the completion of one language requirement. No student is permitted to take the qualifying examination before the completion of all language requirements.

**Course Work** Graduate work in the department is ordinarily conducted by means of two-quarter research seminars (four units per quarter), one-quarter colloquia (four units per quarter) and directed reading. A full-time program consists of a minimum of twelve units per quarter, of which a maximum of four units may be in apprentice teaching. A Ph.D. candidate who is not a T.A. and is burdened by outside employment and family responsibilities may petition for a reduction of course load to nine units per quarter. Students are expected to complete the following minimal program of formal courses: two two-quarter research seminars, five quarters of colloquia in the major and first minor and three quarters of colloquia in the second minor. Under certain circumstances, when appropriate colloquia are not available, students may substitute upper-division undergraduate courses for colloquia in the minor fields.

### Apprentice Teaching and Research

As preparation for a future academic career, every graduate student in history is expected to participate in one of the department's teaching and research programs. Under the supervision of a professor, the student may become a teaching assistant in one of the introductory courses for undergraduates; or he or she may develop special research techniques. Such apprenticeship training, for which regular academic credit is awarded, is an integral part of the graduate program in history at UC San Diego and, as such, constitutes one of the requirements for the Ph.D.

**Examinations** It is required of all Ph.D. candidates that they take at least one examination in the spring of their second year and that they complete all examinations by January of

their third year. They must successfully pass written examinations in their minor fields and an oral examination in the major field. A reading list in the major field, prepared by the Ph.D. candidate in consultation with his or her adviser, should be circulated to the members of the Ph.D. committee at least one week before the examination. In a minor field for the Ph.D., one professor should compose and grade each written examination, although advisory readings may be requested. Students should be informed at least three months in advance who the examiner will be. Minor field examiners may administer an oral examination when the student's performance remains in doubt.

Students who wish to delay completion of their examinations beyond the fall quarter of the third year must petition the graduate committee for an exception. Examinations will be administered normally in November, January, and May. Students who fail either their major or minor field examinations may petition the graduate committee for permission to stand for the examination again at the next scheduled administration. A second failure results automatically in dismissal from the program.

In addition to the formal examination procedure, each student's progress is reviewed at the end of the first year of residence. Students are advised of the results of this review by the graduate committee.

For continuing Ph.D. students an M.A. may be awarded on one of the following two bases:

1. after passing the qualifying examination for the Ph.D.;
2. after completing course work equivalent to that required of an M.A. candidate (including a graduate seminar) and an oral examination.

Note: Students who wish to receive an M.A. degree must apply for candidacy during the first two weeks of the quarter in which they expect to receive their degree.

**Dissertation** Upon completion of the examinations and advancement to candidacy, the student writes a dissertation under the supervision of the major professor and the doctoral committee. The dissertation must be completed not later than six years from the beginning of the program. Normally, the dissertation should not exceed 250 pages, notes included. A final defense of the thesis is conducted by the student's doctoral committee.

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 UC San Diego, there may be appropriate adjustments in the course work. Nevertheless, candidates will be required to demonstrate reading knowledge of one or more foreign languages, depending on the major field; to pass the departmental and qualifying examinations; to write a dissertation; and to pass the final oral examination.

### Lower Division

The Department of History cooperates in the teaching and administration of the Humanities

## History

sequence for Revelle College students. (See "Interdisciplinary Courses".) (Transfer students with credit for a two-semester, lower-division history sequence may be admitted to the upper-division courses.)

### 1A-B-C. Comparative History of the Americas (4-4-4)

A lecture-discussion course on the comparative history of Spanish America and the United States from the pre-Columbian period to the present. Through lectures, panel discussions, and readings, students will compare and contrast selected aspects of the political systems, economic developments, and cultural currents in the Americas. Among the topics to be covered are: patterns of conquest, slavery and race relations, the impact of technology, war, and imperialism.

### 3A-B-C. European Society and Social Thought (4-4-4)

An examination by lectures and discussion of European social development and social theory from the later medieval period to the twentieth century. Important writings will be considered both as responses and as provocations to social change in Europe.

### 6A-B-C. The Third World: The Origins & Consequences of Underdevelopment (4-4-4)

The history of the Third World — Asia, Africa, and Latin America — is surveyed from the fifteenth century to the present. Emphasis is placed not only on the events of the past but on the contemporary significance of those events. The first quarter traces the origins of European empires, the interrelationship between these empires and process of underdevelopment in the Third World, and the beginnings of indigenous resistance to imperialism. The next quarter describes the breakdown of imperial order in the 19th and 20th centuries, placing special emphasis on the course of Third World Revolutions. Finally the course examines the contemporary dilemmas of underdeveloped areas — reviewing the weight of the past on the present — and discusses different strategies, both political and economic, for solving these dilemmas.

### 7A-B-C. Race and Ethnicity in the United States: A Comparative Study (4-4-4)

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, power and protest in modern America. Attention is focused on Native American, Mexican-American, the Black, Asian-American, and White ethnic groups.

### 30A-B-C. The United States (4-4-4)

Examines intensively a series of nine topics over the year drawn from American history, chosen to show the diversity of materials and techniques which historians use. (Not offered in 1978-79.)

### 31. Environment and Economy in Historical Perspective (4)

The influence of geography, disease, technology, and climate on historical change. Problems of population and man's impact on his ecological context. From the perspective of pre-industrial Europe, pre-industrial Third World, and industrial Europe and the United States. *Prerequisite: none.*

### 90. Contemporary Spain and Portugal (none)

Freshman seminar intended to introduce students to culture and politics of the Iberian peninsula. Readings in *New York Times*, *The Economist*, *Nation*, etc. with a view to placing current revolutionary political developments in historical perspective. *Prerequisites: curiosity, willingness to read.* (Not offered in 1978-79.)

## Upper Division

### 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 (1900-445 B.C.) (Not offered in 1978-79.)

### 101A-B. Greece in the Classical Age (4-4)

The political, economic and intellectual history of Greece from the birth of the city-states to the death of Alexander the Great. Three hours lecture and discussion. (Not offered in 1978-79.)

### 101Q. Special Topics in Greek History (4)

See *Colloquia*, below.

### 102A-B. The Roman Republic and Empire (4-4)

The political, economic and intellectual history of the Roman

world from the foundation of Rome to the death of Constantine. Lecture and discussion.

### 102Q. Special Topics in Roman History (4-4)

See *Colloquia*, below.

### 103A-B. Medieval England (4)

Course covers the history of England from Roman times to the Wars of the Roses. Students will study the development of English government, society, and culture. *Prerequisite: humanities sequence or equivalent or permission of instructor.* (Not offered in 1978-79.)

### 104A-B. The Rise of Europe (4-4)

The development of European society from the decline of the Roman Empire to 1250. *Prerequisite: humanities sequence or its equivalent.*

### 104L. Special Topics in Middle Ages — Lectures (2)

Course of lectures devoted to specific historical subjects concerned with Medieval Europe. *Prerequisite: 104A-B or permission of the instructor. Upper-division or graduate standing.*

### 104Q. Special Topics in Medieval History (4)

See *Colloquia*, below.

### 105A-B. Renaissance Europe, 1348-1517 (4-4)

The intellectual, political, and economic transformation of late-medieval Europe from the crisis of the Italian civic spirit to the flowering of the Renaissance monarchies. The concurrent evolution of diplomacy, warfare, and political behavior.

### 105Q. Topics in the Intellectual History of Early Modern Europe (4)

See *Colloquia*, below.

### 106A-B. Reformation Europe, 1500-1660 (4-4)

A lecture-discussion course focusing on the impact of the Reformation, the development of monarchical institutions and the impact of the scientific revolution. *Prerequisite: upper-division standing or permission of the instructor.*

### 106Q. Central Problems in European History from 1500-1715 (4)

See *Colloquia*, below.

### 107A-B. The Old Regime and the French Revolution (4-4)

A lecture-discussion course on Europe from 1660-1815, examining the political and social institutions of the absolutist state and the causes and impact of the French Revolution. 107A covers the period of the Old Regime; 107B covers the period of the French Revolution. 107A is not a prerequisite for 107B. *Prerequisite: upper-division standing or permission of the instructor.*

### 107Q. Central Problems in European History from 1715-1850 (4)

See *Colloquia*, below.

### 108A-B. Europe 1815-1870 (4-4)

The impact of the French Revolution and the Industrial Revolution on European society and politics. Special emphasis will be placed on the social effects of industrialization, and the emergence of the working classes and revolutionary ideology. 108A covers 1815 to 1848; 108B, 1848-1870. 108A is not a prerequisite for 108B. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

### 108Q. Central Problems in European History from 1850-1945 (4)

See *Colloquia*, below.

### 109A-B. Europe Since 1870 (4-4)

A lecture-discussion course dealing with major problems of European history since 1870 and investigating the special character of Europe's crisis of modernization. The course will emphasize the impact of the second industrial revolution, the crisis of socialism, the emergence of fascism, and the two World Wars. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

### 109Q. Special Topics in Twentieth-Century European Social Thought (4)

See *Colloquia*, below.

### 110A. Russian History from Ninth Century to 1855 (4)

The roots of Russian backwardness. The role of dominant personalities (Ivan the Terrible, Peter the Great, Catherine the Great) will be assessed in terms of their long-range historical input. May be taken without 110B. *Prerequisite: upper-division standing or permission of the instructor.*

### 110B. Russia: 1855 to the Present (4)

The long-term causes of the Revolution and its ultimate consequences. Herzen, Lenin, Stalin, and Nicholas and Alexandra. May be taken without 110A. *Prerequisite: upper-division standing or permission of the instructor.*

### 110Q. Lenin and the Russian Revolution (4)

See *Colloquia*, below.

### 111A. Renaissance and Reformation England (4)

An examination of social, political and intellectual developments from the end of the fifteenth century to the beginning of the seventeenth century. Topics to be covered include the establishment of the Tudor monarchy, humanism, and the English Revolution. *Prerequisite: upper-division standing or permission of the instructor.*

### 111B. England — The Revolutionary Age (4)

An examination of the social, political and intellectual developments, 1600-1715. Topics to be covered include constitutional conflict and revolution, Puritanism, and the scientific revolution. *Prerequisite: upper-division standing or permission of the instructor. 111A strongly recommended.*

### 112A. Economic Life in Pre-Industrial Europe: 1000-1750 (4)

Analysis of the underlying structures of a rural economy and society, including interaction of geography, population change, resources, and technology. Evolution of market and state as the dominant economic institutions of modern life: medieval commercial cities, unification of the European market system, mercantilism, and the economic impact of emerging bureaucracies. *Prerequisite: upper-division standing or permission of the instructor.*

### 112B. The Industrialization of Europe (1750-Present) (4)

The beginning of industrialization in England and its spread through 19th-century Europe: role of the state, imperialism, economic ideologies, organization of production, impact on traditional socio-economic structures. World War I and the redefinition of economy: private enterprise vs. social justice, national income accounting, big business vs. state planning, environmental limitations on material "progress". *Prerequisite: upper-division standing or permission of the instructor.*

### 112Q. Special Topics in European Economic History (4)

See *Colloquia*, below.

### 113. European Diplomatic History, 1870-1945 (4)

The creation of the alliance system and the practice of European diplomacy at its zenith. The limitations of this diplomacy and the outbreak of the First World War. Efforts at peace and peacemaking, 1917-1919. The unresolved German question and the breakdown of the postwar settlement. The advent of Hitler and the disarray of the Western democracies. The Second World War: reversals of alliances and emergence of the superpowers. *Prerequisite: upper-division standing or permission of the instructor.*

### 114. European Intellectual History, 1795-1890 (4)

Focus on social thought in the central decades 1830-70, primarily in France and Germany, with more peripheral attention to Great Britain and Italy. Reading in Saint-Simon, Hegel, Tocqueville, Mill, Marx, Darwin, and Nietzsche. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

### 115. Causes of the Great European Revolutions (4)

Why they happen; how they happen. A comparative treatment of the English, French, and Russian revolutions. Stress will be placed on the historiographical, theoretical, and philosophical implications of these events. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

### 116. The Social History of Early Modern Europe (4)

A survey of European society from ca. 1700-1848. Topics covered will include: agrarian society, the impact of industrialization, the rise of professions, witchcraft, banditry and crime, the history of childhood, and position of women, education and popular culture. *Prerequisite: upper-division standing or permission of the instructor.*

### 116Q. Special Topics in the Social History of Early Modern Europe

See *Colloquia*, below.

### 117. The Atlantic World in the Revolutionary Age: 1700-1825 (4)

This course will explore the connections between the rapid expansion of Atlantic commerce in the 18th century and the

widespread changes in political organization around the Atlantic between 1775 and 1825. It will compare the commercial societies of England, Holland, France, and Iberia with their extensions in eighteenth-century America and analyze the differing responses to commercial growth at the beginning of the 19th century. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

#### 118. The Austrian Empire: 1809-1918 (4)

The social, political, and cultural history of nineteenth-century Austria, particularly after 1867. The course emphasizes the crisis of the liberal elites; the Viennese cultural renaissance (Freud, Hofmannsthal, Wittgenstein, Mahler); the emergence of modern mass politics, nationalism, and antisemitism; the impact of Austria's decline on modern Germany. *Prerequisite: upper-division standing or permission of the instructor.*

#### 119. European Intellectual History, 1890-1933 (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 Sorel, Weber, Freud, and Mann. *Prerequisite: upper-division standing or permission of the instructor.*

#### 119Q. Special Topics in Modern European Intellectual History (4)

See *Colloquia*, below.

#### 120. Modern French History (4)

A lecture-discussion course on the political and social history of France during the nineteenth and twentieth centuries. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

#### 120Q. Colloquium in Nineteenth-Century Europe (4)

See *Colloquia*, below.

#### 121. 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 permission of the instructor.* (Not offered in 1978-79.)

#### 121Q. Colloquium in Twentieth-Century Europe (4)

See *Colloquia*, below.

#### 122. British History since 1850 (4)

Emphasis on changes in social structure and corresponding shifts in political power. The expansion and the end of empire. The erosion of world economic leadership. The welfare state and its mounting costs. *Prerequisite: upper-division standing or permission of the instructor.*

#### 123. Social and Political Thought in Europe: 1500-1700 (4)

Special topics in English and European social and political thought between 1500 and 1700. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

#### 124. Social and Cultural History of Europe since 1945 (4)

Europe in the post-European world. The failure of the war-time Resistance. The restoration of bourgeois society. Economic boom and the new role of meritocracy, labor unions, and public enterprise. The end of empire. Population shifts and the problems of foreign workers. Neorealism, existentialism, and the German cultural revival. Thaw and refreeze in Eastern Europe. The European Economic Community. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

#### 125. Italy since 1860 (4)

Political and social history since the unification treated primarily in terms of the successive attempts of parliamentary monarchy, Fascism, Christian Democracy, and Communism to cope with such basic issues as church-state relations, the problem of the South, and the cleavages within Italian society. *Prerequisite: upper-division standing or permission of the instructor.*

#### 126Q. Ideology and the Imagination in France, 1850-1950 (4)

See *Colloquia*, below.

#### 127Q. Ideology and the Imagination in France, 1850-1950 (4)

See *Colloquia*, below.

#### 128. Women and the Family in European Society (4)

A survey of the history of women in Europe from classical Greece to the eve of industrialization. Topics include the legal position of women, women's work, the evolution of the family,

sexual roles and attitudes, and misogyny and other male attitudes toward women. Emphasis on period and topic will vary in different years. *Prerequisite: upper-division standing or permission of the instructor.*

#### 129Q. History of Law in Philosophical Perspective (4)

See *Colloquia*, below.

#### 130A-130B. The Expansion of Europe (4-4)

The techniques, economic organization and institutional evolution of European colonizations in Africa, the Far East and the Americas. The great geographical discoveries and the beginnings of world trade, with emphasis on comparative aspects. (Not offered in 1978-79.)

#### 130Q. Special Topics: Expansion of Europe (4)

See *Colloquia*, below.

#### 133. Medieval and Golden Age Spain (4)

Interaction of the Muslim, Christian and Jewish communities, c. 700-1100. The Reconquest, economic and social development of Castile and Aragon. Inquisition, Renaissance, and Counter-Reformation. Political and cultural role in Europe and America, 1500-1650. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

#### 133Q. Colloquium on Medieval and Renaissance Spain (4)

See *Colloquia*, below.

#### 134Q. Spain in the Eighteenth Century (4)

See *Colloquia*, below.

#### 135. Spain since 1808 (4)

Resistance to Napoleon, Liberal revolution, Carlist wars and the era of pronunciamientos. Industrialization, urbanization. Krausism, socialism, anarchism. The Primo dictatorship, the Republic, the Civil War, and the Franco regime, 1923-present. *Prerequisite: upper-division standing or permission of the instructor.*

#### 135Q. Colloquium on the Spanish Civil War (4)

See *Colloquia*, below.

#### 136. Peasant and Proletarian Movements in Spain (4)

Peasant ideologies, cantonalism, rural anarchism in the nineteenth century; socialist and anarcho-sindicalist labor federations; Left parties and collectivist experiments of the 1930's. *Prerequisite: permission of the instructor.* (Not offered in 1978-79.)

#### 136Q. Colloquium on Spain since 1790 (4)

See *Colloquia*, below.

#### 140A. Colonial Latin America (4)

Emphasis on pre-conquest civilizations, the development of Spain and Portugal, and the experiences of the Iberian colonies (1400-1750). *Prerequisite: upper-division standing or permission of the instructor.*

#### 140B. Emergence of Latin-American Nations (4)

Transition from colonies to nations, impact of economic changes, new social, intellectual, and political influences and forces (18th and 19th centuries). *Prerequisite: upper-division standing or permission of the instructor.*

#### 140C. Latin America in the Twentieth Century (4)

Twentieth-century development with attention to themes of industrialization, dependency, military, and the United States and case studies of Argentina, Brazil, Cuba, and Mexico. *Prerequisite: upper-division standing or permission of the instructor.*

#### 143. Brazil: Colony, Empire, Republic (4)

Lectures, discussions, and readings focus on the socio-economic and political expansion of this former Portuguese colony into a major Latin American power (1500-present). *Prerequisite: upper-division standing or permission of the instructor.*

#### 144. Argentine Growth and Development (4)

Following an introduction to the economy and society of the Río de la Plata area from 1500 to 1850, the lectures and discussions will emphasize political development, economic growth, and social change of modern-day Argentina. *Prerequisite: upper-division standing or permission of the instructor.*

#### 145. 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. *Prerequisite: upper-division standing or permission of the instructor.*

#### 146A-B. A History of Mexico (4-4)

From the Conquest through the Revolution of 1910. The second quarter covers the period since 1910.

#### 146Q. Topics in Latin-American History, 1810-1910 (4)

See *Colloquia*, below.

#### 147. 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.

#### 147Q. Topics in Latin-American History, since 1910 (4)

See *Colloquia*, below.

#### 148A. The Urban Culture of South America, 1830-1920 (4)

The course will compare contemporary social science theories of urban development with the historical experience of several nineteenth-century primary cities in South America: Lima, Santiago de Chile, Rio de Janeiro, Sao Paulo, and Buenos Aires. Specific topics of discussion will include the city as an administrative and economic center, the influence of intellectuals in altering a traditional culture, and the rise of labor radicalism and urban mass politics. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

#### 148B. The City in South America, 1920-present (4)

Are overgrown urban areas the principal cause of South America's underdevelopment? The course will examine conflicting theories of specific urban crises and compare these theories to the need for a general interpretation of the contemporary crisis of the continent. Specific topics of discussion will include the persistence of pre-modern forms of economic and political urban behavior, the role of the military as an urban institution, the role of intellectuals in rationalizing a cultural crisis, and the social impact of growing slums. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

#### 149. Egalitarian Revolutionary Movements in Latin America, 1850-Present (4)

Will discuss the social origins, personalities, and ideologies of the major Latin-American revolutionary movements in the modern era; emphasis will be placed on the issue of violent upheaval as a means of substantial social change. *Prerequisites: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

#### 150. Anglo-American Rural Life: 1450-1750 (4)

This course will deal with the changing structure of English rural life as it responded to the growth of capitalism and then to the problems of the New World. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

#### 150Q. Colloquium in the Literature of Ethnic History (4)

See *Colloquia*, below.

#### 151Q. Colloquium in Nineteenth-Century United States History (4)

See *Colloquia*, below.

#### 152. History of the Far West (4)

The trans-Mississippi West, emphasizing the Pacific Slope and the time since the migrations of the 1840's. *Prerequisite: upper-division standing or permission of the instructor.*

#### 152Q. Colloquium in Social and Ethnic History (4)

See *Colloquia*, below.

#### 153Q. Colloquium: American Federalism (4)

See *Colloquia*, below.

#### 155A. Social and Economic History of the Southwest (4)

An introduction to American borderland history with special emphasis on historiography, economic and social developments of the border states during the eighteenth and nineteenth centuries. The course is designed to present various interpretations of American Southwestern history.

#### 155B. Social and Economic History of the Southwest (4)

The course will consider the significant trends in Mexican-

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American history over the past 100 years in the Southwest. Special emphasis will be placed upon primary documents relating to Mexican-Americans in economic and social institutions. (Not offered in 1978-79.)

### 156A-B. The Social History of the American City (4-4)

A two-term topical approach to the processes of urbanization in the United States. Among the subjects covered are urban historiography, comparisons between pre-industrial and industrial cities, urban growth, occupational and social mobility, immigration, and urban economic, social, and political structures. (Not offered in 1978-79.)

### 156Q. American Urban History (4)

See *Colloquia*, below.

### 157A-B. American Legal and Constitutional History (4-4)

A lecture-discussion course on the growth of constitutionalism in the United States from 1787 to the present, with particular emphasis upon the judicial process, the role of the Supreme Court, and legal institutions. *Prerequisite: upper-division standing or permission of the instructor.*

### 157Q. Colloquium in American Legal and Constitutional History (4)

See *Colloquia*, below.

### 158A-B. Economic History of the United States (4-4)

A two-quarter course providing analysis of the American economy's development from the colonial period to the present. Readings and lectures will emphasize institutional aspects of economic change, including such topics as federal and state resource-use policies, the nature and impact of southern slavery, business entrepreneurship and management, and agricultural reform movements. *Prerequisite: upper-division standing or permission of the instructor.*

### 158Q. Colloquium in American Economic History (4)

See *Colloquia*, below.

### 159A-B. Afro-American History (4-4)

A lecture-discussion course on the history of Afro-Americans from the colonial period to the present. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

### 159Q. Colloquium in American Ethnic History (4)

See *Colloquia*, below.

### 160. United States: 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.*

### 160Q. Colloquium in Colonial American History (4)

See *Colloquia*, below.

### 161. United States: The American Revolution, 1763-1800 (4)

Causes and consequences of the revolution, intellectual and social change, the problems of the new nation, the Constitution, the origins of political parties. *Prerequisite: upper-division standing.*

### 161Q. Special Topics: The American Revolution (4)

See *Colloquia*, below.

### 163. History and Social Role of Women in the United States (4)

Study of women as a group and as members of different ethnic, racial and socio-economic groups from pre-industrial times to the present. Emphasis is on the relationship of economic systems to women's social, work, and family roles.

### 163Q. Selected Topics in American Women's History (4)

See *Colloquia*, below.

### 164A-B. American Intellectual History (4-4)

The first quarter deals with colonial times through the pre-Civil War period, European origins and the development of political, social, economic, and religious thought in an American context. Emphasis on principal thinkers and ideas, with some reference to the general historical background and values. The second quarter deals with the period 1860 to the present. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

### 164Q. Colloquium in American Intellectual History (4)

See *Colloquia*, below.

### 165. Family and Community in Twentieth-Century America (4)

Major themes in this lecture-discussion course include changes in child-rearing patterns and sex roles, the impact of industrial and urban growth, effect of governmental regulations, and the development of popular attitudes and beliefs. Variations along class, ethnic, and regional lines will also be studied. The readings draw from interdisciplinary sources. The class will study a local community using various primary source materials including oral interviews.

### 166. The History of Public Health in the United States (4)

This course covers three periods of public health growth, the *ante-bellum*, late nineteenth century, and twentieth century. It focuses on concepts of disease, institutional attempts to cope with death and disease in the city, the public health movement, and the federal government's provision of health care services. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

### 166Q. American Society in the Cold War (4)

See *Colloquia*, below.

### 167A-B. The United States in the Twentieth Century (4-4)

General historiographical examination through lecture-discussion of political, social, economic, and international trends. Particular emphasis on increasing presidential power, political parties and voting trends, urbanization, the creation of the welfare state, America's role in international politics and the origins of the cold war, and the historical background of the social unrest of the 1960s.

### 167Q. Colloquium in Twentieth-Century American History (4)

See *Colloquia*, below.

### 168Q. America in the 1930's (4)

See *Colloquia*, below.

### 169A-B. History of American Foreign Policy and Diplomacy (4-4)

A two-quarter course in the history of American foreign policy and diplomacy covering the period from the establishment of the colonies to the present. The course deals with the policy of the United States and the forces — intellectual, economic, cultural, and social — which shaped that policy. *Prerequisite: upper-division standing or permission of the instructor.*

### 169C. History of American Foreign Policy and Diplomacy (4)

A continuation of History 169B designed to concentrate on the period of the Cold War. The course will deal with the origins of the Cold War, with its progress in the 1950's, 1960's, and 1970's and the period of detente beginning in the early 1970's which is changing the nature of the struggle and shifting its focus. *Prerequisite: upper-division standing or permission of the instructor.*

### 169Q. Colloquium in American Diplomatic History (4)

See *Colloquia*, below.

### 170Q. Colloquium on the Second World War (4)

See *Colloquia*, below.

### 171. Post-Revolutionary Soviet Social History, 1917-1941 (4)

In contrast to an emphasis on intra-party squabbles and great personalities, this course will stress the class struggle and the construction of socialism in Russia between the Revolution and World War II. The fate of the peasants and workers will be stressed. Other topics covered will be revolutionary culture, women's liberation, the national question, and the social basis of bureaucracy. *Prerequisite: upper-division standing or permission of the instructor.*

### 171Q. Quantitative Methodology in History (4)

See *Colloquia*, below.

### 172Q. Colloquium on the Philosophy of History (4)

See *Colloquia*, below.

### 173Q. Colloquium on Methodology of History (4)

See *Colloquia*, below.

### 175A. History of Africa to 1880 (4)

A survey of pre-colonial Africa, concentrating on ancient Africa, the role of Islam in African history, the Medieval States of West Africa, East Africa in Medieval Times, the Forest Kingdoms of West Africa, State formation in East and Central Africa, the slave trade and abolition and European penetration of

the interior. *Prerequisite: upper-division standing or permission of the instructor.*

### 175B. Modern Africa (4)

A survey of Africa dealing with the European scramble for Africa, primary resistance movements, the rise of nationalism and the response of metropolitan powers, the transfer of power, self-rule and military coups, the quest for identity and unity. *Prerequisite: upper-division standing or permission of the instructor.*

### 177. African Society and the Slave Trade: Topics

Topics: African society on the eve of the slave trade, trans-Saharan trade, slavery within African societies, Atlantic slave trade, problems of numbers exported and profitability, impact of slave trade on African society and abolition of the slave trade.

### 177Q. Colloquium in the Economic History of Africa (4)

See *Colloquia*, below.

### 178. Economic History of Africa (4)

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.*

### 178Q. Special Topics in African History

See *Colloquia* below.

### 179. Colonial Rule and African Resistance (4)

A lecture-discussion course on African resistance to colonial forces. The strength, scale, organization and the effectiveness of African resistance and European pacification will be emphasized. *Prerequisite: upper-division standing or permission of the instructor.*

### 180. History of Modern Japan, 1868-1945 (4)

This course examines the political, social, intellectual, and economic problems of Japan's modern transformation and rise to world power in the period from the Meiji Restoration through World War II. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

### 181A. The History of Chinese Thought and Society: The Ancient Imperial Period (4)

This course deals with the genesis of Chinese thought and institutions in Shang and Chou times as well as Han political structure and thought. *Prerequisite: upper-division standing or permission of the instructor.*

### 181B. The History of Chinese Thought and Society: The Middle Imperial Period (4)

This course deals with the decline of the Han empire, the rise of Buddhism, the transformation of Chinese society in Tang and Sung times, and the beginnings of Neo-Confucianism. *Prerequisite: upper-division standing or permission of the instructor.* 181A or permission of the instructor.

### 181C. The History of Chinese Thought and Society: The Late Imperial Period (4)

This course deals with the economic, political, and intellectual development of China during the five hundred years before the impact of the West. *Prerequisites: 181A and 181B or permission of the instructor.* Upper-division standing or permission of the instructor.

### 182. 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 of the traditional order, reform movements, and the origins of the early revolutionary movement. *Prerequisite: upper-division standing or permission of the instructor.*

### 183. 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. *Prerequisite: upper-division standing or permission of the instructor.*

### 184. 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 post-

revolutionary institutionalization, the role of ideology, the tension between city and countryside, Maoism, the Great Leap Forward, and the Cultural Revolution. *Prerequisite: upper-division standing or permission of the instructor.*

**186. Self and Society in Modern Chinese Thought (4)**

This course examines the confluence of traditional and modern ways of thought in China, dealing with revolutionary, liberal, and conservative trends in the twentieth century and with their relationships to traditional orientation. The first quarter is a lecture course, the second, a colloquium. *Prerequisite: upper-division standing or permission of the instructor.*

**186Q. Self and Society in Modern Chinese Thought (4)**

See *Colloquia*, below.

**187. Intellectual History of Modern China (4)**

This course is designed to focus on selected topics in the intellectual history of modern China. The theme of the course will change each year. Potential topics include: Confucian perceptions of Western ideas, traditional conservatism, reform thinkers, anarchism, liberalism, Marxism, nationalism, and populism. *Prerequisite: upper-division standing or permission of the instructor.*

**188. Peasant Revolution: Modern China (4)**

This course focuses exclusively on the role of the peasant in the modern Chinese revolution. It examines the social and economic status of the peasant in Confucian society, traditional peasant rebel ideologies, the peasant in Marxist theory, Chinese communist mobilization of the peasantry, and the peasant during the transition to socialism. This is a lecture-discussion course which places considerable emphasis on student participation. *Prerequisite: upper-division standing or permission of the instructor.*

**189Q. Special Topics in Modern Chinese History (4)**

See *Colloquia*, below.

**190A-B-C. History of Science (4-4-4)**

The first quarter concerns the history of physical science from megalithic astronomy to Copernicus and from pre-Socratic thought to the late medieval attack on Aristotelian physics. The second quarter deals with the history of the scientific revolution in the seventeenth century, from Kepler and Galileo to the Newtonian synthesis. The third quarter will focus chiefly on three topics: the emergence of modern chemistry from Lavoisier to van't Hoff; the coming of Darwinism, and the roots of Einstein's special theory of relativity. *Prerequisite: upper-division standing or permission of instructor.* (Not offered in 1978-79.)

**190Q. Colloquium in the Literature of Third World History (4)**

See *Colloquia*, below.

**196A. History Honors (4)**

A program of independent study providing candidates for History Honors with 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 196B. *Prerequisite: permission of the instructor.*

**196B. 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 196A and 196B will be given at the completion of this quarter. *Prerequisite: permission of the instructor.*

**196Q. Colloquium in History (4)**

See *Colloquia*, below.

**198. Directed Group Study (4)**

Directed group study on a topic not generally included in the regular Department of History's curriculum. By special arrangement with a faculty member. (P/NP grades only.) *Prerequisite: permission of faculty member (instructor).*

**199. Independent Study for Undergraduates (4)**

Program to be arranged between student and instructor, depending on student's needs and instructor's advice in terms of these needs. (P/NP grades only.) *Prerequisite: upper-division standing and approval of instructor.*

**Colloquia** Colloquia are courses devoted to extensive study of special topics. These courses are limited to twenty or fewer students and are generally organized as seminars or discussion classes.

**101Q. Special Topics in Greek History (4)**

Detailed study of selected problems or periods in the history of Greece. Topics vary from year to year, and students may therefore repeat the course for credit. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

**102Q. Special Topics in Roman History (4)**

Detailed study of selected problems or periods in the history of Rome and the Roman empire. Topics vary from year to year and students may therefore repeat the course for credit. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

**104Q. Special Topics in Medieval History (4)**

Course will focus on specific historical problems or subjects raised by the process of development in Medieval Europe. *Prerequisite: 104A-B or permission of the instructor; upper-division or graduate standing.*

**105Q. Topics in the Intellectual History of Early Modern Europe (4)**

Topics will vary from year to year, and students may therefore repeat the course for credit with the permission of the instructor. *Prerequisite: upper-division or graduate standing.*

**106Q. Central Problems in European History from 1500-1715 (4)**

A three-quarter sequence of readings and discussions, taught by different members of the staff each quarter. Required for all beginning graduate students, including M.A. candidates, in early modern and modern European history, as well as for students preparing a secondary field in either area. *Prerequisite: graduate standing, or upper-division with permission of the instructor.*

**107Q. Central Problems in European History from 1715-1850 (4)**

A three-quarter sequence of readings and discussions, taught by different members of the staff each quarter. Required for all beginning graduate students, including M.A. candidates, in early modern and modern European history, as well as for students preparing a secondary field in either area. *Prerequisite: graduate standing, or upper-division with permission of the instructor.*

**108Q. Central Problems in European History from 1850-1945 (4)**

A three-quarter sequence of readings and discussions, taught by different members of the staff each quarter. Required for all beginning graduate students, including M.A. candidates, in early modern and modern European history, as well as for students preparing a secondary field in either area. *Prerequisite: graduate standing, or upper-division with permission of the instructor.*

**109Q. Special Topics in Twentieth-Century European Social Thought (4)**

A study of twentieth-century European intellectuals and their social, political, historical, and cultural theories. Topics change from year to year. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

**110Q. Lenin and the Russian Revolution (4)**

Will examine the societal roots of the Revolution of 1917, Lenin's role in the development of the revolutionary movement, and the actual events of 1917. Emphasis will be placed on conflicting interpretations. *Prerequisites: upper-division or graduate standing. Permission of the instructor.*

**111Q. Topics in the Intellectual History of England: 1500-1700 (4)**

Topic will vary from year to year, and students may therefore repeat the course for credit with the permission of the instructor. *Prerequisite: upper-division or graduate standing.*

**112Q. 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 findings to the seminar. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

**116Q. Special Topics in the Social History of Early Modern Europe (4)**

Topic varies from year to year. *Prerequisite: upper-division or graduate standing.*

**119Q. Special Topics in Modern European Intellectual History (4)**

Topic varies from year to year. (Not offered in 1978-79.)

**120Q. Colloquium in Nineteenth-Century Europe (4)**

This course alternates with History 121Q, and the topics of these will vary from time to time. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

**121Q. Colloquium in Twentieth-Century Europe (4)**

This course alternates with History 120Q, and the topics of these will vary from time to time. Topic for fall 1978: European Jewry, 1880-1960. Topics emphasized will be the economic, scientific, and cultural role of the Jews, the internal history of their community, relations with the Christian majority, anti-semitism, the holocaust, and post-1945 situation in Russia and eastern Europe. *Prerequisite: upper-division or graduate standing.*

**126Q. Ideology and the Imagination in France, 1850-1950 (4)**

A century of social and cultural change as mirrored in the writings of representative essayists, memoirists, novelists, and social critics and theorists. An IP grade will be given at the end of the first quarter. The final grade will not be given until the end of the second quarter, which is History 127Q. *Prerequisite: upper-division or graduate standing.*

**127Q. Ideology and the Imagination in France, 1850-1950 (4)**

A century of social and cultural change as mirrored in the writings of representative essayists, memoirists, novelists, and social critics and theorists. An IP grade is awarded at the end of 126Q; final grade will be awarded at the conclusion of 127Q. *Prerequisite: 126Q, upper-division or graduate standing.*

**129Q. History of Law in Philosophical Perspective (4)**

Course will study the way in which the historical development of the Western legal system reflects issues raised in the literature of legal philosophy. Students will read of legal philosophy in conjunction with studies of the history of legal doctrines and institutions. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

**130Q. Special Topics: Expansion of Europe (4)**

Topics will vary from year to year. Topic for 1978-79: Spain and the Caribbean. *Prerequisite: upper-division or graduate standing.*

**133Q. Colloquium on Medieval and Renaissance Spain (4)**

Emphasis on the symbiosis of Christian, Muslim, and Hebrew elements; the Inquisition, the conversos, the moriscos, and the Erasmists; relationship of literature to history. *Prerequisite: fluent reading knowledge of Spanish or French; upper-division or graduate standing.* (Not offered in 1978-79.)

**134Q. Spain in the Eighteenth Century (4)**

Readings and discussion of recent studies on Spain in the eighteenth century: the attempt at national revival, social and economic conditions, Spain and the Enlightenment, and the breakup of the Old Regime after 1790. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

**135Q. Colloquium on the Spanish Civil War (4)**

Analysis of domestic and international issues raised by the Civil War; special attention to conflicting interpretations. The Southworth Collection will be used extensively. *Prerequisite: upper-division or graduate standing.*

**136Q. Colloquium on Spain since 1790 (4)**

Impact of the French Revolution, Napoleonic occupation, the Liberal revolution, the Carlist war; development of capitalism, caciquismo, urbanization, Masonry, anticlericalism, Krausism, Marxism, anarchism, and regional autonomy movements. Topic for 1978-79: Spanish Culture in the Twentieth Century. *Prerequisite: fluent reading knowledge of Spanish; upper-division or graduate standing.*

**146Q. Topics in Latin-American History, 1810-1910 (4)**

Topic will vary from year to year. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

**147Q. Topics in Latin-American History (4)**

Topic will vary from year to year. *Prerequisite: upper-division or graduate standing.*

**150Q. Colloquium in the Literature of Ethnic History (4)**

An introduction to the historical and social science literature of ethnicity and intergroup social-cultural relations in the United States. Required of M.A. candidates concentrating in United States social and ethnic history. *Prerequisite: upper-division or graduate standing.*

**151Q. Colloquium in Nineteenth-Century United States History (4)**

Readings in selected topics in American history in the national

## History

period to 1877. *Prerequisite: upper-division or graduate standing.*

### 152Q. Colloquium in Social and Ethnic History (4)

A reading course focusing upon the history of ethnicity and ethnic groups in the United States, with particular emphasis upon migration, cultural identity, and the role of minority groups. Required of M.A. candidates concentrating in United States social and ethnic history. *Prerequisite: upper-division or graduate standing.*

### 153Q. Colloquium: American Federalism (4)

This colloquium will consider the theory of federalism in American political thought and constitutional law; the historic uses and distribution of power in the federal system; the impact of the regulatory and welfare state on federalism; and similar topics. *Prerequisites: senior or graduate standing and instructor's permission.* (Not offered in 1978-79.)

### 156Q. American Urban History (4)

Selected topics in the social history of American cities in the nineteenth and twentieth centuries, with emphasis on industrialization, immigration and class and ethnic conflicts in the urban setting. *Prerequisite: upper-division standing or permission of the instructor.* (Not offered in 1978-79.)

### 157Q. Colloquium in American Legal and Constitutional History (4)

Readings for advanced students in the history of American law. *Prerequisite: upper-division or graduate standing.*

### 158Q. Colloquium in American Economic History (4)

Readings for advanced students in American economic history. *Prerequisite: upper-division or graduate standing.*

### 159Q. Colloquium in American Ethnic History (4)

Readings for advanced students in the history of minority groups in American society. *Prerequisite: upper-division or graduate standing.*

### 160Q. Colloquium in Colonial American History (4)

The colloquium will consider late colonial history, with special attention to neglected or undigested topics including: The Great Awakening as a social movement unrelated to the American Revolution; developing markets, social communication and mobility and their impact on community integration and conflict; corporation-exclusivity, regulation and professionalization in the occupations; the origins of the American nationality; socio-economic character of the early American. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

### 161Q. Special Topics: The American Revolution (4)

Colloquium will deal with special topics on the American Revolution and the formation of the United States, 1763-1800. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

### 163Q. Selected 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. In 1978-79 the focus will be on women, work and the family in the nineteenth century. Preference in enrollment will be given to students who have already taken History 163. *Prerequisite: upper-division or graduate standing.*

### 164Q. Colloquium in American Intellectual History (4)

This course will deal with a variety of topics in American intellectual history. Topic varies from year to year. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

### 166Q. 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 1945-1960. *Prerequisite: upper-division or graduate standing and permission of the instructor.* (Not offered in 1978-79.)

### 167Q. Colloquium in Twentieth-Century American History (4)

Leading works on Progressivism, New Deal, Depression and American foreign policy will be considered and discussed. The emphasis will be on historiography. *Prerequisite: upper-division or graduate standing.*

### 168Q. America in the 1930's (4)

The impact of the Great Depression upon American society will be investigated in this reading and discussion course. In addition to using other types of historical materials, the course will consider literary works which explore aspects of social life during the decade. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

### 169Q. Colloquium in American Diplomatic History (4)

A one-term colloquium designed to give the beginning graduate or qualified upper-classman an overview of United States foreign policy from independence to modern times. Stress will be placed on economic and political as well as more traditional pragmatic motivations. *Prerequisite: upper-division or graduate standing.*

### 170Q. Colloquium on the Second World War (4)

The diplomacy of appeasement, early German victories and comparison of their occupation policies in different areas, creation of the Allied Coalition, resistance movements, the German defeats in Russia and the West, scientific developments and effects of the war on civilian populations, destruction of the "Old Regime" in Prussia and Eastern Europe. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

### 171Q. Quantitative Methodology in History (4)

An introduction to the uses and abuses of quantification in history which will acquaint the student with the potential applications of social-science methods to historical studies and teach basic quantitative skills, the use of packaged computer programs and basic statistics. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

### 172Q. Colloquium on the Philosophy of History (4)

Establishment of the distinction between analytic and speculative philosophy of history, with emphasis on the former. Examination of the concepts and terms ordinarily used in historical discourse, as exemplified in major works of interpretation from Vico to Marc Bloch. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

### 173Q. Colloquium on Methodology of History (4)

Topic varies from year to year. Topic will be psychosocial history. After a background of theoretical readings in Freud and Fairbairn, the course will focus on reinterpreting British and German social practices as exemplified in autobiography, case history, and the novel. No previous work in psychoanalytic theory or modern European history required. *Prerequisite: upper-division or graduate standing.* (Not offered in 1978-79.)

### 177Q. Colloquium in the Economic History of Africa (4)

Will examine selected topics in African economic history. Topics will include the pre-colonial economy, economics of colonialism, economics of underdevelopment and postcolonial economic development. *Prerequisite: upper-division or graduate standing.*

### 178Q. Special Topics in African History

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, theory and practice of Indirect Rule, decolonization, African socialism and pan-Africanism.

### 186Q. Self and Society in Modern Chinese Thought (4)

This course examines the confluence of traditional modern ways of thought in China, dealing with revolutionary, liberal, and conservative trends in the twentieth century and with their relationships to traditional orientations. The first quarter is a lecture course; the second quarter is a colloquium. *Prerequisites: History 186 or permission of the instructor. Upper-division or graduate standing.*

### 189Q. Special Topics in Modern Chinese History (4)

This colloquium is designed to provide students who have sufficient background in modern Chinese history with an opportunity to explore special topics. Topic varies from year to year. *Prerequisite: upper-division or graduate standing.*

### 190Q. Colloquium in the Literature of Third World History (4)

Critical study of the literature of selected topics. Emphasis will be placed on traditional society, colonization, imperialism, resistance and revolution, movements for national independence and neo-colonialism. Geographical emphasis varies from year to year. Required of all master's students in the Third World area of concentration. Interdisciplinary Seminar on Latin America. *Prerequisite: upper-division or graduate standing.*

### 196Q. 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 permission. *Prerequisite: upper-division or graduate standing.*

## Graduate

### 204A-B. Seminar in Medieval History (4-4)

Topics will include the Investiture Contest concentrating on

the personalities involved in the ideas on both sides of the dispute, and the study of the development of Canonical jurisprudence, 1140-1234. An IP (in progress) 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: graduate standing; reading knowledge of French, German, Italian or Latin.* (Not offered in 1978-79.)

### 206A-B. Seminar in Early Modern Europe (4-4)

The seminar will focus on the topic "Science and Society in Early Modern Europe." Primary emphasis will be on England in the 17th century. An IP (in progress) 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: graduate standing.* (Not offered in 1978-79.)

### 208A. Central Problems in European History from 1500-1715 (4)

A three-quarter sequence of readings and discussions, taught by different members of the staff each quarter. Required for all beginning graduate students, including M.A. candidates, in early modern and modern European history, as well as for students preparing a secondary field in either area. *Prerequisite: graduate standing. Upper-division with permission of the instructor.*

### 208B. Central Problems in European History from 1715-1850 (4)

A three-quarter sequence of readings and discussions, taught by different members of the staff each quarter. Required for all beginning graduate students, including M.A. candidates, in early modern and modern European history, as well as for students preparing a secondary field in either area. *Prerequisite: graduate standing. Upper-division with permission of the instructor.*

### 208C. Central Problems in European History from 1850-1945 (4)

A three-quarter sequence of readings and discussions, taught by different members of the staff each quarter. Required for all beginning graduate students, including M.A. candidates, in early modern and modern European history, as well as for students preparing a secondary field in either area. *Prerequisite: graduate standing. Upper-division with permission of the instructor.*

### 214A-B. Seminar in the Cultural History of Europe (4-4)

Topics include cultural change and redefinition in Britain, France, Germany, Spain, and Italy, 1890-1914. An IP (in progress) 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: graduate standing or permission of instructor. 214A is a prerequisite for 214B.* (Not offered in 1978-79.)

### 220A-B. Topics in Modern European History (4-4)

Varied topics in modern European history. An IP (in progress) 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: graduate standing or permission of instructor. 220A is a prerequisite for 220B.*

### 230A-B. Seminar in the Expansion of Europe (4-4)

The expansion of European culture into the non-Western world analyzed through a series of case studies. Emphasis will be on cross-cultural analysis of the colonial experience in Asia and Africa. *Prerequisite: graduate standing.* (Not offered in 1978-79.)

### 234A-B. Readings in Spanish History Since 1790 (4-4)

Study of major Spanish historians of the nineteenth and twentieth centuries. *Prerequisites: graduate standing; reading knowledge of Spanish essential.* (Not offered in 1978-79.)

### 236A-B. Seminar in Spain Since 1870 (4-4)

Topics in the history of Spain since 1870. An IP (in progress) 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: fluent reading knowledge of Spanish required. German or French desirable. Graduate standing.* (Not offered in 1978-79.)

### 240A-B-C. The Literature of Latin-American History (4-4-4)

A three-quarter sequence of readings and discussions on the historiography, bibliography and sources for Latin-American history, from the colonial period to the present. Presented as three separate courses: A, fifteenth to eighteenth centuries; B, 1750 to 1910; C, post-1910. Required of all beginning Ph.D. graduate students in Latin-American history. *Prerequisite: graduate standing. Reading knowledge of Spanish or Portuguese helpful but not required.*

**242A-B. Research in the History of Latin America (4-4)**

Examination through literary and historical texts of major themes and topics such as the role of labor, culture and revolution, peasant movements, nationalism and literary images of social change. Topic may vary from year to year. An IP (in progress) 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: graduate standing. Reading ability in Spanish or Portuguese.*

**246A-B. History of Mexico (4-4)**

A research and study seminar of two quarters with primary emphasis on social change and the Mexican Revolution of 1910. 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 (in progress) 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: graduate standing. 246A is a prerequisite for 246B.* (Not offered in 1978-79.)

**248. Interdisciplinary Seminar on Latin America (4)**

Three-quarter seminar on Latin America for graduate students in the humanities and social sciences. The first quarter will discuss history and modern society — both the impact of the nineteenth and early twentieth century in shaping present Latin America and Latin Americans' perception of that past. Basic materials will be drawn from economic and social history, anthropology, and literature. Full credit will be given at the end of the quarter. A complementary seminar will be taught in sociology following 248. *Prerequisite: graduate standing or permission of the instructor.* (Not offered in 1978-79.)

**250A-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. *Prerequisite: graduate standing.*

**251. Readings in American History (4)**

Readings and discussion in selected areas of American history for advanced graduate students. *Prerequisite: graduate standing.* (Not offered in 1978-79.)

**258A-B. American Economic History (4-4)**

Examination of some of the major interpretive problems in American economic history, and case studies of public economic policies and their impact. The first quarter will be devoted to readings and discussions, and the second quarter to the writing of individual research papers. An IP (in progress) 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: graduate standing or permission of the instructor.* (Not offered in 1978-79.)

**261A-B. United States, Colonial Period (4-4)**

*Prerequisite: graduate standing.* (Not offered in 1978-79.)

**266A-B. United States History, 1789-1877 (4-4)**

Analysis of sources and methods of historical research in the National Period to 1877. Readings and original research papers will be required. *Prerequisite: graduate standing.* (Not offered in 1978-79.)

**267A-B. United States Since 1877 (4-4)**

Analysis of sources and methods of historical research in the period since 1877. Readings and original research papers will be required. An IP (in progress) 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: graduate standing.* (Not offered in 1978-79.)

**268A-B. American Society in the Twentieth Century (4-4)**

A two-quarter research seminar. Students will receive training in the archival sources and research techniques relevant to study of selected topics on American society since ca. 1900. Individual research papers. An IP (in progress) 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: graduate standing.*

**269A-B. Topics in U.S. Diplomatic History (4-4)**

Critical analysis of major works in U.S. diplomatic history, designed to acquaint the student with the historiographic developments in the field. Readings, discussions, and papers will form the basis of the course. An IP (in progress) 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: graduate standing.* (Not offered in 1978-79.)

**277A-B. Seminar in West African History (4-4)**

A two-quarter seminar on selected topics in West African history. One quarter will be devoted to readings and discussions, and the second quarter to the writing of individual research papers. *Prerequisite: graduate standing.*

**298. Directed Reading (1-12)**

Guided and supervised reading in the literature of the several fields of history. *Prerequisite: graduate standing.* (Satisfactory/Unsatisfactory grades permitted.)

**299. Thesis Direction (1-12)**

Independent work by graduate students engaged in research and writing of doctoral theses. *Prerequisite: graduate standing.* (Satisfactory/Unsatisfactory grades permitted.)

**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. *Prerequisite: graduate standing.* (Satisfactory/Unsatisfactory grades permitted.)

**501. Teaching in the Humanities (1-4)**

Consideration of pedagogical methods appropriate to the teaching of literary, historical, and philosophical texts at the undergraduate level. Pedagogical aids for the teaching of composition. Supervised teaching in sections of the undergraduate humanities sequence. Student must be a teaching assistant or fellow-teaching assistant in Revelle College. (Satisfactory/Unsatisfactory grades only.)

**503. Teaching in Third World Studies (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. *Prerequisite: graduate standing.*

## Humanities

Office: 1512 Humanities-Library Building, Revelle College

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These sequences of courses may be used by Revelle College students in fulfilling the humanities requirement of the College. Interested students from other Colleges may register for these courses if space is available. They are offered jointly by the Departments of Literature, Philosophy and History and are intended to provide an interdisciplinary introduction to major aspects of the Western humanistic tradition. Students learn to interpret important literary, historical and philosophical documents through lectures and discussions.

One purpose of the program is to develop the student's ability to write clear and well-ordered expository prose. Humanities 11A-B-C and 12A-B-C are designed to meet this objective, and one of these sequences must be completed by all freshmen in Revelle College. In these courses, students meet twice weekly in sections organized on a laboratory basis and designed to provide instruction specifically devoted to writing. Weekly written exercises are required. Completing these sequences satisfies the Subject A requirement for students who have not otherwise satisfied it. Additional special attention is given to those students who enter Revelle College with a Subject A deficiency.

In the sophomore year, regular written exercises are required in conjunction with students' work in discussion sections.

For detailed description of the Revelle College Humanities requirement see "Revelle College, General Education Requirements, Humanities.

A student may not graduate from Revelle College with a major in humanities. Students interested in the area of humanities must choose a specific major within the humanities, i.e., literature, philosophy, etc.

## Courses

**11A-B-C. The Early Western Tradition (6-6-6)**

(Not open to students who have completed Humanities 2-3-4\* or 10A-B-C\*\*.)

Readings in the history, literature, and philosophy of the Western world from biblical times through the Renaissance, combined with training and practice in writing skills. Intensive practice in writing expository prose. Three hours of lecture, two hours of writing laboratory. (F-W-S)

**12A-B-C. The Western Tradition from the Renaissance to the Present (6-6-6)**

(Not open to students who have completed Humanities 5-6-7 or 20A-B-C.)

Readings in the history, literature, and philosophy of the Western world from the Reformation period to modern times, combined with training and practice in writing skills. Intensive practice in writing expository prose. Three hours of lecture, two hours of writing laboratory. (F-W-S)

**20A-B-C. The Later Western Tradition (4-4-4)**

(Not open to students who have completed Humanities 5-6-7\* or 12A-B-C.)

Readings in the history, literature, and philosophy of the western world from the Reformation period to modern times. Two hours lecture, one hour discussion, regular assignments in expository writing (F-W-S)  
*Prerequisite: completion of freshman course in humanities or equivalent.*

\*Humanities 2-3-4 and 5-6-7 were not offered after 1975-76

\*\*Humanities 10A-B-C are not offered in 1977-1978

## Iberian and Latin American Studies

Office: 1260 Humanities-Library Building, Revelle College

The Center for Iberian and Latin American Studies (CILAS) coordinates and assists interdisciplinary research and instruction as they relate to the cultures of the Spanish, Catalan, Portuguese, and Judeo-Spanish speaking peoples. Participating faculty includes members from the Departments of Anthropology, Community Medicine, Drama, History, Literature, Political Science, Psychiatry, Scripps Institution of Oceanography, Sociology, and Visual Arts, and the Communications Program. The Center operates across these traditional departmental boundaries to encourage inquiry in four sub-areas: the historical cultures of Iberia, the varied experiences of Latin America, the past and present life of the Chicanos of the Southwest United States, and the problems of interaction of the "Frontera" or borderland region societies of Southern California and Baja California, Mexico.

# Iberian and Latin American Studies

	Course title	Department	Course No.	Faculty	Quarter
General	Cultural Traditions	History	Hist 1A-B-C	Ringrose Staff	FWS
	Fiction and Film in 20th-Century Spain	Literature	Lit Gen 5A	Kirkpatrick, S.	F
	Third World: Origins and Consequences of Underdevelopment	History	Hist 6C	Monteon, M.	S
	Literature and History: Third World Major Themes and Ideas	Literature	Lit/Gen 9A	Sánchez, M.	F
	Spanish Literature in Translation: Literature Cervantes	Literature	Lit/Gen 144	Guillén, C.	FS
	Comparative Rural Societies	Sociology	Soc 170	Blumberg, R.	F
	Socio-Economic Change in Underdeveloped Areas	Sociology	Soc 168	Blumberg, R.	W
	Urban Underclass Around the World	Urban and Rural Studies	URS 199	Blumberg	S
	Critical Theory	Literature	Lit/Co 271	Guillén, C.	W
	Genre Studies: Theories of the Novel First: Third World	Literature	Lit/Co 274	Wynter, S.	FW
	Contemporary Caribbean Literature	Literature	Lit/Sp 175	Wynter, S.	S
	Seminar: Caribbean Literature	Literature	Lit/Sp 190	Drake, S.	W
	Phonetics	Literature	Lit/Sp 141	Sánchez, R.	F
	Literature and Society Studies	Literature	Lit/Sp 272	Sommers, J.	W
	Comparative History of the Americas	History	Hist 1A-B-C	Ringrose, D./ Scobie, J./ Ruiz, R.	FWS S
	Spanish-American Literature: Poetry	Literature	Lit/Sp 125	TBA	F
	Spanish-American Literature: The Caribbean	Literature	Lit/Sp 125	Wynter, S.	S
	Spanish-American Literature: Modern Poetry	Literature	Lit/Sp 125	Sánchez, M.	S
	Spanish-American Fiction	Literature	Lit/Sp 127	Sánchez, M.	F
	Spanish-American Fiction	Literature	Lit/Sp 127	Sommers, J.	W
	Spanish-American Essay	Literature	Lit/Sp 129	TBA	S
	History of Brazil	History	Hist 143	Scobie, J.	F
	Machismo and Matriarchy: Latin American Social Structure	History	Hist 145	Monteon, M.	S
	Cuba: From Colony to Socialist Republic	History	Hist 147	Ruiz, R.	W
	The Politics of Industrialization	Sociology	Soc 147	Waisman, C.	W
	Politics and Society in Latin America	Sociology	Soc 164:290	Waisman, C.	S
	Literature of Latin American History	History	Hist 240B	Ruiz, R.	F
	Literature of Latin American History	History	Hist 240C	Ruiz, R.	W
	Literature of Latin American History	History	Hist 240C	Scobie, J.	S
	Selected Topics: History of Latin America	History	Hist 242A	Scobie, J.	W
	Spanish American Prose	Literature	Lit/Sp 258	TBA	FW
	Spanish American Poetry	Literature	Lit/Sp 259	Blanco	F
	Colonial Latin America	History	TBA	TBA	TBA
Chicano Culture	Race and Ethnicity in U.S.	History	Hist 7C	Romo, R.	S



	Literary Criticism: Chicano/Latin American Literature	Literature	Lit/Soc 131	Sánchez, R.	W
	Chicano Poetry	Literature	Lit/Sp 156	Sánchez, M.	W
	Colloquium in Ethnicity	History	Hist 159Q	Romo, R.	S
	Chicano Literature: The Narrative	Literature	Lit/Sp 253	Sánchez, M.	W
	Chicano Literature	Literature	Lit/Sp 253	Sánchez, R.	S
Iberia	Readings and Interpretations	Literature	Lit/Sp 10	Kirkpatrick, S.	FWS
	Composition and Conversation	Literature	Lit/Sp 25	Sánchez, R.	FWS
	Readings in Spanish Literature and Culture	Literature	Lit/Sp 50	Sánchez, M.	FWS
	History of the Spanish Language	Literature	Lit/Sp 104	TBA	F
	The Medieval Period	Literature	Lit/Sp 121	TBA	S
	Renaissance and Baroque	Literature	Lit/Sp 122	Blanco, C.	F
	Renaissance and Baroque	Literature	Lit/Sp 122		S
	19th Century Romanticism	Literature	Lit/Sp 124	Kirkpatrick, S.	F
	The Modern Period: Generation of 98	Literature	Lit/Sp 126	Blanco, C.	W
	The Modern Period: The Theater	Literature	Lit/Sp 126	Kirkpatrick, S.	W
	Spain Since 1808	History	Hist 135	Jackson, G.	W
	Colloquium on Spain since 1790	History	Hist 136Q	Jackson, G.	S
	Spain and the Caribbean	History	Hist 130Q	Ringrose, D.	S
	Cervantes	Literature	Lit/Sp 151	Guillen, C.	W
	The City: Structures, Symbols and Styles	Sociology	Soc 183	Graña, C.	F
	Urban Sociology: Urban Folk Ways	Sociology	Soc 184	Graña, C.	W
	Studies in Medieval Literature: The Epic	Literature	Lit/Sp 214	TBA	F
	Studies in Medieval Literature: Poesía Satírica	Literature	Lit/Sp 224	Guillén, C.	S
	Golden Age Studies	Literature	Lit/Sp 224	Guillén	F
	Studies in Modern Hispanic Literature and Culture	Literature	Lit/Sp 252	Blanco, C.	W
	The Modern Spanish Novel: Valle Inclán	Literature	Lit/Sp 255	Kirkpatrick, S.	S
	Research Practicum (in Madrid)	Literature	Lit/Sp 296	Catalán, D.	FWS

## Italian Literature

See Literature

## Judaic Studies

OFFICE: 2024 Humanities and Social Science Building, Muir College.

UC San Diego offers a number of courses and course sequences in the area of Judaic studies, which enable all interested students to gain insights into the principal aspects of Jewish culture, including history, philosophy, religion, literature, and language. Several of

the courses offered emphasize the relationship of Judaism to other cultures.

Students whose principal interest is in Judaic studies have the following options: special project majors in Revelle and Muir Colleges allow for a concentration in Judaic studies; within the general literature major of the Department of Literature students may concentrate on Judaic literature or on a combined program of Judaic and classical literature.

In addition, Revelle College has non-contiguous minors in Judaic studies; Fourth College has Judaic studies 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.

UC San Diego students are eligible for participation in the UC Education Abroad Programs in Jerusalem and Haifa.

Following are course offerings in this area; it is expected that some additional courses will be available.

*For descriptions of the courses listed below, refer to the appropriate department's section of the catalog.*

## Language

**Cultural Traditions, Judaic 1A-B-C (4-4-4)**  
(Also listed as Philosophy 30A-B-C)

**Cultural Traditions 100. Ethical and Social Theories in the Judaic Traditions (4)**

**History 100. Ancient Near East and Israel (4)**

**History 121Q. Colloquium in Twentieth-Century European History (European Jewry 1880-1960) (4)**

**Humanities 12A-B-C. The Western Tradition from the Reformation to the Present (4-4-4)**

**Lit/Hebrew 1. Beginning Hebrew (4)**

**Lit/Hebrew 2-3. Intermediate Hebrew (4)**

**Lit/Hebrew 51. Introduction to Readings and Interpretations (4)**

**Lit/Hebrew 52. Readings and Interpretations (4)**

**Lit/Hebrew 100. Introduction to Hebrew Literature (4)**

**Lit/Hebrew 121. Medieval Hebrew Literature (4)**

**Lit/Hebrew 122. Hebrew Prophetic Literature (4)**

**Lit/Hebrew 123. Bible: The Narrative Books (4)**

**Lit/Hebrew 124. Bible: The Poetic Books (4)**

**Lit/Hebrew 126. The Modern Period (4)**

**Lit/Hebrew 190. Seminars (4)**

Lit/Hebrew 121, 122, 123, 124, 126 and 190 may be taken as Hebrew literature by students proficient in the language or as general literature by students without knowledge of Hebrew.

**Lit/Hebrew 198. Directed Group Study (4)**

**Lit/Hebrew 199. Special Studies (4)**

**Philosophy 160A-B. Philosophy of Religion (4-4)**

## Language

OFFICE: Language Center, 2125 Psychology and Linguistics Building, Muir College

Courses numbered Language 1-2-3-4-5-6 consist of a combination of small tutorial meetings with a native speaker, weekly group conferences led by a linguist, assigned laboratory work and outside reading.

Students who begin their study of a language at UC San Diego should enroll in Language 1. Students who have studied a language previously must take a placement test if they wish to continue study of that language at UC San Diego. Placement within the language course sequence or in Literature 10 or 25 will be determined by the results of that examination.

Placement into language or literature courses will be as follows:

COURSE	PREREQUISITES	
	Previous Courses	Placement Result*
Language 1	none	or 0-400
Language 2	1	or 400-500
Language 3	2	
Language 4	3	or 500-550
Language 5	4	
Language 6	5	
Literature 9	3	or 500 (Russian) Native speaker (Spanish)
Literature 10	4, 5, or 6 (successful completion)	or Basic Language Proficiency (550 plus oral interview)
Literature 25	10	or Intermediate Lan- guage Proficiency (600 plus oral interview)
Literature 15	10	
Literature 24		Native Speakers (Spanish)

Literature 50 10 or Language Pro-  
ficiency (650 plus  
oral interview)

\*Numerical scores are for CEEB examination.

## Mini and Maxi Programs for Language Study

### 1. Mini Program

The Mini Program (Language 1, 2, 3 (with a grade of "A")\* and Literature 10; Language 1, 2, 3, 4 (with a grade of "A" or "B")\* and Literature 10) would provide students with basic competence in all four language skills — speaking, understanding, reading, and writing. It is to be recommended for students who do not plan to use the language academically, but want to learn it for purposes of travel, reading, and cultural enrichment.

### 2. Maxi Program

The Maxi Program (Language 1, 2, 3 (with a grade of "A") and Literature 10, 25, 50\*\*; Language 1, 2, 3, 4 (with a grade of "A" or "B") and Literature 10, 25) is a two-year sequence which extends the platform provided by the mini model. It is intended to make the student sufficiently competent in the language so that it can be used in an academic major. This sequence is recommended for all students who wish to use the language in their future academic or professional careers.

We strongly urge the completion of the Maxi Program be a prerequisite for all Education Abroad Program students who have not had the language previously.

\*In Russian, the prerequisite for Literature 10 would simply be a passing grade.

\*\*In German, an alternate would be Literature 10, 15, 25.

Courses numbered Language 11 are self-instructional and are intended for students whose concern is to learn only to read a language, and for graduate students preparing to fulfill French or German reading requirements.

The language laboratory and language library at UC San Diego offer a rich collection of materials that can be used for self-instruction in a variety of languages. To encourage students to take advantage of these materials, credit will be granted to undergraduate students who wish to study language on a self-instructional basis. Such students should enroll in Language 19. On the first day of the quarter students enrolled in Language 19 must meet with the supervisor of Language 19, who will establish a program of study and arrange for a midterm and a final examination. Subject to the availability of materials at a suitable level of advancement, Language 19 may be taken for full or half credit and may sometimes be repeated for credit.

With departmental approval students enrolled in Language 4, 5, or 6 may also enroll in Literature 10 courses.

The facilities and materials in the language laboratory and language library are available to all students and faculty of the University,

whether or not they are formally enrolled in one of the language programs.

## Courses

### Chinese

**Lang/Ch 61. Elementary Mandarin (4)**

Basic grammar and usage with initial emphasis on the spoken language. The written language will be progressively incorporated.

**Lang/Ch 62. Elementary Mandarin (4)**

Continuation of Lang/Ch 61. *Prerequisite: Lang/Ch 61 or equivalent.*

**Lang/Ch 63. Elementary Mandarin (4)**

Continuation of Lang/Ch 62. *Prerequisite: Lang/Ch 62 or equivalent.*

**Lang/Ch 64. Intermediate Mandarin (4)**

Grammar, conversation, reading and writing in Mandarin. Continuation of Lang/Ch 63.

**Lang/Ch 65. Intermediate Mandarin (4)**

Continuation of work begun in Lang/Ch 64, Intermediate Mandarin.

**Lang/Ch 66. Intermediate Mandarin (4)**

Continuation of work in Lang/Ch 64, Intermediate Mandarin.

**Lang/Ch 167. Advanced Mandarin (4)**

Advanced conversation, reading and writing in Mandarin. Continuation of Lang/Ch 66.

**Lang/Ch 168. Advanced Mandarin (4)**

Advanced conversation, reading and writing in Mandarin. Continuation of Lang/Ch 167.

**Lang/Ch 169. Advanced Mandarin (4)**

Advanced conversation, reading and writing in Mandarin. Continuation of Lang/Ch 169.

See also:

**Chinese Studies/175. Readings in Contemporary Chinese I (4)**

**Chinese Studies/176. Readings in Contemporary Chinese II (4)**

**Chinese Studies/181A. Introduction to Classical Chinese (4)**

**Chinese Studies/181B. Introduction to Classical Chinese (4)**

### Esperanto

**Lang/Es 16. Elementary Esperanto (4)**

An introduction to the construction of Esperanto, its origins and its literature and general problems of man-made language projects. Students should be able to speak, write, read and understand Esperanto by the end of the quarter. (Esperanto may not be submitted to fulfill UC San Diego language requirements.)

**Lang/Es 26. Intermediate Esperanto (4)**

Conversation, play reading, use of instructional tapes. History of international language projects, birth and development of Esperanto, current uses, etc. *Prerequisite: Lang/Es 16 or equivalent.*

**Lang/Es 36. Advanced Esperanto (4)**

Discussion of literary works and poetry, both translations and original belles lettres. Translations into Esperanto of documents of significance in U.S. and world history. Preparation for active personal participation in annual international Esperanto congresses. *Prerequisite: Lang/Es 26 or equivalent.*

### French

**Lang/Fr 1-2-3-4-5-6 French (4-4-4-4-4)**

See general description above.

**Lang/Fr 11 Elementary French Reading (2-4)**

A course designed to prepare graduate students to meet reading requirements in French. After a one-week introduction to French orthography/sound correspondences, students work with a self-instructional textbook. Mid-term and final examinations. (F,W,S)

See also:

**Department of Literature**

**Lit/Fr 10 Readings and Interpretations (4)**

**Lit/Fr 25 Composition and Conversation (4)**

**Lit/Fr 50 Readings in French Literature and Culture (4)**

**German****Lang/Ge 1-2-3-4-5-6 German (4-4-4-4-4)**

See general description above.

**Lang/Ge 11 Elementary German Reading (2-4)**

A course 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)

See also:

**Department of Literature****Lit/Ge 10 Readings and Interpretations (4)****Lit/Ge 25 Composition and Conversation (4)****Greek**

See:

**Department of Literature****Lit/Gr 1. Beginning Greek (4)****Lit/Gr 2. Intermediate Greek (4)****Hebrew**

See

**Department of Literature****Lit/He 1, 2, 3. Hebrew (4-4-4)****Lit/He 51. Introduction to Reading and Interpretations (4)****Lit/He 52. Readings and Interpretations (4)****Italian**

See

**Department of Literature****Lit/It. 1. Beginning Italian (4)****Lit/It. 2. Intermediate Italian (4)****Latin**

See:

**Department of Literature****Lit/La 1. Beginning Latin (4)****Lit/La 2. Intermediate Latin (4)****Russian****Lang/Ru 1-2-3 Russian (4-4-4)**

See general description above.

See also:

**Department of Literature****Lit/Ru 10. Intermediate Russian (4)****Lit/Ru 25. Readings and Interpretations (4)****Lit/Ru 50. Readings in Russian Literature and Culture(4)****Spanish****Lang/Sp 1-2-3-4-5-6 Spanish (4-4-4-4-4)**

See general description above.

See also:

**Department of Literature****Lit/Sp 9. Readings and Interpretations: Spanish for Native Speakers (4)****Lit/Sp 10. Readings and Interpretations (4)****Lit/Sp 25. Composition and Conversation (4)****Lit/Sp 50. Readings in Spanish Literature and Culture (4)****Directed Study****Lang/19 Directed Study — Language (2-4)**

Self-instructional materials are available at present in Afrikaans, Albanian, American Sign Language, Arabic (Iraqi), Arabic (eastern), Arabic (Egyptian), Arabic (Moroccan), Basque, Bengali, Bulgarian, Burmese, Chinese (Cantonese), Chinese (Mandarin), Chinese (Amoy), Czech, Danish, Dutch, Efik, English as a Foreign Language, Esperanto, Finnish, French, German, Modern Greek, Haitian Creole, Hausa, Hawaiian, Modern Hebrew, Hindi, Hungarian, Igbo, Icelandic, Italian, Japanese, Korean, Latin, Luganda, Malay, Maori, Navajo, Nepali, Nigerian Pidgin, Norwegian, Persian, Polish, Portuguese, Russian, Serbo-Croatian, Spanish, Swahili, Swedish, Tagalog, Tibetan, Thai, Turkish, Twi, Vietnamese, Yiddish, Yoruba

**Latin Literature**

See Literature

**Law and Society**

OFFICE: Provost, Revelle College

These courses may be used in partial fulfillment of the Revelle College Social Science Requirement.

**Courses****15. Jurisprudence (4)**

This is a course in legal epistemology designed to assess the perceptual, inferential, evaluative and communicative processes in law. Comparison will be made with similar processes in the natural sciences, mathematics, the social sciences, ethics and the arts; included will be an exploration of the "logic" of the various disciplines. Legal materials (cases, statutes, administrative regulations, law review articles, etc.) and selected writings from the other fields mentioned are utilized.

**20. Legal System and Legal Method (4)**This course not only exposes students to American legal institutions but also gives a historical perspective and exposes students to issues of current interest. Precedent and *stare decisis* are covered. Modern judicial activism (common law as well as constitutional law) is analyzed. Substantive topics used to illustrate the institutional discussion include the medical malpractice crisis, the Bakke case, tort law and social welfare legislation, industrialization and nineteenth-century lawmaking.**25. Law and Society (4)**

This course will examine aspects of the legal process including how and when the process is invoked, judicial decision-making, the role of the lawyer. Illustrative cases will be drawn from diverse areas, for example, commitment of the mentally ill, economic equalization under the Constitution, etc.

**30. Justice (4)**

In this interdisciplinary course, the faculty from the humanities and social sciences, e.g., anthropology, economics, history, philosophy, political science, psychology and sociology, will discuss and study the construct of justice from their respective frameworks. Theoretical, methodological and empirical problems and findings are analyzed and described with regard to the law.

**31. Land Use and Environmental Law (4)**

This course considers the more important legal issues arising as local governments regulate private residential, commercial and industrial development. The materials show how the courts have resolved the policy conflicts arising as they try to (1) protect the physical environment, (2) provide adequate housing, particularly for those on low and moderate income, and (3) permit the owners of private property to make some reasonable use of their property.

**Linguistics**

OFFICE: 5237 Psychology and Linguistics Building, Muir College

**Professors**

Edward S. Klima, Ph.D.

S.-Y. Kuroda, Ph.D.

Ronald W. Langacker, Ph.D.

Margaret Langdon, Ph.D.

Leonard Newmark, Ph.D.

David M. Perlmutter, Ph.D.

Sanford A. Schane, Ph.D. (*Chairman*)**Associate Professor:**

Matthew Y. Chen, Ph.D.

**Assistant Professors:**

Sandra L. Chung, Ph.D.

Jeffrey L. Elman, Ph.D.

\* \* \*

Linguistics is the study of language. Like other rapidly developing fields, linguistics resists simple classification into one of the tradi-

tional categories of academic disciplines. As one of the humanities, linguistics is concerned with the historical development of a particular language or language family, or with the relation between language and literature. As a social science, linguistics may be related to anthropology, in describing language as part of culture; or it may be related to psychology, in describing language as a kind of human behavior. One branch of linguistics, phonetics, may even be considered a natural science, related to the physical science of acoustics and the biological sciences of anatomy and physiology. As an applied science, linguistics has found many applications in fields as far apart as language pedagogy, speech therapy, and mechanical translation. Finally, linguistics may be considered a formal science in its own right, related to mathematics and formal logic.

(The Department of Linguistics supervises the teaching of the foreign languages offered in the Basic Language Program as well as Language 19. See "Language.")

**The Major Program** An undergraduate major in linguistics is intended to give students the background that will best prepare them for graduate work in this field. At the same time, the department has attempted to design major programs consistent with the particular tone of each of the colleges. Because linguistics shares its object matter — language — with so many other disciplines, this major is unlike many others in that it requires fewer courses in the major department itself. The major in linguistics will consist of twelve upper-division courses: six courses in the Department of Linguistics, complemented by six other courses in linguistics or from other departments, directly related to the study of language. For all courses counted toward the major in linguistics, the student must receive grades of C or better. (Courses counted toward the major may not be taken on a Pass/Not Pass basis.)

Linguistics 1, 2, and 3 are prerequisites for all upper-division courses.

All linguistics majors must satisfy two language requirements. These requirements are above and beyond any language requirements which might be imposed by any of the individual colleges.

**Language Requirement I:** The student must achieve proficiency in French, German, Spanish, or Russian. Proficiency is established by passing a reading proficiency examination as well as passing an oral interview administered by the UC San Diego Basic Language Program.

**Language Requirement II:** The student must achieve competence in at least one additional foreign language. Competence is defined as a successful completion (with grades of C or P or better) of three one-quarter courses or the equivalent in a second language, or by passing a reading test administered by the Basic Language Program. The second language need not be one of the four listed in Language Requirement I.

**Independent Study and Directed Group Study in Linguistics for Majors** Upon presentation of a written study proposal, linguistics majors with at least a 3.0 GPA may request permission to undertake directed group study in linguistics (Linguistics 198) or independent study in linguistics (Linguistics 199).

### The Revelle Major Program

- (1) Language Requirements I and II.
- (2) Six upper-division courses in linguistics.
- (3) A cohesive set of six additional upper-division courses related to the study of language. These six additional courses of the linguistics major must be relevant to the study of language but may be taken in departments other than linguistics: for instance, the Departments of Mathematics, Applied Physics and Information Science, Philosophy, Psychology, Anthropology, Sociology, or Literature. These courses need not be taken in the same department but they must form a coherent program of study in conjunction with the required core of linguistics courses. The courses to complete the major are selected in consultation with the departmental undergraduate adviser. Because of the great flexibility of the linguistics major, the classification of this 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.

**The Revelle Minor Program** The linguistics minor consists of six courses, of which at least three must be upper-division; the departmental requirement is Linguistics 1-2-3, in addition to one upper-division course in linguistics. The remaining minor courses must be relevant to the study of language but may be taken in departments other than linguistics: for instance, the Departments of Mathematics, Applied Physics and Information Science, Philosophy, Psychology, Anthropology, Sociology, or Literature. These courses need not all be taken in the same department, but they must form a coherent program of study. The courses to complete the minor are selected in consultation with the departmental undergraduate adviser. The content of these courses will determine whether the linguistics minor is classified as humanities, natural science, or social science.

### The Muir College Major Program

- (1) Language Requirements I and II.
- (2) Six upper-division courses in linguistics.
- (3) Six additional upper-division courses from linguistics or from the list of related courses.
- (4) Majors must take at least one course, not necessarily upper-division, from

each of the four areas of related courses listed below. (Upper-division courses may simultaneously apply to 3 and 4.)

### Related Courses for Muir College Majors

#### Formal Linguistics Area:

Ling 131; Phil 110; Math 80, 111, 160, 161, 180, 181; APIS 61, 63, 161, 162, 165, 173, 178; Anthro 112; Psych 111; Soc 181.

#### Psycholinguistics Area:

Psych 10, 11, 101, 102, 105, 108, 130, 133, 134, 135, 136, 145, 165; Ling 181, 182.

#### Sociolinguistics Area:

Anthro 105, 106, 118, 125, 156; Soc 103, 106, 107, 108, 117; Ling 174, 175.

#### General Semiotics Area:

Phil 12, 40, 104, 112, 115, 130; Commun 132, 152, 190; Hist 190; Anthro 147; Lit X (an upper-division literature course taught in a foreign language); Soc 152, 153; Ling 179.

### The Third College Major Program

- (1) Language Requirements I and II.
- (2) Six upper-division courses in linguistics.
- (3) Six additional upper-division courses in linguistics or from the list of related courses.
- (4) Majors must take at least one course, not necessarily upper-division, from each of the four areas of related courses listed below. (Upper-division courses may simultaneously apply to 3 and 4.)

### Related Courses for Third College Majors

#### Historical Background to Sociolinguistics Area:

Hist 137, 146, 175, 178, 181, 182, 183, 184; Soc 126, 136, 145; Ling 174, 175.

#### Applied and Non-Experimental Social Science Area:

Lit 195; Anthro 105, 106, 118, 125, 156; Soc 103, 106, 107, 108, 117.

#### Psychology of Language and Quantitative Analysis Area:

Psych 10, 11, 101, 102, 105, 108, 130, 133, 134, 135, 136, 145, 165; Math 80, 111, 160, 161, 180, 181; Anthro 112; APIS 61, 63, 161, 165, 173, 178; Phil 110; Ling 181, 182.

#### General Semiotics Area:

Lit/Sp 141, 142, 143; Commun 132, 152, 190; Phil 104, 112, 115, 130; Vis Arts 113B; Hist 190; Anthro 147; Lit X (an upper-division literature course taught in a foreign language); Soc 152, 153, 164; Ling 179.

### The Warren College Major Program

- (1) Language requirements I and II
- (2) Six upper-division courses in linguistics.
- (3) Six additional upper-division courses in linguistics and/or selected from the list of related courses listed below so that there is no overlap with the student's outside area of concentration. The list of related courses should be approved in advance by the major adviser.

### Related Courses for Warren College Majors

#### Formal Linguistics Area:

Ling 131; Phil 110; Math 111, 160, 161, 180, 181; APIS 161, 165, 173, 178; Anthro 112; Psych 111; Soc 181.

#### Psycholinguistics Area:

Ling 181, 182; Psych 101, 102, 105, 108, 130, 133, 134, 135, 136, 145, 165.

#### Sociolinguistics Area:

Anthro 105, 106, 118, 125, 156; Ling 174, 175; Soc 103, 106, 107, 108, 117.

#### General Semiotics Area:

Phil 104, 112, 115, 130; Commun 132, 152, 190; Hist 190; Anthro 147; Lit X (an upper-division literature course taught in a foreign language); Soc 152, 153; Ling 179.

### The Graduate Program

The Department of Linguistics offers a Ph.D. program that is unique in its primary emphasis on modern linguistic theory combined with serious study of a wide range of languages and language families from around the world, in particular Albanian, American Indian, Austronesian, Chinese, Japanese and Romance. This emphasis is complemented by unusually strong offerings and research interests in such related fields as comparative-historical linguistics, American Sign Language, language acquisition and pedagogy, orthography, poetics, experimental phonetics, neurolinguistics, formal linguistics, anthropological linguistics, sociolinguistics, and psycholinguistics (in conjunction with the Department of Psychology). The department has a wide array of research facilities. The phonetics laboratory contains a full complement of modern equipment for research in acoustic and articulatory phonetics as well as speech perception. The phonetics laboratory houses a PDP-12 computer, and the department also has ready access to the Burroughs 6700 campus computer. In addition to the extensive linguistics holdings in the main library, the department maintains a reading room with a good collection of reference books, journals, research reports, dissertations, and unpublished papers. Access to the libraries of other UC campuses exists through interlibrary loan.

The department's language laboratory maintains a library of written and recorded materials permitting independent study of dozens of common and "exotic" languages. Since the Department of Linguistics directs foreign language instruction for the campus through its Basic Language Program, many opportunities are provided for research in second language acquisition.

The department has its own excellent tape and videotape recording facilities for work in sociolinguistics, anthropological linguistics, psycholinguistics, and the sign language of the deaf. The new Center for Research in Language Acquisition will facilitate research over a broad range of projects concerned with theoretical and applied problems of language acquisition. Finally, UC San Diego is ideally located from the standpoint of availability of native speakers of a wide variety of languages.

**Program of Study** The graduate program is aimed essentially towards the Ph.D. in Linguistics, with provision for granting the M.A. in Linguistics or in Linguistics with Specialization in Teaching English to Speakers of Other Languages upon completion of certain graduate requirements. The C. Phil. is also available to students preparing for the Ph.D. upon completion of all degree requirements other than the dissertation and the teaching requirement.

In the first two years of graduate study, the student's basic courses will stress linguistic theory, the structure of English (particularly

from the point of view of generative grammar) and linguistic analysis. For advanced work, students will choose an area of specialization based on individual interests.

**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. Undergraduate work in certain of the social sciences and humanities, particularly psychology, anthropology, philosophy, and literature, is also good preparation for linguistics. All applicants are expected to have substantial experience with foreign languages. Students may begin their graduate programs here with no previous course work in linguistics proper. However, such students are advised to become acquainted with the fundamentals of contemporary linguistic theory, either by reading on their own or by taking some preliminary course work during the summer prior to enrollment. Because the basic graduate courses offered by the Department of Linguistics are three-quarter sequences, new graduate students will be admitted only in the fall of any academic year.

**Language Requirements** A candidate for the M.A. degree must demonstrate (1) an ability to read French, German, or Russian, to be tested by the department, and (2) knowledge of the structure of a non-Indo-European language, either through performance in courses on the structure of the language or in a descriptive paper acceptable to the department's graduate committee.

A candidate for the Ph.D. degree, in addition to meeting language requirements (1) and (2) above, must demonstrate (3) reading knowledge of a second foreign language — French, German, or Russian, and (4) oral fluency in some language other than the native language. The language chosen for oral fluency may be one of those in which the student has satisfied a reading requirement.

Students choosing the M.A. in Linguistics/ TESOL may use Spanish to satisfy one of the reading requirements. Spanish or another language may be substituted if the student can show it to be necessary for the proposed area of specialization. A student whose native language is not English may substitute English for one of these languages.

**Departmental Examinations** Candidates for both the M.A. and Ph.D. degrees must pass the departmental comprehensive examination. This examination gauges the student's general familiarity with theory and methodology. Normally, a student takes the examination after three quarters of graduate study. To be eligible to take the comprehensive examination, the student must have satisfied language requirement (1) above.

Candidates for the Ph.D. degree must also pass the qualifying examination, an oral examination which tests the student's knowledge in the area of specialization. The qualifying examination — which normally requires from six to nine quarters of course preparation

at the graduate level — may be taken only after the student has passed the departmental comprehensive examination and satisfied all language requirements, and satisfactorily completed all course work.

**Apprentice Teaching and Research** As part of their preparation for a future academic career, linguistics students at UC San Diego are given special opportunities to participate in one of the department's teaching and research programs under the supervision of a professor. Depending on qualifications, students may conduct conversation classes or analysis conferences in the Basic Language Program administered by the department, or may be asked to assist a professor in the teaching of a graduate or undergraduate linguistics course. Such apprentice training, for three quarters, is an integral part of the linguistics graduate program at UC San Diego and as such constitutes one of the requirements for the Ph.D.

**Dissertation** The candidate for the Ph.D. will write a substantial dissertation incorporating the results of original and independent research carried on 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 and after having the final typed version of the dissertation accepted by the Central University Library.

## Courses

### Lower Division

Linguistics 1, 2, 3 need not be taken in sequence.

#### 1. Introduction to General Linguistics (4)

A general introduction to language and linguistics. Language as an instrument of communication. Aspects of the structure of English and other languages. Survey of linguistic subdisciplines.

#### 2. Introduction to Syntax (4)

Lexical and sentential structure. Introduction to syntactic theory and analysis.

#### 3. Introduction to Phonology (4)

Articulatory and acoustic phonetics. Introduction to phonological theory and analysis.

### Upper Division

All upper-division courses have as their prerequisite Linguistics 1, 2, 3 and Language Requirement I. Exceptions require the approval of the adviser or consent of the instructor.

#### 101. Intermediate Syntax (4)

Examination of the syntactic structures of natural languages, with special reference to the structure of English. Exercises in syntactic description. The empirical justification of syntactic analyses. Syntactic theory and universals.

#### 102A. Articulatory Phonetics (4)

Elementary anatomy and physiology of the speech mechanisms. Extensive practice in producing and transcribing the sounds used in a wide variety of the languages of the world. Discussion of phonological/phonetic feature systems.

#### 102B. Intermediate Phonology (4)

Examination of phonological structures of natural languages. Exercises in phonological description. The empirical justification of phonological analyses.

#### 111. Fieldwork (4)

Techniques of linguistic analysis and application of these techniques to fieldwork, either in a sociolinguistic setting or in

a simulated field situation by elicitation from native informants. *Prerequisites: Linguistics 101 and 102B or consent of instructor.*

#### 131A. Introduction to Mathematical Linguistics (4)

Basic mathematical concepts and methods useful in the study of formal grammars and the formal study of syntax and semantics of natural languages. Elements of set theory, propositional and predicate calculus, abstract algebraic systems.

#### 131B. Introduction to Mathematical Linguistics (4)

Formal conceptualization of such basic linguistic notions as strings, trees, constituent structures, and transformations. Basics of formal grammars and automata and the formal concept of generative system. *Prerequisite: Linguistics 131A*

#### 151. Introduction to Historical Linguistics (4)

Language change. Genetic and areal relationships. The comparative method. Internal reconstruction. *Prerequisites: Linguistics 102B and Language Requirements I and II.*

#### 152. History of the English Language (4)

General trends in the historical development of the English language, its sounds and its grammar.

#### 157. Classical Languages (4)

Reading and translation of texts as well as linguistic analysis of Sanskrit, Greek or Latin. *Prerequisites: Linguistics 1, 2, 3 or equivalent or consent of instructor.*

#### 161. French Linguistics (4)

A survey of some major syntactic and semantic processes in the French language which have been largely ignored by traditional grammarians but prove to be extremely interesting in the framework of modern linguistics.

#### 164. Language Structures (4)

Detailed investigation of the structure of one or several languages. *Prerequisites: Linguistics 101 and Linguistics 102B, Language Requirements I and II.* May be repeated for credit with consent of instructor.

#### 165. Native American Languages (4)

A survey of Native American languages, their genetic relationships and area groupings. Specific languages and families are selected for more detailed discussion, illustrating questions of relevance to linguistic theory and analysis, sociolinguistics, and applied linguistics. *Prerequisites: Linguistics 101 and 102B or consent of instructor.*

#### 174. Sociolinguistics (4)

Introduction to the study of the social dimension in linguistics. Topics covered may include: bilingualism, code switching, pidgins, creole language, social factors affecting linguistic change, languages in contact, language in context.

#### 175. Bilingual Education in the U.S. (4)

Bilingual education as currently practiced in the United States. Special concern with two basic questions: 1. assumptions underlying theory of bilingual education; 2. comparison of theory with its realization in specific ethnic communities. Objective is view of bilingual education which takes into account different needs of various ethnic groups.

#### 179. Linguistics and Poetics (4)

Formal poetics, a linguistic approach to various forms of literature. Fundamentals of linguistics will be related to various current theories of literature. Special attention will be given to structuralist analyses of literature including those by Jakobson and the generative grammarians.

#### 181. 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. *Prerequisites: Linguistics 1, 2, 3 or equivalent; or Psychology 110 or 105 or equivalent.*

#### 182. Language and the Brain (4)

The course explores the neuroanatomical and neuropsychological aspects of normal and abnormal language. Topics to be covered include cerebral lateralization of the language functions, aphasia and other disorders, and animal communication as contrasted with human language. *Prerequisites: Linguistics 102A-B, Linguistics 101 or consent of instructor.*

#### 185. Theories and Methods of Foreign Language Acquisition (4)

This course will examine linguistic, psychological, and pedagogical arguments that underlie various language teaching programs. *Prerequisites: Linguistics 1, 2, 3 and speaking and reading competence in a foreign language.*

**186. Structure of Sign Language (4)**

Linguistic and psycholinguistic studies in structure of the American Sign Language of the deaf. Some knowledge of ASL preferable.

**198. Directed Group Study in Linguistics (2 or 4)**

Study of specific language structures or linguistic topics not covered in regular course work, under the direction of an undergraduate major adviser in the linguistics department. (P/NP grades only.) *Prerequisite: consent of instructor.* (See description under *Major Program* above.) (May be repeated for credit.)

**199. Independent Study in Linguistics (2 or 4)**

The student will undertake a program of research or advanced reading in linguistics under the supervision of a faculty member of the linguistics department (P/NP grades only.) *Prerequisite: consent of instructor.* (See description under *Major Program* above.) (May be repeated for credit.)

## Graduate

Note: Unless otherwise specified, the following graduate courses may be taken on a Satisfactory/Unsatisfactory (S/U) basis.

**200A. Writing Workshop (0)**

Practice in professional writing. Bibliographies and style sheets. Presentation of squibs. (Satisfactory/Unsatisfactory grades only.)

**200B. Writing Workshop (0)**

Practice in professional writing. Organization of material. Preparation of professional type paper. (Satisfactory/Unsatisfactory grades only.)

**200C. Writing Workshop (0)**

Professional writing. Preparation in writing a research paper. Preparation of grant applications and proposals. (Satisfactory/Unsatisfactory grades only.)

**201A. Syntax and Semantics (3)**

Introduction to the theory of generative grammar; transformational rules and other rule schemata. Models for syntactic description; formalization of grammars.

**201B. Syntactic Theory (3)**

The Standard Theory, its notations and formal devices. Generative semantics and interpretive semantics. Comparison of these and of other recent proposals in syntactic theory.

**201C. Issues in Syntax (3)**

Trends and issues in syntactic theory and analysis. Recent theoretical models and claims. Detailed discussion of selected problems in syntactic and semantic analysis.

**202A. Phonology (3)**

Introduction to phonological theory. Theoretical constructs and formalism. General problems in phonological theory. Phonetic explanations in phonology.

**202B. Phonology (3)**

Problems in phonological analysis. Detailed consideration of certain aspects of English phonology.

**202C. Phonology (3)**

Current issues in phonology. A survey of phonological theories other than generative phonology.

**211A-B. Linguistic Analysis (3-3)**

Techniques of linguistic analysis (phonetics, phonemics, morphology, syntax). Application of these techniques under simulated field conditions to the recording and analysis of a language by direct elicitation from native informants. May be repeated for credit.

**224A Modern English (3)**

A detailed study of the syntax, phonology, and semantics of modern English, with particular emphasis on current research on the general theory of grammars, as developed through the study of English.

**225. Topics in Syntactic Theory (3)**

Theoretical and descriptive problems in the analysis of the syntactic and semantic structure of English and other languages. May be repeated for credit.

**231A-B. Formal Linguistics (3-3)**

Theory of formal grammars, with particular emphasis on context-free grammars. Aspects of theories of automata and

computation related to grammatical systems. Relationship of the hierarchies of automata and grammars.

**234. Computational Linguistics (3)**

Parsing algorithms for formalized grammars. Approaches to natural-language processing. The computer as a linguist's tool.

**235. Topics in Formal Linguistics (3)**

Advanced material in special areas of the study of formal grammars to be selected by the instructor. May be repeated for credit. *Prerequisites: 231A-B or consent of instructor.*

**236. Formal Semantics (3)**

Introduction to formal semantics and its application to the description of natural language semantics. Semantics of propositional and predicate calculus, elements of modal logic and intensional logic. *Prerequisites: Linguistics 231A or consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.)

**245. Topics in Phonological Theory (3)**

Current theoretical issues in phonological theory. Since the topic can change from year to year, course may be repeated for credit.

**247. Topics in Experimental Phonetics (3)**

Detailed study of the acoustic structure of speech and of the basic anatomy and physiology of normal speech production. Laboratory techniques in these areas will be covered. Relations between experimental phonetics research and phonological theory will be discussed. May be repeated for credit. *Prerequisite: consent of instructor.*

**251. Historical Linguistics (3)**

Topics offered on regular basis will include: Indo-European phonology and morphology; the techniques of linguistic reconstruction; theory of language change; advanced problems of historical linguistics.

**261. Romance Linguistics (3)**

The history and structure of the Romance languages in the context of generative grammar. Topics offered on a regular basis will include: historical French syntax, historical French phonology, modern French syntax, modern French phonology, historical Romance phonology, historical Romance syntax.

**262. Albanian Linguistics (3)**

Grammatical analysis of Albanian—its phonology, morphology, and syntax.

**263. Topics in Chinese Linguistics (3)**

Synchronic and diachronic descriptions of Chinese. Survey of some of the following areas: phonology, syntax, dialectology, phonological change, syntactic change, semantic structure, history of Chinese linguistics. Since the topic can change from year to year, course may be repeated for credit.

**264. Language Structures (3)**

Grammatical analysis of a specific language. Language considered in a given quarter may be Sanskrit, Japanese, Albanian, Diegueño, Hungarian, Old Norse, Tongan or Uto-Aztecan. May be repeated for credit.

**265. Topics in American Indian Linguistics (3)**

Subjects covered may include: the genetic classification of American Indian languages; the structure of individual languages; change and reconstruction; areal relationships; survey of individual language families. Since the topic can change from year to year, course may be repeated for credit.

**268. Topics in Japanese Linguistics (3)**

Selected topics from special areas of Japanese syntax and phonology to be selected by the instructor. Since the topic can change from year to year, course may be repeated for credit. *Prerequisite: consent of instructor.*

**269. Topics in Polynesian Linguistics (3)**

Current problems in comparative Polynesian linguistics, reconstruction of Proto-Polynesian, external relationships of Polynesian. May be repeated for credit.

**274. Sociolinguistics (3)**

Introduction to the study of the social dimension in linguistics. Topics covered may include: bilingualism, code switching, pidgins, creole language, social factors affecting linguistic change, languages in contact, language in context.

**275. Topics in Semantics (3)**

Advanced material in special areas of the study of meaning and its relation to formal aspects of human language. Since

the topic can be changed from year to year, course may be repeated for credit.

**279. Literary Studies and Linguistics (3)**

Fundamentals of linguistics. The relationship of literary theories and current linguistic theories. Examination of formalist and structural analyses of literary texts. The contribution of various literary theorists (Jakobson, Ingarden, Spitzer, etc.) to poetics. Structural analysis of selected texts, mostly in English.

**280. Topics in Historical Change (3)**

Selected topics in syntactic, semantic, and phonological change in one or more languages; discussion of theories accounting for linguistic change. The content of the course will vary from year to year, so the course may be repeated for credit.

**281. Psycholinguistics (3)**

The study of models of language and of language acquisition from the point of view of modern linguistics and psychology.

**282. Language and the Brain (3)**

The course explores the neuroanatomical and neuropsychological aspects of normal and abnormal language. Topics to be covered include cerebral lateralization of the language functions, aphasia and other disorders, and animal communication as contrasted with human language. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.)

**285. Topics in Foreign Language Acquisition (3)**

Seminar will investigate the theories that underlie the teaching of foreign languages, with particular concentration on contemporary statements claiming a basis in modern psychology and linguistics. May be repeated for credit.

**286. Topics in the Language of the Deaf (3)**

The structure of American Sign Language and other gestural languages of the deaf. Perception of language in the visual mode. Since the topic can change from year to year, course may be repeated for credit.

**287. Topics in Orthography (3)**

The relationship of orthographic systems to structural linguistics. Since the topic can change from year to year, course may be repeated for credit.

**288. Topics in Psycholinguistics (3)**

Selected topics in experimental psycholinguistics and applications to language acquisition and pathology. *Prerequisite: consent of instructor.*

**291. Topics in History of Linguistics (3)**

Salient features in the development of the various aspects of linguistic theory will be surveyed, and the contributions of principal schools, such as the Neogrammarian, Prague, Structuralist traditions, will be assessed. Since the topic can change from year to year, course may be repeated for credit.

**292. Seminar in Language Universals (3)**

The methods and concepts of universal grammar. Discussion and evaluation of proposed universals. Original research into universal semantic, syntactic, and phonological tendencies. Since the topic can change from year to year, course may be repeated for credit.

**294. Topics in Research in Progress (0)**

Presentation and discussion of faculty and student research currently in progress. (Satisfactory/Unsatisfactory grades only.)

**295. Topics in Research in Progress (0)**

Presentation and discussion of research currently in progress at other universities and institutions. (Satisfactory/Unsatisfactory grades only.)

**296. Directed Research (1-6)**

Individual research. May be repeated for credit.

**298. Fieldwork (1-6)**

Linguistic analysis of language in the field. May be repeated for credit.

**299. Doctoral Research (1-9)**

Directed research on dissertation topic for students who have been admitted to candidacy for the Ph.D. degree. *Prerequisite: admission to candidacy.* (Satisfactory/Unsatisfactory grades permitted.)

**500. Apprentice Teaching Linguistics (1-4)**

The course, designed to meet the needs of graduate students who serve as LA's and TA's, includes analyses of texts and

materials, discussion of teaching techniques and theories, conducting discussion sections, preparation and grading of routine examinations, under the supervision of the instructor assigned to the course. As a requirement for the Ph.D. degree a student must serve as an apprentice teacher for the equivalent of 50% time for three academic quarters. Enrollment in this course for a total of twelve units (one to four units per quarter) documents the fulfillment of this requirement. (Satisfactory/Unsatisfactory grades only.)

## Literature

ADMINISTRATIVE OFFICE: 1003 Humanities Library Building, Revelle College

### COLLEGE OFFICES:

Muir College: 4009 Humanities and Social Science Building, Muir College  
 Revelle College: 1014 Humanities Library Building, Revelle College  
 Third College: 410 Warren College  
 Warren College: 410 Warren College

### Professors:

Ronald S. Berman, Ph.D. (*English Literature, Emeritus*)

• Carlos Blanco Aguinaga, Ph.D. (*Spanish Literature*)

Bernhard Blume, Ph.D. (*German Literature, Emeritus*)

Joaquin Casaldueiro, Ph.D. (*Spanish Literature, Emeritus*)

\*Diego Catalan, Ph.D. (*Spanish Literature*)

Robert C. Elliott, Ph.D. (*English Literature*)

Edwin S. Fussell, Ph.D. (*American Literature*)

Claudio Guillen, Ph.D. (*Spanish and Comparative Literature*)

Reinhard Lettau, Ph.D. (*German Literature*)

James K. Lyon, Ph.D. (*German Literature*)

Roy Harvey Pearce, Ph.D. (*American Literature*)

† Joseph Sommers, Ph.D. (*Latin-American Literature*)

John L. Stewart, Ph.D. (*English and American Literature, Provost of John Muir College*)

— Martin W. Wierschin, Ph.D. (*German Literature and Germanic Philology*)

Andrew H. Wright, Ph.D., F.R.S.L. (*English Literature*)

Wai-Lim Yip, Ph.D. (*Chinese and Comparative Literature*)

### Associate Professors:

Jack Behar, Ph.D. (*American Literature*)

• Alain J. J. Cohen, Ph.D. (*French Literature*)

David K. Crowne, Ph.D. (*English and Comparative Literature*)

— • Abraham J. Dijkstra, Ph.D. (*American and Comparative Literature*)

† — Thomas K. Dunseath, Ph.D. (*English Literature*)

Fred V. Randel, Ph.D. (*English Literature*)

Jonathan Saville, Ph.D. (*Russian and Comparative Literature*)

† Richard L. Terdiman, Ph.D. (*French Literature*)

Donald T. Wesling, Ph.D. (*English Literature*)

Sherley Anne Williams, M.A. (*American and Afro-American Literature*)

### Assistant Professors:

Jeffrey Barnouw, Ph.D. (*English and Comparative Literature*)

• Deborah J. Clark, Ph.D. (*French Literature*)

† Sandra E. Drake, Ph.D. (*Caribbean and Comparative Literature*)

Page Ann duBois, Ph.D. (*Classics*)

\* Raymond R. Fleming, Ph.D. (*Italian and Comparative Literature*)

— Suzanne C. Gearhart, Ph.D. (*French Literature*)

Jerome H. Katsell, Ph.D. (*Russian and Comparative Literature*)

Susan Kirkpatrick, Ph.D. (*Spanish and Comparative Literature*)

• Ronald L. Martinez, Ph.D. (*Italian and Comparative Literature*)

• Louis Adrian Montrose, Ph.D. (*English Literature*)

• Lowry Cheng-Wu Pei, Ph.D. (*English Literature*)

Mary Jean Pfaelzer, Ph.D. (*English and American Literature*)

Marta E. Sanchez, Ph.D. (*Latin American and Chicano Literature*)

Rosaura A. Sanchez, Ph.D. (*Spanish Literature*)

Saul Steier, Ph.D. (*English and Comparative Literature*)

Cynthia Walk, Ph.D. (*German Literature*)

Don Edward Wayne, Ph.D. (*English Literature*)

### Acting Assistant Professor:

• Richard E. Friedman (*Hebrew and Comparative Literature*)

### Lecturer:

Sam Hinton, A.B. (*General Literature*)

\*On leave 1978-79

†On leave fall quarter

—On leave winter quarter

•On leave spring quarter

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All literature courses at UC San Diego are offered by a single Department of Literature. The department brings together teachers, scholars and students who would elsewhere be separated by the languages in which the national literatures are written. Here, they are united by the nature of the studies they pursue. This lends a comparatist 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 communications. With special permission, undergraduates may take graduate courses for credit and graduate students may also take undergraduate courses for credit.

## 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 college requirements, students who have chosen or are considering

a major in literature take the appropriate lower-division language sequences in linguistics and literature as preparation for upper-division course work in a foreign language and literature.

**The Major in Literature** Eight programs are open to those majoring in literature: English-American, French, General Literature, German, Literature and Society, Third World Literatures, Russian, Spanish, and Writing. In each case, whatever the primary field of concentration, a student is expected to study a second literature. The range of second literatures includes Chinese, Classical Greek, Hebrew, Italian, and Latin, as well as the previously mentioned French, German, Russian, Spanish, and (for those concentrating in a foreign literature) English-American. Once a student has decided upon a major in literature, he or she is required to plan each quarter's program together with a faculty adviser in the Department of Literature.

A major consists of:

1. The Primary Literature: nine upper-division courses in one literature or other area of concentration (except in the writing major which is structured differently). See individual program requirements below on the various areas of concentration.
2. The Secondary Literature: three courses in a second literature, given substantially in the native language. At least one of these courses must be upper-division. The other two may be lower-division, provided that they come from the following list: courses numbered 50 through 54 in French, German, Hebrew, Russian, or Spanish; English 21, 22, 23, 24; Latin 1 and 2; Greek 1 and 2; or Italian 1 and 2.
3. A total of at least twelve upper-division Department of Literature courses altogether.

Regularly scheduled departmental courses taken to satisfy the requirements for the literature major must be taken for a letter grade. Only in independent study courses (Literature 199) and in UC San Diego Extension courses with numbers between Literature 100 and Literature 199 is a "pass" grade acceptable toward the literature major. Undergraduate students who, by special permission, enroll in departmental graduate courses may, however, apply these courses toward their major whether they have a passing letter grade or an "S."

The department also offers the opportunity of interdepartmental majors under the Muir College Special Projects.

### Individual Program Requirements

*Primary Concentration in English and American Literature*

1. Lit/English 21, 22, 23, and 24. Even if some or all of these courses are used toward meeting a college's humanities or general education requirements, they still count toward meeting the require-

ments for the English and American literature major. (This requirement will be applied to students graduating in spring 1981 or later.)

2. Nine upper-division courses in English and American literature, including at least one course from each of the following five categories:
  - a. English literature before 1640
  - b. English literature from 1640 to 1800
  - c. English literature from 1800 to the present
  - d. American literature before 1860
  - e. American literature after 1860

(This requirement will be applied to students graduating in spring 1979 or later.)
3. Three courses, of which at least one must be upper-division, in a second literature, given substantially in a language other than English. See the heading, "The Secondary Literature," above for detailed information on which lower-division courses may be used toward meeting this requirement.
4. Upper-division electives chosen from Department of Literature offerings to make a total of twelve upper-division courses.

*Primary Concentration in a Foreign Literature*

1. Nine upper-division courses in one of the following literatures:
  - a. French
  - b. German
  - c. Russian
  - d. Spanish
2. Three courses, of which at least one must be upper-division, in a second literature given substantially in the native language. See the heading, "The Secondary Literature," above for detailed information on which lower-division courses may be used toward meeting this requirement.
3. Upper-division electives chosen from Department of Literature offerings to make a total of twelve upper-division courses.

*Primary Concentration in General Literature*

1. Any nine upper-division courses offered by the department, chosen in consultation with a departmental adviser.
2. Three courses, of which at least one must be upper-division, in a second literature, given substantially in a language other than English. See the heading, "The Secondary Literature," above for detailed information on which lower-division courses may be used toward meeting this requirement.
3. Upper-division electives chosen from Department of Literature offerings to make a total of twelve upper-division courses.

*Primary Concentration in Literature and Society: Third World Literatures*

The experience of colonization, oppression, or slavery underlies a large portion of the literatures of the Third World and of some ethnic minorities in the United States. Because it is just this sort of social circumstance which generates literary theme and style, the Literature and Society: Third World Literatures Program stresses the relationships between text and historical context. The program is designed to provide a comparative approach, since all Third World literatures share certain historical experiences or relationships, but differ in the types and forms of oral or pre-colonial literatures. The literatures of the dominant industrialized cultures must also be taken into account, both in comparative and contrastive terms. Thus students are required to avail themselves of appropriate courses in the Department of Literature in order to broaden their familiarity with the larger framework of world literature.

Requirements:

1. Nine upper-division courses in Literature and Society
  - a) Four of the Lit/Soc courses must be in a primary U.S. minority literature concentration (Afro-American, Chicano, Native-American, Asian-American).
  - b) Five additional courses from Lit/Soc offerings must be taken. These may deal with another U.S. minority literature or a Third World literature. (Asian, Latin-American, Caribbean, etc.).
2. Four additional literature courses chosen from Department of Literature offerings, two of which may be lower-division. The student's adviser will suggest courses pertinent to the student's chosen concentration.
3. Three literature courses, at least one of which must be upper-division, in a language other than that of the student's principal concentration. For example, a student choosing an Afro-American emphasis and taking most of his or her courses in English must take three courses given substantially in a language other than English, while a student choosing a Chicano and Spanish-American emphasis, and taking most of his or her courses in Spanish, must take three courses given substantially in a language other than Spanish.
4. There must be a total of twelve upper-division courses.

Students majoring in Literature and Society are urged to consider taking, in addition to their major, courses from a list — available in Department of Literature offices — of related courses in other departments. Consultation with a Literature and Society adviser is expected as each student plans his or her program.

A student, for example, who elects Afro-American literature as the primary literary

focus, would choose courses in the history, development of genres and the major themes in Afro-American literature, its relationship to and divergence from other Third World literatures and American literatures. Courses in the secondary literature might be chosen from Latin American literatures or (for a student interested in North American cultures), Chicano literature and complementary courses might include courses in Afro-American history, history of the Southwest and African art.

A student electing Chicano literature as the primary literary focus would of course follow basically the same pattern: *four* literature and society courses in Chicano literature; the *remaining five* could encompass Afro-American, Caribbean, and Latin American literatures. *Additional* courses would probably focus on American or Spanish literatures.

Students interested in double literature majors in which one of the more traditional areas of literature might be combined with Literature and Society should consult with Literature and Society advisers.

*Primary Concentration in Writing*

The writing major is designed to provide directed experience in writing prose fiction and non-fiction, drama and poetry, and to develop critical acumen toward works in progress and literary texts. Those who think of themselves primarily as writers will find courses regularly offered in the various genres to develop their own styles and breadth of experience in composing and criticism. Those whose prime emphases are literary scholarship and the teaching of writing will find the major a context for writing extensively, and for focusing, whether as writers or peer critics, on the act of written composition. Note that both lower- and upper-division requirements for a primary concentration in writing differ from the requirements for other primary concentrations in the Department of Literature. The major consists of:

1. A lower-division creative writing course.
2. Any one of the following literature sequences:
  - a. Lit/Gen 2A-B-C (The Literary Heritage)
  - b. Lit/Gen 4A-B-C (Fiction and Film in Twentieth-Century Societies)
  - c. Lit/Gen 6A-B-C (Understanding Literature)
  - d. Lit/Gen 8A-B-C (Literature and History: The Third World)
  - e. Lit/En 21, 22, and either 23 or 24 (The English and American Literary Imagination)
3. Twelve upper-division courses:
  - A. Six upper-division courses in Literature/Writing selected between the numbers 110 and 150. These classes may be repeated for credit, but the requirement should show a range of writing experience in at least two genres.
  - B. Six additional Department of Litera-



ture courses, at least four of which must be upper-division, showing a knowledge of two or more national literatures. Included must be three courses, at least one of which is upper-division, given substantially in a language other than English. Especially pertinent to the writing major and applicable toward this requirement are the upper-division writing courses in French, German and Spanish (Lit/Fr 140, Lit/Ge 140, and Lit/Sp 140), as well as such upper-division language courses as Spanish Language in America: Dialects in USA (Lit/Sp 143). See the heading "Secondary Literature" above for detailed information on which lower-division courses may be used to meet this foreign language requirement.

- C. One lower- or upper-division course in another creative art. Students are required to obtain the permission of their major adviser for the specific course to count toward the major.

Teaching courses such as Lit/Writing 194 (The Teaching of Writing) and Lit/Writing 195 (Apprentice Teaching of Writing) and courses such as Lit/Soc 162 (Language and Society) and Lit/Sp 120 (Spanish Language in America), which deal with the socio-linguistic aspects of writing, are recommended particularly for writing majors who plan to become teachers of writing.

**The Minor in Literature** The department offers a wide range of possibilities for noncontiguous minors. The options include courses in a single national literature, courses in more than one literature, and a combination of language and literature courses. In all instances, literature minors require at least three upper-division courses. Students minoring in a foreign literature may apply two quarters of Literature 50 toward course requirements. In the case of Chinese, Classical Greek, Hebrew, Italian, and Latin, two of these courses may be tutorials. Individual requirements for minors in a particular program may vary. Students should consult a departmental adviser. The department offers minors in the following areas:

- a. Chinese
- b. Classical Greek
- c. English-American
- d. French
- e. German
- f. Hebrew
- g. Italian
- h. Latin
- i. Literature and Society: Third World Literatures
- j. Russian
- k. Spanish
- l. Writing

Specific requirements for each of the minors are available in the Department of Literature offices and college academic advising offices.

## The Graduate Program

**Doctoral Degree Program** Doctoral programs are offered in English and American literature, French literature, German literature, Spanish literature, and comparative literature. Normally, students will be accepted only for the Ph.D. Students in the doctoral program may, however, qualify for the M.A. under Plan I (modified thesis plan). (See "Graduate Studies: The Master's Degree.") The C.Phil. degree is conferred upon all students advanced to candidacy for the Ph.D.

**Preparation** The following are requirements for admission to graduate study in literature:

1. A baccalaureate 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, including the advanced examination in the literature of the student's field.
3. A working knowledge of one foreign language.

**Course of Study** Although most students will choose to concentrate in a national literature, there will necessarily be a distinctly comparatist emphasis in their studies. Each student will undertake a comparatist project—course work and guided independent study in a literature other than, but related to, the one in which he or she is specializing. The program of study makes explicit provision for a significant amount of independent work. Tutorial work and interdisciplinary study are encouraged; in addition, all graduate students work in close association with an adviser who directs their independent study preparatory to the qualifying examination. No specific courses are required. On the contrary, graduate students take those seminars best suited to their individual needs and interests. Students are required to enroll in a minimum of twelve seminars, or their equivalent, during the first six quarters of graduate study, and receive credit for their participation on a satisfactory/unsatisfactory basis. Students who have received an M.A. or its equivalent elsewhere may receive transfer credit for up to three seminars. While completing the twelve-seminar requirement, students are expected to write six term papers; at least three of these must be written within the first three quarters of graduate study.

**Teaching** The department requires for the completion of the Ph.D. degree that graduate students do apprentice teaching as an integral part of their training. The minimum amount required is equivalent to the duties expected of a quarter-time teaching assistant for three academic quarters. The duties of a teaching assistant normally entail grading papers and examinations, conducting discussion sections, and related activities. Each teaching assistant is expected to attend the

lectures for the course in which he or she participates.

**Language Requirements** Graduate students in literature are required to develop the ability to read literary and secondary texts and to follow seminar discussions or lectures in a second language, a language other than the one in which the literature of their primary specialization is written. Each student must demonstrate language proficiency through regular enrollment in and completion of a seminar in the literature of the second language. Only seminars conducted in the language in question can be considered toward fulfillment of the language requirement. Seminars taken to fulfill the language requirement count toward the twelve seminars required for advancement to candidacy. Students should contact the graduate secretary for further details.

The Ph.D. program in German literature requires that a student who concentrates research in a period before 1700 know or learn Latin. Each student will be required to take a two-course sequence consisting of a cultural history of the German language and an introduction to Middle High German. Equivalent work done elsewhere will be counted toward a fulfillment of the requirement.

The Ph.D. program in comparative literature requires (a) knowledge in depth of two foreign languages, (b) a reading ability in French, German, Italian or Spanish, (c) when the student's field of concentration demands it, a reading ability in a classical or non-Western language (Greek, Latin, Chinese, Arabic, etc.). A student in the program is expected to attend graduate seminars given in the original language or undertake guided independent study in three literatures, one of which can be English or American.

**Advancement to Candidacy** While students participate in seminars they are encouraged to keep in mind—and begin to prepare for—the second stage of their preparation toward advancement to candidacy for the Ph.D. During the second stage of work in the department's doctoral program, students, in consultation with both their academic adviser and the general adviser of their section, choose three areas of specialization:

1. A literary or critical genre or mode.
2. An historical period.
3. An author of major literary historical significance within the national literature of the student's primary focus, or a problem of critical theory or interdisciplinary study.

The requirements for advancement to candidacy are:

1. Successful completion of twelve graduate seminars (or their equivalent) including a seminar which fulfills the student's language requirement.
2. Submission of three papers, one long paper and two in-depth research reports.

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for approval by the student's doctoral committee.

3. A formal candidacy conference between the entire candidacy committee and the student under scrutiny. The subject of discussion is the student's "long paper" and research reports and the relationship between these papers and the larger areas of literary history or criticism which provide the context within which the papers have been written.
4. A public colloquium on a subject of the student's choice, usually the subject of the "long paper" and/or the possible subject of the projected dissertation.

**The Dissertation** A suitable dissertation is required for the Ph.D. degree. The student concentrates on the dissertation after passing the qualifying examination.

## Courses

NOTE: For changes in course offerings implemented after publication, inquire at the office of the Department of Literature.

**General Literature** In both lower- and upper-division general literature courses, texts may be read in English translation when necessary, and lectures and discussions are conducted in English.

### Lower Division

#### Lit/Gen 2A-B-C. The Literary Heritage (4-4-4)

A study of masterpieces from antiquity to the present, emphasizing three major ways of understanding human condition and three successive moments in the history of civilization when each of these perspectives was particularly important: first, an age of religious faith when belief in the supernatural pervaded culture; second, an age when supernaturalism was questioned, and the powers formerly reserved for the gods were increasingly assigned to the human imagination; and, last, an age which distrusted idealistic conceptions of man and instead often stressed the conditioning power of social and material contexts

- 2A *Literature and the Gods* Mr. Friedman (F)  
2B *Literature and the Imagination* Mr. Randel (W)  
2C *Literature and Society* Mr. Wesling (S)

#### Lit/Gen 4A-B-C. Fiction and Film in Twentieth-Century Societies (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 specifically the Spanish-speaking, French-speaking, and German-speaking peoples. All reading will be in English translation. (Texts will be available also in the original language for students who read it.)

- 4A *Latin America* Ms. Kirkpatrick (F)  
4B *France* Mr. Terdiman (W)  
4C *Germany, Austria and Switzerland* Ms. Walk (S)

#### Lit/Gen 6A-B-C. Understanding Literature (4-4-4)

An introduction to the reading and interpretation of the major literary forms—fiction, poetry, and drama—through selected readings from various periods and cultures. The intention of the sequence is to enable the student to discover the relationship between literature and the self.

- 6A *Fiction* Mr. Wright (F)  
6B *Poetry* Mr. Pearce (W)  
6C *Drama* Mr. Steier (S)

#### Lit/Gen 8A-B-C. Literature and History: The Third World (4-4-4)

An analysis of a major theme common to selected ethnic literatures in the United States and to certain literatures of the Third World. The course is organized around major literary genres. Themes vary from year to year. Theme for 1978-79: Tradition and Modernity.

- 8A *Literary Forms and the Third World* Ms. M. Sanchez (F)  
8B *Fiction and the Third World* Ms. Williams (W)  
8C *Drama, Poetry, and the Third World* Mr. Sollors (S)

#### Lit/Gen 19A-B-C. The Greco-Roman World (4-4-4) (Not offered in 1978-79.)

### Upper Division

#### Lit/Gen 120. The Classical Tradition (4)

Greek and Roman literature in translation. May be repeated for credit as topics vary.

- Goddess in Myth and Literature* Ms. duBois (F)  
Topic TBA Staff (S)

#### Lit/Gen 123. Studies in Eighteenth-Century European Literature (4)

Topics to be considered include the age of sensibility, enlightenment, neo-classicism. Attention given to historical and cultural contexts. In translation. Mr. Barnouw (F)

#### Lit/Gen 124. Studies in European Romanticism (4) (Not offered in 1978-79.)

#### Lit/Gen 126. 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. Mr. Crowne (W)

#### Lit/Gen 127. 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.

- Topic TBA Mr. Dijkstra (F)  
Topic TBA Mr. Steier (W)

#### Detective Novel Mr. Barnouw (S)

#### Lit/Gen 128. The Drama (4)

Aspects of the drama, not confined to a single national literature. Texts may be read in English. May be repeated for credit as topics vary. Staff

#### Topic TBA Mr. Steier (F)

#### From Ritual to Total Theatre Mr. Yip (W)

#### Lit/Gen 129. Lyric Poetry (4)

Studies in lyric poetry. Not confined to a single national literature. Texts may be read in English. May be repeated for credit as topics vary.

#### Landscape Poetry Mr. Yip (F)

#### Lit/Gen 130. Introduction to Criticism (4)

Theories of criticism and the role and function of critic and artist in society. Mr. Wayne (W)

#### Lit/Gen 140. Nineteenth-Century Russian Literature in Translation (4)

A study of literary works from nineteenth-century Russia. All readings will be in English. May be repeated for credit as topics vary.

#### Chekhov Mr. Katsell (F)

#### Tolstoy Mr. Katsell (S)

#### Lit/Gen 141. Twentieth-Century Russian Literature in Translation (4)

A study of literary works from twentieth-century Russia, including the Soviet period. All readings will be in English. May be repeated for credit as topics vary.

*Literature of Soviet Central Asia* Ms. Drake (W)  
The focus of the course will be on writings by modern authors from the Asian republics of the Soviet Union (Kirghizia, Kazakhstan, Uzbekistan and others). Most works will be novels and short stories, considered in the context of the social and historical situation of Central Asia, and Soviet theories of literature. Readings in English

#### Lit/Gen 142. Genres in Russian Literature in Translation (4)

An examination of one or more genres in 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

#### Russian Theatre Mr. Saville (W)

#### Lit/Gen 144. Spanish Literature in Translation (4)

One or more periods or authors in Spanish literature. Texts may be read in English. May be repeated for credit as topics vary.

#### Cervantes Mr. Guillen (F,S)

#### Lit/Gen 145. French Literature in Translation (4)

One or more periods of authors in French literature. Texts may be read in English. Staff (W)

#### Lit/Gen 146. Latin American Literature in Translation (4) (Not offered in 1978-79.)

#### Lit/Gen 148. Italian Literature in Translation (4) (Not offered in 1978-79.)

#### Lit/Gen 149. 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.

#### Guenter Grass Mr. Lyon (F)

#### Nineteenth-Century German "Lied"—Goethe to Heine; Schubert to Hugo Wolf Mrs. Walk (W)

#### Lit/Gen 150. Chinese Literature 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 as topics vary.

#### Self and No Self in Contemporary Chinese Literature Mr. Yip (W)

#### Lit/Gen 151. Hebrew Literature in Translation (4)

One or more aspects of Hebrew literature. Texts to be read in English. May be repeated as topics vary.

#### Prophetic Literature Mr. Friedman (W)

#### Lit/Gen 152. Literature and Ideas (4)

This 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 three times as topics vary

#### Psychoanalysis and Literature Mr. Cohen (W)

#### Topic TBA Mr. Steier (S)

#### Lit/Gen 154. 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.

#### Women in Nineteenth-Century European Novel Ms. Kirkpatrick (S)

#### Lit/Gen 161. 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. Mr. Hinton (W)

#### Topic TBA Mr. Hinton (W)

#### Ethnopoetics Mr. Yip (S)

#### Lit/Gen 190. Seminars (4)

These seminars are devoted to a variety of special topics, including the works of single authors, 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

#### Topic TBA Mr. Friedman (W)

**Lit/Gen 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.) *Prerequisites:* upper-division standing and consent of department. Staff (F,W,S)

**Lit/Gen 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 consent of department. Staff (F,W,S)

**Graduate****Lit/Gen 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 prior to completion of Ph.D.; the amount required is equivalent to duties of a 25% TA for three quarters. Enrollment for two units documents the requirement for each quarter. May be repeated for credit. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

**Lit/Gen 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 prior to completion of Ph.D.; the amount required is equivalent to duties of a 25% TA for three quarters. Enrollment for two units documents the requirement for each quarter. May be repeated for credit. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

**Lit/Gen 502. Apprentice Teaching in Muir College (2-4)**

Consideration of pedagogical methods appropriate to undergraduate teaching in Muir College courses, under the supervision of the instructor of the course. Doctoral students in literature are required to participate in undergraduate teaching prior to completion of the Ph.D.; the amount required is equivalent to duties of a 25% TA for three quarters. Enrollment for two units documents the requirement for each quarter. May be repeated for credit. (Satisfactory/Unsatisfactory grades only.) *Prerequisite:* graduate standing. Staff (F,W,S)

**Lit/Gen 503. Apprentice Teaching in Third College (2-4)**

Consideration of pedagogical methods appropriate to undergraduate teaching in Third College courses, under the supervision of the instructor of the course. Doctoral students in literature are required to participate in undergraduate teaching prior to completion of the Ph.D.; the amount required is equivalent to duties of a 25% TA for three quarters. Enrollment for two units documents the requirement for each quarter. May be repeated for credit. (Satisfactory/Unsatisfactory grades only.) *Prerequisite:* graduate standing. Staff (F,W,S)

**Lit/Gen 504. Apprentice Teaching in Warren College (2-4)**

Consideration of pedagogical methods appropriate to undergraduate teaching in Warren College courses, under the supervision of the instructor of the course. Doctoral students in literature are required to participate in undergraduate teaching prior to completion of the Ph.D.; the amount required is equivalent to duties of a 25% TA for three quarters. Enrollment for two units documents the requirement for each quarter. May be repeated for credit. (Satisfactory/Unsatisfactory grades only.) *Prerequisite:* graduate standing. Staff (F,W,S)

**Chinese Literature****Upper Division**

*Prerequisite:* upper-division standing or consent of the instructor. Additional prerequisites may be specified below.

**Lit/Ch 101. Readings in Contemporary Chinese Literature (4)**

(Not offered in 1978-79.)

**Lit/Ch 198. Directed Group Study (4)**

Directed group study in areas of Chinese literature not normally covered in courses. (P/NP grades only.) *Prerequisites:* upper-division standing and permission of department. Mr. Yip (F,W,S)

**Lit/Ch 199. Special Studies (2 or 4)**

Tutorial; individual guided reading in areas not normally cov-

ered in courses. (P/NP grades only.) *Prerequisites:* upper-division standing and consent of department. Mr. Yip (F,W,S)

**Comparative Literature  
Graduate****Lit/CO 210. Classical Studies (4)**

(Not offered in 1978-79.)

**Lit/CO 215. Medieval Studies (4)**

(Not offered in 1978-79.)

**Lit/CO 221. Renaissance Studies (4)**

(Not offered in 1978-79.)

**Lit/CO 224. Seventeenth-Century Studies (4)**

(Not offered in 1978-79.)

**Lit/CO 231. Eighteenth-Century Studies (4)**

One or more major writers, texts, or trends of eighteenth-century European literature. May be repeated for credit as topics vary. (S/U grades only.) Mr. Barnouw (W)

**Lit/CO 241. Romanticism (4)**

(Not offered in 1978-79.)

**Lit/CO 242. Nineteenth-Century Studies (4)**

(Not offered in 1978-79.)

**Lit/CO 243. Symbolism (4)**

(Not offered in 1978-79.)

**Lit/CO 252. Modernism (4)**

(Not offered in 1978-79.)

**Lit/CO 253. The New Literatures (4)**

(Not offered in 1978-79.)

**Lit/CO 261. Comparative Literature: History and Theory (4)**

(Not offered in 1978-79.)

**Lit/CO 262. Comparative Prosody (4)**

(Not offered in 1978-79.)

**Lit/CO 263. Theory and Practice of Translation (4)**

(Not offered in 1978-79.)

**Lit/CO 271. Critical Theory (4)**

Problems of literary analysis; competing schools and major figures in literary criticisms. (S/U grades only.)

*Introduction to Critical Theory* Mr. Barnouw (F)

*Modern Period* Staff (F)

*Topic TBA* Mr. Guillen (W)

*Comparative Poetics* Mr. Yip (S)

*Toward an Anthropology of Literature* Mr. Pearce (S)

**Lit/CO 272. Literature and Social History (4)**

Special topics in practical criticism involving social and economic historical perspectives. (S/U grades only.)

*Literature and Social History of the Caribbean* Ms. Drake (S)

*Contemporary poetry and prose of the Caribbean, considered in historical context.*

**Lit/CO 273. Art and Literature (4)**

(Not offered in 1978-79.)

**Lit/CO 274. Genre Studies (4)**

A consideration of a representative selection of works relating to a theme, form, or literary genre. (S/U grades only.)

*Theories of the Novel: First-Third World* Staff (F,W)

*Satire I and II* Mr. Elliott (W,S)

**Lit/CO 275. Literature and Music (4)**

(Not offered in 1978-79.)

**Lit/CO 276. The Modern Theatre (4)**

(Not offered in 1978-79.)

**Lit/CO 277. Psychoanalytic Approaches to Literature (4-4)**

(Not offered in 1978-79.)

**Lit/CO 278. Communications and Literature (4)**

(Not offered in 1978-79.)

**Lit/CO 279. Literary Studies and Linguistics (4)**

(Not offered in 1978-79.)

**Lit/CO 297. Directed Studies (1-12)**

Guided and supervised reading in a broad area of literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

**Lit/CO 298. Special Projects (4)**

Treatment of a special topic in comparative literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

**Lit/CO 299. Thesis (1-12)**

Research for the dissertation. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

**English and American Literature  
Lower Division****Lit/En 21-22-23. The English Literary Imagination (4-4-4)**

Major figures and works in English literature from the Middle Ages to the present day including *Beowulf*, Chaucer, Spenser, Shakespeare, Milton, Swift, Pope, the Romantics, Tennyson, Browning, Yeats, T.S. Elliot; together with novels by such authors as Fielding, Jane Austen, Dickens, Thackeray, Hardy, and Joyce.

NOTE: 21R, 22R, and 23R may be taken in sequence in partial fulfillment of the Revelle humanities requirement.

21 *The Middle Ages and the Renaissance* Mr. Montrose and Mr. Saville (F)

22 *Neoclassicism and Romanticism* Mr. Elliott and Mr. Wright (W)

23 *The Rise of Modernism* Mr. Behar and Staff (S)

**Lit/En 24. The American Literary Imagination (4)**

An introduction to American literature, centered mainly on the close reading and interpretation of major writers — with due attention, however, to selected minor writers — so that the student, aided and guided by the lectures, can get a sense of the scope of American literature as a whole and also of its relationship to the course of American social, cultural, and intellectual history. Mr. Pearce (S)

**Lit/En 50. Shakespeare and the Nature of Man (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. Mr. Wayne (F)

**Upper Division**

*Prerequisite:* upper-division standing or consent of the instructor. Additional prerequisites may be specified below.

**Lit/En 106. The Medieval Period (4)**

Studies in medieval English literature. Topics such as Old English heroic poetry (in translation), medieval allegory in English, Chaucer's contemporaries, Middle English lyrics, and Middle English romances, as well as surveys of Old or Middle English literature will be presented. May be repeated for credit as topics vary.

*The Heroic Age: Old English Poetry in Translation* Mr. Crowne (S)

**Lit/En 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*. (To be offered in 1979-80.)

**Lit/En 108. The Waning of the Middle Ages (4)**

Studies in the English literature of the late Middle Ages and early Renaissance. Various topics, including the craft-cycle plays, moralities, and interludes, the Scottish Chaucerians, fifteenth-century poetry, Malory, and romances, visions, and satires of the Late Middle Ages. May be repeated for credit as topics vary. (To be offered in 1979-80.)

**Lit/En 110. The Renaissance (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 compari-

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son with other arts and sciences. May be repeated for credit as topics vary.

*Literature and Art in Renaissance England* Mr. Wayne (W)

### Lit/En 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. Mr. Berman (W)

### Lit/En 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. Mr. Berman (S)

### Lit/En 115. 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. May be repeated for credit as topics vary. Mr. Wayne (F)

### Lit/En 116. Elizabethan and Jacobean Poetry (4)

Studies in the evolution of the various poetries and poetic styles from the reign of Elizabeth I to the death of Charles I. The course may consider single major poets, as Spenser, Sidney, Donne, or Jonson. Or it may examine related groups of poets and their works, as metaphysical or cavalier poetry. May be repeated for credit as topics vary.

*Lunatics, Lovers, and Poets: Forms of Desire in Elizabethan Poetry* Mr. Montrose (F)

### Lit/En 117. The Seventeenth Century (4)

A study of English literature during a period when the impact of the "New Science" and the English Civil War were absorbed and literary achievements included the creation of a tradition of great prose stylists from Bacon through Burton and Browne to Dryden; the reestablishment of a flourishing theatrical tradition in the Restoration drama of Wycherley, Dryden, and Congreve; and the metamorphosis of poetical style from metaphysical to neoclassical.

*The English Revolution* Mr. Barnouw (W)

### Lit/En 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. Mr. Randel (F)

### Lit/En 120. The Eighteenth Century (4)

English literature in an age of unsurpassed satirical writing, widespread speculation on aesthetic experience as critical premises shifted from classic to romantic, and exuberant creativity in the varied works of such authors as Pope, Swift, Gibbon, Burke, Johnson, and Blake. May be repeated for credit as topics vary.

*Major Authors* Mr. Elliott (S)

### Lit/En 125. The Romantic Period (4)

A study of English literature during the two generations just after the start of the French Revolution, including such authors as Coleridge, Wordsworth, Byron, Shelley, Keats, Lamb, Hazlitt, and DeQuincey. May be repeated for credit as topics vary.

*Nature and History in Romantic Poetry* Mr. Randel (F)

*Romantic Prose* Mr. Wesling (W)

### Lit/En 127. The Victorian Period (4)

The study of a distinguished body of fiction, poetry, and non-fictional prose, which at once reflects new social conditions and refines the inheritance of the romantic generation; includes such writers as Dickens, George Eliot, Hardy, Tennyson, Browning, Hopkins, Ruskin, Newman, Arnold. May be repeated for credit as topics vary.

*Social Themes in Victorian Literature* Mr. Wesling (F)

### Lit/En 130. Modern British Literature (4)

A study of literature in the British Isles during a period that encompasses the Irish Renaissance, the Bloomsbury group,

Modernism, the Auden generation, D. H. Lawrence and the explorers of working class culture, and the Theatre of the Absurd. May be repeated for credit as topics vary.

*Modern English Drama* Staff (W)

*Modern Irish Drama* Mr. Dunseath (S)

### Lit/En 143. The English Novel: Eighteenth Century (4)

A study of some of the first major novels in English, including such works as *Robinson Crusoe*, *Clarissa*, *Tom Jones*, and *Tristram Shandy*. Mr. Elliott (F)

### Lit/En 144. The English Novel: Nineteenth Century (4)

A study of the English novel in the age of Sir Walter Scott, Charlotte and Emily Brontë, Charles Dickens, George Eliot, and Anthony Trollope. May be repeated for credit as topics vary. Mr. Berman (W)

### Lit/En 145. The English Novel: Modern Period (4)

A study of the English novel in the age of Thomas Hardy, Joseph Conrad, E. M. Forster, Virginia Woolf, D. H. Lawrence, and James Joyce. May be repeated for credit as topics vary. Mr. Wright (S)

### Lit/En 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.

*Modern British and American Poetry* Mr. Behar (F)

*Science Fiction* Staff (F)

*The Familiar Essay: Montaigne to Orwell* Mr. Randel (S)

### Lit/En 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.

*Women in British Literature* Staff (F)

*Women in American Literature* Ms. Pfaelzer (W)

*The Idea of the Modern in Literature and Art* Mr. Behar (W)

*Ethnicity in American Literature* Mr. Sollors (F)

### Lit/En 152. The Origins of American Literature (4)

Readings and lectures 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. May be repeated for credit as topics vary. Mr. Pearce (F)

### Lit/En 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, and Whitman during the period 1836-1865, when the role of American writing in the national culture becomes an overriding concern. May be repeated for credit as topics vary. Mr. Behar (W)

### Lit/En 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, and Stephen Crane, who were writing in an age when the frontier was conquered and American society began to experience massive industrialization and urbanization. May be repeated for credit as topics vary. Ms. Pfaelzer (S)

### Lit/En 158. Modern American Literature (4)

A critical examination of American literature in the age of Pound and Eliot, Hemingway and Faulkner, Stevens and Williams.

*Popular Culture* Staff (W)

### Lit/En 159. Contemporary American Literature (4)

Studies in the literature of our own time.

*Post Modern Fiction* Staff (F)

*Post Modern Poetry* Staff (W)

### Lit/En 171. American Poetry (4)

A survey, through critical and historical interpretation, of

American poetry from its seventeenth-century beginnings to the present, with emphasis on such major poets as Whitman, Emily Dickinson, Ezra Pound, T. S. Eliot, Wallace Stevens, and William Carlos Williams. (To be offered in 1979-80.)

### Lit/En 173. American Fiction (4)

A survey, through critical and historical interpretation, of American fiction from its beginnings to the present, with emphasis on major novels and short stories by such writers as Melville, Hawthorne, Poe, Mark Twain, Henry James, Fitzgerald, Hemingway, and Faulkner.

*Development of American Fiction* Mr. Fussell (W)

*Modern American Fiction* Mr. Fussell (S)

### Lit/En 181. Literature of the English-Speaking Caribbean and Africa (4)

Course readings will be on contemporary fiction from these areas with special attention to historical and cultural relations between these countries and England, the former colonial power. Ms. Drake (W)

### Lit/En 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 permission of department.*

*The Restoration* Mr. Berman (F)

*James Joyce* Mr. Fussell (F)

*Edgar Allen Poe* Mr. Dijkstra (F)

*Wallace Stevens* Mr. Pearce (F)

*Satire I and II* Mr. Elliott (W,S)

*Elizabethan History and Literature* Mr. Montrose (W)

*Tennyson, Browning, and Arnold* Mr. Wesling (W)

*Contemporary Poetry: The San Francisco Scene* Staff (F)

*Chaucer* Mr. Crowne (S)

*Problems in the Theory of Cultural and Social Change in the Early Seventeenth Century* Mr. Wayne (S)

*William Wordsworth* Mr. Randel (S)

*On Literature and History: Yeats, Lawrence, and Eliot* Mr. Behar (S)

### Lit/En 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: special permission of the department.* Staff (F,W,S)

### Lit/En 199. Special Studies (2 or 4)

Tutorial; individual guided reading in an area not normally covered in courses. May be repeated for credit one time (P/NP grades only.) *Prerequisites: special permission of the department and upper-division standing.* Staff (F,W,S)

The following literature courses are also applicable to this major:

### Lit/Soc 140. Development of Afro-American Literature (4)

### Lit/Soc 143. Black Prose (4)

## Graduate

### Lit/En 211A-B. Old English Literature (4-4)

(Not offered in 1978-79.)

### Lit/En 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 (S/U grades only.)

*Chaucer* Mr. Crowne (S)

### Lit/En 221. Sixteenth-Century English Literature (4)

Critical study of one or more major figures, texts, or literary trends in Tudor England. May be repeated for credit as topics vary (S/U grades only.)

*Elizabethan Court Culture: Images and Ideology* Mr. Montrose (W)

**Lit/En 224. Seventeenth-Century English Literature (4)**  
Consideration of one or more major figures, texts, or trends in seventeenth-century English literature, including the metaphysical poets and Jacobean drama. (S/U grades only.)

*Problems in the Theory of Cultural and Social Change in the Early Seventeenth Century* Mr. Wayne (S)

**Lit/En 226. Shakespeare (4)**  
(Not offered in 1978-79.)

**Lit/En 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. (S/U grades only.)

*The Restoration* Mr. Berman (F)

**Lit/En 241. English Literature of the Romantic Period (4)**  
(Not offered in 1978-79.)

**Lit/En 245. Nineteenth-Century American Studies (4)**  
Consideration of some of the principal writers and movements in nineteenth-century American literature. (S/U grades only.)

*Mark Twain* Mr. Dunseath (S)

**Lit/En 246. Victorian Literature (4)**

Consideration of one or more major figures, texts, or trends in the Victorian period. (S/U grades only.)

*Trollope and James* Mr. Wright (F)

*Tennyson, Browning, and Arnold* Mr. Wesling (W)

**Lit/En 251. Twentieth-Century English Literature (4)**  
Consideration of one or more major figures, texts, or trends in twentieth-century English literature. (S/U grades only.)

*James Joyce, I and II* Mr. Fussell (F,W)

*On Literature and History: Yeats, Lawrence, and Eliot* Mr. Behar (S)

**Lit/En 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. (S/U grades only.)

*Wallace Stevens* Mr. Pearce (F)

*Ethnicity in American Literature* Mr. Sollors (W)

**Lit/En 271. Genres in English (4)**  
(Not offered in 1978-79.)

**Lit/En 297. Directed Studies (1-12)**

Guided, supervised reading in a broad area of English and American literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

**Lit/En 298. Special Projects (4)**

Treatment of a special topic in English and American literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

**Lit/En 299. Thesis (1-12)**

Research for the dissertation. Offered for repeated registration. Prerequisite: advancement to candidacy for the Ph.D. degree. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

## French Literature

### Lower Division

Ordinarily students entering the French literature program elect the following sequence: Lit/Fr 10, 25 and 50.

**Lit/Fr 10. Readings and Interpretations (4)**

The course is taught entirely in French and emphasizes the development of reading ability, listening comprehension and writing skills. It includes grammar review, lectures and class discussions. Approximately half of the reading selections are

from modern and classical authors, half from non-literary disciplines—humanities, social sciences, pure and applied sciences. The course is designed to prepare students for Literature 25 and Literature 50. Prerequisite: score of 550 or better on CEEB, or satisfactory completion of Language 4, 5, or 6. Staff (F,W,S)

**Lit/Fr 25. Composition and Conversation (4)**

A course designed for students who wish to improve their ability to speak and write French. Prerequisite: completion of *Revelle* or *Muir* language requirement or consent of instructor. Staff (F,W,S)

**Lit/Fr 50. Readings in French Literature and Culture (4)**

An introduction to French literature. May be taken for three quarters starting with any quarter. Reading and discussion of selections from French literature, scholarship and science. Prerequisite: score of 650 or higher on CEEB test or completion of Literature 10. Staff (F,W,S)

### Upper Division

Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

**Lit/Fr 110A-B-C. Themes in French Intellectual and Literary History (4-4-4)**

This three-quarter sequence is designed as an introduction to French literature and literary history. Each quarter will center on a specific period or problem. It is recommended that majors whose primary literature is French take this sequence as early as possible. Prerequisites: 110A for 110B, 110B for 110C. May be taken out of normal order only by permission of instructor. Theme for 1978-79: French Literature: History and Form.

110A *The Modern Period* Mr. Cohen (F)

110B *The Enlightenment and Nineteenth Century* Ms. Clark (W)

110C *Renaissance and Classicism: The Order of Literature* Ms. Gearhart (S)

**Lit/Fr 115. Explication de texte/Close Reading (4)**

A course in a fundamental technique of literary analysis — close reading — central to literary study in France. Designed for upper-division students planning further work in literature. Application of the close reading technique to a variety of examples from different periods and genres. Taught in French. Mr. Terdiman (S)

**Lit/Fr 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.

*Medieval Narrative* Mr. Terdiman (W)

*Renaissance Poetry* Mr. Saville (S)

**Lit/Fr 122. Seventeenth Century (4)**

Major literary works of the seventeenth century. May be repeated for credit as topics vary.

*The Age of Louis XIV* Ms. Gearhart (F)

Topic TBA Staff (W)

**Lit/Fr 123. Eighteenth Century (4)**

Major literary works and problems of the eighteenth century. May be repeated for credit as topics vary.

(Not offered in 1978-79.)

**Lit/Fr 124. Nineteenth Century (4)**

Major literary works of the nineteenth century. May be repeated for credit, as topics vary.

*Romantic Theater* Mr. Saville (F)

**Lit/Fr 125. Twentieth Century (4)**

Major literary works and problems of the twentieth century. May be repeated for credit as topics vary.

*Modern Theater* Mr. Saville (W)

**Lit/Fr 128. Literature of the French-Speaking Caribbean and Africa (4)**

The course will consider contemporary writing from the French-speaking Caribbean and Africa, north and south of the Sahara, in the context of the historical and cultural relations of the different regions to each other and to France, the former colonial power. Ms. Drake (S)

**Lit/Fr 129. African Literature of French Expression (4)**  
(Not offered in 1978-79.)

**Lit/Fr 140. Composition and Stylistics (4)**

Analysis of classical and modern French literary texts to increase the student's sensitivity to style and improve his or her ability to write and speak French. Prerequisite: Lit/Fr 25. Ms. Clark (F)

**Lit/Fr 151. Major French Authors (4)**

A study in depth of the works of a major French writer. Recommended for students whose primary literature is French.

*Proust* Ms. Clark (F)

Topic TBA Staff (W)

**Lit/Fr 152. Literature and Ideas (4)**

This course will center on writers or movements of international literary, cultural or ideological significance. The texts studied will be read in the original language.

*Psychoanalysis and Literature* Mr. Cohen (W)

**Lit/Fr 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 permission of department.

Topic TBA Staff (F)

*Introduction to French Literary Criticism and Theory* Ms. Gearhart (S)

**Lit/Fr 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. Staff (F,W,S)

**Lit/Fr 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. Staff (F,W,S)

### Graduate

**Lit/Fr 211. Introduction to Old French Language and Literature (4)**

(Not offered in 1978-79.)

**Lit/Fr 221. Sixteenth-Century French Literature (4)**

(Not offered in 1978-79.)

**Lit/Fr 224. Seventeenth-Century French Literature (4)**

(Not offered in 1978-79.)

**Lit/Fr 231. Eighteenth-Century French Literature (4)**

Consideration of one or more major figures, texts, or trends in eighteenth-century French literature.

*Eighteenth-Century Materialism* Ms. Gearhart (F)

**Lit/Fr 241. 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. (S/U grades only.)

*Stendhal* Ms. Clark (W)

**Lit/Fr 251. Twentieth-Century French Literature (4)**

Selected topics in modern French literature and thought. (S/U grades only.)

*Contemporary Texts* Mr. Cohen (F)

*Mediation Theory* Mr. Terdiman (S)

Topic TBA Staff (S)

**Lit/Fr 297. Directed Studies (1-12)**

Guided and supervised reading in a broad area of French literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

**Lit/Fr 298. Special Projects (4)**

Treatment of a special topic in French literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

## Literature

### Lit/Fr 299. Thesis (1-12)

Research for the dissertation. Offered for repeated registration. *Prerequisite: student must be advanced to candidacy for the Ph.D. degree.* (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

## German Literature

### Lower Division

#### Lit/Ge 10. Readings and Interpretations (4)

This course is taught entirely in German and emphasizes the development of reading ability, listening comprehension and writing skills. It includes grammar review, lectures and class discussions. Approximately half of the reading selections are from modern and classical authors, half from non-literary disciplines—humanities, social sciences, pure and applied sciences. The course is designed to prepare students for Literature 15 and Literature 25. *Prerequisite: Basic Language Proficiency (550 plus oral interview) or completion of Language 4, 5 or 6 with grade of B or better. If at any point in the linguistic sequence the student scores close to 550 and feels he or she could successfully participate in German 10, it can be done with consultation and an oral quiz in German by the instructor.* Successful completion of Literature 10 satisfies the requirement for language proficiency in Revelle College. Staff (F,W,S)

#### Lit/Ge 15. Advanced Readings and Interpretations (4)

Continuation of German 10 for those students who intend to practice their reading abilities, listening comprehension and writing skills on a more advanced level. *Prerequisite: German 10 with B or better or special permission of instructor.* Staff (F,W,S)

#### Lit/Ge 25. Composition and Conversation (4)

A course designed for students who wish to improve their ability to speak and write German. *Prerequisite: Lit/Ge 15 or equivalent.* Ms. Walk (F,W)

#### Lit/Ge 51-52-53-54. 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: Adequate proficiency in German to handle course assignments, i.e., successful completion (B or better) of Lit/Ge 25, or equivalent preparation.*

51. Middle Ages and Renaissance Mr. Wierschin (F)

52. Classicism and Romanticism: Eighteenth and Nineteenth Centuries Mr. Lettau (W)

53. The Twentieth Century Ms. Walk (S)

54. Baroque and Enlightenment (Not offered in 1978-79.)

### Upper Division

*Prerequisite: upper-division standing or consent of instructor.* Additional prerequisites may be specified below.

#### Lit/Ge 101. German Literary Prose (4)

(Not offered in 1978-79.)

#### Lit/Ge 102. German Dramatic Literature (4)

(Not offered in 1978-79.)

#### Lit/Ge 103. German Poetry (4)

The development of major forms and modes of German verse. May be repeated for credit as topics vary. (Not offered in 1978-79.)

#### Lit/Ge 123. Eighteenth Century German Literature (4)

(Not offered in 1978-79.)

#### Lit/Ge 140. 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. *Prerequisite: upper-division standing or consent of instructor.*

Stylistic variations and potentialities will be explored, various classical and modern texts will be analysed to establish stylistic criteria and guiding principles. One composition per week on various subjects. Mr. Wierschin (S)

#### Lit/Ge 149. German Literature (4)

One or more aspects of German literature such as major

authors, the contemporary novel, nineteenth-century poetry, German Expressionism. The texts studied will be read in the original language. May be repeated for credit as topics vary.

*Guenter Grass Mr. Lyon (F)*

*Nineteenth Century German "Lied" - Goethe to Heine; Schubert to Hugo Wolf Ms. Walk (W)*

#### Lit/Ge 151. 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.

*The Early Goethe Mr. Lettau (W)*

#### Lit/Ge 152. Major German Authors (4)

A study in depth of the works of a major German author. May be repeated for credit as topics vary.

*H. V. Kleist Mr. Lettau (S)*

#### Lit/Ge 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.

*"Jahrhundertwende" Mr. Lettau (F)*

#### Lit/Ge 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: special permission of department.* Staff (F,W,S)

#### Lit/Ge 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.* Staff (F,W,S)

## Graduate

#### Lit/Ge 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. (S/U grades only.) Mr. Wierschin (F)

#### Lit/Ge 203. Cultural History of the German Language (4)

Philological survey of the German language with particular attention to historical, cultural, and social interrelations. (S/U grades only.) Mr. Wierschin (S)

#### Lit/Ge 210A-B. Middle High German (4-4)

(Not offered in 1978-79.)

#### Lit/Ge 221. Middle High German Classicism (4)

(Not offered in 1978-79.)

#### Lit/Ge 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. (S/U grades only.)

*The Comedy in Practice and Theory Staff (W)*

#### Lit/Ge 238. Goethe (4)

(Not offered in 1978-79.)

#### Lit/Ge 241. German Romantic Prose (4)

(Not offered in 1978-79.)

#### Lit/Ge 242. Nineteenth-Century German Literature (4)

(Not offered in 1978-79.)

#### Lit/Ge 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. (S/U grades only.)

*Approaches to Decoding Lyrics of Trakl, Benn, Celan Mr. Lyon (F)*

#### Lit/Ge 252. Major German Authors (4)

A study in depth of the work of one major German author. (S/U grades only.)

*H. Heine Staff (W)*

#### Lit/Ge 271. Theory of Genres (4)

(Not offered in 1978-79.)

#### Lit/Ge 272. Genres, Trends and Forms (4)

(Not offered in 1978-79.)

#### Lit/Ge 273. Literature and Art (4)

(Not offered in 1978-79.)

#### Lit/Ge 297. Directed Studies (1-12)

Guided and supervised reading in a broad area of German literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

#### Lit/Ge 298. Special Projects (4)

Treatment of a special topic in German literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

#### Lit/Ge 299. Thesis (1-12)

Research for the dissertation. Offered for repeated registration. *Prerequisite: student must be advanced to candidacy for the Ph.D. degree.* (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

## Greek Literature

### Lower Division

#### Lit/Gr. 1. Beginning Greek (4)

Fundamentals of Greek grammar, exercises in vocabulary and accidence in reading. Staff (F)

#### Lit/Gr. 2. Intermediate Greek (4)

Continuing instruction in Greek grammar, with reading of single texts. *Prerequisite: Lit/Gr. 1 or equivalent.* Ms. duBois (W)

### Upper Division

*Prerequisite: upper-division standing or consent of instructor.* Additional prerequisites may be specified below.

#### Lit/Gr. 100. Introduction Greek Literature (4)

Reading and discussion of selections from representative authors. Review of grammar as needed. *Prerequisite: Lit/Gr. 2 or equivalent.* Ms. duBois (S)

#### Lit/Gr. 101-102-103. Readings in Greek Literature (4,4,4)

A continuing course in translation of literary, historical and philosophical works. *Prerequisites: upper-division standing; 101 for 102, 102 for 103, or consent of instructor.*

*Topic TBA Ms. duBois (F)*

*Topic TBA Staff (W)*

*Topic TBA Staff (S)*

#### Lit/Gr. 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 consent of department.* Staff (F,W,S)

#### Lit/Gr. 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.* Staff (F,W,S)

## Graduate

#### Lit/Gr. 297. Directed Study (1-12)

Guided and supervised reading in a broad area of Greek literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

#### Lit/Gr. 298. Special Projects (4)

Treatment of a special topic in Greek literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

## Hebrew Literature

### Lower Division

#### Lit/He 1. Beginning Hebrew (4)

Fundamentals of Hebrew grammar, exercises in vocabulary, accidence and in reading. Language will be studied in the context of the culture. Staff (F)

**Lit/He 2. Intermediate Hebrew (4)**

Continuing instruction in Hebrew grammar, with reading of basic texts. *Prerequisite:* Lit/He 1 or equivalent. Staff (W)

**Lit/He 3. Intermediate Hebrew, Continued (4)**

Continuing instruction in Hebrew grammar, with reading of basic texts. *Prerequisite:* Lit/He 2 or equivalent. Staff (S)

**Lit/He 51. Introduction to Readings and Interpretations (4)**

Second-year course in Hebrew language and literature. Conversation, composition, grammar review, and an introduction to literary and non-literary texts. *Prerequisite:* Lit/He 3 or equivalent or consent of instructor. Staff (F)

**Lit/He 52. Readings and Interpretations (4)**

The course is taught entirely in Hebrew and emphasizes the development of reading ability, listening comprehension and writing skills. Includes grammar review, lectures and class discussions. Approximately half of the reading selections are from modern and classical authors, half from nonliterary disciplines — humanities, social sciences, pure and applied sciences. Successful completion of Lit/He 52 satisfies the requirement for language proficiency in Revelle College. Staff (W)

**Upper Division**

*Prerequisite:* upper-division standing or consent of instructor. Additional prerequisites may be specified below.

**Lit/He 100. Introduction to Hebrew Literature (4)**

Reading and discussion of selections from representative authors of a range of periods: Classical (Biblical), Rabbinic, Medieval, and Modern. Review of grammar as needed. Staff (S)

**Lit/He 121. Medieval Hebrew Literature (4)**

Major 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. (Not offered in 1978-79.)

**Lit/He 122. Hebrew Prophetic Literature (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. Mr. Friedman (W)

**Lit/He 123. 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 archeological data; consideration of theological issues. May be repeated for credit as topics vary. (Not offered in 1978-79.)

**Lit/He 124. Bible: The Poetic Books (4)**

Study of Biblical poetry, its settings, genres and themes. Analysis of metre and structure with particular attention to the use of parallel. Comparison with Canaanite and Mesopotamian examples. May be repeated for credit as topics vary. (Not offered in 1978-79.)

**Lit/He 126. The Modern Period (4)**

Selected topics in modern Hebrew literature. May be repeated for credit as topics vary. (Not offered in 1978-79.)

**Lit/He 190. Seminars (4)**

These seminars are devoted to a variety of special topics, including 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. *Prerequisite:* upper-division standing or consent of instructor. Mr. Friedman (W)

**Lit/He 198. Directed Group Study (4)**

Directed group study in areas of Hebrew literature not normally covered in courses (P/NP grades only.) *Prerequisite:* permission of the department. Staff (F,W,S)

**Lit/He 199. Special Studies (2 or 4)**

Tutorial; individual guided reading in areas of Hebrew 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. Staff (F,W,S)

**Italian Literature****Lower Division****Lit/It 1. Beginning Italian (4)**

Fundamentals of Italian grammar, exercises in vocabulary and accidence and in reading. Mr. Martinez and Staff (F)

**Lit/It 2. Intermediate Italian (4)**

Continuing instruction in Italian grammar, with reading of simple texts. Mr. Martinez and Staff (W)

**Upper Division**

*Prerequisite:* upper-division standing or consent of instructor. Additional prerequisites may be specified below.

**Lit/It 100. Introduction to Italian Literature (4)**

Reading and discussion of selections from representative authors. Review of grammar as needed. Staff (S)

**Lit/It 101. Advanced Readings and Conversation in Italian Literature (4)**

(Not offered in 1978-79.)

**Lit/It 121. Studies in Medieval Lyric Poetry**

(Not offered in 1978-79.)

**Lit/It 122. Italian Renaissance (4)**

A study of representative authors of the renaissance and its forerunners, from the fourteenth through eighteenth centuries. May be repeated for credit as topics vary. Mr. Martinez (W)

**Lit/It 123. Studies in Modern Poetry**

(Not offered in 1978-79.)

**Lit/It 147. Romantic Poetry (4)**

(Not offered in 1978-79.)

**Lit/It 148. Italian Literature (4)**

One or more periods or authors in Italian literature. May be repeated for credit as topics vary.

*Italian Novelle* Mr. Martinez (F)

**Lit/It 151. Dante (4)**

A critical reading of the *Divina Commedia*. Staff (S)

**Lit/It 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. (Not offered in 1978-79.)

**Lit/It 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. Staff (F,W,S)

**Lit/It 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. Staff (F,W,S)

**Graduate****Lit/It 215. Dante (4)**

(Not offered in 1978-79.)

**Lit/It 297. Directed Studies (1-12)**

Guided and supervised reading in a broad area of Italian literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

**Lit/It 298. Special Projects (4)**

Treatment of a special topic in Italian literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F,W,S)

**Latin Literature****Lower Division****Lit/La 1. Beginning Latin (4)**

Fundamentals of Latin grammar, exercises in vocabulary, accidence and in reading. Staff (F)

**Lit/La 2. Intermediate Latin (4)**

Continuing instruction in Latin grammar, with reading of simple texts. *Prerequisite:* Lit/La 1 or equivalent. Staff (W)

**Upper Division**

*Prerequisite:* upper-division standing or consent of instructor. Additional prerequisites may be specified below.

**Lit/La 100. Introduction to Latin Literature (4)**

Reading and discussion of selections from representative authors of the Augustan age. Review of grammar as needed. *Prerequisite:* Lit/La 2 or equivalent. Staff (S)

**Lit/La 101-102-103. Readings in Latin Literature (4,4,4)**

A continuing course in translation of literary, historical and philosophical works. *Prerequisites:* upper-division standing; 101 for 102, 102 for 103, or consent of instructor.

101 Topic TBA Staff (F)

102 Topic TBA Staff (W)

103 Topic TBA Staff (S)

**Lit/La 198. Directed Group Study (4)**

Directed group study 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. Staff (F,W,S)

**Lit/La 199. Special Studies (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. Staff (F,W,S)

**Graduate****Lit/La 297. Directed Studies (1-12)**

Guided and supervised reading in a broad area of Latin literature. (Satisfactory/Unsatisfactory grades only.) Offered for repeated registration. Staff (F,W,S)

**Lit/La 298. Special Projects (4)**

Treatment of a special topic in Latin literature. (Satisfactory/Unsatisfactory grades only.) Offered for repeated registration. Staff (F,W,S)

**Russian Literature****Lower Division****Lit/Ru 10. Intermediate Russian (4)**

Second-year course in Russian language and literature. Conversation, composition, grammar review, and reading of fairly simple literary and non-literary texts. *Prerequisites:* Lang/Ru 1-2-3, a score of 500-549 on the Russian Language Placement Examination administered by the UC San Diego Testing Office, or with permission of the instructor. Mr. Katsell (F)

**Lit/Ru 25. Reading and Interpretation (4)**

A continuation of Lit/Ru 10. The course is taught entirely in Russian and emphasizes the development of reading ability, listening comprehension and writing skills. It includes grammar review, lectures and class discussions. Approximately half of the reading selections are from modern and classical authors, half from non-literary disciplines (humanities and social sciences) and current Soviet newspapers and journals. *Prerequisite:* 1. a score of 550 or higher in the Language Placement Examination administered by the UC San Diego Testing Office; or 2. satisfactory performance in a linguistic proficiency test conducted by the Department of Linguistics; or 3. satisfactory completion of Lit/Ru 9, as indicated by written recommendation from the instructor of that course. Mr. Katsell (W)

**Lit/Ru 50. Readings in Russian Literature (4)**

An introduction to Russian literature, with continuing instruction in grammar, conversation and composition. *Prerequisite:* satisfactory completion of Lit/Ru 10 as indicated by written recommendation from the instructor of that course or consent of the instructor. Mr. Katsell (S)

**Upper Division**

*Prerequisite:* upper-division standing or consent of instructor. Additional prerequisites may be specified below.

**Lit/Ru 103. Russian Poetry (4)**

(Not offered in 1978-79.)

**Lit/Ru 124. Advanced Language and Literature (4)**

(Not offered in 1978-79.)

**Lit/Ru 126. Advanced Language and Literature (4)**

(Not offered in 1978-79.)

**Lit/Ru 128. Advanced Language and Literature (4)**

(Not offered in 1978-79.)

## Literature

### **Lit/Ru 140. Nineteenth-Century Russian Literature (4)** A study of literary work from nineteenth-century Russia.

*Chekhov Mr. Katsell (F)*

*Tolstoy Mr. Katsell (S)*

### **Lit/Ru 141. Twentieth-Century Russian Literature (4)** A study of literary works from twentieth-century Russia, including the Soviet period. May be repeated for credit as topics vary.

*Literature of Soviet Central Asia Ms. Drake (W)*

The focus of the course will be on writings by modern authors from the Asian republics of the Soviet Union (Kirghizia, Kazakhstan, Uzbekistan and others). Most works will be novels and short stories, considered in the context of the social and historical situation of Central Asia, and Soviet theories of literature. Readings in English

### **Lit/Ru 142. 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.

*Russian Theatre Mr. Saville (W)*

### **Lit/Ru 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.* Staff (F,W,S)

### **Lit/Ru 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.) *Prerequisite: upper-division standing and permission of department.* Staff (F,W,S)

## Literature and Society: Third World Literatures

### Lower Division

#### **Lit/Soc 21-22-23. Literature and History: The Third World (4-4-4)**

An analysis of a major theme common to selected ethnic literatures in the United States and to certain literatures of the Third World. The course is organized around major literary genres. Themes vary from year to year.

NOTE: This sequence satisfies the social science requirement of Third College General Education Requirements under Program B.

Theme for 1978-79: Tradition and Modernity

*21 Literary Forms and the Third World Ms. M. Sanchez (F)*

*22 Fiction and the Third World Ms. Williams (W)*

*23 Drama, Poetry, and the Third World Mr. Sollors (S)*

#### **Lit/Soc 30. Introduction to Criticism & Writing (4)** (Not offered in 1978-79.)

### Upper Division

*Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.*

#### **Lit/Soc 110. Writing Workshop: Creative Writing (4)** (Not offered in 1978-79.)

#### **Lit/Soc 120. 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.

*Phonetics Ms. R. Sanchez (F)*

#### **Lit/Soc 125. Spanish-American Literature (4)**

Studies in selected topics in Spanish-American literature. *La narrativa latino-americana:*

*The Caribbean Staff (S)*

*Modern Poetry Ms. M. Sanchez (S)*

#### **Lit/Soc 127. Spanish-American Fiction (4)**

The development of major forms and modes of Spanish-

American fiction. The approach will be either historical or topical. (Also offered as Lit/Sp 127)

*Topic TBA Ms. M. Sanchez (F)*

*Topic TBA Mr. Sommers (W)*

#### **Lit/Soc 128. Spanish-American Poetry (4)** (Not offered in 1978-79.)

#### **Lit/Soc 129. Spanish-American Essay (4)** (Not offered in 1978-79.)

#### **Lit/Soc 133. Literary Criticism (4)**

Major contemporary critical theories. The question of their applicability to contemporary literature in the Third World. May be repeated for credit as topics vary.

*Chicano/Latin-American Literature Ms. R. Sanchez (W)*

#### **Lit/Soc 140. Development of Afro-American Literature (4)**

A cross-genre survey of major themes in black literature from its beginnings to the present with primary emphasis on contemporary black literature. Mr. Sollors (F,W)

#### **Lit/Soc 141. Literary Images of Black Women (4)** (Not offered in 1978-79.)

#### **Lit/Soc 142. Contemporary Black Literature (4)** (Not offered in 1978-79.)

#### **Lit/Soc 143. Black Prose (4)**

The analysis and discussion of the novel, the autobiography, the essay and collected short fiction by Afro-American writers with particular emphasis upon the developing prose styles of the writers and the study of the text in relation to its historical era. Ms. Williams (S)

#### **Lit/Soc 144. Harlem Renaissance (4)** (Not offered in 1978-79.)

#### **Lit/Soc 149. Black Film Series (2)** (Not offered in 1978-79.)

#### **Lit/Soc 152. Spanish Language in America: Chicano Dialects (4)** (Not offered in 1978-79.)

#### **Lit/Soc 153. The Development of Chicano Literature (4)** (Not offered in 1978-79.)

#### **Lit/Soc 154. Themes and Motifs in Chicano Literature (4)** (Not offered in 1978-79.)

#### **Lit/Soc 155. Chicano Prose (4)** (Not offered in 1978-79.)

#### **Lit/Soc 156. 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. Ms. M. Sanchez (W)

#### **Lit/Soc 160. 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 analyses of Lukacs with the uses of history in the Third World novel.

This course will examine, both in literary texts and critical studies, the implicit and explicit theory concept of the novel in its Third World expression. Parallels and divergencies with the form and concept of the novel in the First World literatures will also be explored. Ms. Obeyesekere (F)

#### **Lit/Soc 162. Language and Society (4)**

A comparison of language policy in Latin America and that of other Third World countries and its reflection in literature. Ms. R. Sanchez (W)

#### **Lit/Soc 170. Introduction to Literature of Modern Africa (4)**

This course traces the rise of modern literature in traditional African societies disrupted by the colonial and neo-colonial experience. Ms. Wynter (F)

#### **Lit/Soc 175. Contemporary Caribbean Literature (4)** (Not offered in 1978-79.)

#### **Lit/Soc 177. Literature of the English-Speaking Caribbean and Africa (4)**

Course readings will be on contemporary fiction from these areas with special attention to historical and cultural relations between these countries and England, the former colonial power. Ms. Drake (W)

#### **Lit/Soc 178. Literature of the French-Speaking Caribbean and Africa (4)**

The course will consider contemporary writing from the French-speaking Caribbean and Africa, North and South of the Sahara, in the context of the historical and cultural relations of the different regions to each other and to France, the former colonial power. Ms. Drake (S)

#### **Lit/Soc 180. African Literature of French Expression (4)** (Not offered in 1978-79.)

#### **Lit/Soc 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.

*Modern Women Writers of India Ms. Obeyesekere (S)*

#### **Lit/Soc 198. Directed Group Study (4)**

Directed group study in areas of literature and society not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.* Staff (F,W,S)

#### **Lit/Soc 199. Special Studies (2 or 4)**

Tutorial; individual guided reading in an area normally covered in courses. May be repeated for credit three times (P/NP grades only.) *Prerequisites: upper-division standing and permission of department.* Staff (F,W,S)

The following literature courses are also applicable to this major:

#### **Lit/Gen 150. Masterpieces in Chinese Literature**

#### **Lit/Gen 152. Literature and Ideas**

#### **Lit/Gen 161. Forms of Folklore**

#### **Lit/Chinese 101. Readings in Contemporary Chinese Literature**

#### **Lit/En 24. The American Literary Imagination**

#### **Lit/En 152. The Origins of American Literature**

#### **Lit/En 154. The American Renaissance**

#### **Lit/En 156. American Literature from the Civil War to World War I**

#### **Lit/En 158. Modern American Literature**

#### **Lit/En 173. American Fiction**

There are also a wide range of selected courses offered in history, drama, music, etc. Please contact your advisers. Among the offerings are:

#### **History 145. Mashismo and Matriarchy: The Latin-American Social Structure**

#### **History 159Q. Colloquium in American Ethnic History**

#### **History 175A. History of Africa to 1880**

#### **History 175B. Modern Africa**

#### **Third World Studies 1A. History and Theory of Imperialism**

#### **Third World Studies 1B. Social Change in the Third World**

#### **Third World Studies 1C. History and Cultural Development in the Third World**

#### **Third World Studies 101A. History and Theory of Imperialism**

#### **Third World Studies 101B. Social Change in the Third World**

#### **Third World Studies 101C. History and Cultural Development in the Third World**



**Third World Studies 133. Contemporary Chicano Issues****Third World Studies 135. Bilingualism: Research and Field Studies****Spanish Literature****Lower Division**

Lit/Sp 10, 25, 50 are designed as an intermediate sequence which will prepare students with a basic proficiency in Spanish for upper-division literature courses. Students interested in increasing oral fluency may enroll in Language 4, 5, 6 concurrently with this sequence, with special permission.

**Lit/Sp 9. Reading and Interpretations: Spanish for Native Speakers (4)**  
(Not offered in 1978-79.)**Lit/Sp 10. Readings and Interpretations (4)**

The course is entirely taught in the language of the literature concerned and emphasizes the development of reading ability, listening comprehension and writing skills. It includes grammar review, lectures and class discussions. The course is designed to prepare students for Literature 25 and Literature 50. *Prerequisites:* Basic Language Proficiency (550 plus oral interview) or completion of Language 3 with grade of "A." Successful completion of Literature 10 satisfies the requirement for language proficiency in Revelle College. Staff (F,W,S)

**Lit/Sp 24. Composition and Conversation: Spanish for Native Speakers (4)**  
(Not offered in 1978-79.)**Lit/Sp 25. Composition and Conversation (4)**

A course designed for students who wish to improve their ability to speak and write Spanish. It is a continuation of Lit/Sp 10, with special emphasis on problems in writing and interpretation. *Prerequisite:* Score of 600 on the CEEB exam or completion of Lit/Sp 10. Staff (F,W,S)

**Lit/Sp 50. Readings in Spanish Literature and Culture (4)**

An introduction to Spanish and Spanish-American 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 Spanish. *Prerequisite:* score of 650 or higher on CEEB test or completion of Lit/Sp 25. Staff (F,W,S)

**Lit/Sp 70. Advanced Composition for Native Speakers (4)**  
(Not offered in 1978-79.)**Upper Division**

*Prerequisite:* upper-division standing or consent of instructor. Additional prerequisites may be specified below.

**Lit/Sp 101. Spanish Literary Prose (4)**  
(Not offered in 1978-79.)

*La narrativa medieval* Staff (W)

**Lit/Sp 102. Spanish Dramatic Literature (4)**  
(Not offered in 1978-79.)**Lit/Sp 103. Spanish Poetry (4)**  
(Not offered in 1978-79.)**Lit/Sp 104. History of Spanish Language (4)**

Historical description of Spanish phonology, morphology and syntax based on readings of the different periods. Staff (F)

**Lit/Sp 120. Spanish Language in America (4)**  
(Not offered in 1978-79.)**Lit/Sp 121. The Medieval Period (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.

*A Survey* Staff (W)

*Topic TBA* Staff (S)

**Lit/Sp 122. Renaissance and Baroque (4)**

Studies in selected topics in sixteenth- and seventeenth-century Spanish literature. May be repeated for credit as topics vary.

*Topic TBA* Mr. Blanco (F)

**Lit/Sp 124. The Nineteenth Century (4)**

Consideration of one or more major figures, texts, or trends in the nineteenth-century Spanish literature. May be repeated for credit as topics vary.

*Romanticism* Ms. Kirkpatrick (F)

**Lit/Sp 125. Spanish-American Literature (4)**

Studies in selected topics in Spanish-American literature. (Also offered as Lit/Soc 125)

*Topic TBA* Staff (F)

*The Caribbean* Staff (S)

*Modern Poetry* Ms. M. Sanchez (S)

**Lit/Sp 126. The Modern Period (4)**

Selected topics in modern Spanish literature. May be repeated for credit as topics vary.

*Generation of 98* Ms. Blanco (W)

*The Theater* Ms. Kirkpatrick (W)

**Lit/Sp 127. Spanish-American Fiction (4)**

(Formerly Lit/Sp 130) The development of major forms and modes of Spanish-American fiction. The approach will be either historical or topical. May be repeated for credit as topics vary.

*Topic TBA* Ms. M. Sanchez (F)

*Topic TBA* Mr. Summers (W)

*Topic TBA* Staff (S)

**Lit/Sp 128. Spanish-American Poetry (4)**

(Not offered in 1978-79.)

**Lit/Sp 129. Spanish-American Essay (4)**

A study of the essay in Spanish-American literature from either an historical or a topical point of view. Staff (S)

**Lit/Sp 133. Literary Criticism (4)**

Major contemporary critical theories. The question of their applicability to contemporary Latin-American, Peninsular-Spanish, and/or Chicano literature

*Chicano/Latin-American Literature* Ms. R. Sanchez (W)

**Lit/Sp 140. Composition and Stylistics (4)**

(Not offered in 1978-79.)

**Lit/Sp 141. Phonetics (4)**

A comparative study of the English and Spanish phonetic systems. The course will include a study of the organs of articulation, manner of articulation, stress and intonation patterns, as well as dialectal variations in Spanish. Ms. R. Sanchez (F)

**Lit/Sp 142. Spanish Syntax and Morphology (4)**

(Not offered in 1978-79.)

**Lit/Sp 143. Spanish Language in America: Dialects in USA (4)**

(Not offered in 1978-79.)

**Lit/Sp 151. Cervantes (4)**

A critical reading of the *Quijote*. Required of literature majors whose primary literature is Spanish. Mr. Guillen (W)

**Lit/Sp 153. The Development of Chicano Literature (4)**

(Not offered in 1978-79.)

**Lit/Sp 154. Themes and Motifs in Chicano Literature (4)**

(Not offered in 1978-79.)

**Lit/Sp 155. Chicano Prose (4)**

(Not offered in 1978-79.)

**Lit/Sp 156. 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. Ms. M. Sanchez (W)

**Lit/Sp 162. Language and Society (4)**

A comparison of language policy in Latin America and that of other Third World countries and its reflection in literature. Ms. R. Sanchez (W)

**Lit/Sp 190. Seminars (4)**

(Not offered in 1978-79.)

**Lit/Sp 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 special permission of the department. Staff (F,W,S)

**Lit/Sp 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 special permission of the department. Staff (F,W,S)

**Graduate****Lit/Sp 201. Reading Medieval Texts (4)**

(Not offered in 1978-79.)

**Lit/Sp 202. Spanish Language in America. (4)**

(Not offered in 1978-79.)

**Lit/Sp 203. History of the Spanish Language (4)**

(Not offered in 1978-79.)

**Lit/Sp 208. Textual Criticism in Spanish (4)**

(Not offered in 1978-79.)

**Lit/Sp 214. Studies in Medieval Literature (4)**

Consideration of one or more major figures, texts, trends, or problems in medieval Spanish literature. (S/U grades only.)

*The Epic* Staff (F)

*Poesia Satirica* Staff (S)

**Lit/Sp 216. Fifteenth-Century Spanish Literature and Culture (4)**

(Not offered in 1978-79.)

**Lit/Sp 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. (S/U grades only.)

*Topic TBA* Mr. Guillen (F)

**Lit/Sp 226. Cervantes (4)**

(Not offered in 1978-79.)

**Lit/Sp 231. Eighteenth-Century Spanish Literature (4)**

(Not offered in 1978-79.)

**Lit/Sp 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. (S/U grades only.) Mr. Blanco (W)

**Lit/Sp 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 (S/U grades only.)

*The Narrative* Ms. M. Sanchez (W)

*Topic TBA* Ms. R. Sanchez (S)

**Lit/Sp 254. Modern Spanish Poetry (4)**

(Not offered in 1978-79.)

**Lit/Sp 255. The Modern Spanish Novel (4)**

A historical approach to the modern Spanish novel. (S/U grades only.)

*Valle Inclan* Ms. Kirkpatrick (S)

**Lit/Sp 258. Spanish-American Prose (4)**

Consideration of one or more major figures, texts, trends, or problems in Spanish-American prose. May be repeated for credit as topics vary. (S/U grades only.)

*Topic TBA* Staff (F)

*Topic TBA* Staff (W)

*Topic TBA* Mr. Summers (S)

**Lit/Sp 259. Spanish-American Poetry (4)**

Consideration of one or more major figures, texts, trends, or problems in Spanish-American poetry. (S/U grades only.) Mr. Blanco (F)

## Mathematics

### Lit/Sp 271. Literary Theory (4)

(Not offered in 1978-79.)

### Lit/Sp 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.

Topic TBA Mr. Sommers (W)

### Lit/Sp 280. Field Work (4)

Techniques of on-the-spot linguistic and folkloric surveys including the practice of ballad collection in the Spanish Peninsula. Offered for repeated registration (S/U grades only.) Mr. Catalan (F.W.S.) To be taught in Madrid.

### Lit/Sp 296. Research Practicum (1-12)

Laboratory research on specific topics to be developed by a small group of students under the continued direction of individual faculty members. Offered for repeated registration (S/U grades only.) Mr. Catalan (F.W.S.) To be taught in Madrid.

### Lit/Sp 297. Directed Studies (1-12)

Guided and supervised reading in a broad area of Spanish literature. Offered for repeated registration (Satisfactory/Unsatisfactory grades only.) Staff (F.W.S.)

### Lit/Sp 298. Special Projects (4)

Treatment of a special topic in Spanish literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.) Staff (F.W.S.)

### Lit/Sp 299. Thesis (1-12)

Research for the dissertation. Offered for repeated registration. *Prerequisite: advancement to candidacy for the Ph.D. degree.* (Satisfactory/Unsatisfactory grades only.) Staff (F.W.S.)

## Writing/Literature

### Lit/Writing 10A-B-C. Composition (4)

(Not offered in 1978-79.)

### Lit/Writing 110. Expository Writing (4)

Intensive practice in the various forms of expository writing. Staff (S)

### Lit/Writing 120. Fiction (4)

A workshop designed to serve the needs of writers working on fiction of various lengths; discussion and scrutiny of student work. Mr. Lettau (F), Mr. Pei (W)

### Lit/Writing 122. Short Story (4)

A workshop designed to foster and encourage regular writing in the short forms of fiction; discussion and scrutiny of student work. Mr. Wesling (F)

### Lit/Writing 124. Long Narrative (4)

A workshop designed to foster and encourage regular writing in long narrative forms; discussion and scrutiny of student work. (Not offered in 1978-79.)

### Lit/Writing 130. Poetry (4)

A workshop designed to foster and encourage the writing of poetry; discussion and scrutiny of student work. Staff (F), Staff (W), Mr. Fussell (S)

### Lit/Writing 140. Drama (4)

A workshop designed to foster and encourage regular writing in various dramatic forms; discussion and scrutiny of student work. Staff (F)

### Lit/Writing 194. The Teaching of Writing (4)

This course prepares students to become tutors in the Muir College Writing Program 10 through readings, lectures and discussions about the teaching of writing, and practice in the methodology of tutoring both within the class and in Muir College 10 section. *Prerequisites: upper-division standing, 3.0 GPA and approval of instructor.* No more than two tutoring courses may be counted toward the literature major. (F,S) Staff

### Lit/Writing 195. Apprentice Teaching of Writing (4)

Emphasis on practical aspect of teaching, but students will also conduct a seminar on the principles of teaching in these areas, practical use of classic notions of rhetoric, setting practical and individualized goals for each student and separating the single writing task into stages. No more than two tutoring courses may be counted towards the literature major. May be repeated for credit two times. (P/NP grades only.) Staff (F,W,S)

### Lit/Writing 198. Directed Group Study (4)

Directed group study in area of writing not normally covered in

courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and consent of department.* Staff (F,W,S)

### Lit/Writing 199. Special Studies (2 or 4)

Tutorial: individual guidance in areas of writing not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) *Prerequisites: upper-division standing and consent of department.* Staff (F,W,S)

Students can fulfill the lower-division requirement in creative writing by taking one of the following courses

### Muir College 30. Creative Writing

### Warren College 11. Writing Workshop

### Warren College 12. Poetry

### Warren College 16. Writing for Publication

Also applicable to the writing major are the following courses in writing:

### Lit/Fr 140. Composition and Stylistics

### Lit/Ge 140. Composition and Stylistics

### Lit/Sp 140. Composition and Stylistics

### Third College Composition Program 109. Research Writing

## Materials Science

The materials science program is an interdisciplinary six-course sequence offering the student an introduction to a topic important as either a graduate specialty or as an industrial career.

The whole six-course sequence serves as a minor for Warren College. Students majoring in AMES, APIS, Chemistry and Physics may also wish to take individual courses, or small groups of courses, as useful adjuncts to their majors. For the minor, in addition to five of the courses listed below, a student must take Chemistry 131, Physical Chemistry (Thermodynamics, phase equilibrium, chemistry of solutions).

## Courses

### 11. Elements of Materials Science (4)

The structures of engineering materials and how these structures can be controlled to produce desired, useful properties. Environmental effects: corrosion and oxidation. (Same as AMES 11.) *Prerequisites: Physics 3A-C or equivalent, and Mathematics 2A-C.*

### 101. Properties of Solid State (4)

The binding mechanism of various classes of materials. The periodic table, molecular bonds, free electron theory of metals, band theory, Hume-Rothery and other empirical rules. Properties of ionic, covalent, and metallic solids. Categories of useful materials: metals, alloys, ceramics, composites under diverse conditions. Same as Physics 116. *Prerequisites: Mathematics 2A-2E, and a lower division physics-chemistry sequence.* (F) (Not offered in 1978-79.)

### 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. Same as AMES 102. *Prerequisites: one year of calculus and completion of a natural sciences sequence, or equivalent, in physics and chemistry, or consent of instructor.* (W)

### 103. Phase Equilibria (4)

Thermodynamic properties. Multicomponent phase equilibria. Phase transformations, stability and synthesis in alloys. Rate processes, diffusion, nucleation and growth. Same as Chemistry 150. *Prerequisites: one year of calculus and completion of a natural science sequence or equivalent, or the consent of the instructor.* (S) (Not offered in 1978-79.)

### 104. Electrical and Magnetic Materials (4)

Dielectrics (including ferroelectrics), conductors, semiconductors, liquid crystals, superconductivity, magnetism. Applications of materials in modern technology. Same as Physics 125. *Prerequisites: MS 11, or consent of the instructor.* (F)

### 105. Structure of Solids (4)

Atomic structure, properties and growth of ordered and disordered solids. Laboratory work includes generation of x-ray spectra, symmetry determination by Laue-technique, structure determination by single crystal and powder techniques, electron diffraction and radial distribution analysis. Same as APIS 133. *Prerequisites: consent of instructor.* (F)

### 106. 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. Four to six hours' laboratory. (Same as APIS 137.) *Prerequisite: some background in solid state physics or consent of instructor.*

## Mathematics

OFFICE: 7313 Applied Physics and Mathematics Building, Muir College

### Professors:

Donald W. Anderson, Ph.D.  
Errett A. Bishop, Ph.D.  
John W. Evans, M.D., Ph.D.  
Theodore T. Frankel, Ph.D.  
Adriano M. Garsia, Ph.D.  
Ronald K. Getoor, Ph.D.  
William B. Gragg, Jr., Ph.D.  
Hubert Halkin, Ph.D.  
J. William Helton, Ph.D.  
Einar Hille, Ph.D. (*Research Mathematician*)  
Richard A. Olshen, Ph.D.  
Eric Reissner, Ph.D.  
Burton Rodin, Ph.D., *Chairman*  
Helmut Rohrl, Ph.D.  
Murray Rosenblatt, Ph.D.  
Michael J. Sharpe, Ph.D.  
Lance W. Small, Ph.D.  
Stefan E. Warschawski, Ph.D. (*Emeritus*)  
Stanley G. Williamson, Ph.D.

### Associate Professors:

Edward A. Bender, Ph.D.  
James R. Bunch, Ph.D.  
Jay P. Fillmore, Ph.D.  
Carl H. FitzGerald, Ph.D.  
Alfred B. Manaster, Ph.D.  
Norman A. Shenk, Ph.D.  
Donald R. Smith, Ph.D.  
Audrey A. Terras, Ph.D.  
John Wavrik, Ph.D.  
Daniel E. Wulbert, Ph.D.

### Assistant Professors:

Gunnar Carlsson, Ph.D.  
Solomon A. de Picciotto, Ph.D.  
Thomas J. Enright, Ph.D.  
Ronald J. Evans, Ph.D.  
Michael H. Freedman, Ph.D.  
Leonard R. Haff, Ph.D.  
James P. Lin, Ph.D.  
Jeffrey B. Remmel, Ph.D.  
John A. Rice, Ph.D.  
John A. Trangenstein, Ph.D.  
Adrian R. Wadsworth, Ph.D.

### Lecturers in Mathematics:

Patrick J. Ledden, Ph.D.  
Frank B. Thiess, 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.

**First-Year Courses** Before entering, each freshman student is given an examination to determine his or her grasp of high school mathematics. The object is to advise in the selection of an appropriate freshman mathematics sequence. The possible choices are as follows:

Mathematics 5A, B, C is a liberal arts course in mathematics. It is taken mostly by students with two years of high school mathematics who will not pursue more advanced work. For the first two quarters, topics in geometry are discussed. The third quarter is an introduction to calculus. (This course fulfills the mathematics option of the general education requirements of Muir College and completion of two quarters fulfills the requirement of Third College.)

Mathematics 4A, B, C are separate courses for students with weak backgrounds in high school mathematics. Mathematics 4B is algebra. Mathematics 4C is trigonometry. (Two quarters fulfill the mathematics requirement of Third College.)

Mathematics 1A, B, C is calculus. The students have completed two years of high school mathematics. This course is acceptable for majors in liberal arts, economics and 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 Third College and the option of Fourth College.)

Mathematics 2A, B, C is calculus. Most of the students have completed four years of high school mathematics. Many have previously taken short, introductory calculus courses. This sequence is required for certain majors including mathematics, physics, chemistry, and APIS. (It fulfills the same college requirements as Mathematics 1A, B, C.)

Students with exceptionally strong backgrounds in mathematics should consider advanced placement or the honors calculus sequence 2AH, BH, CH.

Certain transfers from one sequence to another are possible, but such transfers should be carefully discussed with an adviser. Able students, who begin the Mathematics 1 sequence, and who wish to transfer to the Mathematics 2 sequence, should follow Mathematics 1A with 2A and receive two units of credit for 2A, and may, by petition, follow 1B or 1C with 2B and receive two units credit for 2B. Where there is substantial overlap among courses in different sequences, full credit is

given only once. Credit will not be given for courses taken simultaneously from the Mathematics 1 sequence and the Mathematics 2 sequence.

**Minor in Mathematics** For students in Revelle College with a non-contiguous major a minor in mathematics consists of six courses including Mathematics 2D and 2E and four upper-division courses.

To receive a bachelor's degree in Third College with a minor in mathematics, a student must satisfy the following requirements in addition to the Third College requirements for a bachelor's degree:

1. Completion of calculus through Mathematics 2C, with at least a C average.
2. Completion of five courses beyond 2C including
  - a. 2D or 2E, and
  - b. 100A-B, or 140A-B, and
  - c. at least one additional upper-division course.
3. A grade-point average of 2.0 for five mathematics courses beyond 2C.
4. Declaration of intent to minor in mathematics before the student's senior year.

A Warren College program of concentration in mathematics consists of six courses including three upper-division courses in one area.

**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. A major is offered in Revelle, Muir, Third and Warren Colleges. Foreign languages recommended for mathematics majors are French, German and Russian.

All students majoring in mathematics will complete the basic sequence 2A-B-C-D-E and at least twelve one-quarter upper-division courses, which *must* include:

- (i) 140A-B
- (ii) 100A-B or 103A-B
- (iii) two complete sequences from the following list: 100A-B-C, 103A-B-102, 110-120A-B, 120A-110-112, 111A-B, 110-130A-B, 110-132A-B, 140A-B-C, 150A-B-C, 160A-B, 170A-B-C, 171A-B, 180A-B-C, 180A-181A-B, 190A-B-C.

As with all departmental requirements, more advanced courses on the same material may be substituted with written approval from the departmental adviser.

The program of a mathematics major whose main interest is computational mathematics must include Mathematics 103A-B and APIS 161B-C. (The APIS series does not count toward the twelve upper-division course requirement.) For recommended additional courses see the departmental adviser for computational mathematics.

For the B.A. degree, a minimum average of C in the major is required, and in particular a

minimum average of C is required in each of the required upper-division sequences. To be prepared for a strong major curriculum, students who expect to major in mathematics should complete Mathematics 2D and 2E before the end of their sophomore year. Either Mathematics 140A-B or 100A-B (103A-B) should be taken during the junior year.

The mathematics major in John Muir College is required to take Science 4A-B-C or the equivalent. With the approval of his or her major adviser, the Third College mathematics major may replace some upper-division mathematics courses with courses in related fields in which mathematics plays a basic role.

**The Graduate Program** The Department of Mathematics offers a graduate program leading to the M.A. and Ph.D. degrees.

Admission to the graduate program is in accordance with the general requirements of the Graduate Division of the University of California. Students with a bachelor's degree and a background in mathematics comparable to the requirements for the undergraduate major in mathematics at this University may apply for admission. All applicants must present satisfactory scores on the Graduate Record Examination, including the advanced examination in mathematics.

In each quarter a student's program must include at least nine units. At least six of these units must be in graduate mathematics courses. The remaining three units must be in upper-division or graduate courses in mathematics-related subjects. Mathematics 500 Apprentice Teaching may not be used to satisfy any part of this requirement. Mathematics 299 Reading and Research may only be used by students in the Ph.D. program who have passed all four written qualifying examinations (see "Doctoral Degree Program") or who have obtained the approval of the graduate adviser.

**Master's Degree Program** Requirements for the Master of Arts degree are to be met according to Plan II (Comprehensive Examination). (See "Graduate Studies: The Master's Degree") A total of thirty-six units of course credit is required.

These must include:

1. At least eighteen units of graduate mathematics courses.
2. Not more than nine units of upper-division mathematics courses.
3. Not more than nine units of graduate courses in a related field approved by the department.
4. Not more than six units of Mathematics 500 Apprentice Teaching. No units of Mathematics 299 may be used in satisfying the requirements for the Master's degree; Mathematics 500 may not be used under item 1.

The comprehensive examination will cover basic facts in two topics selected from two of the following three groups:

## Mathematics

1. Algebra or topology.
2. Real analysis or complex analysis.
3. Any of the other subjects listed in the Ph.D. program below.

A detailed list of the depth requirements in each of these areas, with literature references and approved courses, is available in the office of the Department of Mathematics.

A reading knowledge of one foreign language: French, German, or Russian, is required. (In exceptional cases other languages may be substituted.) The foreign-language examinations, which consist of the translation of selected passages in mathematics, are administered by the department.

**Master's Degree Program in Applied Mathematics** The Department of Mathematics has initiated a program of graduate studies in applied mathematics for regular or part-time students. The program requires one to two years for completion and may be integrated with the regular program in pure mathematics. A total of thirty-six units of course credit is required. There is no foreign language requirement. Students must take two sequences and pass two qualifying exams (at the M.A. level) from the following applied mathematics courses: 202AB, 210ABC, 211AB, 261ABC, 270ABC, 271ABC, 277ABC, 282ABC, 284ABC. (Not every course is offered each year.) In addition, students will be encouraged to take a one-year sequence in an area outside the mathematics department (computer science, engineering, physics, economics, psychometrics, etc.) Twelve units may be at the upper-division level.

**Accelerated Master's Degree Program in Applied Mathematics** Undergraduate mathematics majors in their junior year who satisfy certain requirements may apply for early admission to the Department of Mathematics M.A. Program in Applied Mathematics. Students accepted into this program become regular graduate students and must complete all of the master's degree requirements within seven quarters after admission. Students may wish to take graduate mathematics courses above and beyond the undergraduate requirements during their junior year in order to finish the program in one year.

The applicant must have satisfied (by the end of the junior year):

- (1) All general education requirements of his or her college.
- (2) All mathematics department requirements for the bachelor's degree.
- (3) An overall and departmental grade-point average of at least 3.5.

**Doctoral Degree Program** A student acquires a general background in mathematics by preparing for and taking written departmental qualifying examinations in four areas. One of the four areas must be real analysis or complex analysis, another must be algebra or topology. Each of the remaining two examinations may be in any of the four areas already listed or in applied analysis, com-

binatorial analysis, differential geometry, mathematical logic, numerical mathematics, ordinary or partial differential equations, probability or mathematical statistics, or an approved minor outside the department. The examinations are given near the beginning and end of each academic year. A detailed list of depth requirements in each area, with literature references and approved courses, is available in the office of the Department of Mathematics. Examinations may be repeated, but no more than eight attempts are allowed to pass the examinations in four areas.

Students in the Ph.D. program must pass, by October of their second year, a written qualifying examination in one of the following areas: real analysis, complex analysis, algebra or topology; by October of their third year they must pass written qualifying examinations in three areas (one of the three areas must be real analysis or complex analysis, another must be algebra or topology); by October of their fourth year they must pass all of the written qualifying examinations. Students in the Ph.D. program who do not pass written qualifying examinations according to the above schedule will be transferred to an M.A. program in mathematics.

A student must demonstrate a satisfactory reading knowledge of two foreign languages (chosen from French, German, and Russian; in exceptional circumstances other languages may be substituted).

After a student has met the area and language requirements and has decided upon a field of research under the supervision of a faculty member, a doctoral committee appointed by the Office of Graduate Studies and Research conducts the student's oral qualifying examination. This examination deals primarily with the proposed area of thesis research and may include the project itself. A student must pass this examination by the end of his or her eleventh quarter. Successful completion of this requirement advances the student to candidacy. The student then concentrates on courses and research related to completion of a doctoral dissertation. After completion of the research and dissertation, the student takes a final oral examination on the dissertation.

## Courses

### Lower Division

#### 1A. Elements of Mathematical Analysis (4)

Differentiation and integration of algebraic functions. Fundamental theorem of calculus. Applications. Three lectures, two recitations. (Credit not given if Mathematics 2A previously completed.) *Prerequisite:* two years high school mathematics (F,W,S)

#### 1B. Elements of Mathematical Analysis (4)

Further applications of the definite integral. Calculus of trigonometric, logarithmic and exponential functions. Complex numbers. (Credit not given if Mathematics 2B previously completed.) *Prerequisites:* Mathematics 1A (F,W,S)

#### 1C. Elements of Mathematical Analysis (4)

Vector geometry, velocity and acceleration vectors. Partial derivatives, multiple integrals. Exact differentials. (Credit not given if Mathematics 2C previously completed.) *Prerequisites:* Mathematics 1B (F,W,S)

#### 2A. Calculus and Analytic Geometry (4)

Differential and integral calculus of functions of one variable: limits, continuity; differentiation of algebraic and trigonometric functions, applications. Definite integral, primitive functions, fundamental theorem of the calculus. Elements of analytic geometry as needed in the development of the calculus. Three lectures, two recitations. *Prerequisites:* three or more units of high school mathematics and passing score on placement examination or consent of instructor; one-half unit of trigonometry is desirable. (F,W,S)

#### 2B. Calculus and Analytic Geometry (4)

Applications of the definite integral, calculus of logarithmic, exponential and hyperbolic functions. Methods of integration. Plane analytic geometry, polar coordinates. Vector geometry, vector functions and their derivatives. Three lectures, two recitations. *Prerequisite:* Mathematics 2A (F,W,S)

#### 2C. Calculus and Analytic Geometry (4)

Partial differentiation, multiple integration. Gradient, divergence, curl. Theorems of Green, Gauss, and Stokes. Note: Mathematics 2C and Mathematics 2D may be taken in either order. Three lectures, two recitations. *Prerequisite:* Mathematics 2B (F,W,S)

#### 2D. Calculus and Analytic Geometry (4)

Infinite series. Ordinary differential equations. Note: Mathematics 2C and Mathematics 2D may be taken in either order. Three lectures, two recitations. *Prerequisite:* Mathematics 2B (F,W,S)

#### 2E. Matrices and Linear Transformations (4)

Linear equations, matrices, vector spaces, linear transformations, determinants, eigenvalues, orthogonal and unitary transformations, quadratic forms. Systems of differential equations, exponential of a matrix. Three lectures, two recitations. *Prerequisite:* Mathematics 2D (F,W,S)

#### 2DA. Calculus and Analytic Geometry (4)

Infinite sequences and series. Ordinary linear differential equations: initial, boundary-value and eigenvalue problems for single equations and for two equations with two unknowns. Laplace transform methods. Applications are directed towards the physical and engineering sciences. Credit not offered for both Math 2D and Math 2DA. Three lectures, one recitation. *Prerequisite:* Math 2B (Math 2C strongly recommended.) (F)

#### 2EA. Matrices and Linear Transforms (4)

Matrix operations, solutions to  $m$  linear algebraic equations in  $n$  unknowns, linear vector spaces, determinants, matrix eigenvalue problem, multiple eigenvalues, orthonormalization and expansions in orthonormal bases, orthogonal matrices, quadratic and positive-definite forms, simultaneous diagonalization, variational and iterative methods. Applications are directed towards the physical and engineering sciences. Credit not offered for both Math 2E and Math 2EA. *Prerequisite:* Math 2DA. (Math 2C strongly recommended.) (W)

#### 2AH. Calculus and Analytic Geometry (4)

The material covered in Mathematics 2AH is similar to the material covered in Mathematics 2A. However in this honors course there is a greater emphasis on rigor in the lectures and the students are confronted with tougher problems. *Prerequisites:* Same as for Mathematics 2A and consent of instructor. (F)

#### 2BH-2CH-2EH. Calculus and Analytic Geometry (4-4-4)

The material covered in Mathematics 2BH, 2CH and 2EH is similar to the material covered in Mathematics 2B, 2C, and 2E. However, in this honors sequence there is greater emphasis on rigor in the lectures, and the students are confronted with tougher problems. The combination of 2BH, 2CH and 2EH makes a very nice integrated one-year honors sequence in calculus. *Prerequisites:* calculus at least equivalent to Mathematics 2A and consent of instructor. (F,W,S)

#### 4A. Introductory Algebra (4)

Rational and real number systems, polynomials, factoring, systems of linear equations and graphs, inequalities, radicals. Introductory computer programming in BASIC language, using minicomputer lab. Instruction format is self-paced. (F) (Not offered in 1978-79)

#### 4B. Intermediate Algebra (4)

Rational, irrational, and complex numbers, polynomials, factoring, inequalities, systems of linear and quadratic equations, determinants, powers and roots, fractional and radical equations and applications. *Prerequisite:* one year of high school algebra. (F,W)

**4C. Elementary Functions (4)**

Trigonometric functions and identities, inverse functions, exponentials, logarithms, oblique triangles, numerical methods. *Prerequisite: Math 6B or Math 4B or equivalent.* (F,W,S)

**5A. Introduction to Mathematics (4)**

Topics in Euclidean geometry. The theorems of Ceva and Menelaus, Desargues' theorem, Pappus' theorem, harmonic tetrads. An emphasis is placed upon geometry as an archetype for the development of mathematical systems. Three lectures, one recitation. *Prerequisite: two units of high school mathematics.* (F)

**5B. Introduction to Mathematics (4)**

Projections, projective geometry, conic sections, Pascal's theorem. Three lectures, one recitation. *Prerequisite: Mathematics 5A.* (W)

**5C. Introduction to Mathematics (4)**

Basic notions of calculus: functions, differentiation of elementary functions, applications. Definite and indefinite integral and applications. Three lectures, one recitation. *Prerequisite: Mathematics 5B.* (S)

**6A-B. Introductory Statistics and Mathematical Analysis (4-4)**

Descriptive statistics, measures of location and variability, organization of multivariate data, basic applied probability, random sampling, Central Limit Theorem, Sampling distributions, confidence intervals, hypothesis testing, single population problems, comparisons between two populations, supporting concepts from pre-calculus and calculus. Four lectures. *Prerequisite: consent of instructor.* (W,S)

**80A-B. Basic Statistics (4-4)**

Analysis of experimental data. Basic probability models — binomial, Poisson, normal. Expectation and variance, sampling models, normal approximation. Unbiased estimation, regression, correlation. Hypothesis testing, including non-parametric tests. Experimental design. Emphasis on application of methods of statistical inference to experimental data. Three lectures, one recitation. *Prerequisite: Mathematics 1C or 2B or consent of instructor.* (F,W,S)

**Upper Division****100A-B-C. Introduction to 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. Three lectures, one recitation. *Prerequisite: Mathematics 2E.* (F,W,S)

**102. Applied Linear Algebra (2)**

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 squares problems. Vector and matrix norms. Characteristic and singular values. Canonical forms. Determinants and multilinear algebra. Three lectures. *Prerequisite: Mathematics 2E.* (S)

**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. *Prerequisite: Mathematics 2E.*

**104A-B-C. Number Theory (4-4-4)**

Topics from elementary and algebraic number theory such as: 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. Three lectures. *Prerequisite: consent of instructor.* (F,W)

**109A-B-C. Undergraduate Seminar (4-4-4)**

Reports by students on assigned reading material and/or discussion of assigned problems in areas compatible with the student's background. Designed to develop insight and originality as well as mathematical techniques. *Prerequisite: consent of instructor.* (F,W,S)

**110. Introduction to Partial Differential Equations (4)**

Fourier series, orthogonal expansions, and eigenvalue problems. Sturm-Liouville theory. Some partial differential equations of mathematical physics. Boundary value problems and

separation of variables. *Prerequisites: Math 2C-D-E or consent of instructor.* (F,S)

**111A-B. Mathematical Model Building (4)**

This course is intended to acquaint students with mathematical model building in fields such as natural science, engineering science, economics. Instructors from various departments will mathematize specific problems in their fields by extracting the pertinent data and structures from the available information. Three lectures. *Prerequisites: Mathematics 2C-D-E or consent of instructor.* (F,W). See 211A-B. (Not offered in 1978-79.)

**112. Vector Analysis (4)**

Topics in vector analysis. Possible topics: Curvilinear motion, Kepler's laws, Motion of a rigid body. Curves and surfaces in space. Frenet-Serret formulas. Fundamental forms. Line and surface integrals. Level curves and surfaces. Conservative fields. Stokes' theorem, Green's theorem, the divergence theorem. Harmonic functions. Potential theory. Applications. Three lectures, one recitation. *Prerequisites: Mathematics 2C, 2E.* (S)

**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. *Prerequisites or co-registration: Mathematics 2C-D.* (F,W)

**120B. Applied Complex Analysis (4)**

Applications of the Residue theorem. Conformal mapping and applications to potential theory, flows, and temperature distributions. 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. *Prerequisites: Mathematics 120A.* (W,S)

**130A-B. Ordinary Differential Equations (4-4)**

Existence and uniqueness of solutions of differential equations and of systems. Linear systems with constant and variable coefficients; solutions in matrix form. Local and global theorems of continuity and differentiability. Autonomous systems. Stability: Lyapounov's theorem. Three lectures. *Prerequisites: Mathematics 2C-D-E.*

**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: Mathematics 2D-E 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, one recitation. *Prerequisites: Mathematics 110 and 131, or consent of instructor.*

**132B. Elements of Partial Differential Equations and Integral Equations (4)**

Relations between differential and integral equations, some classical integral equations. Volterra integral equation, integral equations of the second kind, degenerate kernels. Fredholm alternative, Neumann-Liouville series, the resolvent kernel. Three lectures. *Prerequisite: Mathematics 132A.*

**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 or other infinite processes. Three lectures, one recitation. *Prerequisites: Mathematics 2C-D.* (F,W,S)

**150A-B-C. Calculus on Manifolds (4-4-4)**

Differentiable functions, implicit and inverse function theorems. Integration in Euclidean  $n$ -space. Manifolds, exterior differential forms, and their integrals. Stokes' theorem. Three lectures. *Prerequisites: Mathematics 2E, 140A.* (F,W,S)

**151. Topics in Geometry (4)**

A topic to be chosen from among differential geometry, linear geometry, projective geometry, algebraic geometry, topology of surfaces. May be repeated for credit with a different topic. Three lectures. *Prerequisite: consent of instructor.* (S)

**160A-B. Elementary Mathematical Logic (4-4)**

Propositional and predicate calculi. Interpretations and formal theories. Completeness theorems. Some decision procedures. An introduction to recursion theory. Undecidability of the predicate calculus. Incompleteness of elementary number theory. Three lectures. *Prerequisite: Mathematics 100A, 140A, or consent of instructor.* (F-W)

**161. Theory of Computability (4)**

Introduction to Turing and other machines. Godel numbering and unsolvability results; the halting problem. Relative uncomputability. Recursive function theory and complexity classification. Models of computation. Three lectures. *Prerequisites: Mathematics 100A-B or 103A-B.*

**165. Introduction to Set Theory (4)**

Sets, relations, and function. Partial, linear, and well-orders. The Axiom of Choice, proof by induction and definition by recursion. Cardinal and ordinal numbers and their arithmetic. *Prerequisite: Mathematics 100A or 140A or 103, or consent of instructor.* (S)

**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. Statistical computations. Linear programming. Three lectures. *Prerequisites: programming experience and Mathematics 2E.* (F)

**170B. Numerical Analysis (4)**

Rounding and discretization errors. Interpolation and approximation of functions. Numerical differentiation and integration. Solution of polynomial and single nonlinear equations. Three lectures. *Prerequisites: programming experience and Mathematics 2E.* (W)

**170C. Numerical Analysis (4)**

Ordinary differential equations and their numerical solution. Basic existence and stability theory. Difference equations, numerical methods and error propagation. Boundary value problems. Three lectures. *Prerequisite: Mathematics 170B.* (S)

**171A-B. Mathematical Programming (4-4)**

Elementary topological properties of Euclidean spaces. Convex sets, separation theorems. Simplex, Sperner lemma, Brouwer fixed-point theorem, linear programming, duality. Constrained maxima, Kuhn-Tucker theorem, mathematical programming. Three lectures. *Prerequisites: Mathematics 2C-D-E.* (Not offered in 1978-79.)

**180A. Introduction to Probability (4)**

Probability spaces, independence, conditional probability, random variables, distributions, expectations, joint distributions, central-limit theorem. *Prerequisites: Mathematics 2C-D.* (F)

**180B. Introduction to Probability (4)**

Random vectors, multivariate densities, covariance matrix, multivariate normal distribution, Poisson process. Other topics if time permits. *Prerequisites: Mathematics 180A and 2E.* (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, queueing theory. *Prerequisite: Mathematics 180B.* (S)

**181A. Introduction to Statistics (4)**

Random samples, linear regression, least squares, testing hypotheses and estimation. Neyman-Pearson lemma, likelihood ratios. Three lectures, one recitation. *Prerequisites: Mathematics 180A and 2E.* (W)

**181B. Introduction to Statistics (4)**

Goodness of fit, special small sample distribution and use, non-parametric methods, Kolmogorov-Smirnov statistics, sequential analysis. Three lectures. *Prerequisite: Mathematics 181A.* (S)

**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

## Mathematics

technique, error-correcting codes, combinatorial optimization problems. Three lectures, one recitation. *Prerequisite:* programming experience. (W)

### **190A-B. Introduction to Topology with Applications to Analysis (4-4)**

Set theory, Zorn's lemma, cardinal and ordinal numbers, Metric spaces, General topological spaces, Metrizable Function spaces, Ascoli's theorem. Three lectures. *Prerequisites:* Mathematics 2C-D. (F,W)

### **190C. Introduction to Topology with Application to Analysis (4)**

The course will develop Euler characteristics and the classification of 2-manifolds. This will be followed by the construction and applications of the Fundamental Group, through Van Kampen's theorem, covering spaces, Borsuk-Ulam theory and the Kurosh subgroup theorem. Three lectures. *Prerequisite:* Mathematics 190A-B. (S)

### **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 (3-3-3)**

Group theory, Jordan-Holder theorem, Sylow theorems, Rings, polynomial rings, principal ideal domains, radicals, Wedderburn theorems, Hilbert basis theorem, Modules, exact sequences, projective modules, tensor products, Fields, algebraic and transcendental extensions, algebraic closure, finite fields, Galois theory, fundamental theorem, solvability by radicals. *Prerequisites:* Mathematics 100A-B-C or consent of instructor.

### **201A-B-C. Basic Topics in Algebra (3-3-3)**

Recommended for all students specializing in algebra. Basic topics include categorical algebra, commutative algebra, group representations, homological algebra, non-associative algebra, ring theory. *Prerequisites:* Mathematics 200A-B-C or consent of the instructor.

### **202A-B. Applied Algebra (4-4)**

Selected topics in applied mathematics that are principally algebraic in nature. Boolean algebras, group codes, polynomial rings and polynomial codes, selected applications of finite fields, recurrent sequences, switching theory, finite state machines. *Prerequisites:* Mathematics 103A-B or Mathematics 100A-B.

### **203A-B-C. Algebraic Geometry (3-3-3)**

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:* Mathematics 200A-B-C.

### **204A-B-C. Number Theory (3-3-3)**

Topics in number theory such as: algebraic number theory; cyclotomic and Kummer extensions, class number, units, splitting of primes in extensions, zeta and L-functions, Chebotarev density theorem, prime ideal theorem, Brauer-Siegel theorem, class field theory (abelian extensions, reciprocity laws), p-adic numbers, adeles, number theory of simple algebras, diophantine equations and approximation; quadratic forms; Hasse-Minkowski theorem, Siegel theorem, automorphic forms and applications to number theory, Hecke theory of the relation between Dirichlet series and modular forms, special automorphic forms such as theta functions, Eisenstein series and applications such as Kronecker limit formula, Rademacher's result on the partition function. *Prerequisite:* consent of instructor. (F,W,S)

### **207A-B-C. Topics in Algebra (3-3-3)**

In recent years, topics have included number theory, commutative algebra, non-commutative rings, homological algebra, and Lie groups. May be repeated for credit with consent of adviser. *Prerequisite:* consent of instructor.

### **208. Seminar in Algebra (1 to 3)**

*Prerequisite:* consent of instructor. (Satisfactory/Unsatisfactory grades permitted.)

### **209. Seminar in Number Theory (1 to 3)**

*Prerequisite:* Consent of instructor. (Satisfactory/Unsatisfactory grades permitted.)

### **210A. Mathematical Methods in Physics and Engineering (4)**

Vector spaces and linear transformations, eigenvalue problems, tensor algebra, matrices, norms, completeness, the spaces  $L_p$  and  $C$ , distributions, delta sequences, Properties of Lebesgue, Stieltjes, line integrals, Analytic functions. *Prerequisites:* Mathematics 2D-E and 140A, or advanced calculus. (F)

### **210B. Mathematical Methods in Physics and Engineering (4)**

Scalar products, orthogonal series in Hilbert space, best approximation, Compact symmetric operators, expansions in eigenvectors, Applications to matrices, quadratic forms, integral equations, Regular and singular Sturm-Liouville problems, Green's functions. *Prerequisite:* Mathematics 210A or consent of instructor. (W)

### **210C. Mathematical Methods in Physics and Engineering (4)**

Fourier transforms of functions and distributions, Laplace transforms, applications to boundary value problems. Simple second order elliptic, hyperbolic and parabolic partial differential equations. Uniqueness theorems, maximum principles, Spherical harmonics, Wave propagations. *Prerequisite:* Mathematics 210B or consent of instructor. (S)

### **211A-B. Mathematical Model Building (4-4)**

Topics to include arguments from scale, dimensional analysis, graphical methods, techniques of optimization, continuous, discrete, and stochastic models, local stability theory, principles of systems analysis, models and data collection. *Prerequisites:* Mathematics 2D-E, Mathematics 180A. (W,S) (Not offered in 1978-79.)

### **215A-B-C. Mathematical Theory of Process Optimization (3-3-3)**

Optimal control problems for systems described by nonlinear differential equations, necessary conditions, sufficient conditions; existence theorems, applications to classical calculus of variations and to problems in electrical and aerospace engineering, Optimal control problems for systems described by nonlinear difference equations, applications to the theory of optimal economic growth. *Prerequisites:* Mathematics 241A-B-C, or consent of instructor. (Not offered in 1978-79.)

### **217A-B-C. Topics in Applied Mathematics (3-3-3)**

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 3)**

*Prerequisite:* consent of instructor. (Satisfactory/Unsatisfactory grades permitted.)

### **220A-B-C. Complex Analysis (3-3-3)**

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:* Mathematics 140A-B, or consent of instructor.

### **221A-B-C. Several Complex Variables (3-3-3)**

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:* Mathematics 200A, 220A-B-C, or consent of instructor. (Not offered in 1978-79.)

### **227A-B-C. Topics in Complex Analysis (3-3-3)**

In recent years, topics have included conformal mapping, Riemann surfaces, value distribution theory, extremal length. May be repeated for credit with consent of adviser. *Prerequisite:* consent of instructor.

### **228. Seminar in Complex Analysis (1 to 3)**

*Prerequisite:* consent of instructor. (Satisfactory/Unsatisfactory grades permitted.)

### **230A-B-C. Ordinary Differential Equations (3-3-3)**

Existence and uniqueness theorems, Linear systems with constant and periodic coefficients, Sturm-Liouville theory, Eigenfunction expansions, Stability and asymptotic behavior of nonlinear systems, Poincare-Bendixon theorem, Perturbation theory, Linear systems in the complex domain and their

singularities, Control theory, Equations in Banach space. *Prerequisites:* Mathematics 130A-B and 220A-B or consent of instructor. (Not offered in 1978-79.)

### **231A-B-C. Partial Differential Equations (3-3-3)**

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:* Mathematics 132A-B, or consent of instructor.

### **232A-B-C. Calculus of Variations (3-3-3)**

Euler-Lagrange equation theory of fields, Hamilton-Jacobi theory, sufficient conditions, Weierstrass E test, Mayer, Lagrange and Bolza problems, Optimal control, Pontryagin's maximum principle, existence theorems, sufficient conditions, Carathéodory's approach to calculus of variations. *Prerequisites:* Mathematics 240A-B-C, or Mathematics 10A-B-C. (Not offered in 1978-79.)

### **233. Singular Perturbation Theory for Differential Equations (3)**

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:* Mathematics 130A-B, 132AB; or consent of instructor. (Satisfactory/Unsatisfactory grades permitted.)

### **237A-B-C. Topics in Differential Equations (3-3-3)**

May be repeated for credit with consent of adviser. *Prerequisite:* consent of instructor.

### **238. Seminar in Differential Equations (1 to 4)**

*Prerequisite:* consent of instructor. (Satisfactory/Unsatisfactory grades permitted.)

### **240A-B-C. Real Analysis (3-3-3)**

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:* Mathematics 140A-B-C.

### **241A-B-C. Functional Analysis (3-3-3)**

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:* Mathematics 240A-B-C, or consent of instructor. (Not offered in 1978-79.)

### **247A-B-C. Topics in Real Analysis (3-3-3)**

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 3)**

*Prerequisite:* consent of instructor. (Satisfactory/Unsatisfactory grades permitted.)

### **250A-B-C. Differential Geometry (3-3-3)**

Differential manifolds, Sard theorem, tensor bundles, Lie derivatives, DeRham theorem, connections, geodesics, Riemannian metrics, curvature tensor and sectional curvature, completeness, characteristic classes, Differential manifolds immersed in Euclidean Space. *Prerequisites:* Mathematics 100A-B-C. (Not offered in 1978-79.)

### **251A-B-C. Lie Groups (3-3-3)**

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:* Mathematics 200 and Mathematics 250, or consent of instructor. (Not offered in 1978-79.)

### **257A-B-C. Topics in Differential Geometry (3-3-3)**

In recent years, topics have included Morse theory and general relativity. May be repeated for credit with consent of adviser. *Prerequisite:* consent of instructor.

### **258. Seminar in Differential Geometry (1 to 3)**

*Prerequisite:* consent of instructor. (Satisfactory/Unsatisfactory grades permitted.)

**260A-B-C. Mathematical Logic (3-3-3)**

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. *Prerequisite: Mathematics 100A-B-C or consent of instructor.* (Not offered in 1978-79.)

**261A-B-C. Combinatorial Analysis (3-3-3)**

This course is an introduction to the computational and theoretical aspects of discrete mathematics. Topics include counting and listing, analysis of algorithms, graphs and trees, discrete max-min theory, error correcting codes and designs. *Prerequisites: (may be taken concurrently): ability to program BASIC, ALGOL, or FORTRAN; Mathematics 100A-B or Mathematics 103A-B.* (Not offered in 1978-79.)

**262A-B-C. Topics in Combinatorial Mathematics (3-3-3)**

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: Mathematics 100A-B-C.*

**267A-B-C. Topics in Mathematical Logic (3-3-3)**

Topics chosen from recursion theory, model theory, and set theory. May be repeated with consent of adviser. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.)

**268. Seminar in Logic (1 to 3)**

*Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.)

**269. Seminar in Combinatorics (1 to 3)**

*Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.)

**270A-B-C. Numerical Mathematics (4-4-4)**

Accuracy of numerical calculations; interpolation; numerical quadrature; continued fractions in numerical analysis; determination of the zeros of a polynomial; elimination methods for linear equations; eigenvalue problem for Hermitian matrices; eigenvalue problem for general matrices; iterative methods of linear equations. *Prerequisites: Mathematics 2D, 2E, 140A, or advanced calculus and programming experience.*

**271A-B-C. Complexity of Computational Algorithms (4-4-4)**

Recent research on the analysis of the complexity of computational algorithms will be explored: high-precision multiplication, manipulation of graphs, matrix multiplication, inversion, linear equations, sparse matrices, polynomial evaluation, discrete Fourier transforms, algebraic manipulation, lower bounds of computations, polynomial complete problems. *Prerequisite: Mathematics 102 or Mathematics 100. Some familiarity with computer science or numerical analysis desirable but not required.* (Not offered in 1978-79.)

**277A-B-C. Topics in Numerical Mathematics (3-3-3)**

In recent years, topics have included numerical aspects of complex analysis and ordinary and partial differential equations. May be repeated for credit with consent of adviser. *Prerequisite: consent of instructor.*

**278. Seminar in Numerical Mathematics (1 to 3)**

*Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.)

**280A-B-C. Probability Theory (3-3-3)**

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.* (Not offered in 1978-79.)

**281A-B-C. Mathematical Statistics (3-3-3)**

Testing and estimation; sufficiency; regression analysis; sequential analysis; statistical decision theory; nonparametric inference. *Prerequisites: advanced calculus and consent of instructor.* (Not offered in 1978-79.)

**282A-B-C. Applied Statistics (4-4-4)**

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: Mathematics 181B or equivalent or consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.)

**284A-B-C. Applied Probability (4-4-4)**

Random variables, random number generation, distribution functions, Markov chains, Poisson processes, Brownian motion, branching and queueing processes, stationary processes, Fourier analysis, and related topics. *Prerequisites: Mathematics 140C or equivalent.* (Not offered in 1978-79.)

**285. Statistical Inference in the Medical Sciences (3)**

A first course in statistical procedures for the medical sciences. Topics will be chosen from among paired comparisons, experimental design, quantal data, bioassay, counts, regression and correlation, analysis of variance, survivorship. Some emphasis will be given to computational techniques. *Prerequisites: high school algebra and some familiarity with the medical sciences.* (This course offered only through School of Medicine.) (W)

**287A-B-C. Topics in Probability and Statistics (3-3-3)**

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. *Prerequisite: consent of instructor.*

**288. Seminar in Probability and Statistics (1 to 3)**

*Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.)

**290A-B-C. Topology (3-3-3)**

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: Mathematics 100A-B-C, Mathematics 140A-B-C.*

**295. Special Topics in Mathematics (1 to 3)**

A variety of topics and current research results in mathematics will be presented by staff members and students under faculty direction.

**297A-B-C. Topics in Topology (3-3-3)**

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.*

**298. Seminar in Topology (1 to 3)**

*Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.)

**299. Reading and Research (1 to 9)**

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.* (Satisfactory/Unsatisfactory grades permitted.)

## Teaching of Mathematics

**500. Apprentice Teaching (1 to 3)**

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.* (Satisfactory/Unsatisfactory grades only.)

## Muir

OFFICE: Provost, Muir College  
2126 Humanities and Social Science Building

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## 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 provides courses by which students may meet the Muir College graduation requirement that they demonstrate an ability to write English according to standards appropriate for all college work.

Through practice in writing both narrative and expository papers, Muir Writing 10 emphasizes the development of fluency, voice and confidence, as well as mastery of skills necessary for coherent writing. In the small workshop classes students get individual help with their writing from tutors. Muir Writing 20 is an advanced college writing course which concentrates on analytical and argumentative writing. Students are expected to be able to express complex ideas clearly, to write at a level of sophistication comparable to that required in other college courses, and in general to demonstrate mastery and control of the language. Sections vary in theme and content, giving students the opportunity of writing in areas that interest them or may be relevant to their major field. (Descriptions of the Muir 20 sections are available each quarter in the Muir Writing Program office during pre-registration.) Classes are small, and the dominant mode of instruction is peer critique.

Upon entry, students are placed in 10 or 20 according to their level of writing skills as determined by scores on the English Composition Test of the CEEB. Normally a freshman who completes one quarter of Muir 10 is admitted to Muir 20 in the sophomore year. In cases where more than one quarter of practice is needed to prepare a student for Muir 20, an IP grade is given, and the student is required to take Muir 11.

In keeping with the Muir College philosophy of allowing students choices in fulfilling college requirements, in addition to Muir 10 and 20, the Writing Program provides two alternative ways of satisfying the Muir College writing requirement.

- A. By other courses: a student may petition the provost to meet the Muir College writing requirement by satisfactorily completing at UC San Diego another advanced expository writing course when such a course is available and its instructor agrees to accept the student. (A list of approved courses is available at the provost's office.)
- B. By the Advanced Writing Examination: those who feel that their writing ability already equals the Muir College graduation requirement will be permitted to demonstrate this ability by examination. The Advanced Writing Examination is given in the third week of each quarter.

## Courses

**10. College Writing (4)**

A workshop course focusing on students' discovery of what they want to say and how they might say it effectively in writing. Students will write both personal and academic essays, developing skills through weekly writing and revision, group critiques, and individual conferences. (Pass/Not Pass only. May not be taken for a letter grade.)

## Music

### 11. Special Study in Composition (4)

An individualized writing class which includes class discussions and peer critiques but emphasizes tutorials. Students confer individually with instructors on a regular weekly basis to talk out writing plans, go over drafts and work on specific mechanical problems. This course is designed for students who have taken Muir 10 or its equivalent but need additional writing practice to prepare for Muir 20. Muir 11 does not satisfy the first part of the Muir writing requirement. *Prerequisites:* Muir 10 (P or IP) or its equivalent and permission of the instructor.

### 20. Advanced College Writing (4)

A workshop course in skills necessary for advanced college writing: critical thinking, logical organization, intelligent use of sources and effective style. Students will gain experience in informative, analytical, and argumentative writing by frequent practice, feedback and revision. (Pass/Not Pass only. May be taken for a letter grade.) *Prerequisite:* satisfaction of the Subject A requirement. Students who take Muir College 10 in their freshman year will normally take Muir College 20 in their sophomore year.

### 30. Creative Writing (4)

An elective course in which students can experiment with different modes of creative writing. Weekly presentation and critiques of work in progress. This course does not satisfy the Muir writing requirement. *Prerequisite:* permission of the instructor.

## Music

OFFICE: 114 Mandeville Center for the Arts

### Professors:

Rafael Druian, Dip. Mus.

Robert Erickson, M.A.

Peter Farrell, M.M. (Leave of absence fall 1978 and spring 1979)

Thomas Nee, M.A.

Wilbur Ogdon, Ph.D.

Pauline Oliveros, B.A.

Bernard Rands, M. Mus.

Roger Reynolds, M.M.

John Silber, Ph.D.

Bertram Turetzky, M.A.

### Associate Professor:

Jean Charles Francois, 1<sup>er</sup> Prix

### Assistant Professors:

Gerald Balzano, Ph.D.

Cecil Lytle, B.A.

The Department of Music is dedicated to the development of musical intelligence. The goal of its graduate program is to educate researchers who will extend the musical intelligence of the entire music community; the goal of its undergraduate program is to enhance the musical intelligence of students in their appreciation of the music-making process.

**The Undergraduate Program** The special characteristic of the undergraduate program in music at UC San Diego lies in its attempt to relate graduate goals with undergraduate goals: by involving undergraduate students at all levels in the active extension of musical intelligence by graduate faculty and students, the department affords its undergraduates the opportunity to gain a uniquely advanced familiarity with contemporary thinking about music.

Undergraduate courses offered in the Department of Music satisfy a wide range of student interests. For students with little background in the study of music there are three sets of introductory courses: those that lead the student to a personal understanding

of the nature of music through various projects in which music is made and performed by the students themselves (Music 1A-B-C); those that develop basic skills musicians use in the analysis and performance of music (Music 3A-B-C); and those that introduce students to the classical musical heritage of our culture (Music 11A-B-C). For students who have more background and who intend to continue in upper-division music theory and practice courses, Music 2A-B-C (instead of 3A-B-C) and Music 22A-B-C (instead of 11A-B-C) are essential.

Particular major or minor requirements and course prerequisites may be waived by examination for students with sufficient background in music.

**Major Programs** The Department of Music is committed to active, inventive music majors; thus all music majors are encouraged and normally expected to participate in an ensemble performance group each quarter. As a minimum, every major is required to enroll in Music 95 or Music 130 ensemble performance for at least six quarters. (Transfer students will be credited for corresponding activities at other institutions.) The total amount of credit that may be counted towards graduation for Music 95 is twelve quarter units.

Two undergraduate major programs in music are offered at UC San Diego. The music major program is intended for students interested in music as one of the fine arts, who may wish later to engage in music as a profession; most of the courses in this major involve the student in the performance as well as the analysis of music. This major thus requires extensive development of technical musical skills. A student without those skills upon entrance to UC San Diego must devote considerable time to attaining them, either in lower-division courses or in independent study. For that reason, this program is suited for students in Muir, Third, and Warren College whose college requirements permits considerable specialization in the lower division; however, Revelle College students with extensive training in music prior to entrance at UC San Diego may also pursue this program.

The music/humanities program is intended for students interested in music as one of the liberal arts, who wish to gain extensive knowledge about and deep appreciation of music that will enable them to form part of an understanding, sophisticated musical public. Because it does not require training in music prior to entrance into UC San Diego nor extensive, time-consuming training in musicianship skills, it fits the special needs of students in Revelle College, although it is open also to students in Muir College, Third College and Warren College who do not plan to pursue a career in music or to undertake graduate studies.

All courses to be counted toward satisfying major requirements in music must be passed with a grade of C (P) or better.

**The Music Major Program** The lower-division requirements for this major are Music

1A, Music 2A-B-C, Music 20A-B-C, and Music 22A-B-C. For students in this program Music 1A and 2A may be taken concurrently. To complete the major requirements the following courses are required:

1. Music 101A-B-C.
2. Music 102A-B-C (normally taken in the senior year).
3. Two quarters of Music 133 (normally taken in the winter quarters of the junior and senior years).
4. Music 111 or Music 114.
5. Music 103A-B-C (composition), or Music 105, 106, 107 (music technology and psychoacoustics), or Music 132A-B-C (performance), or three additional courses from the series Music 111-125 (literature).
6. Six quarters of Music 95 or 130.

**Honors** The requirements for a B.A. degree with Honors in Music are the same as for the music major program, but with additional specification that twelve unit credits be taken in courses in advanced performance, specifically in Music 132D-E-F, or in composition, specifically in Music 103D-E-F. To be admitted to the honors program, a student must pass an audition before a jury of faculty members from the department; to graduate with honors the student must give a public presentation of the results of the honors study.

**The Music/Humanities Major Program** The lower-division requirements for this major are Music 1A and Music 11A-B-C. In addition, twelve upper-division courses are required to satisfy the major requirements, of which six must be music literature courses (Music 111-125); the other six must form a coherent set of humanities or fine arts upper-division courses relevant to a music major. For example, the six related courses might all be in visual arts in art history, or they might be courses distributed over several departments (say history, literature, and visual arts), all dealing with the baroque period in the arts. Advance approval of these six related courses must be secured in writing from the departmental music/humanities major adviser. To complete the major, six quarters of participation in ensemble performance — through enrollment in Music 95 or 130 is required.

**Minor Programs** To satisfy the non-contiguous minor requirements for Revelle College or the optional minor requirements for Muir or Third College, a student may take twenty-four quarter units in music courses with a grade of C or better, of which twelve quarter units must be in upper-division courses. To satisfy one of the two required Warren College programs of concentration, a student may take twenty-four quarter units in music courses with a grade of C (or P) or better; of these a sufficient number must be earned in upper-division courses to bring the total number of upper-division quarter units in the two programs of concentration to twenty-four.

### The Graduate Program

The department offers programs leading to



the degree of Master of Arts in Music and the degree of Doctor of Philosophy in Music.

Normally, students will be admitted to begin graduate studies in the fall quarter only; applications should be submitted by January 15 of the admission year; failure to meet that deadline will jeopardize the applicant's opportunity for admission and financial support. Applicants to graduate studies in music must submit, as part of the application, the following:

- a) Tapes demonstrating their level of vocal/instrumental performance. It is expected that applicants will be proficient in one area of performance skills.
- b) A repertory list of works performed during the past year and a sample of printed concert programs in which they have participated.
- c) A minimum of two papers illustrating ability in musical analysis.
- d) A minimum of two scores of instrumental works and tapes of compositions (where applicable).
- e) Scores attained on the Graduate Record Examination — including the Aptitude Test and the Advanced Test in Music — given by the Educational Testing Service of Princeton, New Jersey.

After an advisory examination administered during the week prior to the start of classes in the fall quarter, the departmental graduate coordinator will assign a graduate adviser to each new student, with the concurrence of the student and adviser concerned. The adviser must approve student course programs each quarter prior to registration for classes, as well as any significant change in those programs.

**Master's Degree Program** The department offers work leading to a Master of Arts in Music with emphasis on composition, performance, or theoretical studies. The degree requires completion of at least thirty-six quarter units of graduate courses (courses numbered 200-299), including six units of Music 299 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** Since the department at all levels integrates the actual making of new music, all master's candidates are required to share by enrolling in Music 201A-B, Projects in New Music Performance for both years of their residence at UC San Diego. In addition, all graduate students are expected to attend regularly the departmental colloquia and concerts aimed at extending and sharing their musical experience, and are encouraged to use these as opportunities to present their own work relating to their research and creative interests.

Because of the importance of technology in present-day music, all graduate students must become familiar with and capable of handling the appropriate technological facilities of the department; to that end graduate students are

required to pass an examination in the modern technology of music by the end of their first quarter at UC San Diego; students without the extensive experience in technology that would enable them to pass that examination must enroll in Music 200. All graduate students must familiarize themselves with the special facilities of UC San Diego through instruction by the departmental technical staff. In addition, all M.A. students are required to take Music 210, Musical Analysis and Music 218, Topics in Performance Practices. To complete their emphasis requirements, students emphasizing composition in their M.A. programs must take the composition sequence Music 203A-B-C-D and two courses in theoretical or experimental studies. Students emphasizing performance must take the performance sequence 232A-B-C-D and two courses in music literature or performance practices. Students who wish to emphasize theoretical studies in their M.A. programs must first gain proficiency in either composition or performance by satisfactorily (grade of B or better) completing in their first year either the composition sequence Music 203A-B-C or the performance sequence Music 232A-B-C; in addition, they must take two courses in theoretical and one course in experimental studies, typically in Music 206, 207, or 208.

To flesh out their course programs (a full-time graduate student is required to carry nine to twelve units per quarter) the student may choose among a variety of graduate or upper-division courses in music or related courses in other departments, as approved by the graduate adviser. If the student's research area calls for reading proficiency in one or more foreign languages, the student's master's thesis committee will require that the student present evidence of sufficient proficiency. Finally, in order to be able to certify that its graduates are competent teachers of music, the department requires that a master's candidate have served as an apprentice teacher under the supervision of a member of the faculty; this requirement is satisfied by earning a total of six units of credit in Music 500.

#### Typical Programs for the M.A. in Music

FALL	WINTER	SPRING
<b>First Year</b>		
<i>Composition Emphasis</i>		
203A	203B	203C
200	210	218
201A	201B	
*Other	*Other	*Other
<b>Second Year</b>		
203D	299	299
206	206	
201A	201B	
*Other	*Other	*Other
<b>First Year</b>		
<i>Performance Emphasis</i>		
232A	232B	232C
200	210	218
201A	201B	
*Other	*Other	*Other
<b>Second Year</b>		
232D	299	299
Lit /Perf Prac	Lit /Perf Prac	

201A	201B	
*Other	*Other	*Other
<b>First Year</b>		
<i>Theoretical Studies Emphasis</i>		
Same as for Composition or Performance Emphasis		
<b>Second Year</b>		
206	299	299
207	207	
201A	201B	
*Other	*Other	*Other

\*Other courses and activities will include electives, Music 500, departmental colloquia and concerts.

#### Master's Thesis

M.A. candidates will present a thesis consisting of two parts:

1. A folio of three research papers — normally to be written in connection with the courses the student will be taking.
2. Under supervision of the student's graduate adviser in Music 299:
  - a. Candidates emphasizing composition will prepare a folio of three chamber compositions together with tape recordings of them.
  - b. Candidates emphasizing performance will present a lecture-recital lasting an hour — the program to be approved by the departmental graduate coordinator.
  - c. Candidates emphasizing theoretical studies will write an extended research paper on a topic chosen with the adviser.

The specific nature of Part 2 of the thesis to be undertaken — including the types of compositions in the folio for composition emphasis, the program of the lecture-recital for performance emphasis, and the topic of the extended research paper for theoretical studies emphasis — must be approved in advance by the student's master's thesis committee, typically in the student's fourth quarter in residence. The entire thesis must of course be approved by that committee upon completion of both parts.

#### Doctoral Degree Program

Students of superior musical competence may pursue a program with emphasis in composition or in theoretical/experimental studies leading to the Ph.D. in music, under the general requirements for the Doctor of Philosophy degree as described in the section "Graduate Studies" of this catalog. The specific departmental requirements for the degree are:

- 1) Successful completion of requirements equivalent to those described above for the M.A. in Music.\*\*
- 2) A minimum of eight approved courses beyond the M.A.
- 3) One research paper adjudged to be of publishable quality, to be completed prior to qualifying examinations.
- 4) Demonstration through written and oral examinations of a comprehensive understanding of literature and theory of the field.

## Music

- 5) An acceptable dissertation (Theoretical/Experimental Studies) or a folio of four compositions (Composition Studies).
- 6) A final public defense of the dissertation.
- 7) Six units of credit in Music 500.

Materials previously submitted for other degrees are not acceptable for submission for the Ph.D. degree.

The required eight courses beyond the requirements for the M.A. are assigned by the student's doctoral adviser after review of the student's academic background and abilities, as confirmed by appropriate departmental testing. However, the student should not expect these eight courses alone to prepare him or her for doctoral examinations. The student is expected to choose other electives in music and electives in other disciplines such as history, literature, art history, philosophy and physics when useful. The student will also undertake independent studies, supervised by an appropriate member of the faculty, and prepare himself or herself in the library and laboratory for qualifying examinations.

In addition, the doctoral student is expected to continue participation in departmental colloquia and music-making activities.

### Typical Program for the Ph.D. in Music

#### First and Second Years

Same as for M.A. program in Music\*\*

#### Third and Fourth Years

Eight approved courses and a publishable paper  
Additional courses for breadth  
Six units of Music 500

#### Fifth Year

Dissertation writing  
Dissertation defense

\*\*Students with graduate degrees or courses from other institutions will be appropriately credited.

## Courses

### Lower Division

#### 1A-B-C. The Nature of Music (4-4-4)

Development of music perception and discrimination through participation projects in tape music composition and small-group improvisation, and through critical observation of the preparation and performance of selected ensemble literature by experienced musicians. *Prerequisites: 1A for 1B; 1B for 1C; or consent of instructor. Offered on P-NP basis only.* (F,W,S)

#### 2A-B-C. Basic Musicianship (4-4-4)

The development of basic skills necessary to musicians. Perception and notation of pitch relationships, temporal relationships, and musical structures. Extensive drills in sight-singing, rhythmic reading, and dictation. *Prerequisites: must be taken in sequence, for music majors only or by consent of instructor.*

#### 3A-B-C. Musical Literacy (4-4-4)

Primarily a course to develop listening abilities through a conceptual understanding of the structure of music together with listening exercises and techniques. Topics include musical notation, melodic transcription, scales, chords, intervals, keys, rhythm, meter, and rudiments of musical form. No credit for music majors.

#### 11A-B-C. Understanding Western Music (4-4-4)

An overview of Western musical styles, both historical and present, having as its goal an increase in the breadth and depth of the students' understanding and appreciation of the

music of Western culture. Three hours of listening lecture and two one-hour labs weekly. Occasional papers or reports. Not open to music majors. 11A-B-C will satisfy Muir College fine arts requirements, and 11A will satisfy Revelle College fine arts requirement. *Prerequisites: 11A for 11B, 11B for 11C or consent of instructor.* (F,W,S)

#### 20A-B-C. Music Theory and Practice I (4-4-4)

An integrated and creative approach to the study of materials of music through hearing, writing, analyzing, and performing. Continues ear training. Studies in melodic writing and counterpoint. *Prerequisites: Music 1A and Music 2A-B-C. (Students who have taken Music 2C prior to fall 1978 must also take a qualifying examination in order to be admitted to Music 20.)* (F,W,S)

#### 22A-B-C. Laboratory Survey of Music Literature (4-4-4)

Study of music literature for music majors. Two to four hours of assigned listening weekly with score, plus two hours discussion each week with a faculty member. Occasional readings, papers, and report. (F,W,S)

#### 32. Instrumental/Vocal Instruction (2)

Supervised study of instrument or voice. Credit and grades awarded by juried examination. For music majors. May be repeated for up to a maximum of six total quarter units. Credit not counted towards graduation.

#### 95. Ensemble Performance (2)

Participation in music 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. Not all sections will be offered every year. May be repeated for credit, but a maximum of twelve quarter units in Music 95 may be counted toward graduation. *Prerequisites: audition and permission of instructor for each section.*

Section A. Symphony Orchestra

Section B. Chamber Music Performance

Section C. Concert Choir

Section D. Symphonic Chorus

Section E. Chamber Orchestra

Section F. Collegium Musicum

Section G. Gospel Choir

Section H. Chamber Opera

Section I. Music Theater

Section J. Jazz Ensemble

Section K. Chamber Singers

Section L. Wind Ensemble

Section M. Madrigal Singers

### Upper Division

#### 101A-B-C. Music Theory and Practice II (4-4-4)

A study of the structure of homophonic tonal music. Representative examples of music literature are studied for an understanding of pitch relationships, temporal relationships, form, pattern, etc. Class time is devoted to hearing, singing, analysis and writing. Individual drills in aural comprehension are provided in the Central University Library. *Prerequisites: Music 2A-B-C. (Students who have taken Music 2C prior to fall 1978 must also pass a qualifying examination in order to be admitted to Music 101.)*

#### 102A-B-C. Music Theory and Practice III (4-4-4)

Advanced study of the materials of music. Wagner through Cage. Aural discrimination, analysis, exercises, short compositions. *Prerequisites: Music 20A-B-C, Music 101A-B-C.* (F,W,S)

#### 103A-B-C-D-E-F. Seminar in Composition (4-4-4-4-4-4)

Individual projects in composition critically reviewed in seminar with fellow student and faculty composers. *Prerequisites: Music 20A-B-C, Music A-B-C for D-E-F, or consent of instructor.* (F,W,S)

#### 104. Sound Sources and Receivers (4)

An introduction to the physical properties associated with the production, transmission and reception of sound as musical events. Open to music majors only. *Prerequisites: Music 20A-B-C or consent of instructor.* (F)

#### 105. Electronics in Music (4)

Exercises in electronic sound generation and processing with emphasis on analog systems. *Prerequisites: Music 20A-B-C, Music 104, and consent of instructor.*

#### 106. Musical Psychoacoustics (4)

Survey of psychoacoustical phenomena, theories of hearing and their relation to musical perception and cognition. Techniques of psychoacoustical experimentation. *Prerequisites: Music 20A-B-C.*

#### 107. Fundamentals of Computer Music (4)

Techniques of digital sound synthesis and their implications for composition. *Prerequisites: Music 105, Music 106, APIS 61 recommended.*

#### 111. World Music (4)

A course of illustrated lectures giving an introduction to and brief summary of selected musics of the world.

#### 112. Studies in Vocal and Choral Literature (4)

A critical study of representative works for solo voice (with piano or other accompaniment) and/or for choral ensemble. Since the selected literature will vary from year to year, the course can be repeated for elective credit. Music majors are assigned additional projects. *Prerequisites: Music 11A-B-C or Music 22A-B-C or consent of instructor. (Not offered in 1978-79.)*

#### 113. Studies in Opera (4)

A critical study of representative operas. At least one opera discussed will be selected because of the opportunity to see it in staged performance. Music majors are assigned additional projects. *Prerequisites: Music 11A-B-C or Music 22A-B-C or consent of instructor. (Not offered in 1978-79.)*

#### 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 for credit. *Prerequisites: Music 11A-B-C or Music 22A-B-C or consent of instructor. (Not offered in 1978-79.)*

#### 116. Medieval and Early Renaissance Music (4)

The development of an operational and intellectual account of medieval and early Renaissance music. Music majors are assigned additional projects. *Prerequisites: Music 11A-B-C or Music 22A-B-C or consent of instructor.*

#### 117. Late Renaissance and Early Baroque Music (4)

Functional performance problems and realizations of music of the sixteenth and seventeenth centuries. Music majors are assigned additional projects. *Prerequisites: Music 11A-B-C or Music 22A-B-C or consent of instructor. (Not offered in 1978-79.)*

#### 118. Music of the Classic Era (4)

Main emphasis will be placed in the music of Haydn, Mozart, and Beethoven and general culture of the period. Listening assignments shall be two to four hours with scores. Lectures shall include analysis of specific works together with presentation of interesting topics based on melody, harmony, counterpoint and rhythm of the period. *Prerequisites: Music 11A-B-C or Music 22A-B-C or consent of instructor. (Not offered in 1978-79.)*

#### 119. Music of the Nineteenth Century (4)

A critical study of European Art Music produced during the Romantic period. Stress will be placed on the rise of nationalism and its effects upon the music. *Prerequisites: 11A-B-C or 22A-B-C or consent of instructor.*

#### 123. The Orchestra and Its Literature (4)

A study of the instruments of the orchestra; their resources, tonal effects; their use by major composers; methods of writing for modern instruments; analysis of representative scores. Music majors are assigned additional projects. *Prerequisites: Music 11A-B-C or Music 22A-B-C or consent of instructor. (Not offered in 1978-79.)*

#### 124. Studies in Chamber Music (4)

A critical study of representative works for small ensemble. The literature studied is selected and may vary from course to course. The course can be repeated for elective credit. Music majors are assigned additional projects. *Prerequisites: Music 11A-B-C or Music 22A-B-C or consent of instructor. (Not offered in 1978-79.)*

**125A-B-C. Black Music in America (4-4-4)**

A sequence of three courses entailing a topical study of the music produced by Black Americans. In each section of this course sequence, particular attention will be placed on the political, social and economic developments in America as they affect, and are affected by, the evolution of Black music. *Prerequisite: consent of instructor.* (Not offered in 1978-79.)

**128. Principles and Practice of Conducting (4)**

The theory and practice of conducting as related to the study of instrumental and choral literature. *Prerequisite: consent of instructor.* (Not offered in 1978-79.)

**130A-B-C. Seminar in Chamber Music Performance (2-2-2)**

Performance of representative instrumental and vocal chamber music literature. *Prerequisite: consent of instructor through audition.* (F.W.S)

**132A-B-C-D-E-F. Pro-Seminar in Music Performance (4-4-4-4-4-4)**

Individual or master class instruction in advanced instrumental/vocal performance. May be repeated for credit. *Prerequisites: consent of instructor through audition. Preference given to music majors.*

**133. Projects in New Music Performance (2)**

Performance of new music of the twentieth century. Normally offered winter quarter only. *Prerequisite: consent of instructor through audition.*

**143. Departmental Seminar (1)**

The departmental seminar serves both as a general department meeting and as a forum for the presentation of research and performances by visitors, faculty and students (P/NP grades only.) (Not offered in 1978-79.)

**195. Instructional Assistance (2)**

Observation and critiques of classroom procedures and content. Assisting in the instruction of an undergraduate music class under the supervision of a faculty member. (P/NP grades only.) *Prerequisites: permission of the instructor and departmental approval.*

**198. Directed Group Study (1-4)**

Concentrated inquiry into various problems not covered in the usual undergraduate courses. (P/NP grades only.) *Prerequisite: consent of instructor.*

**199. Independent Study (2 or 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 coursework. *Prerequisites: consent of instructor and departmental approval.*

## Graduate

**200. Music Technology (2)**

A first course in the uses of electronic technology. Operation of UC San Diego analog electronic studios. Sound generation and manipulation. Microphones. Stereo recording technique. Dubbing, mixing, filtering, and splicing. Basic digital sound generating. Practical and creative uses of electronic technology.

**201A-B. Projects in New Music Performance (1)**

Performance of new music of the twentieth century. All graduate music students must enroll in fall and winter quarters. If the student is not invited to participate, the one unit of credit will be dropped. *Prerequisite: audition.*

**202. Live Electronic Performance (3)**

Problems and projects in the specialized use of electronics in performance. *Prerequisites: Music 200 and consent of instructor.*

**203A-B-C-D. Advanced Projects in Composition (3-3-3-3)**

Meetings and laboratory sessions devoted to the study of composition.

**205. Advanced Use of Electronics in Music (3)**

Seminar in advanced theoretical and applied research in the generation and processing of electronic sound for composition and performance. *Prerequisites: Music 200 and consent of instructor.*

**206. Experimental Studies Seminar (3)**

Seminars growing out of current faculty interests. The approach tends to be speculative and often includes individual projects 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 (3)**

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.

**208A-B. Seminar in New Instrumental Resources (3-3)**

Extensions of conventional instrumental technique and tone production and their application to music composition, notation and performance. Must be taken in sequence or may be taken separately with instructor's consent.

**209A-B. Advanced Music Theory and Practice (3-3)**

Advanced integrated studies in music theory; composition and styles study through analysis and performance. *Prerequisite: consent of instructor.*

**210. Musical Analysis (3)**

The analysis of complex music. The course will assume that the student has a background in traditional musical 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. Readings, projects, and analytical papers. Required for graduates in music; others by permission.

**212. Seminar in Vocal and Choral Literature (3)**

A critical and historical study of selected works and repertory.

**213. Opera Studies (3)**

A detailed analytical study of selected operas in production in San Diego, Los Angeles, or San Francisco. *Prerequisite: consent of instructor.* (Not offered in 1978-79.)

**214. Seminar in Twentieth-Century Music (3)**

Detailed study of selected literature through the study of scores and writings, supplemented when possible by performance participation. (Not offered in 1978-79.)

**215. Seminar in Bach and Related Studies (3)**

A study of content and structure in selected compositions of J. S. Bach. *Prerequisite: consent of instructor.* (Not offered in 1978-79.)

**216. Seminar Studies in Late Medieval and Early Renaissance Music (3)**

Problems of style and performance in selected music of the thirteenth, fourteenth, and fifteenth centuries.

**217. Seminar Studies in Late Renaissance and Early Baroque Music (3)**

The study of early music as it has to do with theoretical systems, critical analyses, music and documentary source materials.

**218. Topics in Performance Practices (3)**

Selected aspects of performance practice of the twentieth century will be studied: realization of graphic scores, extended techniques, performance of post-Webern music, etc. Required for graduates in music; others by permission.

**220A. Critical Studies (3)**

An examination of issues involved in writing about music; the nature of critical thinking; verbal and non-verbal languages; research techniques and methodology; implications of other disciplines for the study of music. Extensive readings. Graduate students from other fields welcome. *Prerequisite: consent of instructor.* (Not offered in 1978-79.)

**220B. Music Criticism (3)**

An examination of contemporary music criticism, with emphasis on the practical application of materials covered in 220A. Extensive listening and writing, as well as a systematic review of journals. A thorough knowledge of music literature is essential. *Prerequisite: Music 220A or consent of instructor.* (Not offered in 1978-79.)

**223. Seminar Studies in Orchestral Literature (3)**

Problems of performance and interpretation in representative works of orchestral music, including works for chamber orchestra, opera scenes and choral works. Students will be responsible for problems of editing, bowings and conducting. (Not offered in 1978-79.)

**224. Seminar Studies in Chamber Literature (3)**

A critical and historical study of selected works and repertory. (Not offered in 1978-79.)

**228. Advanced Conducting (3)**

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. Typical pieces to be worked on are Bach *Orchestra Suite No. 1*; Webern, *Five Orchestra Pieces*; and a series of works expressly written by Sydney Hodkinson to teach the interpretation of new music. *Prerequisite: consent of instructor.*

**230. Advanced Seminar in Performance of Music for Small Ensemble (3)**

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.*

**232A-B-C-D. Pro-Seminar in Music Performance (3-3-3-3)**

These seminars are devoted to workshops in instrumental/vocal performance with special attention to technique, style and interpretation. The seminars meet two hours a week, with maximum enrollment of six. A high standard of performance must be demonstrated. May be repeated for credit. *Prerequisite: consent of instructor.*

**236. Chamber Orchestra (3)**

Study and performance of standard orchestra literature in coached rehearsal sessions. A high standard of performance must be demonstrated. This course may be repeated for credit any number of times. The literature performed varies from year to year and quarter to quarter. *Prerequisite: consent of instructor through audition.* (Not offered in 1978-79.)

**237. Opera Studio (3)**

Advanced study and performance of scenes from standard, classic operas, experimental music theatre and chamber operas. *Prerequisite: consent of instructor through audition.* (Not offered in 1978-79.)

**243. Seminar on Contemporary Issues in Music (1)**

Seminars on contemporary issues in music. (Satisfactory/Unsatisfactory grades only.) (Not offered in 1978-79.)

**291. Music Bibliography (3)**

Music encyclopedias and dictionaries. Music histories. Books according to genres. Music of countries. Books on theory and notation. Historical editions (monuments). Practical editions. Collected works.

**296. Directed Research (1-3)**

Individual research. (Satisfactory/Unsatisfactory grades permitted.) May be repeated for credit.

**298. Special Studies (1)**

Concentrated inquiry into various problems, e.g. problems in string notation for composers, problems in sight singing, problems in analysis. *Prerequisite: consent of instructor.*

**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. (Satisfactory/Unsatisfactory grades permitted.)

**500. Apprentice Teaching (1-4)**

Participation in the undergraduate teaching program is required of all graduate students at the equivalent of 25% time for three quarters.

## Natural Sciences

OFFICE: Provost, Revelle College

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The two sequences of courses described below are given jointly by the Departments of Physics, Chemistry, and Biology. They are to be used by Revelle College students in fulfilling the natural science requirement of the College. The courses contain material equivalent to traditional lower-division chemistry, biology, and physics courses, but are organized in such a way as to eliminate unnecessary overlap of content.

## Neurosciences

The sequence Natural Science 1A-B-C-D-E is intended for students whose mathematics proficiency is at the level of the Mathematics 1 sequence. The material of this sequence is presented in a manner which minimizes the dependence on mathematics in the early quarters. Students who are enrolled in Mathematics 2A-B-C or have advanced mathematics standing will usually take the sequence Natural Science 2A-B-C-D-E. In either case, the courses are intended to be taken in the given order. Individual departments may recommend that the above sequences be supplemented with Natural Science 2F or 2FL.

Students who enter with advanced standing in calculus may take Physics 3A-B-C-D instead of Natural Science 2A-B-C. The Physics 3 sequence provides a solid foundation in physics; it is particularly recommended for students majoring in physical science or engineering. The sequence begins a quarter earlier than the regular Natural Science 2 sequence but merges with it at the beginning of Natural Science 2D (chemistry). Revelle students may also take the Physics 2 or Physics 3 sequences instead of Natural Science 2A-B-C; see "Physics" section of the catalog.

## Courses

### 1A. Natural Science: Chemistry (4)

Introductory chemistry with emphasis on physical chemistry. Topics include stoichiometry, periodic table, quantum mechanical basis of atomic and molecular structure and spectroscopy, chemical bonding, intermolecular forces, gas, liquids, solids, equilibrium, thermodynamics and chemical kinetics. (F)

### 1B. Natural Science: Chemistry (4)

Continuation of introductory chemistry. Topics include nuclear chemistry, cosmochemistry, organic chemistry, environmental chemistry, biochemistry, origin of life and neurochemistry. Three hours' lecture, one hour recitation. *Prerequisite: one quarter or one semester of any college-level introductory chemistry course, but preferably Natural Science 1A.* (W)

### 1BL. Natural Science: Chemistry (1)

A laboratory course designed to demonstrate chemical concepts and to acquaint students with simple laboratory techniques. One three-hour laboratory. *Prerequisite: one quarter or one semester of any college level introductory chemistry course, but preferably Natural Science 1A.* (W)

### 1C. Natural Science: Biology (4)

An introduction to the general principles of biology with emphasis on the cell, heredity, and the chemical and physical bases of living processes. Three hours' lecture, one hour recitation. (F)

### 1D. Natural Science: Physics (4)

A lecture course with demonstrations, dealing with the principles of mechanics, kinetic theory of gases, and electrostatics. Applications to technology, such as energy conservation, and to biology. Four hours' lecture. *Prerequisites: elementary trigonometry, vectors, and calculus.* (W)

### 1DL. Natural Science: Physics (4)

A lecture and laboratory course dealing with the principles of mechanics, kinetic theory of gases, and electrostatics. Applications to technology, such as energy resources, and to biology. The lecture portion of the course is identical with Natural Science 1D. Four hours' lecture, four laboratory exercises during the quarter. *Prerequisites: elementary trigonometry, vectors, and calculus.* (W)

### 1E. Natural Science: Physics (4)

A lecture course, with demonstrations, dealing with electrical, optical, and quantum phenomena with applications to biology and technology. Four hours' lecture. *Prerequisites: elementary trigonometry, vectors, calculus, and Natural Science 1D.* (S)

### 1EL. Natural Science: Physics (4)

A lecture and laboratory course dealing with electrical, optical,

and quantum phenomena with applications to biology and technology. The lecture portion of this course is concurrent with Natural Science 1E, four hours' lecture, and four laboratory exercises during the quarter. *Prerequisites: elementary trigonometry, vectors, calculus and Natural Science 1D or the equivalent.* (S)

### 2A. Natural Sciences: Physics (4)

An introduction to natural phenomena which can be understood in terms of the physical sciences is followed by the study of particle motion. Applications are made to astronomy and to the structure of matter. Four hours' lecture, or six hours' tutorial. *Prerequisites: Mathematics 2A and concurrent registration in Mathematics 2B.* (W)

### 2B. Natural Science: Physics (4)

A continuation of Natural Science 2A to the electrical effects of stationary and moving charges, time-dependent fields, and waves. Four hours' lecture, or six hours' tutorial. *Prerequisites: Mathematics 2B and concurrent registration in Mathematics 2C.* (S)

### 2C. Natural Science: Atomic Physics (4)

The study of waves is followed by an introduction to the quantum theory as applied to atoms and their radiation. The exclusion principle is used to study the chemistry and physics of atoms. Four hours' lecture or six hours' tutorial. *Prerequisites: Mathematics 2C and concurrent registration in Natural Science 2CL.* (F)

### 2CL. Physics Laboratory (1)

Introduction to principles of laboratory measurements and analysis of data. Experiments in electromagnetism, optics, atomic physics, and solid state physics. Three-hour laboratory is taken concurrently with Natural Science 2C. (F)

### 2D. Natural Science: Chemistry (4)

The properties of atomic and molecular matter and collections of elementary particles. Thermodynamics, kinetic theory of gases, liquids, and structure of molecules. Three hours' lecture, one hour discussion. Registration in 2D is usually accompanied by registration in either 2DL or 2DS. *Prerequisites: Natural Sciences 2A-B-C recommended.* (W)

### 2DL. Natural Science: Quantitative Chemical Analysis (2)

A laboratory course that introduces the student to laboratory techniques, analytical procedures and physical measurements. Includes gravimetric, volumetric and instrumental methods of chemical analysis. Emphasis is on accuracy and precision. One hour lecture and two three-hour laboratories. Registration is usually concurrent with registration in Natural Science 2D. Interchangeable with Science 3AL in Muir and Chemistry 4AL in Warren College. (W)

### 2DS. Natural Science: Chemistry (1)

A laboratory course that introduces the student to concepts of chemical practice. The course is designed for students not intending to major in physical or biological sciences. One three-hour laboratory. (W)

### 2E. Natural Science: Biology (4)

An introduction to the general principles of biology, with emphasis on the cell, heredity, and the chemical and physical bases of living processes. Three hours' lecture, one hour recitation. (S)

### 2F. Natural Science: Chemistry (4)

A further development of the chemical properties of matter, acids and bases; complexions; oxidation-reduction; electrochemistry; rates of chemical reactions. Three hours' lecture, one hour recitation. *Prerequisite: Natural Science 2D.* (S)

### 2FL. Natural Science: Quantitative Chemical Analysis (2)

A continuation of Natural Science 2DL. One hour lecture and two three-hour laboratories. Registration is usually concurrent with registration in Natural Science 2F. Interchangeable with Science 3BL in Muir and Chemistry 4BL in Warren College. *Prerequisite: Natural Science 2DL.* (S)

## Neurosciences

OFFICE: 3034 Basic Science Building, School of Medicine

### Professors:

Samuel H. Barondes, M.D. (*Psychiatry*)  
Reginald G. Bickford, M.D.

Floyd E. Bloom, Ph.D. (*Behavioral Neurobiology*)

Theodore H. Bullock, Ph.D.

J. Anthony Deutsch, D. Phil. (*Psychology*)

John W. Evans, M.D., Ph.D. (*Mathematics*)

Edmund J. Fantino, Ph.D. (*Psychology*)

Robert Galambos, M.D., Ph.D. (*Director of Graduate Studies*)

Youssef Hatefi, Ph.D. (*Adjunct, Neurochemistry*)

Robert B. Livingston, M.D.

Arnold J. Mandell, M.D. (*Psychiatry*)

Robert Y. Moore, M.D.

John S. O'Brien, M.D.

George S. Reynolds, Ph.D. (*Psychology*)

Charles E. Spooner, Ph.D.

Robert Tschirgi, M.D., Ph.D.

Silvio Varon, M.D. (*Biology*)

Wigbert C. Wiederholt, M.D., (*Chairman of the Group*)

Samuel S. C. Yen, M.D. (*Reproductive Medicine*)

### Associate Professors:

Walter F. Heiligenberg, Ph.D. (*Behavioral Physiology, SIO*)

Steven A. Hillyard, Ph.D.

G. David Lange, Ph.D.

David S. Segal, Ph.D. (*Psychiatry*)

Allen I. Selverston, Ph.D. (*Biology*)

Marjorie E. Seybold, M.D. (*in Residence*)

Palmer W. Taylor, Ph.D. (*Medicine*)

Juan Yguerabide, Ph.D. (*Biology*)

### Assistant Professors:

Jack A. Alhadeff, Ph.D. (*in Residence*)

Darwin K. Berg, Ph.D. (*Biology*)

Mark E. Ellisman, Ph.D. (*in Residence*)

Hannah Friedman, Ph.D. (*Biology*)

Daniel K. Hartline, Ph.D. (*Biology*)

Charles K. Jablecki, M.D. (*in Residence*)

William B. Kristan Jr., Ph.D. (*Biology*)

E. Roger Marchand, Ph.D. (*Adjunct*)

Arnold L. Miller, Ph.D. (*in Residence*)

Robert R. Myers, Ph.D. (*Anesthesiology, in Residence*)

Larry R. Squire, Ph.D. (*Psychology in Residence*)

Nicholas Spitzer, Ph.D. (*Biology*)

Doris A. Trauner, M.D. (*Pediatrics*)

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**The Graduate Program** The group in the neurosciences accepts for the Ph.D. degree candidates with 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 campus-wide group of faculty interested in nervous system mechanisms. Each student, in consultation with a faculty committee, selects courses relevant to his or her interests and goals which also provide a solid grounding in the several disciplines of pre-clinical neurosciences. The selection will include formal courses listed in this catalog and

informal seminars offered by the department. Close association among students, faculty, and postdoctoral personnel adds to this informal, tutorial type of instruction. 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. A period of study at one of the other campuses of the University of California can be arranged by mutual agreement.

**Dissertation** During the second year students are expected to propose and initiate work on a thesis problem under the guidance of a faculty preceptor. The neurosciences group at US San Diego presently 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. Facilities for research on marine forms, vertebrate and invertebrate, are available.

**Examinations** Written examinations on the material covered in formal courses are required. Frequent oral and written exercises and defense of propositions in laboratory and seminar settings can be expected; the aim is to sharpen student skills in the presentation of scientific material. An oral examination to qualify for candidacy for the Ph.D. degree is ordinarily taken at the end of the second year. An oral defense of the thesis is the final examination requirements.

**Teaching** Students are expected 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.

## Courses

### Undergraduate

#### 198. Directed Group Study (2-4)

Directed group studies in areas not presently offered by the department. (P/NP grades only.) *Prerequisite:* consent of department. (F,W,S)

#### 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:* approval of department chairman. (F,W,S)

### Graduate

#### 223. Quantitative Theories of Nervous-System Function (3)

Lectures on linear and non-linear interactive models and linear and non-linear system identification techniques as applied to neurophysiology. *Prerequisite:* consent of instructor. (Satisfactory/Unsatisfactory grades only.) (S)

#### 226. Medical Neuropharmacology (2)

This course is designed to meet the needs of those medical students desiring further knowledge of the actions of CNS therapeutic agents beyond that covered in the Basic Neurology SM205 course of the Core Curriculum. *Prerequisites:*

*Basic Neurology SM 205, Organ Physiology, and Pharmacology SM206.* (Satisfactory/Unsatisfactory grades permitted.) (W)

#### 227. Neurosciences Concepts (1)

Analytical, critical, and creative discussions of neurosciences phenomena and concepts. Entire quarter is devoted to one problem area, e.g., brain mechanisms involved in perception, memory, visceral regulation, development, etc., with attempt to establish improved theoretical and experimental approaches. (Satisfactory/Unsatisfactory grades only.) (W)

#### 228. Physiological Basis of Audition (2)

Based on examinations of the recent literature, lectures and student reports will cover the physiological correlates of pitch, loudness, localization, and other aspects of hearing. *Prerequisite:* consent of instructor. (Satisfactory/Unsatisfactory grades only.) (S)

#### 230. Neurosciences Graduate Seminar (1)

Weekly seminars by students of the neurosciences graduate group on topics of recent advances in the neurosciences. *Prerequisite:* student status in the neurosciences graduate group. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

#### 233. Comparative Neurology (4)

Survey of structure and function of nervous systems of invertebrates and vertebrates. Two hours lectures, three hours laboratory, and two hours discussion. *Prerequisite:* *neurobiology or basic neurology, physiological psychology or other introduction to the nervous system.* (Satisfactory/Unsatisfactory grades only.) (F)

#### 234. Neurochemistry (4)

A survey of the chemistry, metabolism, and pharmacology of the nervous system. *Prerequisite:* *undergraduate biochemistry.* (Satisfactory/Unsatisfactory grades permitted.) (W)

#### 238. Systems Neurophysiology and Functional Neuroanatomy (3-12)

Advanced study of the structure and function of nervous systems especially of mammals and other vertebrates: four hours of lectures, four hours of special presentations by faculty of the Neurosciences Group, four, four-hour laboratories and six hours of individually-directed library research work per week. *Prerequisites:* *graduate standing in the neurosciences doctoral program or permission of the instructor; enrollment limited.* (Satisfactory/Unsatisfactory grades only.) (F)

#### 242 A-B. Mathematics in Biology (3)

Use of linear algebra, differential equations and transform methods in physiology, biophysics, and ecology. Plane techniques and computer simulation will be applied to classical non-linear problems (for instance, the various forms of the Volterra equation). *Prerequisites:* *calculus.* (Satisfactory/Unsatisfactory grades only.) (F,W)

#### 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 inter-relations among psychological and physiological events will be explored in order to arrive at unified concepts of human information processing. *Prerequisites:* *Neurosciences 238 or Psychology 231 and consent of instructor.* (Satisfactory/Unsatisfactory grades only.) (F)

#### 244. EEG Clinical Seminars (1)

Presentation of interesting case histories of EEG patients and EEG's recorded in the previous week. Study of movies of seizure patients, integration of EEG findings with behavior. Review of research projects in clinical neurology, depth recording, computer techniques in automation of EEG. (Satisfactory/Unsatisfactory grades only.) (F)

#### 245. EEG Research Seminars (1)

Presentation of research topics by students and staff. Research projects are discussed in the phase of design and after completion. In addition to research, students are assigned topics for essays and discussion. Emphasis will be on EEG analysis and computer techniques. (Satisfactory/Unsatisfactory grades only.) (F)

#### 246. Advanced Neuroanatomy (2)

The purpose of this course is to present selected advanced topics in the anatomy of the nervous system. It will emphasize the organization of functional systems but consideration of neural ultrastructure and growth and development will be included. *Prerequisites:* *Neurophysiology-Neuroanatomy, or Neurology 238, or Basic Neurology (SM205), or Comparative Neurology or Neurology 233.* (Satisfactory/Unsatisfactory grades only.) (W)

#### 247. Fundamentals of Neuro-Ophthalmology (1)

Anatomy and physiology of the visual and ocular motility systems will be examined. Disorders of these systems will be discussed with emphasis on localizing abnormality by understanding normal function. *Prerequisites:* *medical graduates; neurosciences graduate students; or consent of instructor.* (Satisfactory/Unsatisfactory grades only.) (W)

#### 249. History of Medicine (1)

The course examines the causes of conceptual progress and advances in medicine as well as the historical relations between medicine and society. (Satisfactory/Unsatisfactory grades only.) (S)

#### 250. Introduction to Diseases of the Nervous System (2)

Lectures and discussions providing an introduction to the recognition of the manifestations of neurological illness and to an understanding of pathogenetic mechanisms in the major categories of neurological disease. Intended for graduate students and medical students in the preclinical years. *Prerequisite:* *Basic Neurology 205 or Neurosciences 238 or consent of instructor.* (Satisfactory/Unsatisfactory grades only.) (F)

#### 251. 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. Emphasis on examples from neuroscience. *Prerequisite:* *permission of instructor.* (Satisfactory/Unsatisfactory grades only.) (F)

#### 252. Information Processing in Man (1)

Reports of current research into human information processing with emphasis on electrophysiological changes during attention to, and perception and comprehension of visual, auditory and somatic stimuli. *Prerequisite:* *consent of instructor.* (Satisfactory/Unsatisfactory grades only.) (F,W,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. *Prerequisites:* *medical student, graduate student, intern, resident or permission of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (F)

#### 254. Glycoproteins (2)

This course will consider the biosynthesis, structure and possible functions of glycoproteins with particular emphasis on brain specific glycoproteins. The course will proceed by critical reading and discussion of the current literature by class participants. *Prerequisites:* *general biochemistry or equivalent or consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (F)

#### 255. Neurochemistry Seminar (1)

Course will entail student presentations, discussion and critical evaluation of current research papers in the various disciplines of neurochemistry. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

#### 256. Mammalian Neuroanatomy (4)

Lectures and laboratory 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. *Prerequisites:* *graduate status or consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (W)

#### 257. Systems Neurophysiology (3)

This course covers general systems neurophysiology. There will be three hours per week of lecture and discussion plus extensive reading in the text and in the primary literature. Emphasis will be on vertebrate nervous systems. *Prerequisites:* *graduate status or consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (W)

#### 258. Fundamentals of Cerebral Circulation Metabolism (1)

Structure/function of the cerebral circulation will be presented with emphasis placed on the microcirculatory basis of clinical phenomena. Normal and pathophysiological perturbations in the couple between metabolism and blood flow will be explored. Specialized research techniques will be demonstrated. *Prerequisites:* *Basic Neurology, Neuro 238 or consent of instructor.* (Satisfactory/Unsatisfactory grades only.) (W)

## Philosophy

### 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 thin sectioning EM, scanning EM and freeze-fracture EM. *Prerequisite: graduate student standing in Neurosciences doctoral program and permission of instructor. Enrollment limited to six students. (Satisfactory/Unsatisfactory grades permitted.)* (S)

### 260. Development of the Nervous System (1)

This course will examine development of the vertebrate nervous system, with an emphasis on basic human neuroembryology. Topics will include neural tube and crest formation; histogenesis, differentiation, and synaptogenesis in nuclear and cortical structures; maturation of metabolic and neurotransmitter functions, and hormonal influences on neural development. *Prerequisite: graduate or medical student, or consent of instructor. (Satisfactory/Unsatisfactory only.)* (S)

### 296. Neurosciences Independent Research (1-12)

Independent study. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

### 299. Neurosciences Thesis Research (1-12)

Independent study. (Satisfactory/Unsatisfactory 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. *Prerequisites: successful completion of first two years of medical school.*

### 402. Clinical Neurology Clerkship-Advanced. (7 or 14)

This is a continuation of Neurosciences 401 for students interested in a more advanced clinical neurology experience. It is a full-time inpatient and out-patient experience. This is a four-week course offered continuously throughout the year. *Prerequisites: Neurosciences 401 and instructor's consent. (Satisfactory/Unsatisfactory grades only.)*

### 496. Clinical Independent Study (1-12)

Independent clinical study for medical students. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

### 500. Apprenticeship Teaching (1-4)

Participation in the departmental 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 anytime during their subsequent years of training. The amount of teaching required is equivalent to the duties expected of a 0.50 teaching assistant for one quarter. *Prerequisites: neurosciences graduate students. (Satisfactory/Unsatisfactory grades only.)* (F,W,S)

## Philosophy

OFFICE: 3112 Humanities-Library Building

### Professors:

Henry E. Allison, Ph.D.  
Edward N. Lee, Ph.D. (Chairman)  
Frederick A. Olafson, Ph.D.  
Avrum Stroll, Ph.D.  
Zeno Vendler, Ph.D. (Graduate Adviser)

### Honorary Professor:

Herbert Marcuse, Ph.D. (Professor Emeritus, Frankfurt and Berlin)

### Associate Professor:

Georgios H. Anagnostopoulos, Ph.D.

### Assistant Professors:

Richard J. Arneson, Ph.D.  
Gerald D. Doppelt, Ph.D.  
S. Nicholas Jolley, Ph.D.  
Robert B. Pippin, Ph.D.  
Mark L. Wilson, Ph.D.  
Barbara A. Winters, Ph.D., (Undergraduate Adviser)

### Acting Assistant Professor

Paolo M. Dau, M.A.

### The Undergraduate Program

Students who wish to major in philosophy are advised to undertake some lower-division work in the field before attempting to satisfy the upper-division requirements. The introductory sequences Philosophy 13, 14 and 15, and Philosophy 23, 24 and 25 are especially useful.

The following courses are required of philosophy majors:

1. Philosophy 101-106 (History of Philosophy)
2. Philosophy 110A (Symbolic Logic)
3. One of the following sequences:
  - (a) Philosophy 112A-112B (Philosophy of Science)
  - (b) Philosophy 120A-120B (Political Philosophy)
  - (c) Philosophy 123A-123B (Ethics)
  - (d) Philosophy 130A-130B (Philosophy of Language)
  - (e) Philosophy 140A-140B (Contemporary European Philosophy)
  - (f) Philosophy 150A-150B (Aesthetics)
  - (g) Philosophy 160A-160B (Philosophy of Religion)
4. Five additional upper-division courses in philosophy (may include courses listed in 3 which are not used in satisfaction of 3). With the approval of the undergraduate adviser, up to two upper-division courses from outside the Department of Philosophy but in the fields of study that are closely related to the student's philosophical interests may be used to count towards satisfaction of this requirement.

The total is fourteen courses. Special and independent studies courses (including courses numbered 199) may not be used to satisfy major requirements, nor may Philosophy 180 be used to satisfy major requirements. Courses taken at another institution may be used in satisfaction of major requirements, with the approval of the department. Major requirements may be met by examination. It is required that a passing grade and an over-all average of 2.0 must be obtained in courses taken at UC San Diego fulfilling the major requirements before certification of completion will be granted. Major requirements are not fulfilled by courses in which a grade of "D" is obtained.

### Major Program in Philosophy (Recommended schedule)

FALL	WINTER	SPRING
<b>Junior Year</b>		
Philosophy 101	Philosophy 102	Philosophy 103
Philosophy 110A	Additional Phil Course (Sect. 4)	Additional Phil Course (Sect. 4)
	Additional Phil Course (Sect. 4)	Additional Phil Course (Sect. 4)
<b>Senior Year</b>		
Philosophy 104	Philosophy 105	Philosophy 106
Sequence Course (Sect. 3)	Sequence Course (Sect. 3)	Additional Phil Course (Sect. 4)
or	or	or
Additional Phil	Sequence Course	Sequence Course

Course (Sect. 4) (Sect. 3) (Sect. 3)

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Undergraduate courses offered by the Department of Philosophy enable students to satisfy the humanities requirement of Third College's general education requirement under Program B.

**The Graduate Program** The Department of Philosophy offers programs leading to the M.A. and Ph.D. There is no sequence of required courses in either program. Courses of study are arranged according to the need, interest and experience of the individual student.

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 the study, from a variety of perspectives, of traditional and contemporary philosophical issues.

**Master's Degree Program** An M.A. is offered under the Preliminary Examination Plan. Under this plan, credit must be obtained for thirty-six quarter units; at least fourteen units must be from graduate courses in philosophy; no more than nine units may be from upper-division courses. In addition, a written examination must be passed prior to the conclusion of the seventh quarter in residence. This examination is identical to the written examination required of Ph.D. candidates.

Candidates for an M.A. degree must demonstrate reading proficiency in one foreign language (Classical Greek, Latin, French or German).

**Doctoral Degree Program** During the first two years of residence the student will be expected to take in each year at least twelve units in graduate philosophy courses (specifically, those numbered 201-295). The balance of the student's course work, which will normally total thirty-six units per year, may be made up from upper-division courses in philosophy, upper-division and graduate courses in other departments and, if the student is a teaching assistant, Philosophy 500.

By their seventh quarter of residence, all students must pass a preliminary examination consisting of the following three parts:

- a) metaphysics,
- b) epistemology,
- c) ethics.

The exam in all of its parts has a strongly historical character. Questions will be based on a departmental reading list and on pertinent graduate courses offered in the previous year. All three parts must be attempted before the fourth quarter of residence and passed by the seventh. Any students who fail all three parts must retake and pass some one part before the end of their sixth quarter. Any other failed parts must be retaken and passed before the seventh quarter. Accordingly, the examina-

tions are regularly offered at the beginning of each academic year and a make-up, if needed, in the spring quarter.

All students must demonstrate reading proficiency in two of the following languages: German, French, Latin, Classical Greek. The Department's formal logic requirement may be satisfied by (a) passing with grade B or better the final examination in Philosophy 110A; and (b) passing with grade B or better Philosophy 210 (or another course specifically approved by the department for this purpose). Both logic and language requirements must be satisfied before the student can be advanced to candidacy for the Ph.D.

Students in their third year of residence must take at least one graduate course with regular grades in each quarter until the end of that year or their admittance to candidacy, whichever occurs first.

After passing the written preliminary examination, the student must submit a prospectus of the dissertation to his or her doctoral committee. This committee will then orally examine the student on the intended subject of research. This examination will seek to establish that the thesis proposed is a satisfactory subject of research and that the student has the preparation and abilities necessary to complete the research. This oral qualifying examination must be passed before the beginning of the tenth quarter in residence. Students who are passed will be advanced to candidacy for the Ph.D.

Under the supervision of the 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".)

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 for the course in which he or she is assisting.

## Courses

### Lower Division

The Department of Philosophy cooperates in the teaching and administration of the humanities sequence for Revelle College students. (See *Interdisciplinary Courses: Humanities*.)

#### 10. Introduction to Logic (4)

An examination of the nature of argument, inference, and proof, and their role in philosophical, scientific and ordinary discourse. (May be used in fulfilling the Warren College formal skills requirement.)

#### 11. Logic and Scientific Reasoning (4)

Application of formal methods to problems in inductive logic, scientific theory confirmation and formalization. (May be used in fulfilling the Warren College formal skills requirement.)

#### 13. Introduction to Philosophy (4)

An inquiry into the nature of morality and its role in personal and social life. (May be used in fulfilling the Muir College breadth requirement.)

#### 14. Introduction to Philosophy (4)

An introduction to metaphysical thought, especially as it relates to topics such as freedom, mind and God. (May be used in fulfilling the Muir College breadth requirement.)

#### 15. Introduction to Philosophy (4)

A study of the scope and nature of human knowledge in both its everyday and scientific forms. (May be used in fulfilling the Muir College breadth requirement.)

#### 23, 24, 25. Man 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 in fulfilling the Revelle College humanities requirement.) (Students may not take these courses for credit if they previously had credit for Philosophy 20-21-22.)

#### 30A-30B-30C. Judaic Studies (4-4-4)

A three-quarter sequence involving the study of the deep and surface structures of the life styles of one specific culture. The approach from several disciplines addresses itself to analysis of the social, political and economic institutions, the aesthetic structuring through formal artistic expression and the cultural forms of everyday living.

#### 40A. The Nature of Scientific Theories (4)

This is a course designed to introduce students to some logical and epistemological issues raised by science, including the nature of laws and their role in explanation, the distinction between observational and theoretical terms, the truth of scientific theories. (Not offered in 1978-79.)

#### 40B. The Nature of Scientific Theories (4)

Topics in the development and justification of scientific theories, including the nature of discovery, probability theory and the problem of induction and the nature of scientific change. (Not offered in 1978-79.)

## Upper Division

#### 101. History of Philosophy: Greek Philosophy (4)

A study of Greek philosophy from the Pre-Socratic philosophers through Plato.

#### 102. History of Philosophy: Hellenistic and Roman Philosophy (4)

Greek philosophy from Aristotle to Plotinus including the major schools of Hellenistic philosophy: Stoicism, Epicureanism, Skepticism, and Neo-Platonism. *Prerequisite: Philosophy 101.*

#### 103. History of Philosophy: Medieval Philosophy (4)

An examination of the major trends of medieval philosophy through the study of selected texts by such authors as St. Augustine, Aquinas, Scotus, and Ockham. *Prerequisite: Philosophy 102.*

#### 104. History of Philosophy: Early Modern Philosophy (4)

Sixteenth and seventeenth-century philosophy with emphasis on the rationalists (Hobbes, Descartes, Spinoza, Leibniz) and with some attention to major intellectual currents of the sixteenth and seventeenth centuries.

#### 105. History of Philosophy: Eighteenth-Century Philosophy (4)

An examination of the works of eighteenth-century philosophers such as Locke, Berkeley, Hume and Kant. *Prerequisite: Philosophy 104.*

#### 106. History of Philosophy: Nineteenth-Century Philosophy (4)

A study of the development of German idealism with special attention to Hegel and to the reaction his thought provoked on the part of thinkers such as Kierkegaard and Marx. *Prerequisite: Philosophy 105.*

#### 108. Mythology and Philosophy (4)

Study of various ancient Near Eastern mythologies in relation to early Greek philosophy. (Not offered in 1978-79.)

#### 110A. Symbolic Logic (4)

Introduction to mathematical logic; consistency and completeness results for propositional and predicate calculi and identity theory. (May be used in fulfilling the Warren College formal skills requirement.)

#### 110B. Symbolic Logic (4)

First order theories, recursive functions, arithmetic models, Godel results. (May be used in fulfilling the Warren College formal skills requirement.)

#### 112A. Philosophy of Science (4)

An introductory examination of the nature, import and procedures of science in the light of its historical development.

#### 112B. Philosophy of Science (4)

An examination of the nature and historical development of some of the major conceptions of science, such as time, space, motion, causality, determinism. Three hours' lecture-discussion. *Prerequisite: Philosophy 112A.*

#### 115. Philosophy of Logic (4)

Topics in philosophy of logic. Subjects covered vary from year to year. Typical topics include the problem of non-denoting terms (free logic), intensional contexts (Leibniz's law, identity, necessity, belief sentences). *Prerequisite: Philosophy 110.*

#### 120A. Political Philosophy (4)

An examination of problems and theories concerning the nature of the state, society and government. Two or three lecture-discussions.

#### 120B. Political Philosophy (4)

An advanced course in some of the fundamental questions and theories concerning state, society and government. Three hour lecture-discussion. *Prerequisite: Philosophy 120A.*

#### 123A. Ethics (4)

An examination of issues in ethical philosophy with emphasis on the works of major historical figures in this area.

#### 123B. Ethics (4)

A more advanced course dealing with contemporary issues in ethics. *Prerequisite: Philosophy 123A.*

#### 124. Philosophical Psychology (4)

An examination of issues in the philosophy of mind and philosophy of action, such as the nature of beliefs, emotions and actions and the inter-relationships between them; the nature of the mental and conceptual issues arising in psychology.

#### 125. Technology and Human Values (4)

Traditional ideas of nature and the rise of science and technology. The influence of the rise of science and technology on political ideals, on human life, on freedom, education, and on warfare.

#### 130A-B. Philosophy of Language (4)

Philosophical reflections on such linguistic universals as meaning, synonymy, analyticity, reference, grammar and speech act. A selection of contemporary articles will be discussed. Some background in linguistics or philosophy is desirable.

#### 135A-B. Contemporary Analytic Philosophy (4)

This is a two-quarter sequence in the history of analytic philosophy from approximately 1879 to about 1960. The first quarter will deal with the writings of Frege, Russell, Moore and Wittgenstein (*Tractatus*); the second quarter with works of Ayer, Carnap, Tarski, Quine, the later Wittgenstein, Wisdom, and Austin.

#### 140A. Contemporary European Philosophy (4)

A study of the thought of Nietzsche, Husserl and Heidegger with emphasis on the development of the phenomenological movement.

#### 140B. Contemporary European Philosophy (4)

A study of existential phenomenology through the works of its major representatives such as Sartre, Merleau-Ponty and others, as well as of other recent philosophical movements on the European continent. *Prerequisite: Philosophy 140A.*

#### 150A. Aesthetics (4)

A study of the relations of aesthetic experience to ordinary experience and the problems of relating the different arts by such general concepts as expression and artistic form.

#### 150B. Aesthetics (4)

An examination of some special aesthetic problems, such as the cultural relevance of art, the nature of critical evaluation and the understanding of styles. *Prerequisite: Philosophy 150A.*

#### 152. Philosophy and Literature (4)

A study of philosophical themes as presented in selected fiction, drama, or poetry, as well as an inquiry into philosophical puzzles that arise in the appreciation and criticism of literature.

## Physical Education

### 160A. Philosophy of Religion (4)

An examination of the classical treatments, within the Judeo-Christian tradition, of issues such as the nature and existence of God, the possibility of miracles, and the relation between reason and revelation.

### 160B. Philosophy of Religion (4)

An examination of some of the major recent and contemporary discussions of the nature, logic, and existential significance of religious belief. *Prerequisite: Philosophy 160A or consent of instructor.*

### 162. Philosophy of Law (4)

An introduction to some major topics and problems. The nature of law and legal systems, the relationship of law to morality and of legal obligation to moral and political obligation; natural law theory and civil disobedience; theories of punishment, responsibility and legal reasoning.

### 164. Philosophy of History (4)

A study of classical and contemporary conceptions of history and historical knowledge. (Not offered in 1978-79.)

### 166. Philosophy of Social Science (4)

An examination of problems arising out of the concepts, methods and goals characteristic of the social sciences, incorporating current materials from these disciplines; problems such as causal vs. rational explanation; the individual vs. the social whole as unit of study; the meaning and possibility of objectivity, freedom or determinism as a pre-supposition or consequence of theory; the role of values, etc. (Not offered in 1978-79.)

### 168. Philosophy of Psychology (4)

Philosophical problems in the foundations of psychological theorizing and the modeling of mind. Topics may include the status of psychological mechanisms; the unconscious, mental states and processes; problems in psychological explanation.

### 170. Metaphysics (4)

The content of this course will vary from year to year, but in each case it will center about fundamental problems in metaphysics, such as the mind-body problem, problem of universals or the other-minds problem. The discussion of these issues may be either historical or analytic or both, depending upon the interests of the instructor.

### 172. Epistemology (4)

A course dealing with topics in the theory of knowledge, such as the nature of knowledge and belief, the justification of knowledge claims, knowledge of the external world, knowledge of other minds, the nature of perception, memory.

### 180. Senior Colloquium (4)

A seminar dealing with the examination of specific philosophical problems and topics, designed for seniors of high standing who major in philosophy. *Prerequisites: senior status and permission of department.* May be repeated for credit.

### 198. Directed Group Study (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. (P-NP grades only.)

### 199. Individual Study (4)

*Prerequisite: permission of departmental adviser* (P-NP grades only.)

## Graduate

### 200. Proseminar in the History of Philosophy (4)

A course of studies designed to prepare students for advanced work in seminars.

### 201. Greek Philosophy (4)

A study of selected authors and texts from the history of ancient Greek philosophy.

### 202. Hellenistic and Roman Philosophy (4)

Selected topics drawn from the major philosophical schools in the Hellenistic and Roman periods, among them Stoicism, Epicureanism, Skepticism, and Neo-Platonism.

### 203. Medieval Philosophy (4)

A study of representative writings from one or more of the major philosophical movements of the Middle Ages.

### 204. Early Modern Philosophy (4)

A study of selected philosophers of the sixteenth and seventeenth centuries as, for example, Descartes, Spinoza, Leibniz, and Locke.

### 205. Eighteenth-Century Philosophy (4)

A study of major philosophical texts of the period such as Kant's *Critique of Pure Reason* and Hume's *Treatise of Human Nature*.

### 206. Nineteenth-Century Philosophy (4)

A selective study of major philosophical texts of the period with emphasis on such figures as Hegel, Marx, Nietzsche, Mill and others.

### 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.

### 210. Philosophy of Logic (4)

A study of major topics in logical theory, together with a close examination of contributions by different philosophical schools to the analysis of central issues in philosophy of logic. *Prerequisites: Philosophy 110 or equivalent.*

### 211. Advanced Symbolic Logic (4)

An intensive examination of propositional and quantificational logic as a basis for further deductive development. *Prerequisites: Philosophy 110 or equivalent.*

### 212. Philosophy of Science (4)

An examination of such problems as concept formation, the explanation of law, the role of logic and mathematics in the sciences.

### 215. Introduction to Formal Semantics (4)

A general introduction to theories of sense and reference, comprising a comparative approach to Fregean, Russellian and Tarskian semantic techniques, with emphasis on semantic primitives and the general structure of theories of truth.

### 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.

### 235. Philosophy of Language (4)

Examination of some current philosophical and scientific views on the nature, use and acquisition of natural languages.

### 250. Aesthetics (4)

An exploration of problems in 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.

### 260. Philosophy of Religion (4)

A study of the philosophical foundations of religious experience, including the nature of belief and knowledge, faith and reason, God and the character and meaning of religious commitment.

### 262. History of Law in Philosophical Perspective (4)

Course will study the way in which the historical development of the western legal system reflects issues raised in the literature of legal philosophy. Students will read works of legal philosophy in conjunction with studies of the history of legal doctrines and institutions.

### 264. Philosophy of History (4)

An examination of basic concepts, categories, and presuppositions of historical experience in the context of representative philosophies of history.

### 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.

### 272. Theory of Knowledge (4)

An examination and critique of representative theories of mind, reality, knowledge and perception.

### 280. Department of Philosophy Colloquium (4)

Special topics submitted by visiting philosophers for critical appraisal by staff and students. (Satisfactory/Unsatisfactory grades permitted.)

### 285. Seminar on Special Topics (4)

A seminar for examination of specific philosophical problems. (Satisfactory/Unsatisfactory grades permitted.)

### 290. Directed Independent Study (4)

Supervised study of individually selected philosophical topics. May be repeated for credit. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades optional.)

### 295. Research Topics (1-12)

Advanced, individual research studies under the direction of a member of the staff. May be repeated for credit. *Prerequisite: permission of graduate adviser.* (Satisfactory/Unsatisfactory grades optional.)

### 299. Thesis Research (1-12)

(Satisfactory/Unsatisfactory grades permitted.)

### 500. Apprentice Teaching (1-4)

A course designed to satisfy the requirement that graduate students should serve either as teaching assistants in philosophy, or in the Humanities Program in Revelle College, or in the Writing Programs offered by the various colleges. Each Ph.D. candidate must teach the equivalent of quarter-time for three academic quarters. (Satisfactory/Unsatisfactory credit only.)

## Physical Education

OFFICE: Gymnasium

### Supervisors:

Howard F. Hunt, Ph.D. (*Chairman*)  
John H. Douglass, Ph.D.  
Theodore W. Forbes, Ed.D.  
Frank N. Vitale, M.A.  
Bert N. Kobayashi, Ph.D.  
James R. White, Ph.D.

### Associate Supervisors:

John W. Cates, M.A.  
J. Charles Millenbah, M.A.  
J. Barry Cunningham, M.A.  
Andrew Skief, Jr., M.S.

### Assistant Supervisors:

Patti Butterfield, M.F.A.  
Marlene G. Cloward  
Diana E. Dann, M.S.  
Paul J. Giotta, B.A.  
Margaret C. Marshall, M.F.A.  
Robert C. Moss, M.S.  
Walter W. Muryas, B.A.  
Patricia A. Rincon, M.F.A.  
Judith M. Sweet, M.S.  
Benso Tsuji  
W. M. Vander Griend, M.A.  
Tad Yamaguchi, A.A.

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"Activity" and "participation" describe the many programs of the Department of Physical Education. Modern facilities provide an activity center for class sections in a wide variety of coeducational lifetime activities, casual recreation ("doing your own thing") and organized competition for the novice or expert through intramural or intercollegiate competition. Gymnasiums, natatorium, tennis courts, and playing fields are a hub of campus life for all students who want to learn a new sport, perfect a skill, join fellow students in an activity club, or compete against fellow students or those from neighboring colleges. All students are entitled to locker and towel issue on a quarterly basis and can use all facilities which also include a golf driving range and sailing on Mission Bay.



## Learning to Be Active and Fit

Courses listed below offer a wide variety of choices in aquatics, lifetime sports, fitness for living, combatives, and officiating. Most classes meet twice weekly for one-hour sessions with sections offered according to skill levels. Enrollment is voluntary and students are encouraged to sign up for one or more courses of their choice.

## Participating in Activities

**Intramural Sports** Intramural sports provide a diversity of sports in which all students may participate each quarter. Intramurals are the most popular activity on campus and are perhaps the best method for meeting new friends. Leagues are arranged by the competitive desires of the participants and thus range from the highly skilled to those merely out for exercise and fun with little or no regard for winning. The emphasis is toward coed sports (men and women on the same team) as the department believes the social and physical aspects are equally important. Activities include men's and coed competition in flag football, innertube water polo, floor hockey, volleyball, basketball, soccer, softball, and tennis. Come and join the fun.

**Recreational Clubs** The recreational athletic clubs play a varied and active role in the students' life on campus. At present there are twenty-four clubs open for participation. These include: aikido, archery, Ballet Folklorico, ballroom dance, belly dance, conditioning, fencing, frisbee, gymnastics, handball/raquetball, horseback riding, Israeli dance, jazz dance, judo, karate, outing, SCUBA, snow skiing, soaring, surfing, table tennis, tennis, weight lifting and yoga (hatha).

**Special Events** The campus special events program provides a quarterly schedule of approximately six to seven major and recreation-oriented special events that are designed to attract students from all segments of the campus. Events are selected, approved and evaluated by a student committee under the direct supervision of a recreation supervisor. Major campus-wide activities include dances, carnivals, festivals, casino nights, etc., while recreation-oriented events include bike races, cross-country runs, over-the-line tournaments, superstars all-sports competition, etc.

**Aquatic Sports** The Mission Bay Aquatic Center on Santa Clara Point, Mission Bay, is only seven miles from campus. Classes are offered in waterskiing, sweep rowing, surfing, SCUBA diving and sailing (hobie cats, sloops and cat rigged). Recreational sailing, waterskiing and rowing are also available.

**Casual Recreation** Many hours are available to use gymnasium and pool facilities. Noontime and evening volleyball, badminton, or basketball games are popular, and the sauna is open from 8 a.m. to 10 p.m. daily. There is a golf driving range within bicycling distance of the main campus and a sailing facility on Mission Bay at Santa Clara Point.

**Intercollegiate Athletics** Students possessing a high degree of proficiency and interest in sport skills may compete against other Southern California colleges and universities in regularly scheduled men's and women's athletic events. Presently thirty-one UC San Diego teams represent the campus. Participation is entirely voluntary; students are encouraged to compete for the pleasure of participation. For further information, contact the intercollegiate office.

## Courses

Registration for physical education classes takes place along with regular academic enrollment, except intercollegiate teams, for which students must check with the intercollegiate office. Consult the *Schedule of Classes* issued by the Office of the Registrar for specific course offerings. Not all courses are offered each quarter. Several levels of skill proficiency follow:

- A — introductory level (intended for those who have never participated in the activity);
- B — advanced beginning level (continued instruction and practice on basic skills);
- C & D — intermediate level (improvement of skill techniques and/or game strategy);
- E — advanced level (for skilled participants with instruction to perfect techniques and sharpen competitive strategy.)
- G — courses specially designed for the physically handicapped student.

### 1A-B-C. Swimming (0)

Designed to permit students to gain or improve swimming strokes, techniques, and aquatic skills on an individual basis.

### 2. Synchronized Swimming (0)

Designed for advanced swimmers. Fundamentals in individual and group water ballet. Opportunity for public presentations.

### 3. Lifesaving (0)

The American Red Cross Senior Lifesaving Certificate will be awarded to students satisfactorily completing the course. Emphasis is placed upon knowledge and skills to prepare one to save his or her own life, or the life of another in an emergency. *Prerequisite: intermediate swimming or consent of instructor.*

### 4. Water Safety Instruction (0)

Standard American Red Cross course to train authorized water-safety instructors to teach A.R.C. swimming and life-saving courses thereafter. *Prerequisites: only holders of the A.R.C. Senior Lifesaving Certificate are eligible to register. Students must pass Part I in order to qualify for Part II.*

### 7A-D. Skin-Diving (0)

Techniques of skin-diving and practical experience. Introductory course will include lectures on equipment, environment and principles of skin-diving with pool training. Advanced course will emphasize practical experience in ocean dives. *Prerequisite: consent of instructor.*

### 8C-D. Scuba Diving (0)

Intermediate course exposes basic certified scuba diver to all aspects of scuba diving to inspire self-confidence and enhance enjoyment of this activity. Advanced course assists more experienced scuba divers in gaining proficiency in skills and knowledge about diving and the ocean environment. *Prerequisites: current certification as a scuba diver under NAUI, SIO/UC, NASDS, or L.A. County, or consent of instructor. Students must furnish all basic scuba gear.*

### 9C. Intermediate SCUBA Diving (0)

Course is designed to propel the beginning newly-certified inexperienced SCUBA diver safely through the awkward first ten dives in the ocean environment. It will introduce the diver to many aspects of SCUBA so as to inspire self-confidence and to enhance enjoyment. *Prerequisites: current certification as SCUBA diver under one of the following: NAUI, YMCA, NASDS, SIO/UC, SCIP, LA County, or consent of instructor. Students must furnish all basic gear.*

### 9E. Advanced SCUBA Diving (0)

A course designed to orient the intermediate SCUBA diver to the La Jolla oceanic environment at depths of forty to one hundred feet — submarine canyon diving and boat diving in the La Jolla/Del Mar/Solana Beach/Point Loma waters. *Prerequisites: successful completion of the UC San Diego Intermediate SCUBA course, or equivalent. Students must furnish all gear.*

### 9F. Master Scuba (0)

This course provides the advanced SCUBA diver with the methods of beachmastering, divemastering, boatmastering, techniques of deep diving, detailed knowledge of pertinent SCUBA topics, and insight into auxiliary activities associated with SCUBA. *Prerequisites: successful completion of the UC San Diego advanced SCUBA diver course, student must furnish all gear.*

### 10A-B. Surfing (0)

Surfing techniques taught in pool including mounting, sitting, paddling and turning surfboard, safety techniques. Only after mastery of pool techniques will student be allowed to surf in ocean. *Prerequisites: ability to swim 400 yards, basic lifesaving skills and UC San Diego beginning swimmer's certificate.*

### 10C. Surfing, Intermediate (0)

A continuation of PE 10A and 10B, for the more advanced student. Section 10C includes instruction in more advanced techniques and skills. *Prerequisites: same as 10A & B, plus performance at advanced level or satisfactory completion of 10A or 10B.*

### 11A-B-C-D. Sailing (0)

Course is designed to make sailing an easily understood sport and provide students an opportunity for a lifetime of stimulating and relaxing activity. Special emphasis is placed on nautical terms, water and safety rules, demonstrations and practical exercises in rigging and boat handling. (Offered at Mission Bay Aquatic Center.)

### 14A-B-C-D-E. Tennis (0)

Instruction in the fundamentals of the serve, strokes, volley, rules, scoring, tactics and court strategy.

### 15A-B-C-D-E. Badminton (0)

Instruction in the fundamentals of the serve, strokes, volley, rules, scoring, tactics and court strategy. Designed to allow both men and women students, novice and expert, an opportunity to participate.

### 16A-B-C-D-E. Volleyball (0)

An emphasis on fundamental skills in serving, spiking, blocking, and teamwork techniques. Opportunity for team competition.

### 17A-C. Golf (0)

Instruction and practice in the fundamentals of golf. Emphasis is placed upon golf swing and techniques of using all clubs under varying conditions.

### 18A-C-D. Cycling (0)

The wonderful world of the bicycle builds the exercise habit into daily routines. Proper riding techniques, care, maintenance, and safety considerations add to the extra thrills of exploring backroads, byways and paths in a fifty-mile radius of campus or overnight trips for advanced cyclists.

### 19. Squash (0)

Introduction to the sport, including instruction in fundamental skills and techniques, individual and group practice, and opportunities for competition.

### 20. Handball (0)

Instruction in fundamentals of the serve, rally and court strategy. Opportunity for singles and doubles competition.

### 21A. Modern Dance (0)

Opportunities in dance techniques. Pattern variations will be discovered in time, space and design. Students will explore improvisation and composition. These, woven together with the technical skills, will produce a means of communication through a controlled body.

## Physics

### 21C. Intermediate Modern Dance (0)

The content of the intermediate modern class is based on the language of body movement. All types of movement are explored and re-explored, developing mind and body coordination and kinetic resources. Various techniques are taught in the styles of Jose Limon, Merce Cunningham, Martha Graham, Doris Humphrey, Eugene Loring, and Margaret Marshall (instructor). *Prerequisites: Beginning Modern Dance and or instructor's approval*

### 22A. Jazz Dance (0)

Emphasis will be on technical skills of jazz dance including current dance trends, general rhythmic exercises, isolations, turns, locomotor combinations, and dance sequences to the accompaniment of contemporary rock and jazz music. Students will have the opportunity for simple improvisation and composition.

### 22C. Jazz Dance—Intermediate (0)

A dance technique class in which the student learns the contemporary and lyrical styles of jazz dance to rhythmical music, working in individual and group situations, and publicly performing the final dance at the end of the quarter. Students learn techniques and body control, advancing toward performance. *Prerequisites: Beginning Jazz Dance and or instructor's approval*

### 23A-B-C. Ballet (0)

An introduction to classical ballet. An experience in a disciplined form of dance which is essential to dancers before attempting modern and contemporary dance styles. An opportunity for students to be trained in ballet with emphasis on technique, theory, music, projection, and terminology.

### 24. Folk Dance (0)

The course will give students an understanding of the background of folk dancing by developing an awareness of the characteristics, styles, step patterns, formations, and quality of movement of each country or area. Emphasis will be placed on line, circle, and couple dances from Israel, Greece, Turkey, Italy, Scotland, Rumania, and Czechoslovakia.

### 25A-B-C. Tap Dance (0)

Emphasis on rhythm, coordination, timing, and style. Beginning course will teach basic time step, soft shoe, fast buck rhythms and simple routines suitable for performance. Advanced-beginning will include more intricate rhythms such as riffs, pull backs and wings. Intermediate will include more complicated steps and rhythms.

### 26A-B-C. Social Dance (0)

Course will include 4-6 basic variations of foxtrot, tango, waltz, samba, rumba and swing. Includes discussions and instruction by students about current trends in social dance, e.g. hustle, bus stop.

### 28. Elements of Mind/Body Movement (0)

Designed to acquaint students with mechanical and mental relationships needed to produce coordinated movement. Includes mechanics of body coordination, mind dynamics, and training.

### 29. Soccer (0)

Instruction in fundamentals. Skills, game strategy and team play are included.

### 30. Softball Skills and Strategies (0)

Course instruction will include demonstrations, handout materials, films, drills, strategy lectures and supervised play. Special emphasis will be placed on cultivating visualization, a process for facilitating major skill improvement in a short period of time.

### 31A-B-C. Psychology of Officiating I, II and III (0)

Emphasis on proper use of officiating mechanics and effective interpreting of basketball and baseball rules. Provides students with positive mental attitude through exposure to dynamics of self-motivation.

### 32. CPR (0)

Basic life support, emergency first aid procedures in respiratory and cardiac arrest and proper applications of cardiopulmonary resuscitation.

### 33A-C. Conditioning—Coed (0)

Designed to meet individual needs of each student enrolled in class, through personal evaluation of diet, measurements and exercise program. Students who have already taken a class in physical conditioning, weight training, or who can run one or two miles, qualify for the intermediate course. Intermediate conditioning includes cardio-vascular efficiency, weight training, isometrics, circuit training, cross country runs, etc.

### 34. Weight Training (0)

Participation in individual exercise routines, running, weight and strength exercises to increase general fitness, endurance and muscular efficiency.

### 35. Exercise, Nutrition and Weight Control (0)

Theory and practice of regular exercise and nutritional needs for development, maintenance and continuation of good health.

### 37. Rhythmical Conditioning (0)

Combines vigorous rhythmical exercises with the challenge of individual choreography. It includes a variety of musical arrangements and is individually adapted for low, medium, and high levels of participation.

### 38A-B-C-D-E. Basketball (0)

Instruction in fundamentals is combined with opportunities for team play. Some pre-knowledge of the game is desirable since emphasis will be on vigorous competition.

### 40A-B-C-D. Gymnastics (0)

Fundamentals of gymnastics, including instruction on the use of apparatus and tumbling routines.

### 43. Gymnastics "Circus Stunts" (0)

Advanced gymnastics techniques involving "circus-type" activities including trampolining, tumbling, vaulting, juggling, free exercise, unicycling and riding the Balla Rolla Board. Particular stress will be placed upon individual cardio-respiratory endurance, agility, strength, coordination and kinesthetic balance.

### 46A-C-E. Fencing, Epee (Electric) (0)

Classical French style, brief history, electrical equipment and safety, protocol and basic technique. Attacks, both simple and compound; defenses, simple and compound; strategy and directing of bouts using French terminology. (Not offered in 1978-79.)

### 47A-C-D. Fencing, Foil (0)

Classical French style protocol, on guard, advance and retreat, attacks (simple and compound), parries (simple and compound), strategy and basic rules.

### 48C-D. Fencing, Sabre (0)

Designed for the intermediate and advanced student of fencing to continue training in classical Hungarian sabre-style. (Not offered in 1978-79.)

### 49. Fencing, Theatrical (0)

Fencing techniques useful to students involved in performing arts. Emphasis will be upon choreography and dramatic presentation.

### 50A-B-C-D. Karate (0)

Instruction and training in the fundamentals of Sho-to-kan karate, emphasizing: basic stances and techniques; "kata," ancient stylized sequences of defensive and counter-offensive movements; sparring, a graded progression from strictly controlled defense and counter-attack situations to free sparring for competition.

### 52A-C. Judo (0)

Includes origin and development of judo, nature and basic rules of judo contests, basic techniques and terminology. Intermediate and advanced judo emphasizes improvement of skills and intraclass competition.

### 53A-C. Aikido (0)

Instruction and training in fundamentals of aikido. Provides a non-aggressive, non-competitive art of self-defense for men and women through development of individual sense of balance, timing and mental attitude.

### 54A-D. First Aid (0)

Standard and advanced course. Upon successful completion of the course, the student is awarded a Red Cross certificate. Prepares the student to render effective first aid in treatment of wounds, burns, fractures, dislocations, artificial resuscitation and other emergency conditions. Laboratory practice on splints and bandaging.

### 57. A-B-C. Self Defense I, II, III (0)

Designed to familiarize students, women particularly, with methods of self defense. Mainly directed toward students not involved in martial arts. Deals with psychology of self-defense situation. Students may enter at any level.

### 59A-G. Applied Rehabilitation for Post Muscle and Joint Trauma (0)

The course is to provide injured students (students with muscle and joint trauma) with specific information and instruction

concerning the nature of tissue injury, the rehabilitative process and preventive measures useful in avoiding or reducing further injury. *Prerequisite: referral from attending physician*

### Intercollegiate Athletics (0)

A wide variety of intercollegiate sports activities is offered to all undergraduate students. The program is designed for those who possess a high degree of proficiency in sport skills. Competition with other colleges and universities is scheduled.

Not all teams listed below have formed. Additional information is available in the intercollegiate office.

#### 61. Baseball

#### 62. Basketball

#### 63. Crew

#### 64. Cross Country

#### 65. Fencing

#### 66. Golf

#### 67. Gymnastics

#### 68. Karate

#### 69. Rugby

#### 70. Sailing

#### 71. Snow Skiing

#### 72. Soccer

#### 73. Surfing

#### 74. Swimming

#### 75. Tennis

#### 76. Track and Field

#### 77. Volleyball

#### 78. Water Polo

#### 79. Wrestling

#### 80. Badminton

#### 81. Field Hockey

#### 82. Lacrosse

#### 83. Cycling

#### 84. Softball

## Physics

OFFICE: 3426 Mayer Hall, Revelle College

### Professors:

Keith A. Brueckner, Ph.D.  
E. Margaret Burbidge, Ph.D. (*Astronomy*)  
Geoffrey R. Burbidge, Ph.D. (*Astrophysics*)  
Joseph C. Y. Chen, Ph.D.  
George Feher, Ph.D.  
William R. Frazer, Ph.D.  
John M. Goodkind, Ph.D.  
Robert J. Gould, Ph.D.  
Francis R. Halpern, Ph.D.  
Walter Kohn, Ph.D.  
Norman M. Kroll, Ph.D.  
Leonard N. Liebermann, Ph.D.  
Ralph H. Lovberg, Ph.D.  
Shang-Keng Ma, Ph.D.  
John H. Malmberg, Ph.D.  
George E. Masek, Ph.D.  
Bernd T. Matthias, Ph.D.  
Carl E. McIlwain, Ph.D.  
William A. Nierenberg, Ph.D.  
Thomas M. O'Neil, Ph.D.  
Laurence E. Peterson, Ph.D.

Oreste Piccioni, Ph.D.  
 Sheldon Schultz, Ph.D.  
 Lu Jeu Sham, Ph.D.  
 Harry Suhl, Ph.D.  
 Robert A. Swanson, Ph.D.  
 William B. Thompson, Ph.D.  
 John C. Wheatley, Ph.D.  
 David Y. Wong, Ph.D. (*Chairman*)  
 Nguyen-Huu Xuong, Ph.D.  
 Herbert F. York, Ph.D.

**Associate Professors:**

Donald R. Fredkin, Ph.D.  
 S. Maurice Montal, M.D., Ph.D.  
 Wayne Vernon, Ph.D.  
 M. Brian Maple, Ph.D.

**Assistant Professor:**

Oscar Lumpkin, Ph.D.  
 H. Eugene Smith, Ph.D.

\* \* \*

**The Major Program** The upper-division program 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 course 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 with the modern view of atomic and some aspects of sub-atomic 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 particles physics.

A grade-point average of 2.0 or higher in the upper-division major program is required for graduation.

The following courses are required for the physics major:

- (a) Lower division:  
 (1) Physics: Natural Science or Physics 2A-B-C-CL; or Physics 3A-B-C-CL-D-DL; or Science 4A-B-C and 4BL or 4CL.  
 (2) Chemistry: Natural Science 2D-DL-F-FL; or Science 3A-AL-B; or Chemistry 4A-AL-B; (or upper-division chemistry course with associated laboratory).  
 (3) Mathematics: Mathematics 2D-E or 2DA\*-EA\*.

\*Strongly recommended

- (b) Upper division:  
 (1) Physics: Physics 100A-B-C, 110A-

B, 120A-B, 130A-B, 140A-B, and two additional laboratory courses from the following group: 120C, 131, 132, 170, or 199 with departmental approval.

- (2) Mathematics: Mathematics 110.  
 (3) Restricted Electives: Three upper-division or graduate courses in natural sciences or mathematics, subject to departmental approval; one elective must be in mathematics (Math 120A recommended).

## (c) Suggested Schedule:

FALL	WINTER	SPRING
<b>Junior</b>		
Physics 100A	Physics 100B	Physics 100C
Physics 110A	Physics 110B	Physics 120A
Restricted Elective	Math 110	Restricted Elective
<b>Senior Year</b>		
Physics 120B	Physics 120C	Physics 132 or 170
Physics 130A	or 131	Restricted Elective
Physics 140A	Physics 130B	
	Physics 140B	

**Physics Major with Specialization in Biophysics**

The upper-division program 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 departmental adviser for biophysics.

The following courses are required for the physics major with specialization in biophysics:

- (a) Lower division:  
 (1) Physics: Natural Science or Physics 2A-B-C-CL; or Physics 3A-B-C-CL-D-DL; or Science 4A-B-C and 4BL or 4CL.  
 (2) Chemistry: Natural Science 2D-DL-F-FL; or Science 3A-AL-B-BL; or Chemistry 4A-AL-B-BL.  
 (3) Biology: Natural Science 2E.  
 (4) Mathematics: Mathematics 2D-E or 2DA-EA.  
 (b) Upper division:  
 (1) Physics: Physics 100A-B-C, 110A, 120A-B, 130A-B, 153.  
 (2) Chemistry: Chemistry 131, 140A-B, 143A.  
 (3) Biology: Biology 101, 102, 105, 111, 114.  
 (4) Mathematics: Mathematics 110.  
 (5) Restricted Elective: Mathematics 120A or Frontiers of Science 128.

## (c) Suggested Schedule:

FALL	WINTER	SPRING
<b>Junior Year</b>		
Physics 100A	Physics 100B	Physics 100C
Physics 110A	Math 110	Restricted Elective
Chemistry 140A	Chemistry 140B	Physics 120A
Chemistry 143A	Biology 101	
<b>Senior Year</b>		
Physics 130A	Physics 130B	Biology 102
Physics 120B	Biology 111	Biology 114
Biology 105	Chemistry 131	Physics 153

**Physics Major with Specialization in Biophysics-Premedical**

The upper-division program 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.

The following courses are required for the physics major with specialization in biophysics-premedical:

- (a) Lower division:  
 (1) Physics: Natural Science or Physics 2A-B-C-CL; or Physics 3A-B-C-CL-D-DL; or Science 4A-B-C and 4BL or 4CL.  
 (2) Chemistry: Natural Science 2D-DL-F-FL; or Science 3A-AL-B-BL; or Chemistry 4A-AL-B-BL.  
 (3) Biology: Natural Science 2E.  
 (4) Mathematics: Mathematics 2D-E or 2DA-EA.  
 (b) Upper division:  
 (1) Physics: 100A-B-C, 110A, 120A-B, 130A, 153.  
 (2) Chemistry: Chemistry 126 or 131, 140A-B, 143A.  
 (3) Biology: Biology 101, 105, 111, 114, 117.  
 (4) Restricted Elective: upper-division or graduate course in natural sciences or mathematics.

## (c) Suggested Schedule:

FALL	WINTER	SPRING
<b>Junior Year</b>		
Physics 100A	Physics 100B	Physics 100C
Physics 110A	Biology 101	Physics 120A
Chemistry 140A	Chemistry 140B	Chemistry 143A
		Biology 105
<b>Senior Year</b>		
Physics 120B	Chemistry 126 or 131	Physics 153
Physics 130A	Biology 114	Biology 117
Biology 111	Restricted Elective	

**Physics Major with Specialization in Earth Sciences**

The upper-division program consists of the standard physics major augmented by Earth Sciences 101, 102, 103, 120, and SIO 256A. If necessary, the senior physics laboratory requirements may be modified by arrangement with the department. See "Earth Sciences."

**Engineering Physics Program** The engineering physics program is offered jointly by the Departments of Physics, AMES, and APIS and is administered by the Department of APIS. See "APIS, Engineering Physics Program."

**Minor in Physics** Students may arrange minor programs or programs of concentration in physics by consulting with the Department of Physics.

## The Graduate Program

The Department of Physics offers curricula leading to the Master of Science and Doctor of Philosophy degrees in physics. For students specializing in the area of biophysics, the degree Ph.D. in Physics (Biophysics) is offered.

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 written examination for Ph.D. students. A list of acceptable courses is available in the Department of Physics office. There is no foreign language requirement.

**Doctoral Degree Program** The Ph.D. program consists of three components: graduate courses, apprenticeship in research, and thesis research. In addition, opportunities for teaching are provided. The department has developed a flexible program which provides a broad, advanced education in physics while at the same time giving students opportunity for emphasizing their special interests.

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. After two years of graduate study, or earlier, they 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. Typically, thesis work takes two or three years. There is no foreign language requirement.

**Entrance Testing** An entrance test covering undergraduate physics is given to entering graduate students during registration week, for the purpose of enabling the faculty to give them better guidance in their graduate work. Performance on this test has no bearing on the students' status in graduate school.

**First-Year Written Examination** Students are required to take a written examination after completing one year of graduate work at UC San Diego. Biophysics students take this examination after completing two years of graduate work. The examination is on the level of material usually covered in undergraduate courses and the first-year graduate physics courses listed below. It 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.

## First-Year Graduate Courses

### Fall:

Physics 200A (Theoretical Mechanics)  
Physics 203A (Adv. Classical Electrodynamics)  
Mathematics 210A (Mathematical Methods)

### Winter:

Physics 200B (Theoretical Mechanics)  
Physics 212A (Quantum Mechanics)  
Mathematics 210B (Mathematical Methods)

### Spring:

Physics 203B (Adv. Classical Electrodynamics)  
Physics 212B (Quantum Mechanics)  
Mathematics 210C (Mathematical Methods)

**Second-Year Oral Examinations** Students are required to take two oral examinations after completing two years of graduate work or earlier. Biophysics students take these examinations no later than the spring of their third year of graduate work.

**(1) General** The general oral examination, administered by a faculty committee, tests general mastery of advanced physics. Students are asked to indicate areas in which they have special competence and are questioned more intensively in these areas. The examination is offered twice a year, at the beginning of the fall and spring quarters, and lasts approximately one hour.

This examination will be waived for students who obtain credit (C or better) in six advanced courses selected from the second-year physics graduate courses listed below, provided that they obtain at least a 3.0 average in five out of the six. The selection must include all of Group I. Biophysics students select eighteen units of courses from two of the five categories under courses related to life sciences listed below. A list of acceptable courses within these categories is available in the department office.

## Second-Year Physics Graduate Courses

### Group I (3)

Physics 212C (Quantum Mechanics) fall  
Physics 210A (Statistical Mechanics) fall  
Physics 210B (Statistical Mechanics) winter

### Group II: (3)

Physics 206 (Biophysics) winter  
Physics 211 (Solid State Physics) spring  
Physics 213 (Theoretical Nuclear Physics) winter  
Physics 215 (High Energy Nuclear Physics) spring  
Physics 216 (Atomic and Molecular Theory) fall  
Physics 218A (Plasma Physics) winter  
Physics 219 (Astrophysics) fall

## Courses Related to Life Sciences

Category 1 Biochemistry  
Category 2 Molecular Biology  
Category 3 Genetics  
Category 4 Physiology  
Category 5 Cell Biology

**(2) Oral Presentation of a Topic** This examination is held two weeks following the

general oral examination and lasts approximately one hour. Three topics of current interest in physics or biophysics, together with relevant references, are made available to students who present to a faculty committee a one-half hour talk on one of the topics, followed by approximately one hour of questioning related to the topic. The oral examinations may be repeated once the next time they are offered.

**Qualifying Examination** After students have passed the departmental examinations, they should obtain a faculty research supervisor. When they are ready to demonstrate their ability to engage in thesis research, they may take the qualifying examination.

**Thesis Defense** When students have completed their theses, they are asked to present and defend them before their doctoral committees.

**Advanced Courses and Seminars** In addition to the above-listed basic courses, the department offers a weekly general departmental colloquium, advanced courses for students doing specialized research, and seminars in the main departmental areas of interest. Students are strongly urged to enroll for credit in appropriate advanced courses and seminars.

**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 office of their intention no later than the first week of the course.

## Courses

### Lower Division

Most of the lower-division physics courses are incorporated in the science sequences of the colleges. The Department of Physics is responsible for the teaching of physics in the natural science sequence of Revelle College, the science and technology sequence of Third College, and the scientific perspectives and the materials science programs of Warren College. (The physics part of the science sequence of Muir College, 4A-B-C, is the responsibility of the Department of Applied Physics and Information Science.)

The Physics 2 sequence has the same syllabus as the Natural Science 2 sequence but begins one quarter earlier; it is primarily for life science majors. The Physics 3 sequence is particularly recommended for students majoring in physical science or engineering.

### NS1D-1DL-1E-1EL. Physics

See Course Listings: "Natural Sciences."

### NS2A-2B-2C-2CL. Physics

See Course Listings: "Natural Sciences."

### 2A. Physics (4)

An introduction to natural phenomena which can be understood in terms of the physical sciences is followed by the study of particle motion. Applications are made to astronomy and to the structure of matter. *Prerequisites: Mathematics 2A and concurrent registration in Mathematics 2B.* (F)

**2B. Physics (4)**

A continuation of Physics 2A to the electrical effects of stationary and moving charges, time-dependent fields, and waves. *Prerequisites: Mathematics 2B and concurrent registration in Mathematics 2C.* (W)

**2C. Atomic Physics (4)**

The study of waves is followed by an introduction to the quantum theory as applied to atoms and their radiation. The exclusion principle is used to study the chemistry and physics of atoms. *Prerequisites: Mathematics 2C and concurrent enrollment in Physics 2CL.* (S)

**2CL. Physics Laboratory (1)**

Introduction to principles of laboratory measurements and analysis of data. Experiments in electromagnetism, optics, atomic physics, and solid state physics. Three-hour laboratory is taken concurrently with Physics 2C. (S)

**3A. Physics (4)**

First quarter of a physics sequence which provides a solid foundation in physics; it is particularly recommended for students majoring in physical science or engineering with a strong high school mathematics and physics background. Measurement, vectors, motion in one and two dimensions, particle dynamics, work and energy, conservation laws, collisions, rotational kinematics and dynamics, harmonic motions, relativity. *Prerequisite: Mathematics 2A or 2AH, or equivalent.* (W)

**3B. Physics (4)**

Electric charge, Coulomb's law, Gauss' law. Electric potential. Conductors in electrostatic field. Electric current, Ohm's law. Relativity and the field of a moving charge. Magnetic fields. Electromagnetic induction, magnetic energy, AC circuit, Maxwell's equation. Electric and magnetic properties of matter. *Prerequisite: Physics 3A, Mathematics 2B or 2BH or equivalent.* (S)

**3C. Physics (4)**

Introduction to oscillations and waves. Free oscillations, forced oscillations, traveling waves, reflection, pulses and wave packets, waves in two and three dimensions, polarization, interference and diffraction. *Prerequisites: Physics 3B, Mathematics 2C or 2CH or equivalent, and concurrent enrollment in Physics 3CL.* (F)

**3CL. Physics Laboratory (1)**

Statistical analysis of laboratory data. Experiments study electric and magnetic fields in space and in circuit elements. Three-hour laboratory is taken concurrently with Physics 3C. (F)

**3D. Physics (4)**

Introduction to quantum physics. Order of magnitude of microscopic quantities, energy levels, photons, material particles, the uncertainty principle, Schrödinger's equation, stationary states, elementary particles. *Prerequisites: Physics 3C and concurrent enrollment in Physics 3DL.* (W)

**3DL. Physics Laboratory (1)**

Introduction to principles of laboratory measurements and analysis of data. Interference and diffraction of waves are studied in context of acoustics, optics, and microwaves. Three-hour laboratory is taken concurrently with Physics 3D. (W)

**5. The Skies (4)**

Introductory descriptive (non-mathematical) account of modern astronomy, with emphasis on what is observed and on the development of ideas. The earth's place in the universe, the sun, the birth, life and death of stars, galaxies and cosmology. This course, Earth Sciences 1 (The Oceans), and APIS 35: Earth Sciences 4 (The Nature of the Earth) form a three-course sequence for general interest in science. (S)

**Science and Technology 10C. Physics**

See Course Listings: "Science and Technology"

**Science and Technology 11C. Physics**

See Course Listings: "Science and Technology"

**Science and Technology 15A-B-BL-C-CL. Physics**

See Course Listings: "Science and Technology"

**31A. The Perspective of Physics (4)**

A qualitative introduction to the basic ideas of macroscopic physics: mechanics, conservation laws, basic laws of thermodynamics, fields, gravitation and planetary motion, electricity and magnetism, electromagnetic waves. Introduction to relativity. (F)

**31B. The Perspective of Physics (4)**

A qualitative introduction to the basic ideas of microphysics. The perfect gas — ideas of kinetic theory, physics of atomic systems, electrons and their properties — origins of quantum mechanics, basics of quantum mechanics, atomic structure — origins of chemical behavior — nuclei and elementary particles. (W)

**31C. The Perspective of Physics (4)**

A qualitative introduction to the frontier problems in biophysics and the current approaches to their solution. Emphasis on the fundamental physical principles which govern complex living processes from the molecular and cellular phenomena to the animal and human systems. (S)

**Upper Division**

(See also Course Listings: "Frontiers of Science")

**100A. Electromagnetism (4)**

Coulomb's law, electric fields, electrostatics; conductors and dielectrics; steady currents, elements of circuit theory. Four hours lecture. *Prerequisite or co-registration: Mathematics 2D.* (F)

**100B. Electromagnetism (4)**

Magnetic fields and magnetostatics, magnetic materials, induction; AC circuits; displacement currents, development of Maxwell's equations. Three hours lecture. *Prerequisite: Physics 100A; prerequisite or co-registration: Mathematics 2E.* (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)

**110A. Mechanics (4)**

Mechanics of systems of particles; conservation laws; planetary motion; linear oscillators; statics and dynamics of plane rigid bodies. Four hours lecture. *Prerequisite or co-registration: Mathematics 2D.* (F)

**110B. Mechanics (4)**

Special relativity; Lagrange's and Hamilton's equations; small oscillations of coupled systems; non-inertial frames; general motion of rigid bodies. Four hours lecture. *Prerequisite: Physics 110A; prerequisite or co-registration: Mathematics 2E.* (W)

**120A-B-C. Physical Measurements (4-4-4)**

A laboratory-lecture course covering the basic elements in physical measurements, with emphasis on electronic methods. The lecture will provide an introduction to circuit theory and error analysis. Three hours lecture, four hours laboratory. (S,F,W)

**125. Electrical and Magnetic Materials (4)**

Dielectrics (including ferroelectrics), conductors, semiconductors, liquid crystals, superconductivity, magnetism. Applications of materials in modern technology. *Prerequisite: AMES 11.* (F)

**130A. Quantum Physics (4)**

Atomic physics in the nineteenth century; radioactivity, Rutherford experiments; Bohr model, optical spectra, X-ray spectra, electron spin, vector model. Four hours lecture. *Prerequisites: Mathematics 110 or equivalent, Physics 100A-B-C or equivalent, Physics 110A or other upper-division physical science course.* (F)

**130B. Quantum Physics (4)**

Atomic structure according to wave mechanics; Schrödinger equation for hydrogen-like atoms; Pauli principle, Heisenberg principle; particle in a periodic potential. Four hours lecture. *Prerequisite: Physics 130A.* (W)

**130C. Quantum Physics (4)**

Elementary nuclear physics, quantum mechanics of radiation, elementary particles and scattering. Three hours lecture. *Prerequisites: Physics 100C, 130B.* (S)

**131. Modern Physics Laboratory (2)**

Experiments in radioactivity, X-rays, atomic physics, resonance physics, solid-state physics, etc. One hour lecture, four hours laboratory. *Prerequisite: Physics 130A.* (W)

**132. Modern Physics Laboratory (2)**

Experiments in atomic physics, optics, physical electronics, fluid dynamics, surface physics, etc. One hour lecture, four hours laboratory. *Prerequisites: Physics 130A-B.* (S)

**140A-B. Thermal Physics (4)**

Thermodynamics, including the first, second and third laws, thermodynamic potentials; phase transitions, applications to low-temperature physics, radiation and chemical reactions. Elementary statistical mechanics, probabilistic interpretation of entropy, fluctuation phenomena, transport phenomena. Four hours lecture. *Prerequisite: Physics 110A.* (F,W)

**150. Continuum Mechanics (4)**

Mechanics of continuous media; waves, instabilities, applications to earth sciences, oceanography, and aerodynamics. Three hours lecture. *Prerequisite: Physics 110B.* (S)

**151. Plasma Physics (4)**

Particle motions, plasmas as fluids, waves, diffusion, equilibrium and stability, nonlinear effects, controlled fusion. *Prerequisites: Physics 100A-B, 110A.* (S)

**152. Introduction to Solid-State Physics (4)**

Crystal symmetry, free electron gas, band structure, properties of insulators, semiconductors and metals, atomic diffusion, alloys, electronic transport phenomena. Four hours lecture. *Prerequisites: Physics 130B, 140B.* (S)

**153. Topics in Biophysics (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. *Prerequisite: upper-division standing in biology, chemistry, or physics, or consent of instructor.* (S)

**154. Physics of the Utilization of Solar Energy (4)**

Systematics of solar radiation; collectors; heat engines, heat pumps, refrigeration, thermodynamics; machines systems using low grade heat; classical heat transfer, thermal superconductors; energy storage; photovoltaic effect, miscellaneous topics and applications. *Prerequisite: Physics 140A or equivalent, elementary quantum physics, co-registration in Physics 140B or equivalent.* (W)

**160. Survey of Astronomy and Astrophysics (4)**

Introduction to modern astronomy and astrophysics. Three hours' lecture. *Prerequisite: Physics 110A.* (F)

**161. Astrophysics (4)**

The physics of stars, interstellar matter, and stellar systems. Three hours' lecture. *Prerequisites: Physics 130A, 160.* (W)

**162. Astrophysics (4)**

Continuation of Physics 161. Three hours' lecture. *Prerequisites: Physics 130B, 140B, 161.* (S)

**170. Advanced Laboratory (2)**

Experimental study of a special problem in optics, cryogenics, resonance physics, nuclear physics, etc., using existing apparatus or developing new apparatus or both. Hours by arrangement. *Prerequisites: Physics 131 or 132.* (Not offered in 1978-79.) (S)

**171. Advanced Electronic Laboratory (4)**

Electrical networks, vacuum tube and solid-state electronics, analysis and design, and components. Power supplies. Amplifiers, noise and feedback, oscillators, digital and logic circuits, microwaves and special topics. Emphasis on applications to physical research. Six hours. *Prerequisite: consent of instructor.* (Not offered in 1978-79.) (F)

**180. The Physics of Music (4)**

Acoustics; mechanical production of sound (musical instruments, auditorium design); high-fidelity reproduction (linear transducers and amplifiers, recording and playback devices); electronic production of sound (non-linear amplifiers, sound synthesizers). Three hours' lecture. *Prerequisites: freshman calculus, mechanics, electricity and magnetism.* (S)

**182. Atmospheric Physics and the Physics of Flight (4)**

The application of basic physical principles to a study of the earth's atmosphere and to aircraft flight and operations in the earth's atmosphere. Three hours' lecture. *Prerequisites: Natural Science 1D-E or Natural Science or Physics 2A-B or Science 4A-B-C.* (S)

**195. Physics Instruction (2)**

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

## Physics

regular departmental curriculum. (P:NP grades only.) *Prerequisites: consent of instructor and departmental chairman.* (F,W,S)

### 199. Special Project (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 chairman.* (F,W,S)

## Graduate

### 200A. Theoretical Mechanics (4)

Lagrangian mechanics with application to linear and nonlinear motion in inertial and non-inertial frames. (F)

### 200B. Theoretical Mechanics (3)

Variational principles, Hamilton's equations and Hamilton-Jacobi theory. Special relativity. Rigid body and continuum mechanics. *Prerequisite: Physics 200A.* (W)

### 203A. Advanced Classical Electrodynamics (3)

The boundary value problems of electrostatics and the electrostatics of macroscopic media, magnetostatics and the properties of magnetic materials, currents in extended media, macroscopic properties of superconductors, electromagnetic induction and quasi-static phenomena. Maxwell theory and wave propagation. *Prerequisite: Physics 100C or equivalent.* (F)

### 203B. Advanced Classical Electrodynamics (4)

Application of Maxwell's equations to radiating systems and boundary value problems, such as wave guides and diffraction phenomena; relativistic electrodynamics; radiation by moving charges; classical electron theory; non-linear phenomena. *Prerequisites: Physics 100C or equivalent; Physics 203A.* (S)

### 206. Topics in Biophysics and Physical Biochemistry (3)

Application of physical methods to biochemistry, e.g., X-ray diffraction, optical rotary dispersion and circular dichroism, magnetic resonance. (Same as Chemistry 206.) *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (W)

### 210A-B. Statistical Mechanics (3-3)

Systems of weakly interacting elements; ensemble theory; applications to gases, plasmas, and liquids; elements of the theory of phase transitions; fluctuations and non-equilibrium processes. *Prerequisites: Physics 140A-B, 152 or equivalent, Physics 212B.* (F,W)

### 211. Solid-State Physics (4)

Basic graduate course in solid-state physics, dealing with topics such as lattice dynamics, magnetism in insulators, electronic band structure, transport phenomena and electrodynamics in metals, optical properties. *Prerequisite: Physics 152 or equivalent.* (S)

### 212A-B. Quantum Mechanics (4-4)

Physical basis of quantum mechanics, the Schrödinger equation and the quantum mechanics of one-particle system, matrices and the transformation theory of quantum mechanics, approximation methods for discrete stationary states, translational and rotational invariance, angular momentum and spin, theory of scattering, approximation methods in the continuum and for time-dependent problems and the quantum theory of atomic structure. *Prerequisite: Physics 130B or equivalent.* (W,S)

### 212C. Quantum Mechanics (4)

Many-particle systems, second quantization and application to nonrelative many-body problems, relativistic quantum theory. *Prerequisite: Physics 212B.* (F)

### 213. Theoretical Nuclear Physics (3)

Basic phenomenology of strong interactions; two- and three-nucleon systems; weak and electromagnetic interactions of nucleons; thermonuclear reactions; nuclear systematics, models of nuclear structure, particle-transfer reactions, fission; introductory BCS pairing and nuclear matter theory. *Prerequisites: Physics 130C or equivalent, Physics 212C.* (W)

### 215. Elementary Particle Physics (3)

An introduction to the elementary particles with particular emphasis on the invariance principles by which they are classified. *Prerequisite: Physics 212C.* (S)

### 216. Atomic and Molecular Physics (3)

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.* (F)

### 218A. Plasma Physics (3)

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 of radiation, Fokker-Planck equation. (W)

### 218B. Plasma Physics (3)

This course deals with the magnetized plasma. Topics include: Appleton-Hartree theory of waves in cold plasma, waves in warm plasma (Bernstein waves, cyclotron damping), MHD equations, MHD waves and shocks, MHD theory of equilibrium and stability (interchange instability), adiabatic invariants and drift model of interchange instability, drift waves. *Prerequisite: Physics 218A.* (S)

### 219. Introductory Astrophysics (3)

Fundamentals of radiative transfer; theory of gray and non-gray stellar atmospheres; Eddington's approximation, principles of invariance. Formation of absorption lines, curve of growth, resonance radiation. Convection theory. Stellar structure: polytropes, nuclear reactions, stellar models. Stellar evolution. *Prerequisites: Physics 130C, 140B, or equivalent.* (W)

### 220. Group Theoretical Methods in Physics (3)

Study of the representations and applications of groups to problems in physics, with particular emphasis on the permutation of unitary groups. *Prerequisite: Physics 212C.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.) (F)

### 221. Advanced Mechanics (3)

Advanced topics such as general relativity, hydrodynamics and shock waves, elasticity. *Prerequisite: Physics 200B.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.) (S)

### 222. Advanced Nuclear Physics (3)

Topics of current interest. Examples: ambiguities in the nuclear two-body problem, three-nucleon systems and Faddeev equations, recent developments in the theory of nuclear matter and finite nuclei, exotic nuclei. *Prerequisite: Physics 213.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.) (S)

### 223A. Advanced Astrophysics (3)

Theory and observation of white dwarfs, degenerate matter, interstellar matter; theory and observation of emission lines and continua; thermal energy balance. The Crab Nebula; synchrotron radiations; Fermi acceleration, X-ray, optical and radio flux spectra. Other topics of current interest. *Prerequisite: Physics 219.* (Satisfactory/Unsatisfactory grades permitted.) (W)

### 223B. Advanced Astrophysics (3)

Kinematical and dynamical properties of the galaxy; spiral structure; stellar dynamics; masses and rotation of galaxies; theory and observation of galactic nuclei, radiogalaxies; evolution of the universe; observational cosmology, cosmic blackbody radiation, other topics of current interest. *Prerequisite: Physics 223A.* (Satisfactory/Unsatisfactory grades permitted.) (S)

### 224. Advanced Quantum Mechanics (3)

Covariant perturbation theory, mass and charge renormalization of quantum electrodynamics, radiative corrections to scattering and atomic energy levels, introduction to dispersion theory. *Prerequisite: Physics 212C.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.) (F)

### 225A-B. General Relativity and Cosmology (3-2)

The principle of covariance, tensors and tensor transformations in special relativity; the principle of equivalence; tensor calculus; foundations of general relativity, applications and tests of the theory, gravitational waves; applications in cosmology and observational tests of cosmological theories. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.) (W,S)

### 230A. Advanced Solid-State Physics (3)

A sequel to Physics 211 for students intending to specialize in solid-state physics and related subjects. Examples of topics to be covered are electron-electron and electron-phonon interactions, superconductivity, Landau theory of Fermi liquids,

surfaces, disordered systems. *Prerequisite: Physics 211.* (Satisfactory/Unsatisfactory grades permitted.) (F)

### 230B. Advanced Solid-State Physics (4)

Selection of topics of current interest. Examples: magnetic and electric resonances, surface physics, superconductivity, ferroelectrics, disordered systems, phase transitions, liquid helium, ferromagnetism. Topics given in this course may vary from year to year. *Prerequisite: Physics 211.* (Satisfactory/Unsatisfactory grades permitted.) (W)

### 231. Collision Theory (3)

Collision theory and its application to atomic and molecular processes. Description of collision processes, scatterings and resonances in composite systems. Rearrangement collisions and the methods of approximation. *Prerequisites: Physics 212A-B.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.) (S)

### 232. Advanced Plasma Physics (3)

An advanced course treating topics of current research interest, such as: weak turbulence theory, fusion, diagnostic techniques, etc. *Prerequisites: Physics 218A-B.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.) (F)

### 233. Elementary Particle Theory (4)

Current problems in elementary particle theory, especially the theory of strong interactions. *Prerequisite: Physics 215.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.) (F)

### 234. High-Energy Experimental Physics (4)

Current elementary particles research. Techniques used in experiments with high-energy accelerators. *Prerequisite: Physics 215.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.) (S)

### 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.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.) (S)

### 239. Special Topics (1-2)

From time to time, it will be possible to give a self-contained short course on an advanced topic in special areas of research. (Satisfactory/Unsatisfactory grades permitted.)

### 250. Solid-State and Cryogenics Physics Seminar (0-1)

Discussions of current research in solid-state physics. (Satisfactory/Unsatisfactory 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. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

### 252. Plasma Physics Seminar (0-1)

Discussions of recent research in plasma physics. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

### 253. Astrophysics and Space Physics Seminar (0-1)

Discussions of recent research in astrophysics and space physics. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

### 254. Atomic and Molecular Physics Seminar (0-1)

Discussions of current research in atomic and molecular structures and collisions. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

### 255. Theoretical Solid-State Seminar (0-1)

Discussions of current research in theoretical solid-state physics. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

### 256. Experimental Solid-State Physics Seminar (0)

Discussions of current research in experimental solid-state physics and biophysics. (F,W,S)

### 257. High-Energy Physics Special Topics Seminar (0)

Discussions of current research in high-energy physics. (F,W,S)

### 258. Astrophysics and Space Physics Special Topics Seminar (0)

Discussions of current research in astrophysics and space physics. (F,W,S)

### 259. Biophysics Seminar (0)

Discussions of current research in biophysics. (F,W,S)

**260. Physics Colloquium (0-1)**

Discussions of recent research in physics directed to the entire physics community. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

**285. Seminar in National Security for Science Students (3)**

The course will consist of two parts: first, a presentation of what our national security policy is, and second, a discussion of how various current science and technology programs and policies relate to it. (Satisfactory/Unsatisfactory grades permitted.) (W)

**298. Independent Study (1-4)**

*Prerequisites:* consent of instructor and departmental chairman. (Satisfactory/Unsatisfactory grades permitted.) (F,W,S)

**299. Research in Physics (1-12)**

(Satisfactory/Unsatisfactory grades permitted.) (F,W,S)

## Physiology and Pharmacology

OFFICE: 2042 Basic Science Building, School of Medicine

**Professors:**

Samuel H. Barondes, M.D. (*Psychiatry*)  
Kurt Benirschke, M.D. (*Pathology and Reproductive Medicine*)

Eugene F. Bernstein, M.D., Ph.D. (*Surgery*)

Colin M. Bloor, M.D. (*Pathology*)

Theodore H. Bullock, Ph.D. (*Neurosciences*)

James W. Covell, M.D. (*Medicine and Bioengineering, Chairman, Group in Physiology and Pharmacology, 1978-80*)

John W. Evans, M.D., Ph.D. (*Mathematics*)

Darrell D. Fanestil, M.D. (*Medicine*)

Morris E. Friedkin, Ph.D. (*Biology*)

Arnold Fronek, M.D., Ph.D. (*Bioengineering*)

Harold T. Hammel, Ph.D. (*Physiology*)

Nathan O. Kaplan, Ph.D. (*Chemistry*)

Allen Lein, Ph.D. (*Reproductive Medicine*)

Arnold J. Mandell, M.D. (*Psychiatry*)

Steven E. Mayer, Ph.D. (*Medicine, Chairman, Group in Physiology and Pharmacology, 1976-77*)

John Ross, Jr., M.D. (*Medicine*)

Gordon H. Sato, M.D. (*Biology*)

Stewart Sell, M.D. (*Pathology*)

S. Jonathan Singer, Ph.D. (*Biology*)

Daniel Steinberg, M.D., Ph.D. (*Medicine*)

John B. West, M.D., Ph.D. (*Medicine*)

Henry O. Wheeler, M.D. (*Medicine*)

Fred N. White, Ph.D. (*Medicine*)

Samuel S. C. Yen, M.D. (*Reproductive Medicine*)

Benjamin W. Zweifach, Ph.D. (*Bioengineering*)

**Associate Professors:**

D. John Faulkner, Ph.D. (*Marine Chemistry*)

Stanley A. Mendoza, M.D. (*Pediatrics*)

Michael Rosenfeld, M.D. (*Medicine*)

Palmer W. Taylor, Ph.D. (*Medicine*)

**Assistant Professors:**

Jack A. Alhadeff, Ph.D. (*Neurosciences*)

Guy P. Curtis, M.D. Ph.D. (*Medicine*)

Stephen R. Gross, Ph.D. (*Medicine*)

Morton P. Printz, Ph.D. (*Medicine*)

Peter Wagner, M.D. (*Medicine*)

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**The Graduate Program** The graduate program leads to the Ph.D. degree in one or both of the following aspects of the life sciences: (1) the function and metabolism of

cells, organs and organ systems; (2) the fundamental mechanisms of action of drugs, their effectiveness and their use in better understanding of biochemical, physiological and pathological processes. Students are encouraged to design and execute investigations in a self-critical and independent manner and to develop proficiency as teachers. Entrance requirements are flexible. Undergraduate preparation should include courses in calculus, organic chemistry, physical chemistry and biochemistry.

**Doctoral Degree Program** During the first two years of graduate study, the student will be required to take basic courses in biochemistry, physiology and pharmacology and to participate in a laboratory rotation program so that he or she can become familiar with the research activities of the faculty. Additional course work will depend upon the student's interests and the direction of the thesis project to be selected by the end of the second year of graduate studies.

The graduate program is interdepartmental and interdisciplinary; it involves faculty of the Departments of Biology, Chemistry, Medicine, Neurosciences, Psychiatry, the Bioengineering Group and Scripps Institution of Oceanography. Specialized research fields are the physiology of respiration and temperature regulation, cardiovascular physiology and pharmacology (including bioengineering approaches to these disciplines), neurotransmitter metabolism, metabolism of specialized tissues, chemotherapy and drug action at the molecular and biochemical levels.

The graduate program in physiology and pharmacology is designed also to educate physician-scientists. The flexibility of this program and that of the School of Medicine permits students admitted to both degree programs to obtain an M.D. and a Ph.D. in about six years.

**Examinations** Students obtain letter grades in the program's basic courses. At the end of the second year, candidacy for the Ph.D. degree is determined by a two-part examination. The first part, the minor proposition examination, tests student 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 preparing the dissertation, an oral defense of the thesis completes the requirement for the Ph.D. degree.

**Teaching** Teaching experience is an important part of the program. Students direct laboratory exercises and discussion sections of the School of Medicine core courses.

### Courses

First-year graduate students take fall quarter courses in cell biology and biochemistry

through the Departments of Biology and Chemistry. Students register for Basic or Advanced Biochemistry (Chemistry 211 or 218) and Human Biochemistry, Chemistry 217. Biology courses in this sequence are Genetics or Advanced Genetics (Biology 254 or 275); Molecular Biology or its advanced component (Biology 253 or 276); Membrane Biology, Biology 274; and Immunology, Biology 255.

See listings under Departments of Biology and Chemistry.

**205. Basic Neurology (9)**

Interdisciplinary survey of structure, function, chemistry and pharmacology of normal human nervous system emphasizing neurological mechanisms underlying development, sensory and motor capabilities and higher nervous processes. *Prerequisites:* Physiology Pharmacology 206 or equivalent and consent of instructor. (S)

**205L. Basic Neurology Laboratory (2)**

Interdisciplinary survey of structure, function, chemistry and pharmacology of the normal human nervous system, emphasizing neurological mechanisms underlying development, sensory and motor capabilities and higher nervous processes. *Prerequisites:* Physiology Pharmacology 206 or equivalent and consent of instructor. (S)

**206. Organ Physiology and Pharmacology (12)**

Building on the student's basic knowledge of cellular biology and biochemistry, this course develops fundamental concepts of organ function and relates them to clinical problems. Integrating physiology, pharmacology, and elements of histology, the course examines major organ systems and their interactions in humans. Emphasis is placed on general principles of drug action, fluid balance and electrolyte metabolism, blood, heart and circulation, respiration, renal function and gastrointestinal function. The mechanism of action of drugs is discussed in the context of each target organ system and in special sections devoted to general pharmacology. Clinical correlation sessions are used to relate physiological and pharmacological principles to clinical situations. The course represents the major time commitment for graduate students in the winter quarter. *Prerequisites:* cell biology and biochemistry or equivalent background in biology and biochemistry. For students not in 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)

**209. Endocrinology, Reproduction and Metabolism (5)**

An integrated introduction to the physiology and pharmacology of the endocrine and reproductive systems in humans, followed by a review of metabolic regulation and nutrition. An overview of the endocrine system is presented. Regulation of hormone secretion, mechanisms of hormonal action and clinical implications are discussed. The basic aspects of the biology of reproduction are covered in detail, including discussion of human embryology, endocrine control, the reproductive cycle and facets of population dynamics. Finally, metabolic regulation is reviewed, with emphasis on endocrine influences, and related nutritional problems are discussed (energy balance, temperature regulation, obesity, diabetes mellitus, hypercholesterolemia). Pharmacologic agents influencing the endocrine and reproductive systems are reviewed, including the use of hormones as drugs. *Prerequisites:* Physiology Pharmacology 206 or equivalent and consent of instructor. (S)

**221. Selected Topics in Cardiovascular Instrumentation (2)**

Basic principles of the design and use of modern cardiovascular instrumentation techniques—both laboratory and clinical—are discussed in a series of twelve seminars dealing with different problems in the cardiovascular area. Topics will range from electronic monitoring and display systems, to video and x-ray procedures, to system analysis and outline computational methods. *Prerequisites:* Physiology Pharmacology 206 and 206L and consent of instructor. (S)

## Political Science

### 222. Introduction to the Cardiovascular Sciences (1)

An introduction to the basic and clinical sciences pertinent to cardiology. The seminar group will use "heart failure" as a central theme from which to explore biochemistry, physiology, pharmacology and histology as they relate to the diagnosis and treatment of cardiovascular disease. Open to six to twenty students. *Prerequisite: Physiology/Pharmacology 206 and the consent of the instructor.* (S)

### 223. Metabolic Basis of Inherited Disease (2)

A brief introductory review of patterns of inheritance and cytogenetics followed by detailed consideration of the biochemical abnormalities and their phenotypic expression as disease. Discussion of biochemical methods for localizing enzyme defects and biological and physiological characterization of disordered metabolism. *Prerequisites: cell biology and biochemistry or permission of instructor.* (S)

### 224. Advanced Medical Pharmacology and Therapeutics (3)

Three hours of lecture weekly on topics not adequately covered 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, cardiovascular drugs, anesthetics. *Prerequisites: School of Medicine 206 or Physiology/Pharmacology 206 and consent of instructor.*

### 225. Ultrastructure, Biochemistry and Mechanics of Muscular Contraction (2)

This course will emphasize modern concepts of striated muscle physiology and biochemistry. The course will cover the comparative ultrastructure and developmental aspects of skeletal, cardiac and smooth muscle and will provide an in-depth analysis of the biochemistry and mechanics of contraction. *Prerequisites: Physiology/Pharmacology 206 or consent of instructor.* (F)

### 226. Respiration Physiology (3)

This course is devoted to aspects of respiratory physiology that are not covered in physiology/pharmacology courses 206 and 206L. These include atmospheric pollutants, comparative physiology of gas exchange, and environmental physiology of respiration including diving physiology and liquid breathing. *Prerequisites: Physiology/Pharmacology 206, School of Medicine 206 or consent of instructor.* (S)

### 228. Advanced Cardiovascular Physiology (1)

This course surveys cardiovascular physiology with the emphasis on structure, mechanics and energetics of cardiac muscle. An introduction to the theoretical basis of and fundamental approach to research problems in cardiovascular physiology is provided. *Prerequisites: Physiology/Pharmacology 206 and 206L and consent of instructor.* (F,S,W)

### 229. Molecular and Biochemical Pharmacology (2)

An examination of the molecular and biochemical bases of drug action. The course in the spring quarter is directed towards drug action in relation to intermediary metabolism, mediators of smooth muscle responses, drug metabolism, chemical carcinogenesis, principles of chemotherapy and selective toxicity. *Prerequisite: course in biochemistry.*

### 230. Neuropharmacology and Receptor Mechanisms (2)

An examination of the molecular and biochemical bases of drug and neurotransmitter action. The fall quarter course is devoted to receptor mechanisms, neuropharmacology and drug action on excitable tissues. *Prerequisite: course in biochemistry.*

### 241. Methods in Physiology and Pharmacology (2)

Topics will include biochemical procedures, subcellular fractionation, elementary principles of electronics and circuits, techniques in radioisotope usage and isolated muscle mechanics. The course will consist of one two-hour lecture and one three-hour laboratory or demonstration. *Prerequisite: enrolled in cell biology and biochemistry.*

### 248. Introduction to Drug Action and Pharmacology (3)

An introductory study of the actions of drugs and chemicals on animals (including humans) in modifying the physiological responses of tissues in isolation and *in situ*. This course is particularly appropriate for students electing a health science or human biology major and as an introductory course for graduate students. *Prerequisite: consent of instructor.* (F)

### 253. Advanced Renal Physiology and Pharmacology (2)

The course will review renal physiology and pharmacology

with an emphasis on mechanism and will examine intensively selected aspects of the subject. The format will be a lecture followed by a seminar. *Prerequisites: School of Medicine 206 and consent of instructor.*

### 264. Poisons—Natural and Man-made—and their Mechanisms of Action (3)

An introduction to the effects of environmental agents on biologic systems, particularly emphasizing effects on humans. Emphasis will be placed on the biochemical mechanisms by which toxic agents affect organisms, and these mechanisms will be correlated with physiologic changes. Three hours lecture, one hour discussion. *Prerequisite: Biology 106, 110A, 144 or consent of instructor.* (S)

### 271. Introduction to Cardiovascular Physiology (3)

Physical concepts of behavior of heart, large blood vessels, vascular beds in major organs and the microcirculation. Included will be the physical and physiological principles of blood flow, blood pressure, cardiac work, electrophysiology of the heart, descriptions of special vascular beds including their biological and hemodynamic importance. Integration of separate components through nervous and humoral controls will be analyzed. *Prerequisite: consent of instructor.*

### 272. Introduction to Respiratory Physiology (3)

Broad course in the principles of respiratory physiology including structure-function relationships of the lung, ventilation, diffusion, pulmonary blood flow, pulmonary gas exchange, blood-gas transport, mechanics of breathing, control of respiration, unusual environments, pulmonary function tests. *Prerequisite: consent of instructor.*

### 285. Statistical Inference in the Medical Sciences (3)

A first course in statistical procedures for the medical sciences. Topics will be chosen from among paired comparisons, experimental design, quantal design, bioassay, counts, regression and correlation, analysis of variance, survivorship. Some emphasis will be given to computational techniques. *Prerequisite: high school algebra.*

### 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. Graduate Seminar (1)

For first-year graduate students and for medical students. Each week a different faculty member will discuss his or her research in the broad areas of physiology, physiological chemistry and pharmacology. For advanced graduate students: discussion of current research and pertinent literature on a rotating basis. *Prerequisite: consent of instructor.* (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)

## Political Science

OFFICE: 2550 Humanities-Library Building, Revelle College

### Professors:

Henry W. Ehrmann, Ph.D. (*Visiting*)

††Clifford Grobstein, Ph.D.

Sanford A. Lakoff, Ph.D. (*Chairman*)

Arend Lijphart, Ph.D.

†Roger R. Revelle, Ph.D.

Martin Shapiro, Ph.D. (Fall Quarter)

††Herbert F. York, Ph.D.

### Associate Professors:

Samuel H. Kernell, Ph.D.

Samuel L. Popkin, Ph.D.

### Assistant Professors:

Nathaniel L. Beck, Ph.D.

Gerald Bender, Ph.D. (*Visiting*)

Ellen T. Comisso, Ph.D.

Peter F. Cowhey, Ph.D.

Mark A. Heller, Ph.D. (*Visiting*)

David D. Laitin, Ph.D.

Susan L. Shirk, Ph.D.

†Affiliated from Scripps Institution of Oceanography

††Affiliated from Program on Science, Technology and Public Affairs

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**The Major Program** The undergraduate major in political science aims to provide both a broad introduction to the discipline and an opportunity for students to pursue topics and areas of study in which they develop a particular interest. The major is especially appropriate undergraduate preparation for subsequent careers in law, government, and public service. Each student enrolled in the program is required to take Political Science 10, 11, and 12, and any twelve upper-division courses approved by a departmental faculty adviser. Quarterly registration cards must be signed by the departmental faculty adviser before submission. *Courses taken elsewhere cannot be credited toward the major requirement unless approved by the department on the basis of individual petition.* Candidates for departmental honors are required to take Political Science 191A and B, which may be counted toward the upper-division requirement. **Since the department is in the process of adding faculty and enlarging the list of course offerings, students are strongly advised to consult the department for the latest listing of courses before pre-registration.**

*Note:* Any of these courses may be used to satisfy the social science component of the Third College general-education requirement under Program B.

## 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. (F)

#### 11. Introduction to Political Science: Comparative Politics (4)

Issues of legitimacy, equality, authority and policy-making will be explored in the context of politics and government in a number of different countries. (W)

#### 12. Introduction to Political Science: International Relations (4)

The issues of war/peace, nationalism/internationalism, and economic growth/conservation will be examined in both historical and theoretical perspectives. (S)

#### 43. Introduction to African Politics (4)

The differential impact of British, French, Portuguese and Belgian colonialism is examined along with the African nationalist responses which developed during the second half of the twentieth century. Limited to freshmen and sophomores or upper division students with permission of the instructor.

### Upper Division

#### 100A-B-C. Systems of Political Thought (4-4-4)

This course treats the development of western political thought from the time of Plato and Aristotle to the modern era. Selected texts will be examined closely, including Plato's *Republic*, Machiavelli's *Prince* and *Discourses*, Hobbes' *Leviathan*, Locke's *Second Treatise on Government* and the



writings of Marx and Mill in order to inquire into such topics as the meaning of justice and nature of systematic thinking about politics. (F,W,S)

#### 101. Comparative Politics (4)

A focus on the problems of stability and democracy in various political systems; on the politics, economics, and ideologies of Western Europe and Communist systems. Comparisons will be drawn between one-party, multi-party and dictatorial regimes. *Prerequisite: Pol. Sci. 11.* (S)

#### 103. China in World Politics (4)

This course will examine many of the major issues in the international relations of Pacific-Asia and in Sino-American relations since the end of World War II. Within the context of such issues the course will analyze Chinese leaders' changing perceptions of the international political system and the way in which they formulate and attempt to carry out their foreign-policy goals. *Prerequisite: junior or senior standing and one course in political science or consent of the instructor.*

#### 104. Seminar on British Government and Politics (4)

Examines the nature of parliamentary government in Britain, historical and contemporary perspective. Special attention will be paid to cabinet government, differences between the major parties and trends in social and economic policy. Some attention will also be given to local politics. (Not offered in 1978-79.)

#### 105A-B-C. Technology and Society (4-4-4)

This course examines the impact of advances in science and technology on society. Among the topics considered: the theory of post-industrial society, the debate over limits to growth, the "energy crisis", the making of science policy, and the roles and responsibilities of scientists and technologists in politics. Each quarter may be taken separately. (F,W,S)

#### 106. Politics in France (4)

This course is an attempt to explain how France has become an increasingly bi-polarized political system. Emphasis will be placed on (1) French "conservative" and "radical" ideologies; (2) French political parties; (3) the institutions of the Fifth Republic with and without deGaulle; (4) French local politics; (5) France in a crisis situation; (6) prospects for the future. (W)

#### 107A-B. Voting, Campaigning and Elections (4-4)

This course will consider the nature of public opinion and voting in American government. Studies of voting behavior will be examined from the viewpoints of both citizens and candidates and an effort will be made to develop models of their electoral behavior. Attention will also be devoted to recent efforts to develop rational choice theories of electoral behavior and to critiques of elections as democratic institutions. The role of the mass media and money also will be examined. *Prerequisite: 107A.* (F,W) (Not offered in 1978-79.)

#### 108A-B. Politics of Education (4-4)

This course examines a series of controversies over the direction and control of education. American materials, including experience with desegregation and community control, will be stressed, but attention will also be paid to controversies arising in other systems, including modern China, Malaysia and Nigeria. The second quarter of this course stresses field research. Students will be asked to select a particular problem in connection with schooling and investigate the problem directly, with the supervision of the instructor. *Prerequisite: 108A.* (F,W) (Not offered in 1978-79.)

#### 109. 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. (W)

#### 112A-B. Law and Politics — The Supreme Court (4-4)

A two-quarter sequence examining the political role of the Supreme Court and the evolution of constitutional doctrines. Only the first quarter to be offered this year. (F)

#### 112C. Law and Politics — Courts (4)

This course is a systematic treatment of the role of courts in various societies. It will cover European as well as American courts and courts in developing as well as developed societies.

#### 112D. Law and Politics — The Urban Courts (4)

An examination of the relation of trial courts to the urban political system; judicial recruitment; the relation of trial courts to appellate courts, police, prosecutors and defense attorneys, and the penal system. *Prerequisite: Lower division political science or consent of instructor.* (F) (Not offered in 1978-79.)

#### 112E. Undergraduate Seminar in Law and Politics (4)

An undergraduate seminar designed to allow students who have already had lecture courses in Law and Politics to pursue some aspect of those courses in greater depth and in a small group setting. *Prerequisites: Political Science 112A-B-C-D and permission of instructor.* (Not offered in 1978-79.)

#### 112F. Special Topics in Law and Politics (4)

An undergraduate seminar designed to allow students who have already had lecture courses in Law and Politics to pursue some aspect of those courses in greater depth and in a small group setting. This course is open to students who have had 112E. *Prerequisites: Political Science 112A-B-C-D-E and permission of instructor.* (Not offered in 1978-79.)

#### 114A-B. People and Politics (4-4)

This course is about how people learn about politics and why they participate in politics. Among the topics to be treated will be how children learn about politics, why some people participate in politics and some don't, what kinds of personalities are to be found among political leaders and followers, and why people have the political attitudes they do. *Prerequisite: 114A.* (W,S)

#### 115. American Political Parties (4)

Examines the development of two major parties as well as third party movements. Considers the nature of party affiliation, the role of leaders, activists, and organizers, and the relation of parties to government and special interest groups. (Not offered in 1978-79.)

#### 119. Labor and Politics (4)

The theme of the course will be the relationship between work and political conflict in the United States and Europe. It will explore this theme through an examination of different types of labor organizations, including trade unions, political parties, syndicalist movements, and systems of self-management. (Not offered in 1978-79.)

#### 120. Urban Politics (4)

This course will focus on structures and processes of urban politics, as well as on contemporary issues of urban public policy. Topics to be considered include the nature and development of the metropolitan community, urban politics and decision-making, and policy issues such as criminal justice, civil rights, and planning. (Not offered in 1978-79.)

#### 121. 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. *Prerequisite: Political Science 10.* (S)

#### 128. Revolution and Socialism in the Third World (4)

A number of former revolutionary guerilla movements in the Third World now hold state power. These revolutions were made both to achieve national liberation and to build new socialist societies. The seminar will examine the experience of building socialism in these countries before and after the guerillas took power. *Prerequisite: consent of instructor.* (F)

#### 131. 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. (Not offered in 1978-79.)

#### 132. Politics in the People's Republic of China (4)

This course will study post-1949 China as a country which has experimented broadly with economic, social and political problems confronted in their attempt to build a modernized society based on revolutionary ideals.

#### 133A. Vietnam: The Politics of the Village (4)

This first unit of a two-quarter sequence will discuss the nature of Vietnamese society, especially its village structure, but also its religious, ethnic and class divisions. (W) (Not offered in 1978-79.)

#### 133B. Vietnam: The Politics of Intervention (4)

The second unit of the sequence will examine the intervention of foreign powers in Vietnam (including France, the United States, China and the Soviet Union) and the effects of intervention. *Prerequisites: 133A and permission of instructor.* (S) (Not offered in 1978-79.)

#### 134. Seminar — Chinese Politics (4)

This course will examine selected topics concerning major problems of political institutions, political participation, and social change in post-revolutionary China. These topics will be related to a general examination of Maoism and to general

scholarly critiques of post-revolutionary political development. *Prerequisite: Political Science 132 or equivalent.*

#### 139. Political Modernization Theory (4)

A survey of approaches to the study of modernization. Processes of the development of capitalism, industrialization and urbanization will be examined. The way in which these processes affect mobilization, incorporation, assimilation, legitimacy and the institutionalization of political regimes will be studied. (W)

#### 141. Soviet Politics (4)

This course will examine the goals of socialist society and various strategies proposed to achieve them in the context of the Soviet Union. Thus, we will examine Soviet development and politics as a product of the choices Soviet leaders have made, examining why those choices were made and with what results. The particular aspects of Soviet politics which will be emphasized are economic and social policy, human rights, nationality relations and foreign policy. (F)

#### 144. African Politics (4)

An examination of pre- and post-colonial trends in African political organization. Economic management, dissemination of ideologies, leadership and relations with other states will be among the topics considered. (Not offered in 1978-79.)

#### 145A-B. The Middle East in World Affairs (4-4)

This course examines the internal and external politics of the nations of the Middle East. It will treat such broad topics as nationalism, Pan-Arabism, and modernization and will also examine the internal political structure of the major states against the historical and cultural background of the region. Attention will also be paid to the Arab-Israeli conflict, the political role of the oil producing nations of the area, and to the Middle East as an arena of superpower conflict. (F,W)

#### 146A. Politics of Southern Africa I (4)

Angola and Mozambique, from empire to nations. This course covers the nature of Portuguese colonialism, the nationalist struggles for independence, and the major developments since independence in 1975. Major emphasis is on Angola. (W)

#### 146B. Politics of Southern Africa II (4)

South Africa, Rhodesia and Namibia. This course examines the background and setting of the conflicts, the structures and nature of inequality, pressures for change and the development of nationalism in each of the three territories. (S)

#### 148. Public Control of Private Enterprise (4)

This course treats the regulatory process in the U.S., with particular reference to the rationale for government intervention and the criticisms raised against it. The major regulatory mechanisms and agencies will be described, with special reference to such topics as consumer information, automobile safety standards and emissions controls, the regulation of pollution, patents, and energy investments. Some European alternatives to American institutions and practices will also be considered. (Not offered in 1978-79.)

#### 151. Topics in American International Relations (4)

This course will examine post-World War II American international relations in selected geographical and issue areas. The approach will include analysis and evaluation of specific American policies toward the selected areas and analysis of the internal process of foreign policy decision-making. (Not offered in 1978-79.)

#### 152. American Foreign Policy (4)

American foreign policy as directed to our allies, our adversaries and to neutrals, and concerning energy and ecology as well as more traditional issues — will be critically analyzed. Analysis will center on questions of purposes, interests, and political responsibility. General theories of American foreign policy, both conventional and radical, will also be discussed. (F)

#### 153. International Organization (4)

Three independent themes will be explored: (1) the prospects for, and an evaluation of, world government; (2) the purposes of international organizations of more limited scope than world government, and the implications of these organizations for future world reorganization based on current social, economic, ecological and political trends. (W)

#### 154. Comparative Politics and Political Culture (4)

To what extent do aspects of culture — language, religion, family, history, beliefs, and values — influence the range of political behavior in any society, or define the range of questions on its political agenda? If in some way culture has an important bearing on politics, what are the mechanisms of real

## Psychology

political change? To what extent is political change unidirectional toward some homogeneous industrialized world, and to what extent will heterogeneous cultures develop along divergent paths? These are the seminal questions around which this course will be organized. *Prerequisite: consent of instructor.* (S)

### 155A-B. Politics and the Economic Order (4-4)

This course examines the interplay of politics and economics in international relations. The first quarter 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 nation-state and its implications for economic arrangements. The second quarter will consider major theories purporting to explain and predict the workings of the international order from the point of view of political economy. *Prerequisite: 155A - Political Science 12 and one quarter of economics; 155B - Political Science 155A.* (F,S)

### 156. The Policy Making Process (4)

This course will describe the policy-making processes employed by American national government. Attention will be focused on the law-making process and on decision making within the executive branch. (Not offered in 1978-79.)

### 158. Social Welfare Policies in Industrialized Countries (4)

What explains the differences in income assistance, health care and other types of social welfare policies among Western countries? Do some types of welfare programs work better than others? Can the U.S. learn important lessons from other countries' experiences with social welfare policies? These questions will serve as organizing themes for this course. (Not offered in 1978-79.)

### 159. Energy Policy and Politics (4)

Political, economic and technological constraints on public policy responses to the energy problem will be explored. Case studies of the evolution of oil, natural gas and nuclear policies will illustrate the argument. There will also be a discussion of the international dimensions of energy policies. (F)

### 162. Seminar in Advanced Topics in Political Theory (4)

Topics to be treated in the course will include concepts of liberty and justice as well as the work of selected political theorists from the 18th century onwards. *Prerequisite: open only to students who have had previous courses in political theory or political philosophy.* (Not offered in 1978-79.)

### 163. Special Topics in American Politics (4)

An undergraduate seminar designed to give students who have had upper-division American politics classes an opportunity to study some aspect of current American politics in greater depth in a small group setting. *Prerequisites: Political Science 10 and two upper-division classes in American politics.* (F)

### 167A-B. Democracy in Plural Societies (4-4)

This course examines the problem of creating and maintaining stable democratic regimes in societies divided by major cleavages such as those of religion, ethnicity, and language. The theoretical model of "consociational democracy" will be explained and applied to explain experience in a variety of national settings, including Holland, Belgium, Switzerland, Canada and Lebanon, as well as Third World cases. (F,W)

### 170. American National Security Policy (4)

A course about U.S. national security objectives and the means for achieving them. Special emphasis will be placed on current U.S. military posture and arms-control policies, and the rationales behind them. Topics will include the strategic balance, the NATO-Warsaw Pact confrontations, the Middle East, SALT, and other arms control forums.

### 174A-B. Statistical Methods/Data Analysis (4-4)

This course will offer a general introduction to statistical methods and data analysis for students interested in political science, public policy and communications research. Although calculus is not required, it is strongly recommended. The course will include a basic introduction to the theory and practice of statistical inference, measures of association, sampling theory, and linear regression models. There will be extensive work with computer data analysis systems such as SPSS and each student will do a large-scale analysis project during the second half of the course. (F,W)

### 175A. Fundamentals of Political Economy (4)

The first half of the two-quarter course will focus broadly on how economic behavior affects political action and institutions, and how political action and institutions affect economic behavior. Central consideration will be given to the impact of

democratic political systems on various types of economic arrangements and vice versa. (F)

### 175B. Issues in Political Economy (4)

The second half of this two-quarter course will be a seminar, dealing in depth with one or a number of specific issues touched on in the first half of the course (175A) and dealt with in the framework developed there. Issues may cover such topics as labor and politics, corporatism, politics and economics of bureaucratic organizations, the welfare state, equality and other such questions. *Prerequisite: Political Science 175A.* (W)

### 191A-B. Senior Honors Seminar: Frontiers of Political Science (0-8)

This course will be taught jointly by the staff of the department with occasional lectures by visitors. It is open only to seniors interested in qualifying for departmental honors. Admission to the course will be determined by the department on the basis of the student's academic record. Each student enrolled will be required to write an honors essay under the supervision of a member of the faculty. This essay, which is to be submitted by the end of the winter quarter, will be the basis of the final grade for the course. (F,W)

### 197. Field Study in Political Science (4)

Field work in the local area in some aspect of politics or public policy. The project should be largely designed by the student, with faculty supervision, and should contribute to an overall understanding of the political process. (F,W,S)

### 198. Directed Group Study (2 or 4)

Directed group study in an area not presently covered by the departmental curriculum. (P/NP grades only.) (F,W,S)

### 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.* (F,W,S)

### 298. Directed Reading (1-12)

Guided and supervised reading in the literature of the several fields of political science. *Prerequisite: graduate standing.* (F,W,S)

## Psychology

OFFICE: 5217 Psychology-Linguistics Building, Muir College

### Professors:

Norman H. Anderson, Ph.D.  
Robert M. Boynton, Ph.D.  
J. Anthony Deutsch, D.Phil.  
Edmund J. Fantino, Ph.D.  
George Mandler, Ph.D.  
Jean M. Mandler, Ph.D.  
Donald A. Norman, Ph.D.  
George S. Reynolds, Ph.D. (*Chairman*)  
June L. Tapp, Ph.D.

### Associate Professor:

Ebbe N. Ebbesen, Ph.D.  
Harry L. Munsinger, Ph.D.  
David E. Rumelhart, Ph.D.

### Assistant Professors:

Alonzo B. Anderson, Ph.D.  
Norbert L. Kerr, Ph.D.  
Vladimir J. Konečni, Ph.D.  
Donald I. A. MacLeod, Ph.D.  
James L. McClelland, Ph.D.  
Jeffrey O. Miller, Ph.D.  
Elissa L. Newport, Ph.D.  
Ben A. Williams, Ph.D.

\* \* \*

Ursula Bellugi, Ed.D., *Adjunct Professor of Psychology*

Robert Galambos, Ph.D., M.D., *Professor of Neurosciences*

Steven A. Hillyard, Ph.D., *Associate Professor of Neurosciences*

Larry Squire, Ph.D., *Associate Professor of Psychiatry*

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**The Major Program** The department offers courses in all major areas of experimental psychology, with emphasis in the areas of human information processing, sensation and perception, learning and motivation, physiological psychology, developmental psychology and social psychology. The department emphasizes modern research in the experimental and theoretical analysis of human and animal behavior. 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.

The department offers a flexible program of study towards the B.A. degree. Several different options are available to the student, from a general curriculum which allows for diversity of studies to a specialized curriculum which allows the student to explore a limited number of topic areas in great depth. An honors program — requiring laboratory courses and a year-long individual research project — is also available to students. The honors program is specifically designed for students interested in preparing for graduate or professional school. The more general curricula are available to students who do not plan to continue studies beyond the B.A. degree.

A Bachelor of Arts degree in psychology will normally be given to any student who has satisfactorily completed at least twelve four-unit upper-division psychology courses. The course must follow a prescribed program and must include at least one course in statistics. The choice of which twelve or more courses a student wishes to take should be made on the basis of three criteria: interest in the topic, long-range goals, and the prerequisites for the various courses that are offered.

A major consideration in deciding on the type of program one will pursue are the prerequisites of the various upper-division psychology classes taught by the department. The student should note the prerequisites for *all* of the classes he or she might be interested in taking. It is important to take those classes which are prerequisites for many others early in one's program. For example, students are well advised to take Introduction to Statistics (60) in their sophomore year, or sooner, as it is a prerequisite for many other psychology classes. Similarly, many of the classes which serve as introductions to the various areas of psychology (e.g., Introduction to Sensation and Perception, and Introduction to Social Psychology) are prerequisites for more advanced courses in those areas. Therefore,

these classes should also be taken early in one's college career.

All students are encouraged to plan their major program with the aid of a faculty member of the department. Such planning should normally take place in the student's sophomore year to insure that ample time is available to satisfy the necessary prerequisites for the courses taught in the department.

**Alternative Programs of Study** Students may wish to obtain a general overview of experimental psychology, or they may wish to have more intensive exposure to one or more areas of specialization within experimental psychology. To aid the student's selection, the courses falling within particular areas of specialization are listed below. Note that students wishing to specialize in an area need not take all of the courses listed under that area. Groupings of courses are presented only to show which courses are most pertinent to each specialty area.

Students interested in a general background in experimental psychology should consider the following courses:

Introduction to Statistics (60)  
Introduction to Experimental Psychology (108)  
Introduction to Developmental Psychology (101)  
Introduction to Social Psychology (104)  
Introduction to Sensation and Perception (102)  
Introduction to Cognitive Psychology (105)  
Introduction to Physiological Psychology (106)  
Introduction to the Principles of Behavior (103)  
History of Psychology (166)  
Explanation and Knowledge (165)

in addition to other upper-division psychology electives which might be of particular interest to the student.

A student interested in specializing in human development should consider the following courses:

Introduction to Statistics (60)  
Introduction to Developmental Psychology (101)  
Cognitive Development: Piaget (136)  
Psycholinguistics (145)  
Behavior Genetics (149)

as well as other electives of interest.

A student interested in specializing in social psychology should consider the following courses:

Introduction to Statistics (60)  
Introduction to Social Psychology (104)  
Advanced Statistics (111)  
Experimental Methods in Social Psychology (126)

Methods in Applied Social Psychology (127)  
Group Processes (155)  
Topics in Legal Psychology (157)  
Ethnic Attitudes (156)  
Emotions (143)  
The Psychology of Judgment (148)  
Social Perception and Cognition (147)

as well as other electives of interest.

A student interested in specializing in cognitive psychology should consider the following courses:

Introduction to Statistics (60)  
Introduction to Cognitive Psychology (105)  
Visual Cognition (160)  
Memory and Attention (135)  
Psychology and Artificial Intelligence (133)  
Psychology of Thinking (134)  
Psycholinguistics (145)  
Cognitive Development: Piaget (136)  
Advanced Statistics (111)  
Laboratory in Cognitive Processes (115)  
The Psychology of Judgment (148)  
Choice and Decision (141)  
Social Perception and Cognition (147)

as well as other electives of interest.

A student interested in specializing in sensation and perception should consider the following courses:

Introduction to Statistics (60)  
Introduction to Sensation and Perception (102)  
Introduction to Cognitive Psychology (105)  
Visual Cognition (160)  
Physiological Basis of Perception (159)  
Laboratory Methods in Sensory Psychology (116)  
Memory and Attention (135)

as well as other electives of interest.

A student interested in specializing in learning and motivation should consider the following courses:

Introduction to the Principles of Behavior (103)  
Introduction to Statistics (60)  
Learning and Motivation (120)  
Laboratory in Learning and Motivation (121)  
Comparative Psychology (150)  
Control of Human Behavior (151)

as well as other electives of interest.

A student interested in specializing in physiological psychology should consider the following courses:

Introduction to Physiological Psychology (106)  
Neutral Basis of Memory (162)  
Introduction to Statistics (60)  
Introduction to Sensation and Perception (102)  
Comparative Psychology (150)  
Physiological Basis of Perception (159)  
Laboratory Methods in Sensory Psychology (116)

in addition to other electives of interest.

**Honors Program** Students are encouraged to participate in the departmental honors program. The major feature of the program is a year-long independent research project (194) done in the student's senior year which results in an honors thesis. The honors project normally will be under the supervision of a faculty member in the Department of Psychology. In preparation for such a project the honors candidate must take:

Introduction to Statistics (60)  
Advanced Statistics (111)  
Any Methods or Laboratory Course (115, 116, 121, 126, 127).

The student also is expected to have taken the sequence of courses related to the area of the honors thesis. Successful completion of the honors program requires a grade of A in Psychology 194 and a minimum grade-point average of 3.5 for courses taken in the major.

**Prerequisites for Psychology Majors** Experimental psychology uses the tools and knowledge of science; calculus, probability theory, computer science, chemistry, biology, 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 listings for the courses.

Psychology majors are required to take Introduction to Psychology (Psychology 1), one course in computer programming (e.g., APIS 61), three science courses, and a year of college-level mathematics. Students are encouraged to satisfy these prerequisites as early as possible.

**The College Science and Mathematics Requirements** Each college imposes its own science and mathematics requirement upon its students. A student who wishes to major in psychology must also fulfill the special prerequisites listed above. These science and mathematics prerequisites are automatically met by the Revelle College requirements. Muir College and Third College students will have to take one year of mathematics, as well as the required number of science courses from the ones offered to them. Warren College students will also have to take one year of mathematics as well as the required number of science courses.

**The Noncontiguous Minor for Revelle College** Students may enroll in psychology courses in order to fulfill the requirements of the noncontiguous minor. The noncontiguous minor will normally consist of three of the lower-division courses in psychology and three courses selected from the upper-division offerings of the department. One of the lower-division courses must be Psychology 1. Please note carefully the prerequisites for the upper-division courses. Students who wish to pursue a noncontiguous minor should consult with one of the departmental undergraduate advisers before enrolling for these courses. Lower-division psychology courses may not be used simultaneously to satisfy both the social-

science requirement and the non-contiguous minor requirement.

**Minor Program for Third College** Third College students may minor in psychology by completing a six course sequence in psychology which must include at least three upper-division courses. The first course of the minor sequence must be Psychology 1. At the beginning of their program planning, students should carefully examine the prerequisites for each of the courses to be used for the minor and consult with one of the departmental undergraduate advisers. Note in particular that Introductory Statistics (Psychology 60) is a prerequisite for almost all upper-division courses.

**Minor Program for Warren College** Warren College requires its students to complete two six-course sequences to fulfill the area-of-concentration requirements. Six of these twelve courses must be upper-division. A student may minor in psychology by choosing a six-course sequence conforming to the following rules: (a) the first course must be Psychology 1; (b) at least three of the six courses must be upper-division; (c) upper-division courses may be selected from any of those listed in section on alternative study programs.

### 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 exceptions may be made for applicants with good backgrounds in such fields as biology and mathematics.

**Language Requirements** There is no foreign-language requirement.

**Master's Degree Program** Normally, students will be accepted only for the Ph.D. Students in the doctoral program may, however, qualify for the M.A.

Plan II has been adopted by the department (see *Graduate Studies: The Master's Degree*). Each candidate must complete a two-course requirement in quantitative methods and at least six additional graduate courses other than the research courses 296, 298 and 299. Each candidate must also pass the master's examination, which is offered by the department once each year.

### Graduate Curriculum

All students must fulfill all course requirements — stated below — while registered as graduate students in psychology at UC San Diego. 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.

**First-Year Requirements** In the first year of study, each student must fulfill the following requirements:

1. Each student must fulfill a quantitative methods requirement, either by taking two quantitative methods courses approved by the graduate 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 at least eight courses from the list prepared by the graduate affairs committee. At least five of these must be basic courses from at least four different areas. During the first year of study, the student is required to complete five of these courses, four of which must be basic seminars. By the end of the second year the student must have completed at least five basic seminars in four different areas. The graduate committee will provide a list of acceptable courses and a list of the areas.
3. All first-year graduate students are required to submit a research paper on the project completed as a part of their 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 format of the paper should be in the style of a journal article acceptable to any of the major journals in the student's area (the publication manual of the American Psychological Association, second edition, 1974, should be followed).

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 affairs committee. The paper will be graded on a 3 point scale: +, 0, and —. Additional readers may be required when there are conflicting evaluations.

The research paper is presented orally also at a research meeting held at the end of the spring quarter. Attendance at this meeting is required of the entire 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. Students are evaluated by the entire faculty by a meeting at the end of the academic year. At the department evaluation, the normal minimum stand-

ards 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+ average in the quantitative methods courses and a B+ average in the courses which fulfill the area requirements.

### Qualifying Examination for the Ph.D. Degree

The qualifying examination has two parts. In one part, the student is examined on topics related to the thesis proposal. In the other, the student is examined on a broader range of topics. This broader range of topics is determined jointly by the student and the qualifying committee. Prior to the examination, the student submits to the committee a written list of the four areas in the department in which the student is qualified and a list of topics in those areas on which the student wishes to be examined. The student and the committee work together to reach a mutually satisfactory document that lists the topics to be covered. Then, at the time of the examination, a definite period of time is set aside for questions on these topics.

These regulations took effect on the first day of classes in the 1975/76 academic year (September 19, 1975). All students are required to follow the new program, except that those students who have already passed the written qualifying examination are allowed to follow the old requirement (the qualifying examination will consist only of questions on the area of the thesis proposal itself).

**Teaching** All students are required to participate in the teaching activities of the department for one quarter of half-time teaching in every year of residence.

**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** From the first year of graduate study all students are enrolled in a research practicum (Psychology 296). Students are assigned to current research projects in the department, and receive the personal supervision of a member of the staff.

### Courses

#### Lower Division

**Experimental Requirements** Psychology at UC San Diego 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. Psychology majors must all learn experimental methods, including basic statistical techniques. Those 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 courses (with the exception of Psychology 60) must serve as experimental subjects for participation in three hours per quarter. 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 will usually 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 with alternate service assignments which are designed to serve similar educational goals.

#### 1. Psychology (4)

An introduction to basic concepts in psychology. (Offered fall, winter and spring.)

#### 10. Developmental Psychology (4)

An introduction to the psychological development of the human organism with special reference to cognitive development in the child.

#### 11. Perception and Information Processing (4)

An introduction to basic principles of perception, learning and information processing.

#### 14. Social Psychology Applied to Human Problems (4)

An introduction to concepts and methods in social psychology.

#### 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 permission of instructor.*

#### 88. Learning Skills (4)

An experimental seminar on the development of skills for learning. We will talk about how to analyze learning strategies, how to remember, how to plan, and how to analyze a task. We will cover analysis of "bugs" in a solution and the development of appropriate "debugging" strategies. (Not offered in 1978-79.)

### 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 the 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.

#### 108. Introduction to Experimental Psychology (4)

Various members of the psychology faculty will discuss their current research with special emphasis upon methodological problems.

#### 111. Advanced Statistics (4)

Intermediate examination of the experimental method in psychology and mathematical techniques necessary for experimental research. *Prerequisite: minimum grade of B in either Psychology 60 or Mathematics 80A*

#### 115. Laboratory in Cognitive Psychology (4)

Lecture and laboratory work in human information processing. *Prerequisites: Psychology 105 and 111 and consent of the instructor*

#### 116. Laboratory in Sensory Psychology (4)

An introduction to the experimental measurement and analysis of auditory and visual phenomena. *Prerequisites: Psychology 159 (co-registration permitted) and Psychology 111.*

#### 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: Psychology 103, and Psychology 60 or Mathematics 80A, and co-registration with Psychology 121.*

#### 121. Laboratory in Operant Psychology (4)

Lecture and laboratory in operant psychology. *Prerequisite: must be taken with Psychology 120.*

#### 126. Experimental Methods in Social Psychology (4)

Lecture and laboratory work in social psychology. *Prerequisites: Psychology 104 and 111 or equivalent. (Not offered in 1978-79.)*

#### 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.*

#### 130. Developmental Psychology and Education (4)

An introduction to cognitive development with emphasis on its relation to education. *Prerequisites: enrollment in Teacher Education Program or consent of instructor.*

#### 133. Psychology and Artificial Intelligence (4)

A survey of current developments in artificial intelligence as it pertains to psychology. Special attention will be given to work in automatic speech understanding, natural language processing, belief systems, problem solving and game playing. *Prerequisites: Psychology 105 and APIS 61.*

#### 134. Psychology of Thinking (4)

An introduction to contemporary models of cognition and the process of thinking. *Prerequisite: Psychology 105. (Not offered in 1978-79.)*

#### 135. Memory and Attention (4)

An intensive introduction to the study of the human as an information processing system. Covers topics in perception, memory, cognition, and artificial intelligence. *Prerequisites: Psychology 105 and APIS 61. (Not offered in 1978-79.)*

#### 136. Cognitive Development: Piaget (4)

Intensive examination of Jean Piaget's theories of cognitive growth from birth to adolescence. Topics: development of imagery and mental representation, thought and language, concepts of space, causality and number, logical thinking. *Prerequisite: Psychology 101 or 105.*

#### 141. Choice and Decision (4)

Empirical techniques, from the testing of mathematical models to the collection of process tracing data. Content includes decision making and problem solving. *Prerequisites: Psychology 105 and 111. (Not offered in 1978-79.)*

#### 143. Emotion (4)

Introduction to current theories and research on emotion, with special reference to theories of anxiety. *Prerequisite: Psychology 105 or 104.*

#### 145. Psycholinguistics (4)

Presentation of the psychology of language including its

biological basis, its development in children, and its use by the adult. Of particular interest will be the question of the relevance of linguistic descriptions to psycholinguistics. *Prerequisites: Psychology 105 or Linguistics 1 and 2.*

#### 147. Social Perception and Cognition (4)

How we perceive and judge other persons and ourselves. Focus on experimental analysis of cognitive processes. *Prerequisites: Psychology 104 and 105.*

#### 148. The Psychology of Judgment (4)

General theory of judgment based on cognitive algebra. Applications across many areas of psychology, including psychophysics, decision-making, cognitive and social psychology. *Prerequisite: senior honors standing; for students planning on graduate study. (Not offered in 1978-79.)*

#### 149. Behavior Genetics (4)

An exploration of the nature/nurture controversy with particular attention to human intelligence. *Prerequisite: Psychology 101 or 10A or any genetics course in biology. (Not offered in 1978-79.)*

#### 150. Comparative Psychology (4)

Principal emphasis will be on the comparative psychology of learning and ethology. Selected topics such as critical periods and animal communication will be covered. *Prerequisite: Psychology 103 or 106.*

#### 151. Control and Analysis of Human Behavior (4)

Extensions of learning principles to human behavior. Topics include methods of self-control, applications to clinical disorders, and the design of cultures. *Prerequisite: Psychology 120.*

#### 155. Group Processes (4)

An introduction to the social psychological study of human behavior in small groups. Special emphasis will be given to interpersonal relations, structure, leadership and cohesiveness. The course will combine lecture, discussion and small group experience methods. *Prerequisites: Psychology 104 and any one of Psychology 126, 127.*

#### 156. Ethnic Attitudes (4)

This course examines beliefs and values of ethnic groups in the United States with emphasis on behavioral and social consequences. The origin and development of racial attitudes will be studied, with an emphasis on the attitudes of African and European Americans. *Prerequisites: Psychology 104 and any one of the following: Psychology 126, 127, Urban and Rural Studies 108, or permission of instructor.*

#### 157. Topics in Legal Psychology (4)

Several topic areas of research on psychological factors in the legal system will be surveyed. The psychology of the courtroom will receive special emphasis (especially jury research). Students will also complete original projects representing library, field, or experimental research in an area of their choice. *Prerequisites: Psychology 104 and either Psychology 60 or Mathematics 80A and permission of instructor. (Not offered in 1978-79.)*

#### 158. Legal Socialization: Psychological and Legal Issues (4)

This course will focus on the socialization of legal values and public attitudes toward rule systems, emphasizing theory and method implications for such topics as law and justice, law as socializer, compliance and decision making. *Prerequisite: Psychology 104.*

#### 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. Visual Cognition (4)

This course will provide an advanced examination of cognitive processing and representation of visual information. Topics to be covered in depth include visual memory, pattern recognition, and visual imagery. *Prerequisites: Psychology 102 and 105. (Not offered in 1978-79.)*

#### 161. Human Aggressive Behavior (4)

Influential theories of human aggression will be reviewed in detail. Classical and recent studies in the area will be examined, with an emphasis on methodological and definitional issues. An integrated cognitive-emotional model of interpersonal aggression will be developed. *Prerequisite: Psychology 104 or permission of instructor.*

#### 162. Neural Basis of Memory (4)

A review of current topics concerning plasticity in the nervous system including development, invertebrate nervous systems,

## Psychology

neuro-physiological and morphological correlates of memory in mammalian brain; pharmacology of memory; human memory and brain function. *Prerequisite: Psychology 106.*

### 164. Non-traditional Approaches to Psychological Disorder and Therapy (4)

Survey of psychological approaches to interpersonal disorders and their therapies. Topics: humanistic therapies: Gestalt, Trans-Actional analysis, peer counseling, (e.g. Synanon, re-evaluation counseling, AA, life style therapies — such as communes); group methods (e.g. encounter, sensitivity training, psycho-drama, etc.); biophysical methods (Rolling, bioenergetics, etc.). Lectures, discussions and experiential opportunities at San Diego centers specializing in the above techniques as can be arranged. A critical but open examination of these approaches to psycho-social discomfort. *Prerequisite: consent of instructor.*

### 165. Explanation and Knowledge (4)

Discussion of psychological theory and evidence on such topics as epistemology, ordinary language, reasons and causes, existence, socio-cultural determinants of thought, ethics. *Prerequisites: restricted to seniors and graduate students in anthropology, linguistics, philosophy, political science, psychology and sociology; permission of instructor.*

### 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. Behavior Pathology (4)

An introduction to the theories and research of psychopathological processes. Topics include etiology, the natural course, epidemiology of abnormal behavior, descriptive, diagnostic, and cross-cultural issues. Psychosocial, cultural and bio-physical perspectives will be examined. Treatment will not be covered; see Psychology 164. *Prerequisite: Psychology 1.*

### 168. Topics in Black Psychology (4)

This course will examine several topic areas of research and theory involving the psychology of African-Americans. Topics include child development and socialization practices, psychohistory, ethnic identification and the structure and maintenance of belief systems. *Prerequisites: Psychology 104 and 156 or permission of instructor.*

### 169. Small Group Performance (4)

A review of theory and research on small group problem solving and decision making. This is an advanced course for students with a strong interest in social psychology. *Prerequisites: Psychology 104, 111 and permission of instructor. (Not offered in 1978-79.)*

### 181. Advanced Seminar in Ethnic Groups (4)

This course will focus on in-depth discussions of selected research and theoretical issues in the area of ethnic group psychology. Students will also complete original projects representing library, field or experimental research in an area of their choice. *Prerequisites: Psychology 104, 156, 168 or permission of instructor.*

### 194A-B-C. Honors Thesis (4)

Research seminars and research, under the direction of a member of the staff. *Prerequisites: one laboratory course in Psychology (Psychology 115 through 127), Psychology 111, a 3.0 grade-point average and permission 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/NP only.) *Prerequisites: major in psychology and permission of instructor at least one quarter before start of course. Only counts once towards minor or major.*

### 199. Independent Study (2-4)

Independent study or research under direction of a member of the staff. Not counted for credit towards the major. *Prerequisite: special permission of department. (Pass/Not Pass only.)*

## Graduate

### 201A-B. Quantitative Methods in Psychology (3-3)

An intensive course in statistical methods and the mathematical treatment of data, with special reference to research in psychology.

### 201C. Theoretical Methods in Psychology (4)

An introduction to the methodology of model building and theory development in psychology. Topics to be covered include the techniques from stochastic modeling, computer simulations, decision theory and scaling. (Satisfactory/Unsatisfactory grades permitted.)

### 202. Sensory Mechanisms (4)

A survey of current problems in the analysis of sensory systems.

### 203. Physiological Psychology (3)

The central nervous system and its relation to behavior. Seminar.

### 204. Social Psychology (3)

The behavior of man as a function of social variables. Seminar.

### 205. Human-Information Processing (3)

An intensive introduction to the study of the human as an information-processing system. Covers topics in perception, memory, cognition and artificial intelligence. (Not offered in 1978-79.)

### 206. Conditioning and Learning (3)

Classical and operant conditioning in lower animals. Seminar.

### 207. The Nature and Nurture of Development (4)

This graduate seminar will consider the theories, methods and data related to the genetics and environment of behavior with particular attention to early cognitive development, social behavior, and the antecedents of abnormal development.

### 208. Methods in Cognitive Psychology (3)

Traces the development of formal methods from mathematical equations to the information-processing framework. Content includes choice and decision, problem-solving and other intellectual tasks. (Not offered in 1978-79.)

### 209A. Judgment and Decision Making (3)

General theory of judgment and decision. Psychophysical judgment, social judgment, decision-making, and rudiments of measurement theory. Primary emphasis on experimental applications. *Prerequisite: open to undergraduates with permission of instructor. (Not offered in 1978-79.)*

### 209B. Judgment and Decision Making (3)

General theory of judgment and decision. Primary emphasis on mathematical and statistical analysis of algebraic models, both for controlled experiments, and for observational field data. *Prerequisite: Psychology 209A. (Not offered in 1978-79.)*

### 210. Motivation and Learning (3)

Basic seminar on principles of human and animal motivation and learning. (Not offered in 1978-79.)

### 211. Piagetian Theory (3)

Selected topics in Piaget's theory of cognitive development. Seminar.

### 212A-B. Introduction to Visual Science I & II (3-3)

Specification and measurement of the visual stimulus, introductions to basic physiological optics and visual neurophysiology. *Prerequisites: 212A: open to undergraduates with Psychology 159. 212B: open to undergraduates with Psychology 212A.*

### 213. Systematic Issues in Psychology (4)

Selected historical and current topics will be discussed from competing theoretical perspectives. (Not offered in 1978-79.)

### 214. Alcohol and Its Problems (4)

The physiological actions of alcohol on the body; medical implications. Animal research on alcoholism. The relative importance of the environmental and genetic factors in alcoholism. Behavioral change due to alcohol intake. Alcohol consumption and interaction in small groups and society at large. *Prerequisite: undergraduates with permission of instructor.*

### 220. Detection Theory in Psychology (2)

The application of detection theory to human-information processing. Advanced seminar. (Not offered in 1978-79.)

### 221. Judgmental Processes (2)

The psychology of judgments and information integration. Advanced seminar. (Not offered in 1978-79.)

### 222. Brain Functions (2)

Selected topics. Advanced seminar.

### 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 UC San Diego. *Prerequisite: Psychology 212A or special permission of instructor.*

### 224. Memory (2)

Survey seminar on current state of knowledge in human memory. Basic seminar.

### 225. Experimental Analysis of Behavior (2)

Advanced seminar in modern techniques and findings, with special emphasis on operant conditioning and lower animals. Advanced seminar.

### 226. Contemporary Problems in Vision (2)

Survey seminar on recent work in physiological optics, vision research and the visual process. (Not offered in 1978-79.)

### 227. Perceptual Development (2)

Selected topics with emphasis on current experimental work. Advanced seminar. *Prerequisite: permission of the instructor. (Not offered in 1978-79.)*

### 228. Advanced Topics in Mathematical Psychology (4)

Advanced seminar on mathematical models in learning, memory, perception, sensory processes. *Prerequisite: Psychology 201C. (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.)*

### 229. Selected Topics in Social Psychology (2)

Advanced seminar on theoretical issues in attitudes and social perception with special attention to current research.

### 230. Advanced Topics in Developmental Psychology (2)

Theoretical and methodological problems in cognitive, perceptual and social development. Advanced seminar. (Not offered in 1978-79.)

### 231. Advanced Topics in Human Information Processing (2)

Selected discussions of advanced topics. Advanced seminar. *Prerequisite: Psychology 205 or consent of instructor.*

### 232. Advanced Topics in Human Social Behavior (3)

The course will cover topics in human social behavior, with special emphasis on recent developments in experimental and social psychology. Such topics as aggression, affiliation and the relationship between self-reports and other behavior will be examined. Advanced seminar. *Prerequisite: permission of instructor.*

### 233. Topics in Learning and Motivation (3)

Advanced topics in learning and motivation, with special emphasis on current research. Advanced seminar. *Prerequisite: Psychology 210.*

### 234. Cognitive Development (2)

Nature and function of perception and judgment from a developmental point of view. Advanced seminar. (Not offered in 1978-79.)

### 235. Topics in Psycholinguistics (3)

Selected topics in experimental psycholinguistics and applications to language acquisition and pathology. *Prerequisite: consent of instructor. (Not offered in 1978-79.)*

### 236. Animal Discrimination Learning (3)

Intensive examination of problems in the study of discrimination learning. (Not offered in 1978-79.)

### 237. Methods and Topics in Experimental Social Psychology (3)

An advanced seminar dealing with the laboratory and field methods of experimental social psychology and topics such as aggression, altruistic behavior, conformity and bystander intervention. Students will be encouraged to engage in field experimentation. (Not offered in 1978-79.)

### 238. Psychological Theories of Pattern Recognition (3)

Examination of current theoretical and experimental approaches to problems of visual pattern recognition and object identification. (Not offered in 1978-79.)

### 241A-B-C. Advanced Topics in Cognition (4-4-4)

Research and discussion on selected topics in cognitive psychology. May be taken by undergraduate senior majors concurrently enrolled in Psychology 194. (Satisfactory/Unsatisfactory grades permitted.)

**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.* (Satisfactory/Unsatisfactory grades permitted.)

**243. Language Acquisition (4)**

Discussion of the acquisition of language by young children, including such topics as its stages, mechanisms, and relation to nonlinguistic development. *Prerequisite: permission of instructor.* (Not offered in 1978-79.)

**244A-B. Psycholinguistics (4)**

Discussion of human language abilities and consideration of a variety of psychological, biological, and linguistic models to account for them.

**245. Advanced Topics in Human Cognition (3)**

Research and discussion on selected topics in human cognition. *Prerequisite: permission of instructor.*

**246. Exploration in Cognition (3)**

Research seminar in advanced topics in the study of cognition. *Prerequisites: restricted to students in the LNR research group; others should request permission of the instructor; advanced knowledge of modern concepts of human information processing.*

**247. Introduction to Group Processes (4)**

Selected topics in small group research will be discussed. Choice of topics will be largely determined by instructor's and students' interest, but will span a broad range of research on group structure, process, and performance. *Prerequisites: Psychology 201A-B, or permission of instructor.* (Satisfactory/Unsatisfactory grades permitted.) (Not offered in 1978-79.)

**248. Semantic Theory (4)**

An introduction to the fields of semantics and pragmatics. Material from linguistics, philosophy and artificial intelligence will be related to current developments in psychology and psycholinguistics. *Prerequisite: permission of instructor.* (Not offered in 1978-79.)

**249. Reading (4)**

Application of an information processing approach to reading, drawing on research findings in visual information processing, psycholinguistics, and artificial intelligence. Advanced seminar. (Not offered in 1978-79.)

**250. Group Cohesiveness (4)**

Basic problem in theory and research on group cohesion. Seminar. *Prerequisite: Psychology 247.* (Not offered in 1978-79.)

**251. Advanced Topics in Learning and Motivation (3)**

Weekly meetings for graduate students actively engaged in research on conditioning. *Prerequisite: permission of instructor.*

**252. Advanced Topics in Group Processes (3)**

Research and discussion on selected topics in group processes. *Prerequisite: permission of instructor.*

**253. Advanced Topics in Social Perception and Cognition (3)**

Research and discussion on selected topics in cognitive psychology. *Prerequisite: permission of instructor.*

**254. Advanced Topics in Perception (3)**

Research and discussion on selected topics in perception. *Prerequisite: permission of instructor.*

**255. Advanced Topics in Physiological Psychology (3)**

Research and discussion on selected topics in physiological psychology. *Prerequisite: permission of instructor.*

**256. Advanced Topics in Genetics and Field Development (3)**

Research and discussion on selected topics in developmental psychology. *Prerequisite: permission of instructor.*

**257. Advanced Topics on the Analysis of Behavior (3)**

Research and discussion on selected topics in the analysis of behavior. *Prerequisite: permission of instructor.*

**260. Advanced Topics (2)**

Advanced seminar on special topics in theoretical and experimental psychology. *Prerequisite: graduate student in psychology.* (Not offered in 1978-79.)

**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.*

**280. Seminar in Communication and Information Research (1)**

(Satisfactory/Unsatisfactory grade only.)

**296. Research Practicum (1-12)**

Research in psychology under supervision of individual staff members. (Satisfactory/Unsatisfactory grades permitted.) (F,W,S)

**298. Library Research (1-12)**

Reports and surveys of the literature on selected topics. *Prerequisite: graduate student in psychology.* (F,W,S)

**299. Independent Research (1-12)**

Independent research and thesis research. (Satisfactory/Unsatisfactory grades permitted.) (F,W,S)

**500. Apprentice Teaching (4)**

Required teaching practicum for students enrolled in graduate program in psychology. One four-unit course per year of residency. (Satisfactory/Unsatisfactory grade only.)

## Russian Literature

See Literature

## Science

OFFICE: Science 3A, 3AL, 3B, 3BL — Chemistry Department; Science 3C — Biology Department; Science 4A, 4B, 4C, 4AL, 4BL, 4CL — APIS Department

These courses are to be used by Muir College students in fulfilling the science requirements of various majors, as well as the general education requirements of the College (See "Muir College: The General Education Requirements"). The Science 3 series is a course in university-level chemistry; the Science 4 series is a course in university-level physics. Although these courses are intended primarily for students planning to major in a science, they are excellent courses for any student who is adequately prepared.

### Courses

#### Lower Division

**3A. Science: General Chemistry (4)**

Introductory chemistry with emphasis on the applications of chemistry to molecular biology. Required for Muir students majoring in biology. Three hours lecture, one hour discussion. (W)

**3AL. Science: Quantitative Chemical Analysis (2)**

A laboratory course that introduces the student to laboratory techniques, analytical procedures and physical measurements. Includes gravimetric, volumetric and instrumental methods of chemical analysis. Emphasis is on accuracy and precision. One-hour lecture and two three-hour laboratories. Interchangeable with Natural Science 2DL in Revelle and Chemistry 4AL in Fourth College. (W,S)

**3B. Science: General Chemistry (4)**

A continuation of General Chemistry 3A. Three hours lecture, one hour discussion. *Prerequisite: Science 3A.* (S)

**3BL. Science: Quantitative Chemical Analysis (2)**

A continuation of Science 3AL. One hour lecture and two three-hour laboratories. Interchangeable with natural Science 2FL in Revelle and Chemistry 4BL in Fourth College. *Prerequisite: Science 3AL.* (F)

**3C. Thermochemistry (4)**

This course will be required of all Muir students majoring in biology. Thermodynamics, physical chemistry, and chemical reactions will be studied with occasional reference to reactions of biological interest. Emphasis will be on general principles and problem-solving. Three hours lecture, two three-hour laboratories. *Prerequisite: Science 3B.* (F)

**4A. The Physics of Equilibrium and Motion (4)**

An introduction to the science of mechanics. The principle of static equilibrium, Newton's laws, with applications to linear and circular motion. The concepts of work and energy. The conservation of energy, linear momentum, and angular momentum. Four hours' lecture, one hour recitation. *Prerequisite: Mathematics 1A or 2A. Concurrent registration permissible.* Lewak and staff. (F)

**4B. Waves, Energy and Properties of Matter (4)**

An introduction to continuum mechanics, dimensional analysis, and wave motion. Elementary geometrical optics with applications to optical instruments. Calorimetry and heat transport. Four hours' lecture, one hour recitation. *Prerequisites: Science 4A, Mathematics 1B or 2B. Concurrent registration permissible.* Rickett and staff. (W)

**4C. Electromagnetic Theory (4)**

The concepts of fields and potentials. Ohm's Law. Capacitance and inductance. DC and simple AC circuits. Magnetic fields, the law of induction. Four hours' lecture, one hour recitation. *Prerequisites: Science 4A and 4B, Mathematics 1C or 2C. Concurrent registration permissible.* Rotenberg and staff. (S)

**4AL-4BL-4CL. Physics Laboratory (2-2-2)**

A laboratory course sequence designed to demonstrate various concepts in Science 4A-4B-4C respectively, as well as to acquaint students with simple laboratory techniques and physical measurements. One-hour lecture and three hours' laboratory. *Prerequisite: some prior knowledge about Science 4A-4B-4C or concurrent registration is encouraged.* Luo, Lee. (F,W,S)

## Science and Technology

OFFICE: 101, Media Center Communications Building, Third College

**Professors:**

William R. Frazer, Ph.D. (*Physics*)  
Donald R. Helinski, Ph.D. (*Biology*)  
John Helton, Ph.D. (*Mathematics*)  
Te Chiang Hu, Ph.D. (*APIS*)  
Trevor C. McMorris, Ph.D. (*Chemistry*)  
William Nachbar, Ph.D. (*AMES*)  
Sheldon Schultz, Ph.D. (*Physics*)  
Melvin I. Simon, Ph.D. (*Biology*)  
Herbert Stern, Ph.D. (*Biology*)

**Associate Professors:**

Willie C. Brown, Ph.D. (*Biology*)  
Elvin Harper, Ph.D. (*Chemistry*)  
Katja Lindenberg, Ph.D. (*Chemistry, Chairwoman of Science and Technology Program*)  
Juan E. Luco, Ph.D. (*AMES*)  
Herbert B. Shore, Ph.D. (*Physics*)  
Joseph W. Watson, Ph.D. (*Chemistry, Provost of Third College*)  
Daniel E. Wulbert, Ph.D. (*Mathematics*)  
Juan Yguerabide, Ph.D. (*Biology*)

**Assistant Professors:**

Thomas J. Enright, Ph.D. (*Mathematics*)  
Ronald J. Evans, Ph.D. (*Mathematics*)  
P. A. George Fortes, Ph.D. (*Biology*)  
Michael E. Garst, Ph.D. (*Chemistry*)  
David Gough, Ph.D. (*AMES*)  
Leonard Haff, Ph.D. (*Mathematics*)  
William B. Kristan, Jr., Ph.D. (*Biology*)  
John Leong, Ph.D. (*Chemistry*)  
Oscar J. Lumpkin, Ph.D. (*Physics*)  
Terrence C. Miller, Ph.D. (*APIS*)

## Science and Technology

Ramon Pinon, Jr., Ph.D. (*Biology*)  
Anthony Sebald, Ph.D. (*AMES*)  
Richard L. Sites, Ph.D. (*APIS*)

### Lecturers:

Edward E. Coughran, (*Director, Campus Computer Center*)  
Dean S. Ezell, Ph.D. (*Biology*)  
Meredith G. Somero, Ph.D. (*Biology*)  
Frank B. Thies, Ph.D. (*Mathematics*)

\* \* \*

**General Requirements** The Science and Technology Program is designed to give students an understanding of the basic laws of nature and their relation to the foundations of a technological society. A basic sequence is required of all students in Third College, consisting of three quarters covering biology, chemistry, and physics (Science and Technology 10A,B,C or 11A,B,C).

1. The Science and Technology 10A,B,C sequence is for students with weak or modest previous preparation in science and/or no career objectives in this area.
2. The Science and Technology 11A,B,C sequence is for students with good high school science preparation and/or aspirations towards a science major.

The mathematics requirements for students in Third College consist of two quarters (8 units) of any mathematics course offering at UC San Diego. Descriptions of the courses are listed under the Department of Mathematics.

**Science Majors** Science and Technology is a lower division interdisciplinary program of the Third College. It is designed to prepare students for the science, mathematics, and engineering majors at UC San Diego. Therefore, students declaring a science, mathematics, or engineering major are expected to satisfy the science and mathematics prerequisites for the departmental major as well as the Third College general education requirements. (See appropriate department under "Courses, Curricula, Programs of Instruction.") It is also recommended that students consult a faculty member affiliated with the Science and Technology Program, in the department offering the major.

**Applied Mechanics and Engineering Science Majors** Third College students interested in preparing for an upper-division major in applied mechanics, systems science, or bioengineering (engineering or premedical) in the Department of Applied Mechanics and Engineering Sciences (AMES) can select an individual lower-division program worked out with their AMES/Third College advisers to satisfy AMES prerequisites (see AMES). Such a program would normally require completion of Mathematics 2A, 2B, 2C, 2DA and 2EA, and Science and Technology 16A and 16B, before the two-year AMES major is begun. Prospective AMES majors should contact an AMES/Third College adviser about a program of preparatory courses immediately after entering the College. Third College students interested in the AMES four-year program leading to the

Bachelor of Science in Engineering (Engineering Sciences) should contact an AMES/Third College adviser immediately after being accepted to the College.

## Courses

### Lower Division

#### 10A. Introduction to Modern Biology (4)

An introductory course in modern biology exploring specific areas to illustrate biological principles. A significant portion of the course is devoted to microbiology. (F)

#### 10B. Chemistry (4)

This course is intended for non-science majors. It introduces some of the fundamental concepts and theories of chemistry, including atomic and molecular structure, the nature of chemical reactions and an introduction to organic and biological chemistry. (W)

#### 10C. Physics (4)

Selected basic phenomena encountered in the natural sciences. Typical topics include the range of length, time, and mass dimensions encountered in physical phenomena; energy and other selected topics as related to current problems in science and society. One-hour lecture and up to six hours tutorial. *Prerequisite: some familiarity with algebra and trigonometry helpful. Calculus not required.* (S)

#### 11A. Vertebrate Zoology (4)

An introduction to the vertebrate way of life through the examination of selected topics in anatomy, physiology, environmental adaptation, and evolution. Three hours' lecture, three hours' laboratory. (Biology 15 is a sequel to Science and Technology 11A.) (F)

#### 11B. Introduction to Chemistry (4)

A basic introduction to chemistry for science majors with insufficient science and math backgrounds for enrollment in Science and Technology 12A. This course is intended to prepare such students for enrollment in the general chemistry sequence 12A, B, C (or any other general chemistry sequence). It reviews basic mathematical skills and covers certain fundamental aspects of chemistry, including atomic theory and structure and stoichiometry. *Prerequisites: Math 4C, which may be taken concurrently. Students who have completed Math 4B and/or 4C, with a grade of "D" or "F," may only enroll with the consent of the instructor. This course is not open to students who obtained a grade of "B" or "A" in Math 1A or in Math 2A or in any higher math course.* (S)

#### 11C. Physics (4)

This course is designed to introduce potential science majors to concepts in physics and to prepare them for further sequences in the sophomore year. Topics include kinematics, dynamics, energy, momentum, and thermodynamics. Emphasis will be on problem solving. Three hours' lecture. *Prerequisites: Mathematics 1A or 2A (or concurrent enrollment).* (S)

#### 12A. Chemistry (4)

The first course of a three-quarter introductory general chemistry sequence for science majors which covers atomic theory and structure, stoichiometry, chemical bonding, reactions in aqueous solution, gas laws and kinetic theory of gases, and solids. *Prerequisites: Math 1A or 2A, either of which may be taken concurrently. This course is not open to students who have completed Math 4C with a grade of "D" or "F" (unless they have completed Math 1A or 2A with a grade of "C" or better). Science and Technology 11B is not required if students meet the above prerequisites.* (F)

#### 12AL. Chemistry Laboratory (2)

A laboratory course designed to demonstrate various principles covered in Science and Technology 12A. The course introduces the student to gravimetric and volumetric methods of analysis. Accuracy and precision is emphasized. Includes one one-hour lecture and one four-hour laboratory. *Prerequisite: registration is usually concurrent with registration in Science and Technology 12A.* (F)

#### 12B. Chemistry (4)

The second quarter of a three-quarter course in general chemistry for science majors. Topics to be covered include liquids, solutions, thermodynamics, kinetics, equilibrium, acids and bases, ionic equilibria, and electrochemistry. *Prerequisites: Science and Technology 12A, Math 1A or 2A, Math 1B or Math 2B. Math 1B or Math 2B may be taken concurrently.* (W)

#### 12BL. Chemistry Laboratory (2)

A continuation of Science and Technology 12AL. The course emphasis is on instrumental methods of analysis. Includes one one-hour lecture and one four-hour laboratory. Registration is usually concurrent with registration in Science and Technology 12B. (W)

#### 12C. Chemistry: Introduction to Organic Chemistry (4)

The third quarter of a three-quarter course in general chemistry for science majors. Topics to be covered include covalent bonding and molecular structure, chemistry of representative and transition elements, nuclear chemistry, organic chemistry and biochemistry. *Prerequisites: Science and Technology 12B.* (S)

#### 15A. Physics (4)

An introduction to mechanics: statics, Newton's laws, momentum and energy, rotational motion. This course is primarily for students in the Third College Human Biology Program. Three hours' lecture. *Prerequisite: grade of "B" or better in Mathematics 1A and concurrent enrollment in Mathematics 1B, or concurrent enrollment in Mathematics 2A.* (F)

#### 15B. Physics (4)

Introduction to electromagnetism and applications in electricity: electric and magnetic fields, electric potential, DC and AC circuit theory, electrical measurements. Three hours' lecture. *Prerequisite: Science and Technology 15A; concurrent enrollment in Mathematics 1C or Mathematics 2B; and concurrent enrollment in Science and Technology 15BL.* (W)

#### 15BL. Physics Laboratory (1)

Introduction to laboratory methods. Experiments study electromagnetic circuit elements and their use in passive and active circuits. Two-hour laboratory is usually taken concurrently with Science and Technology 15B. (W)

#### 15C. Physics (4)

Introduction to mechanics of fluids, thermal physics, optics, description of the structure of atoms and nuclei. Three hours' lecture. *Prerequisite: Science and Technology 15B and concurrent enrollment in Science and Technology 15CL.* (S)

#### 15CL. Physics Laboratory (1)

Analysis of laboratory data. Experiments in thermal physics, optics and atomic physics. Two-hour laboratory is usually taken concurrently with Science and Technology 15C. (S)

#### 16A. Introduction to Engineering Mechanics (4)

Statics of particles and rigid bodies, forces in beams, cable structures, submerged structures, and machine elements. Analysis of truss structures in two and three dimensions. Friction. Applications to engineering problems. *Prerequisites: Science and Technology 15A, or Physics 2A or 3A, or Science 4A, or equivalent; Mathematics 2EA or Mathematics 2E (concurrent registration permitted).* (W)

#### 16B. Introduction to Circuit Analysis (4)

Steady-state and transient analysis of circuits composed of linear electrical elements; electromechanical analogy; acoustic and hydraulic elements. Applications to engineering problems. *Prerequisites: Science and Technology 15B, or equivalent; Math 2EA (or concurrent registration), or Math 2D and Math 2E.* (S)

#### 20. Problem Solving & Basic Programming (2)

This course is an introduction to BASIC mini computer programming and applications. The following are typical of the topics covered: interactive techniques, simulation methods, subroutines, matrix manipulations, computer aided instructions, graphics, and statistics calculations. The class will meet for three weeks, for "hands on" instruction on the two Third College computers. This will be followed by an individual project in the student's area of interest. A student with credit for APIS 61 will not be eligible for credit in this course. Students wishing to pursue further instruction in programming or computer science are advised to follow Science and Technology 20 with APIS 61. *Prerequisite: this course will not require an extensive mathematics background. A solid high school background or some college mathematics will suffice. A student with credit for APIS 10 or APIS 13 will not be eligible for credit in this course.* (F,W,S)

#### 69. Computers and Society (4)

An introduction to computers, their applications, and their impact on people and social institutions. Factual and technical information for making objective judgments about computer use. Social problems created by the use of computers and tools for solving them. Constructive and creative thought about technology and its social impact. The course has no prerequisites; it is based on the hypothesis that the computer affects all of us and is important for everyone to understand. (F)



## Upper Division

### 195. Undergraduate Teaching

Course is designed to provide undergraduate students with teaching experience in science laboratory courses. The students will assist in the preparation and running of laboratory sections. (P/NP grades only.) *Prerequisites:* accomplishment of above-average grade in course in question and approval of instructor. (F.W.S.)

## Science, Technology and Public Affairs

OFFICE: 1516 Humanities—Library Building, Revelle College

### Professors:

Herbert F. York (*Physics*) (*Program Director*)  
Hannes Alfvén (*APIS*)

James R. Arnold (*Chemistry*)

James N. Brune (*Geological Research Division, SIO*)

Clifford Grobstein (*Biological Science and Public Policy*)

Sanford A. Lakoff (*Political Science*)

Stanford S. Penner (*AMES*)

Roger R. Revelle (*Science and Public Policy*)

### Associate Professor:

Georgios H. Anagnostopoulos (*Philosophy*)

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 technological and scientific development as well as the impact of science and 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 environmental problems.

**The Minor Program for Warren College** The Science, Technology and Public Affairs (STPA) minor consists of six courses chosen from the following lists. Of these six, at least four must be from the list of STPA courses and not more than two of those four should be given by the same instructor. Two of the six courses may be chosen from the list of related courses in other departments and programs. Students' specific plans for completing the minor should be approved by the program office no later than early in the junior year.

## Courses

### Lower Division

#### 35. Society and the Sea (4)

(Same as AMES 35) Selected topics including living and non-living resources, seaports and sea travel, the frail sea, the wild sea, military oceanology, legal, economic and social aspects, coastal zone management, scientific research. The sea and weather. Instructor: C. Gibson

#### 69. Computers and Society (4)

(Same as APIS 69) An introduction to computers, their applications, and their impact on people and social institutions. Factual and technical information for making objective judgments

about computer use. Social problems created by the use of computers and tools for solving them. Constructive and creative thought about technology and its social impact. The course has no prerequisites; it is based on the hypothesis that the computer affects all of us and is important for everyone to understand. Instructor: R. Sites

## Upper-Division Core Courses

### 100A. Origins and Results of the World's Space Programs (4)

(Same as Contemporary Issues 100) A course designed to explore and analyze the origins and results of a particular modern technology, using the world's space programs as an example. The political, technological, and strategic origins of the U.S., Soviet, and other space programs from the earliest times will be presented, with special emphasis on the period since World War II. Results to be discussed will include science and monitoring arms-control agreements. (Not offered 1978-79.)

### 100B. Seminar on the Results and Value of the Space Programs (4)

A continuation, in seminar form, of STPA 100A for those who want to go more deeply into the matter. Each student will be required to present a paper for discussion by the others. Limited to twenty. *Prerequisite:* STPA 100A or consent of instructor. (Not offered 1978-79.)

### 101A. Arms and Arms Control (4)

(Same as Frontiers of Science 104) A course designed to explore and analyze a particular current issue in technology policy and how society goes about coping with it. The technological, political, and strategic ideas that underlie both the nuclear-arms race and attempts to control it will be discussed in a historical perspective. H. York (Not offered in 1978-79.)

### 101B. Seminar on Arms and Arms Control (4)

A continuation, in seminar form, of course 101A for those who want to go more deeply into the subject. Each student will be required to present a paper for discussion by the others. Limited to twenty. *Prerequisite:* STPA 101A or the consent of the instructor. H. York (Not offered in 1978-79.)

### 105A-B-C. Technology and Society (4)

(Same as Political Science 105A-B-C). This course examines the impact of advances in science and technology on society. Among the topics considered: the theory of post-industrial society, the debate over limits to growth, the "energy crisis," the making of science policy, and the roles and responsibilities of scientists and technologists in politics. Instructors: S. Lakoff, H. York, R. Revelle, C. Grobstein

### 107. Technology and Human Values (4)

(Same as Philosophy 125) Traditional ideas of nature and the rise of science and technology. The influence of the rise of science and technology on political ideals, on human life, on freedom, on education, and on warfare. G. Anagnostopoulos

### 119A. Energy: Demands, Resources, Impact, Technology and Policy (4)

(Same as Frontiers of Science 119A) Past and estimated future energy demands. Renewable and non-renewable energy resources. Economic impact of energy use. Environmental impact of energy use. Energy conservation in manufacturing, transportation, home use. Energy policy. AMES and physics faculty.

### 119B. Energy: Non-Nuclear Energy Technologies (4)

(Same as Frontiers of Science 119B) Oil recovery from tar sands and oil shale. Coal production, gasification, liquification. 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 power production, transmission, and distribution. *Prerequisites:* lower-division science and mathematics sequence in Revelle or equivalent and STPA 119A. AMES and physics faculty

### 119C. Energy: Nuclear Energy Technologies (4)

(Same as Frontiers of Science 119C) 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. *Prerequisites:* Lower-division science and mathematics sequence in Revelle or equivalent and STPA 119B

### 127. Understanding Earthquake Hazard

(Same as Frontiers of Science 127) This course will deal with elementary physical concepts necessary for understanding earthquake hazard. Topics will include earthquake causes, mechanism, probability, prediction, and ways of reducing earthquake hazard. The course will include discussions of public policy concerning building design, siting of nuclear reactors and other critical structures. Instructor: J. Brune (Not offered in 1978-79.)

### 170. American National Security Policy (4)

(Same as Political Science 170) A course about U.S. national security objectives and the means for achieving them. Special emphasis will be placed on current U.S. military posture and arms control policies, and the rationales behind them. Topics will include the strategic balance, the NATO Warsaw Pact confrontations, the Middle East, SALT, and other arms control forums. H. York and Political Science faculty.

### 180. Senior Seminar in Biomedical Science and Public Policy Analysis (4)

Readings and discussion of requirements for effective utilization of biomedical science in public policy analysis with examples drawn from biostandardization (radiation, carcinogenicity, toxicity), bioethics (life support, human experimentation), biological engineering, research policy, etc. *Prerequisite:* senior or graduate standing. Instructor: C. Grobstein and others

### 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. Instructor: H. York

**Related Courses** in other departments and programs (change somewhat from year to year.)

AMES 149A-B-C

Biology 5

Communications 180, 191

Economics 105, 116, 160, 161

Frontiers of Science 112, 122, 124, 125

Philosophy 112A-B

Sociology 131

Urban and Rural Studies 144, 146

## Scripps Institution of Oceanography

OFFICE: 1156 Ritter Hall

### Professors:

Gustaf Arrhenius, Ph.D. (*Oceanography*)

Robert S. Arthur, Ph.D. (*Oceanography*)

George E. Backus, Ph.D. (*Geophysics*)

Andrew A. Benson, Ph.D. (*Biology*)

James N. Brune, Ph.D. (*Geophysics*)

Charles S. Cox, Ph.D. (*Oceanography*)

Harmon Craig, Ph.D. (*Geochemistry and Oceanography*)

Joseph R. Curray, Ph.D. (*Marine Geology*)

Russ E. Davis, Ph.D. (*Oceanography*)

Albert E. J. Engel, Ph.D. (*Geology*)

James T. Enright, Ph.D. (*Behavioral Physiology*)

J. Freeman Gilbert, Ph.D. (*Geophysics*)

Edward D. Goldberg, Ph.D. (*Chemistry*)

Harold T. Hammel, Ph.D. (*Physiology*)

Richard A. Haubrich, Ph.D. (*Geophysics*)

Francis T. Haxo, Ph.D. (*Biology*)

James W. Hawkins, Ph.D. (*Geology*)

Walter F. Heiligenberg, Ph.D. (*Behavioral Physiology*)

Myrl C. Hendershott, Ph.D. (*Oceanography and Vice Chairman of the Department*)

Robert R. Hessler, Ph.D. (*Biological Oceanography*)

Douglas L. Inman, Ph.D. (*Oceanography*)

## Scripps Institution of Oceanography

John D. Isaacs, B.S. (*Oceanography*)  
Charles D. Keeling, Ph.D. (*Oceanography*)  
Devendra Lal, Ph.D. (*Nuclear Geophysics*)  
Ralph A. Lewin, Ph.D., Sc.D. (*Biology*)  
John A. McGowan, Ph.D. (*Oceanography*)  
Henry W. Menard, Ph.D. (*Geology*)  
Michael M. Mullin, Ph.D. (*Oceanography and  
Chairman of the Department*)  
Walter H. Munk, Ph.D. (*Geophysics*)  
William A. Newman, Ph.D. (*Oceanography*)  
William A. Nierenberg, Ph.D. (*Physics, Vice  
Chancellor of Marine Sciences and Director  
of Scripps Institution of Oceanography*)  
Robert L. Parker, Ph.D. (*Geophysics*)  
Joseph L. Reid, M.S. (*Oceanography*)  
Richard H. Rosenblatt, Ph.D. (*Marine Biology*)  
George G. Shor, Jr., Ph.D. (*Marine  
Geophysics*)  
Fred N. Spiess, Ph.D. (*Oceanography*)  
Charles W. Van Atta, Ph.D. (*Engineering  
Physics and Oceanography*)  
Benjamin E. Volcani, Ph.D. (*Microbiology*)  
Edward L. Winterer, Ph.D. (*Geology*)  
Edward C. Bullard, Sc.D., F.R.S. (*Geophysics,  
Emeritus*)  
Seibert Q. Duntley, Sc.D. (*Physics, Emeritus*)  
Denis L. Fox, Ph.D. (*Marine Biochemistry,  
Emeritus*)  
Carl L. Hubbs, Ph.D. (*Biology, Emeritus*)  
Martin W. Johnson, Ph.D. (*Marine Biology,  
Emeritus*)  
Fred B. Phleger, Ph.D. (*Oceanography,  
Emeritus*)  
Russell W. Raitt, Ph.D. (*Geophysics, Emeritus*)  
Norris W. Rakestraw, Ph.D. (*Chemistry,  
Emeritus*)  
Roger R. Revelle, Ph.D. (*Oceanography,  
Emeritus*)  
Per F. Scholander, M.D., Ph.D. (*Physiology,  
Emeritus*)  
Francis P. Shepard, Ph.D. (*Submarine Geol-  
ogy, Emeritus*)  
Victor Vacquier, M.A. (*Geophysics, Emeritus*)  
Claude E. ZoBell, Ph.D. (*Marine Microbiology,  
Emeritus*)

### Associate Professors:

Jeffrey L. Bada, Ph.D. (*Marine Chemistry*)  
Wolfgang H. Berger, Ph.D. (*Oceanography*)  
Paul K. Dayton, Ph.D. (*Oceanography*)  
D. John Faulkner, Ph.D. (*Marine Chemistry*)  
Carl H. Gibson, Ph.D. (*Engineering Physics  
and Oceanography*)  
Joris M.T.M. Gieskes, Ph.D. (*Oceanography*)  
Nicholas D. Holland, Ph.D. (*Oceanography*)  
Thomas H. Jordan, Ph.D. (*Geophysics*)  
Miriam Kastner, Ph.D. (*Geology*)  
John D. Mudie, Ph.D. (*Geophysics*)  
Melvin N. A. Peterson, Ph.D. (*Oceanography*)  
George N. Somero, Ph.D. (*Biology*)

### Assistant Professors:

Daniel Goodman, Ph.D. (*Population Biology*)  
Robert T. Guza, Ph.D. (*Oceanography*)  
J. Douglas Macdougall, Ph.D. (*Earth Sci-  
ences*)  
Kenneth H. Nealson, Ph.D. (*Marine Biology*)  
Richard L. Salmon, Ph.D. (*Oceanography*)  
Hans R. Thierstein, Ph.D. (*Geology*)  
Clinton D. Winant, Ph.D. (*Oceanography*)

\* \* \*

Elbert H. Ahlstrom, Ph.D., *Adjunct Professor of  
Oceanography*  
Victor C. Anderson, Ph.D., *Professor, (APIS)*  
Willard N. Bascom, *Adjunct Professor of Ap-  
plied Ocean Science*  
Hugh Bradner, Ph.D., *Professor, (AMES)*  
Theodore H. Bullock, Ph.D., *Professor of  
Neurophysiology*  
Edwin L. Hamilton, Ph.D., *Adjunct Professor of  
Oceanography*  
John R. Hunter, Ph.D., *Associate Adjunct Pro-  
fessor of Marine Biology*  
Reuben Lasker, Ph.D., *Adjunct Professor of  
Marine Biology*  
Fred N. White, Ph.D., *Professor of Medicine*  
Angelo F. Carlucci, Ph.D., *Research Micro-  
biologist and Lecturer*  
Theodore Enns, Ph.D., *Research Physiologist  
and Lecturer*  
Richard W. Eppley, Ph.D., *Research Biologist  
and Lecturer*  
Frederick H. Fisher, Ph.D., *Research  
Oceanographer and Lecturer*  
Abraham Fleminger, Ph.D., *Research  
Biologist and Lecturer*  
Osmund Holm-Hansen, Ph.D., *Research  
Biologist and Lecturer*  
Michael P. Kennedy, Ph.D., *Research As-  
sociate and Lecturer*  
William R. Riedel, D.Sc., *Research Geologist  
and Senior Lecturer*  
Jonathan Berger, Ph.D., *Associate Research  
Geophysicist and Lecturer*  
G. David Lange, Ph.D., *Associate Professor  
(Neurosciences)*  
LeRoy M. Dorman, Ph.D., *Associate Research  
Geophysicist and Lecturer*  
William H. Fenical, Ph.D., *Assistant Research  
Chemist and Lecturer*  
Robert A. Knox, Ph.D., *Assistant Research  
Oceanographer and Lecturer*  
Kenneth C. Macdonald, Ph.D., *Assistant Re-  
search Geophysicist and Lecturer*  
Elizabeth L. Venrick, Ph.D., *Assistant Re-  
search Biologist and Lecturer*  
Gerald L. Wick, Ph.D., *Assistant Research  
Physicist and Lecturer*

\* \* \*

The graduate department of the Scripps Institution of Oceanography offers graduate instruction leading to M.S. and Ph.D. degrees in oceanography, in marine biology and in earth sciences. Emphasis is on the Ph.D. program. A student's work normally will be concentrated in one of several curricular programs within the department. These programs now include: biological oceanography, marine biology, marine chemistry, geological sciences, geophysics, physical oceanography and applied ocean sciences.

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 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 in-

terdisciplinary character. The research vessels and other facilities of the Scripps Institution and its associated laboratories (including the Institute of Geophysics and Planetary Physics) are available to department students, many of whom participate in oceanographic research at sea.

### The Curricular Programs **Biological Oceanography**

is the field of study concerned with the interactions of populations of marine organisms with one another and with their physical and chemical environment. Since these interactions are frequently complex, and since the concepts and techniques used in investigating the environment and the populations are drawn from many fields, biological oceanography is, of necessity, interdisciplinary. Therefore, studies in physical oceanography, marine chemistry, and marine geology, as well as biology, are pertinent. Research activities in this curriculum include studies of the factors influencing primary and secondary productivity and nutrient regeneration, food-chain dynamics, community ecology of benthic and pelagic forms, population dynamics, habitat changes and disruption, fishery biology, systematics, evolution, biogeography, behavior as it affects distribution, and sampling problems. Theoretical, experimental, and direct observational approaches to these problem areas are conducted.

**Marine Biology** is the study of marine organisms, their development, and their adaptations. It is, therefore, concerned with the physiological and biochemical processes in marine organisms, their genetic relationships, and the relationship between them and their environment, both biotic and physical. It encompasses several major areas of modern biology, and is interpreted from the viewpoints gained through understanding the physical and chemical dynamics of the seas. Research activities of faculty members in the curriculum currently include microbiology, ultrastructure, photobiology (photosynthesis and respiration, energy-transfer processes and comparative anatomy and physiology of vertebrate and invertebrate vision), barobiology, cardiovascular physiology, comparative biochemistry, comparative and cellular physiology, neurophysiology and behavior, systematics, distribution, ecology, developmental biology and evolution of marine animals and plants.

**Marine Chemistry** is concerned with chemical processes operating within the marine environment: the oceans, the marine atmosphere, and the sea floor. The interactions of the components of seawater with the atmosphere, with the sedimentary solid phases, and with plants and animals form the basis for research programs. These include: investigations of the carbon system, natural products, chemical interactions between marine organisms, physical and inorganic chemistry of sediment water systems, organic chemistry in the marine environment, distribution of noble gases in seawater, and effects of pollutants on the marine environment.

**Geological Sciences** emphasizes the application of observational, experimental and theoretical methods of the basic sciences to the understanding of the solid earth, ocean, atmosphere, and the solar system. Principal sub-programs at Scripps are Marine Geology, Petrology, and Geochemistry. Expedition work at sea and field work on land are emphasized as an essential complement to laboratory and theoretical studies. Marine geology is the field of study concerned with the origin, properties, and history of ocean basins and with the geological processes that affect them. Research areas include tectonics and vulcanism; geomorphology, structure, and deformation of the oceanic crust and continental margins, utilizing both geophysical and geological techniques; deep sea and continental margin sedimentation, stratigraphy, and paleontology; and beach and nearshore processes. Petrology is the study of the origin and history of the rock complexes of the earth's crust and upper mantle, with emphasis on the igneous, metamorphic, and sedimentary rocks of the ocean basins and their margins, the characteristics and interrelations of the oceanic and continental crust, and studies of lunar and meteoritic materials. The Geochemistry Program is designed for students with undergraduate majors in either geology or chemistry. Areas of advanced study and research include the geochemistry of the ocean, the atmosphere, and the solid earth, nuclear geochemistry, circulation and mixing of oceanic water masses based on carbon, oxygen, carbon-14, radium, radon, stable isotopes, and rare gases, studies of volcanic and geothermal phenomena, the interaction of sediments with seawater and interstitial waters, geochemical cycles, and the history and composition of the ocean and sedimentary rocks.

**Geophysics** emphasizes the application of general experimental and theoretical methods of physics to fundamental problems in the atmosphere, oceans, and interior of the Earth, and in the solar system. Research interests within the curricular group include: magnetohydrodynamic phenomena in the Earth's core, hydrodynamics of oceans and atmospheres, geophysical inverse problems, theoretical seismology, the design of geophysical arrays, multichannel data-processing methods, nonlinear tidal prediction, long-period resonant and equilibrium fluctuations in the Earth and its oceans, radiative transfer in the sea and the atmosphere, interactions of weakly non-linear wave fields, studies of oceanic crustal structure, acoustic propagation in the oceans, interpretation of regional geomagnetic data, processes of ocean-floor spreading, and irreversible thermodynamics.

**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. Research activities within this curricular group 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.

**Applied Ocean Sciences** is concerned with man's purposeful and useful intervention into the sea. The program combines the interests of faculty members of the Scripps Graduate Department, the Department of Applied Mechanics and Engineering Sciences, and the Department of Applied Physics and Information Science to produce oceanographers who are knowledgeable of modern engineering and engineers who know about the oceans. Instruction and research are not restricted to structural, mechanical, material, electrical, and physiological problems of operating within the ocean but include the applied environmental science of the sea as well. 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. Present research activities within the curricular group include studies of: deep circulation and deep fish populations; deep-sea autonomous vehicles, instruments, basic control devices and special collecting gear; seismic surveys of the mantle; ocean bottom microseisms and crustal displacements associated with earthquakes; surveys of bathymetric-magnetic trends; deep-sea drilling; design and construction of special purpose ocean vehicles (ships, submarines, platforms) such as FLIP; remotely operated cable-connected vehicles and stations on the sea floor; sonar systems and sonar signal processing equipment; underwater communication and signal detection; underwater photography and television; visibility by swimmers; underwater lasers; remote sensing of sea-surface temperature, roughness, and marine resources from aircraft and orbital spacecraft; meteorology above the oceans; turbulent flows, formation of barrier beaches; mechanisms of currents, sand transport and sediment transport in the surf zone, the shelf and in submarine canyons; diving and hyperbaric physiology. Studies of air-sea interaction, turbulence in mixing from FLIP, and ships of the Scripps fleet.

**Requirements for Admission** Candidates for admission should have a bachelor's or master's degree in one of the physical, biological, or earth sciences; in some cases a degree in mathematics or engineering science is accepted. 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 or chemistry.
5. Biology and geology, minimum of one quarter each.
6. Preparation in at least one foreign language chosen from the following: German, Russian, a Romance language.
7. Applicants for admission are required to submit scores on the verbal and quantitative tests of the Graduate Record Examinations given by the Educational Testing Service of Princeton, New Jersey.

Specific additional requirements for admission to the various curricular programs are as follows:

Biological oceanography — two years of chemistry, including general and organic chemistry (physical chemistry requiring calculus may be substituted for physics requiring calculus where a more elementary physics course was taken); and a year of general biology (or zoology, or botany). Normal preparation should also include a course in general geology and at least one course in three of the following four categories: systematics (e.g., invertebrate zoology), population biology (e.g., ecology), functional biology (e.g., comparative physiology), morphology (e.g., embryology). In special cases other advanced courses in mathematics or natural sciences may be substituted for one or more of the above.

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 (biochemistry and physical chemistry will be expected of students in experimental biology, although the student may, if necessary, enroll in these courses at UC San Diego after admission). Training in one or more of the following areas is strongly recommended: cellular biology, molecular biology, comparative physiology, genetics, developmental biology, ecology, comparative anatomy, vertebrate and invertebrate zoology, microbiology and botany. A strong scholastic record in a narrower biological field may be considered in lieu of breadth of background.

Marine chemistry — major in chemistry or biochemistry.

Geological sciences — major in one of the earth sciences or physical or inorganic chemistry. Physical chemistry with calculus is required, and preparation beyond the minimum requirements in mathematics, physics, and chemistry is strongly recommended.

Geophysics — major in physics or mathematics, or equivalent training.

Physical oceanography — major in a physi-

cal science, including three years of physics and mathematics.

Applied ocean sciences — major in physical science or engineering science, including three years of physics or applicable engineering and three years of mathematics at college level.

Candidates with preparation different from that given above can be admitted only if their undergraduate or previous graduate record has been outstanding. It is possible to make up most shortcomings in preparation with courses available at UC San Diego.

**Programs of Study** Because of limited facilities, the department does not encourage students who wish to proceed only to the M.S. If circumstances warrant, the degree is normally offered under Plan II (comprehensive examination) after completion of course work established by the department. The program of study for the Ph.D. degree is determined in consultation with the student's adviser (after the first year, the chairperson of the student's guidance or doctoral committee). General requirements of the curricular groups are as follows:

**Biological Oceanography** The student will be expected to be familiar with the material presented in the following courses: SIO 210A, 240, 260, 270, 275A-B, 276A-B, 280, 280L, and one of 289, 274 or 294A. Other course work ordinarily will be recommended by the student's advisory committee, usually including 278 (or equivalent) and at least one advanced-level course in physical, chemical, or geological oceanography. Participation in an oceanographic cruise (minimum of two weeks duration) is required.

**Marine Biology** Entering graduate students will be expected to gain a varied research experience in several laboratories during their first year through a "rotation system" normally consisting of six weeks' involvement in the activities of each of three different laboratories to be selected in consultation with their guidance committees and with the consent of the other professors concerned. In their first year at SIO, or latest, early in the fall quarter of their second year, 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 210A, 260, 280, 280L and 289, as well as any other course work recommended by the advisory committee. All students are expected to enroll and actively participate in a seminar course during two quarters of each year.

**Marine Chemistry** Students in this curriculum will be expected to take courses within the areas of physical and biological oceanography and marine geology or marine biology, as well as courses in the Department of Chemistry, which will be assigned according to personal needs after consultation with a faculty adviser.

**Geological Sciences** The Geological Sciences curricular group offers programs

leading to the Ph.D. either in earth sciences or oceanography. The only general requirement is responsibility for material offered in the Marine Geology Seminar (SIO 248A-B-C). The "basic" courses (SIO 210A, 260 and 280) are considered essential for the oceanography degree. Some, or all, of these courses will normally be taken by candidates for the earth sciences degree. Other courses in oceanography and related areas 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 doctoral qualifying examination will be given during the second year of residence. There are no additional language requirements beyond the general department admission requirements of one year of college-level study in a modern foreign language useful in the student's studies.

**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. Every student, however, will be required to have knowledge of one or more of the ocean sciences. In the winter quarter of the second year of residence each student will be given an oral departmental examination, which is intended to cover the student's formal training. A brief presentation of possible research interests will also be expected at this exam. There is no formal language requirement.

**Physical Oceanography** Students in this curricular program will be expected to have satisfied the departmental admission requirement of preparation in at least one important foreign language and to demonstrate proficiency in the subjects treated by the following courses: SIO 210A, 211A-B, 212A-B, 214, 216A, 223, 240, 260 and 280; AMES 294A, B, C. Additional requirements chosen from oceanography or other fields will be based on the objectives and needs of the individual student.

**Applied Ocean Sciences** Students must: (a) take or demonstrate their knowledge of the following basic courses: SIO 210A, 240, 260, 280 and AMES 294(A-C); and (b) attend the Applied Ocean Sciences Seminar throughout their 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 by the advisory committee.

**Language Requirements** The department has no formal language requirements. Graduate students are expected to have satisfied the entrance requirement of preparation in at least one important foreign language. Within

the department, 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 primarily oral, although written parts may be included. The student will be required to demonstrate in quantitative and analytical manner comprehension of required subject material and of the pertinent interactions of physical, chemical, biological, or geological factors.

After 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. This committee will determine the student's qualifications for independent research, normally by means of a qualifying examination late in the second year of study or early in the third year, and will supervise the student's performance and reporting of his or her research.

The nature of the qualifying examination varies between curricular groups. In biological oceanography, marine biology, geological sciences, physical oceanography, and applied ocean 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, the student will be expected to present, in an oral examination, both a major and a minor proposition. The major proposition will consist of a statement of an original research problem or scientific idea within his or her area of interest. The student should be prepared to discuss the theory and experimental techniques that may be involved, the significance of the proposition, and its relationship to previous knowledge. The minor proposition should consist of a research problem or scientific idea outside the student's main field of interest. In geophysics, the student presents an original research problem, in the form of a written proposition, to the candidacy 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. It is expected that each doctoral candidate will submit a manuscript based on this dissertation for publication in a scientific journal.

**Special Financial Aids** In addition to teaching and research assistantships, fellowships, traineeships and other awards available on a campus-wide competitive basis, the department has available a certain number of fellowships and research assistantships 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

**208. Seminar in Applied Ocean Sciences (1)**

Topics in applied ocean sciences. One hour seminar. Staff (F,W,S) (Satisfactory/Unsatisfactory grades only)

**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. (Satisfactory/Unsatisfactory grades permitted.) Staff (F,W,S)

**210A. Physical Oceanography (3)**

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, Reid (F)

**210B. Physical Oceanography (3)**

Introduction to mechanics of fluids on a rotating earth; transport and boundary-layer phenomena, turbulent flow, and wave motion, emphasis on application to biological, chemical, and geological oceanography. *Prerequisites: SIO 210A and consent of instructor.* Arthur, Cox, (F) (Satisfactory/Unsatisfactory grades permitted.)

**211A-B. Ocean Waves (3-3)**

Propagation and dynamics of waves in the ocean including the effects of stratification, rotation, topography, wind and nonlinearity. *Prerequisites: SIO 210A, 214.* Davis, Hendershott (W,S)

**212A-B. Dynamical Oceanography (3-3)**

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. *Prerequisites: SIO 214 or consent of instructors.* Salmon, Hendershott (W,S)

**214. Introduction to Fluid Mechanics (3)**

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 (F)

**215A-B. Experimental Ocean Physics (4-4)**

A lecture and laboratory course designed to present experimental aspects of physical measurements at sea and in general methods of fluid mechanics. Students will conceive, design, and conduct experiments; interpret and present written results. *Prerequisite: SIO 214 or consent of instructors.* Cox, Winant (S,F)

**216A. Physics of Sediment Transport (3)**

Mechanics and energetics of sediment transport by water, wind, waves, and density flows. Types of flow systems, mechanics of granular and fluid media, their interactions and transport relations; and the generation and formation of bed forms under waves and currents. Lectures, laboratory and demonstration sessions. *Prerequisite: consent of instructor.* SIO 214, 211A recommended. Inman, Guza (W)

**216B. Nearshore Processes (3)**

Application of the mechanics of wind, wave and sediment transport to the nearshore environment and to the formation of sedimentary structures and beaches. Fluid mechanics of the surf zone; generation of longshore and rip currents, surf beat, nonlinear waves. *Prerequisites: SIO 211A or 214 or 216A.* Guza, Inman (S)

**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. Staff (F,W,S)

**220. Topics in Geophysical Continuum Mechanics (3)**

Mathematical foundations, physical limitations and selected geophysical applications of continuum mechanics. Topics include finite strain, thermodynamics of stress-strain relations, phenomenology and mechanisms of dissipation; continuum theory of dislocations; and generation and propagation of elastic waves in a nearly homogeneous medium. *Prerequisites: differential and integral calculus, differential equations, linear algebra.* Backus (F)

**221. Topics in Geophysical Fluid Dynamics (3)**

Effects of viscosity, density gradients, and gravitational and electromagnetic fields on fluid motion. Topics include forced and free convection and percolation, Alfvén waves, and the theory of the origin and secular variation of the earth's magnetic field. *Prerequisite: SIO 220.* Backus (W)

**222A. Mathematical Tools in Elementary Geomagnetism and Gravity (3)**

Vector spaces, linear operators, spherical harmonics and distributions will be discussed and applied to the description and interpretation of the earth's gravitational and magnetic fields. *Prerequisites: ordinary differential equations, multiple integrals.* Backus (F)

**222B. Tensors and Continuum Mechanics (3)**

An elementary introduction to tensors will be applied to the foundations of seismology and flow in porous media. Topics will include seismic normal modes and the theory of seismic source representation. *Prerequisite: SIO 222A.* Backus (W)

**223. Geophysical Measurements (3)**

Design of geophysical experiments and analysis of geophysical measurements, interpretation of geophysical time series, wave number filters, theory of arrays, geophysical systems analysis. *Prerequisite: elementary complex variables.* Haubrich (W)

**224. Internal Constitution of the Earth (3)**

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 the instructor.* Jordan (S)

**226A. Introduction to Marine Geophysics I (3)**

Methods of geophysical investigations in the ocean, with emphasis on seismic and acoustic methods. Includes discussion of instrumentation, field methods, data processing, interpretation, assumptions, limitations. Critical discussion of "state of the art" and current results. The course is intended primarily for geologists and geophysicists. *Prerequisites: calculus, differential equations, classical physics, at least one geology course, or consent of instructor.* Shor (W)

**226B. Introduction to Marine Geophysics II (3)**

Methods of geophysical investigations in the ocean, with emphasis on gravity, magnetic, and geothermal methods. Includes discussion of instrumentation, field methods, data processing, interpretation, assumptions, and limitations. Critical discussion of "state of the art" and current results. The course is intended primarily for geologists and geophysicists. *Prerequisites: calculus, differential equations, classical physics, at least one course in geology, or consent of instructor.* Dorman (S)

**227A-B-C. Seismology (3-3-3)**

Equation of motion, exact transient solution of canonical problems, interface pulses, geometrical diffraction theory, ray theory and mode theory in plane-layer media, free oscillations of the earth, radiation from moving sources, source determination, aeolotropic and heterogeneous media, dissipation, interpretation problems. *Prerequisite: consent of instructor.* Jordan, Gilbert (W,S)

**228. Structure of Science and Scientific Revolutions (3)**

The major aim of the course will be to discuss and observe the growth of a recent major scientific paradigm e.g. plate tectonics by discussing the evolution of understanding associated with facets of the paradigm e.g. paleomagnetism, continental drift, sea floor spreading, heat-flow motion on a sphere, and to discuss the impact of these ideas on scientific thinking at the time. Mudge (S)

**229. Geomagnetism (3)**

Survey of the application of electromagnetic theory to the solid earth, the main geomagnetic field, the dynamo model of its source, implications of the dynamo theory, induction by external variations, the electrical conductivity inverse problem and its solution, electromagnetic anomalies, induction in simple bodies, induction in the oceans, magnetotelluric theory. *Prerequisites: advanced calculus, differential equations, complex variables and familiarity with Maxwell's equations, or consent of instructor.* Parker (S)

**230. Introduction to Inverse Theory (3)**

Linear theory of Backus and Gilbert, non-linear theory, which is an approximation based on the linear solution; Backus inference treatment and the instructor's own variational methods. Examples will be drawn from gravity, geomagnetism and seismology. *Prerequisite: consent of instructor.* Parker (S)

**231A-B. Seismological Methods (3-3)**

Problems and techniques in seismology, seismic wave propagation, free oscillations of the earth, earthquake source mechanism, seismogram analysis, instrumentation. *Prerequisite: consent of instructor.* Brune (F,W)

**232. Interpretation of Seismograms (3)**

This course will deal with the principles and practice in the interpretation of seismograms. A variety of projects involving the analysis of seismograms will be assigned. *Prerequisite: consent of instructors.* Brune, Jordan (S)

**233. Seminar on Seismology (3)**

Assignments in reading, class presentations and discussions of important papers in seismology. *Prerequisite: graduate students.* Brune (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. Staff (F,W,S) (Satisfactory/Unsatisfactory grades permitted)

**240. Marine Geology (3)**

Introduction to the geomorphology, sedimentation, stratigraphy, vulcanism, structural geology, tectonics and geological history of the oceans. *Prerequisites: the physics, chemistry, and geology required for admission to the graduate curriculum in SIO or consent of instructor.* Staff (W)

**241A-B. Continental Margin Sediments (3-3)**

Lectures, reading and discussion of Quaternary sediments environments of deposition, and physiography of the continental margin, including the shore zone, continental shelf and slope, deep sea fans, and continental rise. *Prerequisite: consent of instructor.* Curry (S,W)

**243A. Marine Stratigraphy (2)**

Principles of stratigraphy as applied to marine environments. *Prerequisite: SIO 240 or consent of instructor.* Winterer (F)

**243B. Laboratory in Marine Stratigraphy (2)**

Laboratory study and interpretation of microfossils in oceanic sediments. *Prerequisite: SIO 240 or consent of the instructor.* Riedel (S)

**244. Seminar in Sedimentary Petrology (3)**

Discussions of current research in sedimentary mineralogy, geochemistry, and petrology. The subject(s) will vary from year to year. (Satisfactory/Unsatisfactory grades permitted.) Kastner (W)

**245A. Sedimentary Petrology (3)**

Characteristics and origin of sediments and sedimentary rocks. *Prerequisite: Consent of instructor.* Winterer (W)

**245B. Sedimentary Geochemistry and Mineralogy (3)**

Principles of chemical sedimentology, structure and composition of sedimentary minerals, mineral assemblages in sediments, reaction mechanisms in sediments and their geochemical applications, stable isotopes and diagenesis. *Prerequisites: consent of instructor, mineralogy, geochemistry, sedimentary petrology, and physical chemistry are recommended.* Kastner (F)

**246. Oceanic Micropaleontology (3)**

Introduction to foraminifera and coccoliths (taxonomy, ecology, sedimentation), use of foraminifera and coccoliths in Quaternary paleoceanography, evolution of calcareous microfossils and biostratigraphic dating, isotopic geochemistry of calcareous microfossils, Pre-Quaternary paleoceanographic applications. Berger, Thierstein (W)

**248A-B-C. Seminar in Marine Geology (3-3-3)**

An advanced discussion of the geomorphology, sedimentation, stratigraphy, vulcanism, structural geology, tectonics, and geological history of the ocean. *Prerequisites: the requirements for admission to the Geological Sciences Curricular Group of the Scripps Institution of Oceanography or consent of instructor.* Staff (F,W,S) (Satisfactory/Unsatisfactory grades permitted.)

**249. Special Topics in Marine Geology (1-4)**

Special course offerings by staff and visiting scientists. (Satisfactory/Unsatisfactory grades permitted.) Staff (F,W,S)

**250. Coastal Marine Geochemistry (3)**

A survey of chemical reactions in estuaries, lagoons, and coastal marine waters. Fundamentals of river and ocean water chemistries. Coastal sedimentation processes. Geochronologies applicable to inshore systems. Goldberg (W)

**251. Thermodynamics of Natural Processes (3)**

Applications of thermodynamics to general problems in the earth sciences. Topics include chemical and phase equilibria in heterogeneous multicomponent systems; properties of substances at high temperatures and pressures; models for solid solutions and gaseous mixtures; phase equilibria in silicate melts; adiabatic and pseudo-adiabatic transport; steady-flow systems; closed and open system models of the atmosphere, oceans, and solid earth. *Prerequisite: Chemistry 102A or 202A, or Physics 140, Mathematics 2D or equivalent.* Craig (W)

**252A. Nuclear Geochemistry (3)**

Geochemistry of stable and radioactive isotopes, with emphasis on oceanic and atmospheric applications. Topics include mixing and circulation studies in the ocean, atmosphere-sea interaction, the carbon cycle, volcanic contributions to the atmosphere and ocean, isotope fractionation effects and stable isotope variations in minerals and rocks. *Prerequisites: Mathematics 2D or equivalent, SIO 210A.* (Satisfactory/Unsatisfactory grades permitted.) Craig (W)

**252B. Nuclear Geophysics (3)**

Natural radioactivity on the earth; artificial radioactivity on the earth; radioactive nuclei as tracers or tools for studying earth sciences and meteoritics, experimental data and information to date. Lal (S)

**252C. Nuclear Geology (3)**

Treats various topics dealing with natural radioactivity, radiometric dating techniques, their potentials and limitations, discussed in detail with examples from current applications, implications of Rb-Sr, K-Ar and U-Pb systematics for crustal and atmospheric evolution; terrestrial heat production. Macdougall (W)

**253. Igneous and Metamorphic Petrology (3)**

Physical, chemical and mineralogic properties of igneous and metamorphic rocks. Emphasis is on the origin and genetic relationships as interpreted from field occurrences, theoretical studies and experimental data. *Prerequisites: physical geology, geochemistry, mineralogy, physical chemistry (may be taken concurrently).* Hawkins (F)

**254. Advanced Igneous Petrology (3)**

The origin and evolution of igneous rocks is considered in terms of field and laboratory evidence. Experimental and theoretical studies bearing on igneous processes are discussed and evaluated in the light of geologic occurrences. Special emphasis is given to igneous rocks of the ocean basins and their margins. Typical rock types are analyzed in the laboratory, and their history is interpreted. *Prerequisite: consent of instructor.* Hawkins (S)

**255. Crustal Evolution (3)**

The properties, origin, and evolution of the rocks in the earth's crust. *Prerequisite: one year of graduate study in Scripps Institution of Oceanography or consent of instructor.* Engel (W)

**256A. Field Geology (4)**

Mapping of a field area and preparation of a geological report. Principles of stratigraphy and descriptive structural geology are outlined in the lecture room and in the field. Field work is done on weekends in a local area. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) Engel (W)

**256B. Earth Sciences Spring Field Trip (1)**

Classical areas of the southwestern United States, such as the Colorado Plateau, Mojave Desert, Sierra Nevada and the Peninsular Range, are examined in successive years during six-day field trips. Normally required of all first- and second-year graduate students in marine geology (Satisfactory/Unsatisfactory grades only.) Engel (S)

**256C. Earth Sciences Summer Field Course (6)**

Participation in a department summer expedition for four to six weeks. Field studies in geology, geochemistry and geophysics are conducted at sea and on islands and coastal regions. Areas recently studied include Central America and the Caribbean, Easter Island, the southeastern Pacific, the western Mediterranean and Melanesia. (Satisfactory/Unsatisfactory grades permitted.) Staff

**257. Seminar in Petrology (3)**

Discussion of current research in petrology and mineralogy (Satisfactory/Unsatisfactory grades permitted.) Hawkins (W)

**258. Seminar in Geology (3)**

Discussions of current research and special topics in geology not treated in the general courses. Staff (F,W,S)

**259. Seminar in Geochemistry (2)**

The subject matter will vary from year to year and will normally cover an area of geochemistry not treated extensively in other courses. Craig (F,W,S) (Satisfactory/Unsatisfactory grades permitted.)

**260. Marine Chemistry (3)**

Chemical description of the sea, the distribution of chemical species in the world oceans, and their relationships to physical, biological, and geological processes. Gieskes (W)

**261. Physical Chemistry of Seawater (3)**

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: Chemistry 202A.* Gieskes (S)

**263. Major Chemical Cycles in the Sea (3)**

The distribution of chemical species in the world oceans and their relation to physical and biological processes, with emphasis on transport and exchange. Keeling (S)

**264. Solids in Nature (3)**

Experimental and theoretical evaluation of geologically important properties of solids. Characteristic differences between solid types, electronic structure of solids, microscopic significance of thermodynamic concepts. Interaction between matter and radiation, structure of geologically important crystals and glasses, order and disorder. Band structure of solids, excited states, the dynamics of phase change. Conductivity, magnetic and optical properties of solids with particular consideration of geological systems. *Prerequisite: consent of instructor.* Arrhenius (W)

**265. Marine Natural Products Chemistry (3)**

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)

**266. Geochemistry of Organic Compounds (3)**

Distribution, sources, and stability of organic compounds in the geological environment. Major emphasis will be on the synthesis of organic compounds on the primitive earth; organic material in ancient rocks and sediments; and the cycle of organic material in the sea. *Prerequisite: organic chemistry; (biochemistry recommended).* Bada (S)

**268. Seminar in Marine Chemistry (1)**

Discussion of topics related to the chemistry of the marine environment not treated in general courses. (Satisfactory/Unsatisfactory grades permitted.) Bada (W)

**269. Special Topics in Marine Chemistry (1-4)**

Staff (F,W,S)

**270. Pelagic Ecology (3)**

An analysis of the concepts and theories used to explain the biological events observed in the ocean. Emphasis on plankton. *Prerequisites: SIO 210A, 280 or the consent of instructor.* McGowan, Mullin (W)

**271. Biological Oceanographic Techniques (4)**

An introduction to some shipboard techniques and tools in biological oceanography and related physical and chemical measurements. Enrollment limited to ten. Alternate years. *Prerequisite: SIO 280 and 210A or consent of instructor.* Mullin (Satisfactory/Unsatisfactory grades only.) (S)

**273. The Evolution of Invertebrates (2)**

Lectures on the origin of multicellularity and the phylogeny of the invertebrate higher taxa as deduced from embryology, morphology and the fossil record. *Prerequisite: SIO 280, 280L or equivalent.* Newman (W)

**274. Marine Arthropods (4)**

Lectures and laboratories on the natural history, zoogeography, taxonomy and phylogeny of arthropods, with emphasis on marine forms. *Prerequisite: SIO 280, 280L or equivalent.* Newman, Hessler (W)

**275A. Population and Community Models (3)**

Survey of techniques for forming and testing hypotheses concerning the quantitative aspects of population and community ecology. *Prerequisite: consent of instructor.* Goodman (F)

**275B. Topics in Community Ecology (3)**

Maintenance of community structure, with special emphasis on the importance of competition, predation, energetics, and stability as they affect patterns of distribution and abundance; interrelationships between community structure and population phenomena such as trophic specialization, reproductive strategies, and life histories. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) Dayton (S)

**275C. Natural History of Coastal Habitats (4)**

Two three-hour laboratories per week, two-four week-long field trips to sites in Baja California and the Monterey Bay area, several one-three 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 275B. *Prerequisite: open to undergraduates with consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) Dayton (S)

**276A-B. Applied Statistics (3-3)**

Methods of statistical analysis, including both parametric and nonparametric procedures; sampling and design of experiments, with emphasis on those procedures particularly useful in marine studies. *Prerequisite: the mathematics required for admission to SIO or consent of instructor.* Enright, Venrick (W,S)

**276C-D. Mathematics in Biology (3-3)**

Use of linear algebra, differential equations and transform methods in physiology, biophysics, and ecology. Phase plane techniques and computer simulation will be applied to classical non-linear problems (for instance, the various forms of the Volterra equation). *Prerequisite: calculus.* (Satisfactory/Unsatisfactory grades only.) Lange (F,W)

**277. Deep-Sea Biology (2)**

The ecology, zoogeography, taxonomy, and evolution of deep-sea organisms, with emphasis on the benthos. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) Hessler (W)

**278. Problems in Biological Oceanography (2)**

Presentation of reports, review of literature, and discussion of current research in biological oceanography. Seminar (Satisfactory/Unsatisfactory grades permitted.) Staff (F,W,S)

**279. Special Topics in Biological Oceanography (1-4)**

Staff (F,W,S) (Satisfactory/Unsatisfactory grades permitted.)

**280. Marine Communities and Environments (3)**

Marine environments and their effects on ecological processes and community structure; distribution patterns, adaptations, and evolution of marine organisms. *Prerequisites: bachelor's degree in science or consent of instructor; concurrent registration in SIO 280L required for students in marine biology and biological oceanography curricula.* Mullin (F)

**280L. Laboratory in Marine Organisms (2)**

Laboratory and discussion of the phylogeny, comparative morphology and taxonomy of the major groups of marine organisms, with emphasis on animals. *Prerequisite: registration in SIO 280.* Fleminger and staff (F)

**281. Environmental Physiology and Biochemistry of Marine Organisms (3)**

Emphasis on adaptation to environmental factors such as temperature, pressure, and salinity. *Prerequisites: adequate training in biology and physical sciences, and consent of instructors.* Somero (W)

**282. Physiology of Marine Vertebrates (3)**

Fundamental aspects of comparative physiology. Included are studies of the physical-chemical basis of living systems and the principles and adaptations of animal function. *Prerequisite: bachelor's degree in science or consent of the instructor.* Hammel (W)

**283. Isotope Tracer Techniques and Related Topics in Physiology (3)**

Biological transport and related processes as determined by

isotope tracers. Laboratory includes methods of measuring radioactive and stable isotope tracers, and tracer experiments in marine organisms. *Prerequisite: consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) Enns (S)

#### 284. Cell Physiology of Marine Organisms (4)

Deals with (1) how methods of cell biology can solve problems peculiar to marine animals and (2) how marine animals provide favorable systems for elucidation of general problems of cell biology; laboratory includes training in electron microscopy, cytochemistry and autoradiography. *Prerequisites: basic courses in biology and chemistry; consent of instructor.* Holland (W)

#### 285. Marine and Comparative Biochemistry (3)

Biochemistry of major products of marine organisms, with emphasis on carbohydrates and lipids. The current concepts of their structural and physiological function will be presented and discussed. *Prerequisites: organic chemistry required, physical chemistry and biochemistry recommended.* Benson (S)

#### 285L. Methods in the Comparative Biochemistry of Marine Organisms (4)

Emphasis on biochemical techniques of usefulness to marine biologists. Techniques to be covered include: enzyme purification and assay; starch and acrylamide gel electrophoresis; ultracentrifugation; and ion exchange chromatography. *Prerequisites: adequate training in biology and biochemistry, and consent of instructors.* Somero, Neelson (S)

#### 286. Cellular Structure and Biochemical Function (3)

Lectures and laboratory studies of subcellular structures and their function in cell metabolism. Experiments involving techniques for isolation and biochemical assay with special reference to marine organisms. *Prerequisites: preparation in biology and biochemistry; consent of instructor. BIO 285 and Biology 201 are recommended for background.* Volcani (S)

#### 287A. Microbial Ecology (3)

The biochemistry and ecological importance of microorganisms in the marine environment. *Prerequisite: consent of the instructors.* Neelson, Carlucci (F)

#### 287B. Experimental Microbiology (4)

Ecology of shore microbes, sampling, enrichment and isolation techniques, development of nutrient media, etc. *Prerequisite: preparation in biological sciences, including physiology or microbiology. Introductory courses in chemistry and biology of the sea are recommended.* Lewin (W)

#### 287C. Microbial Metabolism (4)

Biochemistry and physiology in relation to metabolic activities and elemental cycles; growth and death of bacteria. *Prerequisite: consent of the instructor.* Neelson (S)

#### 287D. Microbial Biosynthesis (3)

Pathways, regulation and energetics of biosynthesis of small molecules. Control mechanisms which regulate the activity of biosynthetic pathways in procaryotes and some lower eucaryotes. Pathways covered will include purine and pyrimidine bases, amino acids, vitamins, sugars and antibiotics. *Prerequisites: preparation in biochemistry and microbiology and consent of instructor.* Neelson, Crawford (S)

#### 288. Deuterostome Biology (4)

Lectures and laboratories on functional morphology, natural history and evolutionary biology of the deuterostome invertebrates (protochordates, echinoderms and minor phyla). *Prerequisites: Elementary invertebrate zoology and consent of instructor.* Holland (W)

#### 289. Marine Plants (4)

An introduction to marine plants and the roles they play in the ecology of the seas. *Prerequisite: consent of instructor.* Lewin (W)

#### 291. Physiology of Marine Algae (3)

Lectures and laboratory in comparative physiology of algae with emphasis on marine problems. *Prerequisite: basic courses in biology and chemistry.* Haxo (S)

#### 293A-B. Animal Behavior (3-3)

(A) Ethological Approach: Species characteristic behavior, its causation and adaptive significance. Controversies on "innateness", "drives" and related concepts. Ecology in relation to neurophysiology. (B) Control Mechanisms: Feed back and feed forward in elementary behaviors associated with orientation and assessment of environment; random processes describing the occurrence of behavioral patterns. *Prerequisites: basic knowledge of calculus and statistics recommended.* Heiligenberg (F,W)

#### 293L. Experimental Laboratory in Animal Behavior (2)

Quantitative behavioral experiments on fish and invertebrates, focusing on social behavior and orientation. *Prerequisite: consent of instructor.* Heiligenberg (S)

#### 294A. Biology of Fishes (4)

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)

#### 294B. Seminar in Advanced Ichthyology (2)

Discussion of special topics related to ichthyology. *Prerequisite: graduate standing or consent of instructor.* (Satisfactory/Unsatisfactory grades permitted.) Rosenblatt (F,W)

#### 296. Special Topics in Marine Biology (1-4)

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. (Satisfactory/Unsatisfactory grades permitted.) Staff (F,W,S)

#### 297. Marine Biology Seminar (1)

Lectures given by visiting scientists and resident staff and students. (Satisfactory/Unsatisfactory grades only.) Lewin (F,W,S)

#### 298. Special Studies in Marine Sciences (1-2)

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.* (Satisfactory/Unsatisfactory grades permitted.) Staff (F,W,S)

#### 299. Research (1-12)

(Satisfactory/Unsatisfactory grades permitted.) Staff (F,W,S)

## Sociology

OFFICE: 7001 Humanities and Social Sciences Building, Muir College

#### Professors:

Bennett M. Berger, Ph.D.  
Aaron Cicourel, Ph.D.  
Fred Davis, Ph.D. (*Chairman, until 12/31/78*)  
Jack D. Douglas, Ph.D.  
César Graña, Ph.D.  
Joseph R. Gusfield, Ph.D.  
Jacqueline P. Wiseman, Ph.D. (*Chairwoman, effective 1/1/79*)

#### Associate Professors:

Rae Lesser Blumberg, Ph.D. (*Acting*)  
Murray S. Davis, Ph.D. (*Acting*)  
David P. Phillips, Ph.D.

#### Assistant Professors:

Beryl L. Bellman, Ph.D.  
Bruce C. Johnson, Ph.D.  
Bennetta Jules-Rosette, Ph.D.  
Kristin Luker, Ph.D.  
Hugh B. Mehan, Ph.D.  
Chandra Mukerji, Ph.D.  
Carlos Waisman, Ph.D.

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**Sociology at UC San Diego** A major in sociology provides a solid liberal-arts background for entrance into professional graduate study in law, business and medicine, or for a direct move into occupations involving general urban problems, the field of corrections, community work and social welfare. For those wishing to continue study in sociology for teaching and research careers, an undergraduate degree from the Department of

Sociology will provide recent theoretical and methodological advances in the field. In addition, Sociology 2, which is required of all majors, offers undergraduates the rare opportunity to engage in field research under the guidance of individual faculty members — a chance to explore on their own what they have learned in the classroom.

Many of the courses offered by this department are traditional sociological topics such as deviance, social control and the police, stratification, organizations, health and society, race and ethnic relations, social protest and movements, education, urban problems, colonialism and imperialism. Nevertheless, like most of the humanities and social science departments at UC San Diego, the Department of Sociology has concentrated its efforts on developing and teaching innovative approaches to these traditional topics. In line with this philosophy, we offer courses found in few sociology departments across the country, such as sociolinguistics, the sociology of everyday life, and myths and symbols in society. Moreover, this department actively encourages its majors to take courses in other social science disciplines (see "The Major Program for Undergraduates") in order to broaden their perspective and grasp of various subject matters. In general terms, the department stresses a comparative-historical approach to sociology, field studies of everyday life settings, and the sociology of culture. Quasi-experimental work and survey research are available also and are pursued by several faculty members.

A total of fifteen sociology courses is required for the major. Of these the student must take eight required courses — three lower-division and five upper-division. The remaining seven are upper-division electives.

Regulations of the Department of Sociology are flexible, and we do make exceptions if we are shown good academic reasons for doing so. However, the faculty members feel strongly that a thorough and balanced program is important for undergraduate studies, and they have designed this program accordingly. Special courses may be petitioned for by individuals or groups who wish to undertake independent or group study projects in consultation with a sociology faculty member.

Transfer students should see the undergraduate secretary or the undergraduate adviser during their first quarter at UC San Diego in order to petition to have their sociology courses from other colleges accepted to apply toward their majors here.

In addition to declaring their majors on the IBM card during registration, all students wishing to major in sociology must fill out the *Application for Major in Sociology* form available in the Department of Sociology office (7001 H&SS). The department will then keep an up-to-date record of their progress toward the degree.

It is preferable that students not declare their majors until after having completed the required lower-division courses in sociology.

## The Major Program for Undergraduates

The following is the required program for undergraduates with a major concentration in sociology:

A total of fifteen courses in sociology (three lower-division, twelve upper-division), including the required courses listed below. A 2.0 grade-point average in the major. (F's are not applicable toward the major.)

### Lower Division

Sociology 1A and 1B (Sociological Analysis). This sequence is required for most upper-division courses in sociology and should be taken during the freshman or sophomore year. Students who have had one year of sociology in an accredited institution of higher education may petition for exemption from this requirement if those courses are equivalent to 1A and 1B. Sociology 10 is *not* accepted for credit toward the major.

Sociology 2 (Sociological Research). This course should be taken in the sophomore year.

### Upper Division

Any *one* course from each of the following cluster areas:

- A. Social psychology and interaction: 100, 102, 103, 106, 109, 117, 163.
- B. Social organization and institutions: 110, 111, 112, 113, 116, 124, 134, 173.
- C. Social control and social problems: 120, 121, 122, 123, 128, 140, 142, 143, 146, 178.
- D. Social change, development and comparative sociology: 118, 130, 135, 138, 139, 141, 144, 147, 164, 167, 168, 169, 170, 171, 174, 175.
- E. Social bases of culture and knowledge: 105, 108, 149, 150, 151, 152, 153, 154, 156, 157, 158, 160, 161, 162, 183, 184, 185, 186, 187, 188.

Students may complete Sociology 181, Statistical Analysis of Sociological Data, in lieu of one of the above cluster areas.

It is strongly recommended that among the courses offered for concentration the student include at least *one* senior seminar (Sociology 190). Such a seminar may be included in the appropriate cluster area.

No courses taken to apply toward the major may be taken on a Pass/Not Pass basis except Sociology 198, Directed Group Study or 199, Independent Study. Only *one* independent study course may be applied toward the major. Independent study 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 undergraduate secretary for the necessary application forms and deadlines.

In fulfilling the major, students may take up to three upper-division courses from the regular offerings in the Departments of Anthropol-

ogy, Economics, History, Linguistics, Political Science, Psychology, Urban and Rural Studies and from the regular offerings of the Macro and Micro areas of Communications. Courses from other departments may be taken if the student submits a petition to the Department of Sociology and thereby obtains permission to have such courses approved for the major.

### The Graduate Program

**Admission** Qualified and interested students may be admitted from a broad range of undergraduate preparations, including the sciences, as well as humanities and the social sciences. Adequate preparation for graduate work in sociology varies considerably with individual cases, and no specific courses are prerequisites.

**Candidate in Philosophy Degree** The department will grant a Candidate in Philosophy Degree to students after they pass the oral qualifying examination leading to the Ph.D. This degree indicates successful completion of all graduate work, except the doctoral research and dissertation and special requirements pertinent to the doctoral research.

**Doctor of Philosophy Degree** The training program is predicated on a division between levels of sociological knowledge. The initial year is largely concentrated on development of overall knowledge of sociology as a means for uniting theory, empirical studies and methods of investigation. The second year is chiefly concentrated on the development of depth in specific fields, and the third year, on the formulation and execution of a Ph.D. study. Under normal circumstances, it is anticipated that a candidate will complete a dissertation in approximately three to four years after entrance into the graduate program.

At the core of the program is a group of seven courses distributed over four quarters integrating theoretical materials with empirical studies and providing instruction in practical methods of conducting research. These courses will occupy approximately three-quarters of a normal program during the first four quarters of graduate study. The purpose of the core curriculum is to provide the student with an introduction to the major theoretical ideas and issues in sociology; classic research that has been carried out in response to, or as the result of, these basic ideas; and, finally, to provide the student with an understanding of the methods and techniques used in developing such research. As a further means of achieving its goals, the course provides practice in a variety of methods of data collection and analysis, including participant observation, field-study observations, interviewing, survey data-collection and analysis, and the use of appropriate statistical techniques and historical research.

In their first year, students will be expected to complete research papers and at the end of this period to have passed an examination based on all but one of the seven courses

comprising the core curriculum. Each student will then receive from the department a written evaluation of his or her performance in the examination and in coursework during the year.

Before taking their oral qualifying examinations, students must, in addition to the core curriculum, take four substantive seminars (courses numbering from 200 to 263); provided the graduate adviser approves, one of these may be in a related discipline. It is highly recommended that students also take at least three courses outside the department as a means of broadening their knowledge of related fields of interest. By the end of the second year, in consultation with their faculty advisers, they should have selected three subfields within the discipline in which to specialize. No specific courses are prescribed for specialization since these will be arranged by combinations of seminars, tutorials and independent studies. Areas of specialization currently available are political sociology, complex organizations, mass culture, sociology of education, social movements, collective behavior, occupations and professions, deviance, social stratification, comparative race and ethnic relations, sociology of everyday life, sociology of science, modernization and new nations, sociolinguistics, cognitive sociology, sociology of religion, history of social thought, social change, sociology of health, and computer applications in sociology.

For Ph.D. candidacy, the department requires a minimum of three consecutive quarters of residence, with a minimum registration of three courses per quarter.

The department also encourages qualified students with no teaching experience to seek teaching assistantships with the department or in closely-related disciplines.

**Qualifying Examination** The oral qualifying examination, which is conducted by the student's doctoral committee, is based on a knowledge of three areas of specialization and at least the preliminary delineation of a research topic for the Ph.D. dissertation. Papers which treat of the state of knowledge in one or more of the specialized areas may be required of the student. Typically the qualifying examination is taken during the third year of graduate work.

**Dissertation Research and Preparation** The nature and requirements for dissertation research vary greatly depending upon the specific problem chosen. Before work on the dissertation can proceed officially a formal meeting must be held during which the doctoral candidate discusses the thesis proposal with his or her committee and obtains its approval. Following this, the student should remain in frequent consultation with the committee, and one month before the student expects to defend the thesis the dissertation should be deposited with the department. The dissertation defense then takes place at a meeting with the student's doctoral committee.



## Courses

## Lower Division

**1A-B. Sociological Analysis (4-4)**

An introduction to the major ideas, concepts and methods in the study of societies: social interaction and social structure, the construction and acquisition of social roles and organizations, major institutions and processes of change. To be taken in sequence.

**2. Sociological Research (4)**

A survey of major research procedures used by sociologists for studying historical and contemporary everyday activities. *Prerequisites: Sociology 1A-B.*

**10. American Society (4)**

An introduction to American society in historical and world perspectives, touching on the following topics: the American cultural tradition; industrialization, capitalism and the welfare state; careers, work and leisure; the changing forms of family and kinship stratification; the distribution of wealth, power and prestige; politics; community, national and international; ethnic and racial groups; the changing position of religion, education, the mass media and the arts; predicting future trends.

## Upper Division

*Prerequisites: Sociology 1A-B, Sociology 2, or consent of instructor.* Additional prerequisites may be specified below.

**100. Sociology of Everyday Life (4)**

A general introduction to the objective observation, description and analysis of everyday life. The aim of the course is to demonstrate the theory and method of observation by which studies of everyday experience become information basic to the study of society.

**101. Sociological Investigations (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. Students will write a paper using these methods.

**102. 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, will be considered.

**103. The Acquisition of Social Rules (4)**

The course examines "socialization" as the acquisition of the rules by children and others new to social groups. The course further examines the development of adult social competence.

**105. Popular Culture (4)**

An historical and comparative analysis of selected forms of the transmission of cultures. The major emphasis will be directed toward the understanding of the leisure and artistic activities in contemporary mass societies.

**106. Introduction to Sociolinguistics (4)**

Investigation of the fundamental relations between the forms of language and other aspects of human social order. Special emphasis is given to the interaction between selected modes of language investigations and theories of social cognition and behavior. *Prerequisites: Sociology 100, 101 or consent of instructor.*

**108. Sociology of Culture (4)**

A study of the concept of culture, its origins and its applications primarily to modern societies. Included will be discussions of the role in society of various symbolic systems, such as art, science, myths, history, language.

**109. The Individual and Society (4)**

Reciprocal influences between the individual and society will be investigated from a variety of perspectives. The nature, formation and destruction of the social self in family, group and larger social units will be emphasized.

**110. 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.

**111. Organizations (4)**

Determinants of organizational structure; the effects on or-

ganizational and individual behavior. Formal and informal structures; effects on goals and values. Industrial organizations, governments, voluntary association, schools, prisons, hospitals, communities as organizations, professions and the organization of science.

**112. Social Stratification (4)**

The causes and effects of social rankings in various societies. Theories of stratification; the dynamics of informal social groupings; 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.

**113. Occupations and Professions (4)**

Analysis of the social organization of work in modern societies, the concept of career, the development of professionalization, Occupational subcultures; work, leisure and alienation; social relationships of work groups in organizations; human relations in work situations; professional and occupational associations.

**116. The Social Organization of Education (4)**

A consideration of the social organization of education in American and other societies; the relationship between socialization and education; the influence that culture has on education, the structure of schools at present in the United States; the educational decision-making phenomenon; evaluation of alternative models of education; suggestions for educational programs that are cross-culturally sensitive, developmentally sound, and student centered; education for critical consciousness.

**117. Classroom Interaction (4)**

Application of sociolinguistic principles to the study of interaction in classroom and educational testing situations. Development of techniques of observation and methods of analysis that are applicable to interactional settings in general, school settings in particular. Interaction from classroom and testing situations will be presented by way of transcripts and videotape. Topics important for the classroom and methods for their analysis will be discussed.

**118. Comparative Educational Sociology (4)**

The organization of education in a number of historical and contemporary societies, such as ancient Greece and Rome, medieval Europe, traditional China, India, and Japan, and contemporary United States, Russia, England, France and Germany. Education will be examined in terms of its internal organization and in relation to religious and secular ritual and ideology, to stratification, economics, and politics.

**120. Urban Social Problems (4)**

Concerns the facts and theories of contemporary social problems in urban America. The emphasis will be on social problems, not on urbanism.

**121. Sociology of Deviance, Law and Crime (4)**

Concerns the fundamental problems of rule-making and the use of rules, especially laws. Such subjects as addiction, marijuana use and suicide will be considered.

**122. Sociology of Law (4)**

Functions of law in society; social source of legal change; social conditions affecting the administration of justice; role of social science in jurisprudence.

**123. Sociology of 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.

**124. Political Sociology (4)**

The contributions of sociology to the study of political systems and processes, including the analysis of the sociocultural context of political behavior and the bases of power.

**128. Sociology of Death (4)**

A survey of the relationships between mortality and the social characteristics of the individual and his or her environment.

**130. Sociology of Development (4)**

A sociological perspective on problems of development and modernization in formerly non-industrial societies. An analysis of interactions between the old and the new social structures and processes and the social implications of various selected strategies in social planning for emergent institutions.

**134. The City of San Diego (4)**

A research-oriented course on the institutions and subcommunities of San Diego. Readings will be drawn from the sociological studies of urban communities and from studies on

the political structure of American cities. Lecturers will include people from the political and planning agencies of the city and its subcommunities. Students will work on individual or joint projects.

**135. Comparative Race and Ethnic Relations (4)**

An historical and comparative analysis of race and ethnic relations in the United States, Western Europe and Asia. The course will analyze the origins of slavery, the various approaches to minority community development and the causes and consequences of discrimination and prejudice in various national settings.

**138. Comparative Historical Sociology (4)**

Classical and contemporary treatments of long-term and large-scale social processes. Topics include war and the structure of the state, economic development and decay, religion and secular ideologies.

**139. Political Modernization Theory (4)**

A survey of approaches to the study of modernization. Processes of the development of capitalism, industrialization and urbanization will be examined. The way in which these processes affect mobilization, incorporation, assimilation, legitimacy and the institutionalization of political regimes will be studied.

**140. 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.

**141. Culture Conflict and Politics (4)**

The effects of conflicts between cultural groups on political processes and institutions in old and new nations. Topics include the implications of changing moral styles on political issues; the significance of ethnic and religious conflict on politics; the influence of cultural diversities in national development and the impact of cultural and linguistic movements.

**142. 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.

**143. Power in American Society (4)**

The concept of power; definitions, types and social locations. Review of the literature on power structures, local and national in the United States. Evaluation of the several approaches to power structure (pluralist, power elite, ruling class). Analysis of such related topics as normal politics vs. crisis politics and agencies of change in American politics.

**144. 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 on social change. The methods and data used in various village and community studies in Africa will be critically examined.

**146. Equality and Inequality (4)**

Equality and elitism as persistent issues in modern societies. Materials from philosophy, history and social sciences as used to define and describe current arguments and existing patterns of political power, popular and high culture, educational equality and the distribution of income.

**147. Paths to Modernity (4)**

A comparative historical analysis of the different "paths to modernity." The evolution of selected European and Latin-American societies, such as Britain, Germany, Argentina and Chile will be examined. Special attention will be devoted to processes of participation and institutionalization and the incorporation of the working class into the political system.

**149A. Religion in Contemporary Society (4)**

This course will explore ways of approaching sacred texts, religious experiences and ritual settings from the perspective of their construction in the world. We will examine how aspects of these phenomena can be made more fully available to sociological analysis. The course will treat also religious institutions and some background material in the analytic study of religion. Data from African religions will be used as a resource for lecture and study.

**149B. Sociology of Religion (4)**

The course will deal with the following questions, among

others: sociological explanations of religious ideas and religious behavior. The influence of religion upon concepts of history, nature, human nature and the social order. Sacred places, sacred time, sacred peoples, ritual, ceremony and their social significance. Religion and cultural movements. The religious-like quality of social movements and certain social attitudes.

#### 150. History of Social Thought (4)

Major figures and schools from early nineteenth century through the present, including Comte, Marx, Tocqueville, Spencer, Durkheim, Weber, Simmel, Freud, Sumner, Mead, Park, Parsons and Mannheim.

#### 151. 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: senior standing or three sociology courses.*

#### 152. Myth and Symbols in Society (4)

A study of the contribution of mythical symbols and narratives to the establishment of social meanings and behavior in primitive and modern societies. Included will be a review of different theories of myth and narrative, such as those of Levi-Strauss, Cassirer and Propp.

#### 153. Sociology of Knowledge (4)

The analysis of political ideology and its relationship to forms of scientific thought, especially of the social sciences. The analysis of the social influences and institutions affecting the development and transmission of knowledge, including the analysis of universities, communications agencies and markets for popular and high culture.

#### 154. Sociology of Mass Media (4)

This course will be concerned primarily with the techniques and social methods of constructing the news. It will be especially concerned with the news of the newspapers and television. It will also deal with how men construct the news; the effects of their messages on the public and other important subjects, such as the effects of ownership patterns on the messages of the news media.

#### 156. 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 as spokesmen and as rebels, literary movements and social conditions and literary works as social documents.

#### 157. Culture, Science and Society (4)

The impact of science as an ideology and an institution on modern American society. Discussion will include the political use of science, the organization of research and the effect of science on American culture.

#### 158. Sociology and Drama (4)

The ways in which dramatic metaphors (e.g., the dramaturgical model, the concept of social drama, and the concept of frame) have been applied to the study of human interaction. Also, the ways in which the detailed study of nonverbal behavior (kinesics and proxemics) can be applied to theory and practice in theater.

#### 160. Sociology of Intellectual Life (4)

Sociological analysis of the intelligentsia: types of intellectuals, 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.

#### 161. Work and Leisure (4)

Historical and comparative analysis of problems associated with quality of work and quantity of leisure, impact of cultural and social change on occupational pattern and leisure activity.

#### 162. 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.

#### 163. Ethnographies: Their Uses and Analysis (4)

This course will analyze the methods and underlying assumptions of field observation and ethnographic reporting. It will contrast various types of written and audiovisual ethnographies, critically examine their styles, approaches, and uses as a form of sociological analysis, and provide opportunities for their application.

#### 164. Society in Latin America (4)

A survey of the literature on Latin-American social structures and political systems. The emphasis will be historical and comparative, and most readings will deal with the entire area or a group of countries rather than particular cases.

#### 167. Culture, Contact and Change (4)

Analysis of patterns and problems of socio-cultural persistence and change with a special focus on the impact of the West on Third World societies.

#### 168. Socio-Economic Change in Developing Areas (4)

This course reviews theories and definitions of development, traces the industrial Revolution in the West and Japan, and analyzes how the colonialism and world economy fostered by the industrial capitalist countries affected development of Third World nations. Finally, some alternate development paths pursued by underdeveloped countries are examined.

#### 169. Social Change (4)

A general introduction to processes of change in modern societies and new nations. Major theories of change; major contemporary trends; conflicts and movements of change; role of technology, ideas and institutional change.

#### 170. Comparative Rural Societies (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 ones.

#### 171. Women in Cross-Cultural Perspective (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 U.S.S.R., Israeli kibbutz, and especially U.S.A.; and the political economy of sex stratification.

#### 173. Sociology of Men (4)

This course will explore the sociology of sex and gender from the perspective of what it means to talk about "mankind". The course will explore the physiological, biochemical, psychological, and sex role aspects of sex and gender in an attempt to separate what is distinctively social about male identity.

#### 174. Sociology of Population (4)

This course will cover the theory and techniques of population analysis. A brief intellectual history of the study of population will be covered, as well as major concepts in the field (natality, mortality, nuptiality and migration). Students will also learn basic techniques of population analysis such as the calculation of rates, the use of demographic data and the like.

#### 175. Comparative Analysis of American Society (4)

A comparison of popular and scholarly images of American society. Students will work on specific projects involving some aspect of culture in the United States, seeing what the literature in sociology says about it and comparing this perspective to what they see in newspapers and magazines, on television and radio and in films.

#### 178. Sociology of Health and Illness (4)

A selective inquiry into the roles of culture, social structure, and organized health professions for defining, mediating, and structuring the health and illness experiences of key social groups in American society.

#### 180. Designs of Sociological Research (4)

This course will acquaint students with a variety of sociological methods of quantitative research. The course will: (1) teach students how to understand tabular presentations of quantitative materials, (2) provide a basis of evaluating different studies and (3) present strengths and weaknesses of different research designs.

#### 181. Statistical Analysis of Sociological Data (4)

A problem-centered course, emphasizing the correct application of elementary statistical techniques to actual sociological data. The course will cover statistics commonly used in sociological analysis (binomial, t-test, Chi-squared, regression, correlation). *Prerequisites: Mathematics 1A-B or an introductory statistics course or consent of the instructor.*

#### 183. The City: Structure, Symbols and Style

The urban world as the source and stage of particular forms of imagination, human types, manners, taste, sentiment and intellectual outlook. The presumed "naked rationality" and "anonymity," and the city as a new "folk" system and the arena of individualism and "creativity." The time and visual qualities

of urban life and their relationship to the character of personal communication and "views of life." The rituals, ceremonies and imagery of urban life. The course will rely, not only on sociological, socio-psychological and historical accounts, but also make ample use of literary accounts (novels, short stories). Literary and artistic sources will be both European and American, "classic" and modern. A number of "great" cities, Paris, New York, London, Venice and Florence, among others, will be given particular attention.

#### 184. Urban Sociology: Urban Folkways

A critique of some of the conventional theories of urban life as "impersonal," "destructive of identity," overly rationalistic, productive of "mass" conditions dominated by bureaucratic manipulation. The city as the stage for the creation of special social traditions and folk-like ways of life. Urban ritual and urban pageantry. Cities and the aesthetic structure of daily life. The image of the city as a popular cult. The course will deal primarily with urban life in the Southern Mediterranean, and most particularly with the city of Seville, Spain. It will make use of sociological and cultural-anthropological writing as well as literary descriptions. It will also make ample use of slides.

#### 185. Sociology of Art: Art and the Aristocratic Order

The portrayal of kings, knights, courtiers and saints. The traditional social order and the artistic celebration of military virtues. The artistic representation of the concept of "nobility." The cult of classical antiquity and the ideals of the aristocratic system. Religious art and traditional views of the state. Art and the emergence of the great European courts. The course deals essentially with Western European art from the sixteenth century to the middle years of the eighteenth. Examples will be drawn from paintings, sculpture and architecture.

#### 186. Sociology of Art: Art and Social Life Since the "Age of Reason"

The end of the aristocratic tradition in the course of the eighteenth century. The "moralistic" art of the mid-eighteenth century and the celebration of domestic virtues. Quaint eroticism and the decline of courtly art. The political philosophy of the late eighteenth century and the appearance of "philosophical" and the "political art." The revolutionary use of Classical Antiquity. The art of the French Revolution and the Napoleonic Empire. The artistic expression of new concepts of the state and of political leadership. The Romantic Movement and new views of the social function of the artist. French Impressionism. The course will deal primarily with European painting from mid-eighteenth century to the latter part of the nineteenth.

#### 187. Films and Society (4)

An analysis of films and how they portray various aspects of American society.

#### 188. Sociology of Visual Knowledge (4)

This course will cover four different uses of media images as documents of natural events; documents of families (home movies, family photographs), educational documentaries, media images for scientific research, and conventional documentary films. Classes will include discussions of and lectures about characteristics of those situations in which these types of images are produced and interpreted as well as the methods people use to evaluate and interpret these kinds of visual information.

#### 190. Senior Seminar (4)

A research seminar on special topics of interest to available staff; provides majors and minors in sociology with research experience in close cooperation with faculty. *Prerequisites: senior standing, plus three sociology courses or consent of instructor.* May be repeated for credit.

#### 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. *Prerequisite: upper-division standing or permission of the department.* (Pass/Not Pass grades only.)

#### 199. Independent Study (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. *Prerequisite: upper-division standing or permission of department.* (Pass/Not Pass grades only.)

## Graduate

### 200. Analyzing Everyday Life (4)

A graduate seminar in the objective observation, description and analysis of everyday life. This seminar will systematically examine phenomenological, ethnomethodological and existential theories of society, in contrast to structural theories. (Satisfactory/Unsatisfactory grades permitted.)

### 206. Introduction to Sociolinguistics (4)

Investigation of the fundamental relations between the forms of language and other aspects of human social order. Special emphasis is given to the interaction between selected modes of language investigation and theories of social cognition and behavior. (Satisfactory/Unsatisfactory grades permitted.)

### 210. Social Psychology of Health and Illness (4)

A close-in examination of the effect of cultural, social structural and interactional factors in the diagnosis, treatment and outcome of illness experiences in contemporary society. Class discussions are organized around a series of readings designed to parallel the phases of the natural history of an illness.

### 212. Social Stratification (4)

The causes and effects of social rankings in various societies. Theories of stratification; the dynamics of informal social groupings; 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. Graduate students will be assigned an additional research paper and/or examination of more complex material and design. (Satisfactory/Unsatisfactory grades permitted.)

### 215. Seminar in Political Sociology (4)

Research and readings in sociological analysis of political institutions. Readings on politics and stratification power structure. Political elites; conflict groups; participation. Student research in selected areas. (Satisfactory/Unsatisfactory grades permitted.)

### 223. Social Problems (4)

Facts and theories about social problems and possible solutions to them will be analyzed.

### 235. Comparative Race and Ethnic Relations (4)

An historical and comparative analysis of race and ethnic relations in the United States, Western Europe and Asia. The course will analyze the origins of slavery, the various approaches to minority community development and the causes and consequences of discrimination and prejudice in various national settings. (Satisfactory/Unsatisfactory grades permitted.)

### 240. Pre-Modern Sociological Theory (4)

Major figures and their ideas in the history of social thought prior to the late nineteenth-century classicists, e.g., Marx, Durkheim, Weber and Simmel.

### 241. Modern Sociological Theory (4)

A comparative examination of major themes of such classical sociological theorists as Marx, Durkheim, Weber, Simmel, G. H. Mead and Park.

### 242. Contemporary Sociological Theory (4)

Major trends in American and European sociological theory since World War II with particular emphasis on such schools as structural functionalism, symbolic interaction, ethnomethodology, structuralism and neo-Marxism.

### 243. 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.

### 244. Socio-Linguistic and Micro-Sociological Methods (4)

The analysis of communication materials using sociolinguistics, psycho-linguistics and the methods of ethnoscience as well as general question-answer systems as they are related to the logic of social inquiry.

### 245. Survey and Demographic Methods (4)

The 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.

### 246. 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.

### 260. Ethnomethodology (4)

An analysis of sociology's relation to genetic and subjectivistic approaches to behavior. Discussion of hierarchical systems and corresponding levels of theory.

### 261. Social Structure (4)

An analysis of structuralist and phenomenological ideas of structure. Discussion of the differences between major theorists such as Levi-Strauss, Piaget, Merleau-Ponty, and Gurwitsch. Emphasis on their influences on modern sociological research.

### 262A. Cognitive and Linguistic Aspects of Social Structure

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 organization structures.

### 262B,C. Advanced Topics in Cognitive and Linguistic Aspects of Social Structure

An advanced seminar dealing with field and quasi-experimental methods for studying discourse and textual materials. Students are expected to conduct their own field research in natural or organizational settings.

### 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. (Satisfactory/Unsatisfactory grades permitted.)

### 292. Selected Readings in Sociology (2)

Year-long seminar. Discussion and analysis of research problems and issues under investigation by departmental faculty. Readings will vary depending upon the instructor. This seminar may be repeated for credit and is required of first-year graduate students for at least two quarters. (Satisfactory/Unsatisfactory grades only.)

### 297. Directed Group Study (4)

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.

### 298. Independent Study (1-4)

Tutorial individual guided study and/or independent research in an area not covered by present course offerings. (Satisfactory/Unsatisfactory grades permitted.)

### 299. Thesis Research (1-12)

Open to graduate students engaged in thesis research. (Satisfactory/Unsatisfactory grades permitted.)

### 500. Apprentice Teaching (2)

Supervised teaching in lower-divisional contact classes, supplemented by seminar on methods in teaching sociology. (Satisfactory/Unsatisfactory grades only.)

## Spanish Literature

See Literature

## Subject A

OFFICE: 1254 Humanities-Library Building,  
Revelle College

Adela B. Karliner, M.A., *Lecturer and Supervisor of Subject A*

*During the first year of residence, each student whose ECT score is below 600 must enroll in the appropriate writing course for his or her particular college:*

Third College:	Third College Composition Program 10A, B or C
Warren College:	Warren College 10A & B
Muir College:	Muir College 10
Revelle College:	Humanities 11A, B, C or 12A, B, C

Successful completion of one of these courses or sequences will satisfy the Subject A requirement.

See also "Subject A" under "Admissions."

## Teacher Education Program

OFFICE: Media Center and Communications Building, Third College

Hugh Mehan; Ph.D., Assistant Professor of Sociology (*Director of the Program*)

Jean M. Mandler, Ph.D., Associate Professor of Psychology

\* \* \*

Gloria Fimbres, Supervisor of Student Teaching

Cynthia Lawrence-Wallace, Supervisor of Student Teaching

Randall J. Souviney, Supervisor of Student Teaching

\* \* \*

**The Program** The Teacher Education Program (TEP) is a campus-wide program physically located at Third College. It is designed to provide the UC San Diego student with a "preliminary" multiple subjects credential within the framework of existing academic departments. There is no school of education at UC San Diego. Students who satisfy program requirements will graduate from UC San Diego with a complete major in their selected field of specialization as well as a "preliminary" multiple subjects credential. A teacher may teach for five years with a preliminary credential. To obtain a "clear" multiple subjects credential in California, the teacher must complete a fifth year of college within five years of the B.A. or B.S. and teach successfully for two years.

The main themes of the TEP are multicultural and child-centered education. A multicultural education is pluralistic; it recognizes the unique heritage of different cultures and seeks to preserve each child's cultural identity while providing the child with skills necessary to move between different cultural systems if he or she chooses to do so.

A child-centered education is constructed to be consistent with each child's developmentally acquired ability to learn. Current research in comparative cultures, comparative child development, and social interaction will provide the prospective teacher with insight into the relationship between language, culture, and education.

Because of the recognized need for bilingual/biliterate teachers, both locally and nationally, the TEP offers a bilingual emphasis within its four year course of study. Students who plan to become bilingual educators follow the existing program's curriculum with some modifications. These include achieving a second language proficiency (as determined by the UC San Diego language lab and a TEP committee) and preliminary field work and student teaching in a bilingual classroom. Upon completion of the bilingual emphasis

## Third College Composition

curriculum, students receive a certificate indicating their bilingual competencies in addition to the preliminary multiple subjects credential and the bachelor's degree. Students who are interested in the bilingual emphasis should contact the TEP office for more information.

**Curriculum** The state of California requires that the teacher in the elementary school be prepared to teach all courses normally offered in the elementary school. This necessitates professional preparation as well as practical experience in the classroom. The TEP will meet these requirements in the following ways:

**Academic Area Requirement** The academic area requirement is intended to provide the prospective elementary school teacher with training in the subject matter usually taught in the elementary school. This is *not* a substitute for the student's regular major. The teacher candidate must take a minimum of seven four-quarter unit courses in *each* of the following areas: (1) mathematics and science, (2) English, (3) social sciences, and (4) humanities, foreign languages and fine arts. University general education requirements at UC San Diego satisfy many of these requirements. Courses are offered in each of these four areas which enable the teacher candidate to work as a classroom aide in the respective discipline in a local school. (See *TEP 183 through 189*.) The candidate can take a total of three elementary aide courses as long as he or she teaches in a different subject area each time; these courses will be credited toward the academic area requirement. The classroom aide experience is seen as an excellent vehicle for learning about the learning processes and interpersonal communication involved in a teaching relationship.

**Professional Preparation** The state requirement for professional preparation will be met by offering eighteen quarter hours of courses which deal with the sociology of education and innovative instructional practices. Details of these courses follow in the course listing.

**Practical Classroom Experience** The teacher candidate will student-teach for the equivalent of one elementary school semester. During this time the candidate will be given thorough, realistic, and practical experience in classroom instruction, and will be given continuous and diversified responsibilities in the school. The teacher candidate will engage in classroom observation, course preparation, actual teaching, and student evaluation. Concurrent with student teaching, the teacher candidate must take TEP 191C, described below.

**Student Selection** Students interested in applying to the TEP will be advised in the spring of their sophomore year as to what courses they should take in their junior year, at which time the actual coursework for the TEP begins. Student performance in these courses will be a factor in program selection. Other criteria for admission to the program include:

1. A strong interest in multicultural approaches to education; a strong desire to improve the quality of American education; a strong desire to instruct students as self-activated learners.
2. Experience working with students in educational environments, especially in multicultural settings.
3. Community involvement.
4. Academic excellence.

Prospective candidates for the TEP will be carefully reviewed by a diversified committee composed of faculty, staff, and students. Formal acceptance into the TEP will take place *during* the student's junior year, prior to student teaching.

## Courses

All of the following courses are required toward the "preliminary" multiple subjects credential. Students are advised to consult with TEP staff to determine how they can best fulfill the academic area requirement.

### **Sociology 116. The Social Organization of Education (4)**

A consideration of the social organization of education in America and other societies; the relationship between socialization and education; the influence that culture has on education; the structure of schools at present in the U.S.; the educational decision-making phenomenon; evaluation of alternative models of education; suggestions for educational programs that are cross-culturally sensitive, developmentally sound, and student centered; education for critical consciousness. *Prerequisite: Sociology 1A-B, Sociology 2 or consent of instructor. (F)*

### **Psychology 130. Developmental Psychology and Education (4)**

An introduction to the child's cognitive, perceptual, linguistic and social development with emphasis on his or her relation to education. Piagetian, information processing and cross-cultural points of view will be discussed, including theories of cultural difference in relation to education and the nature of the learning process in relation to success and failure in the schools. *Prerequisite: consent of instructor. (W)*

### **Sociology 117. Classroom Interaction (4)**

Application of sociolinguistic principles to the study of interaction in classroom and educational testing situations. Development of techniques of observation and methods of analysis that are applicable to interactional settings in general, school settings in particular. Interaction from classroom and testing situations will be presented by way of transcripts and videotape. Topics important for the classroom and methods for their analysis will be discussed. *Prerequisite: Sociology 1A-B, Sociology 2 or consent of instructor. (S)*

### **TEP 180. Practicum in Student Teaching (18)**

The teacher candidate will be assigned to a classroom in one of the participating schools under the supervision of a participating master teacher. The candidate will begin teaching in the first week of September and will spend at least five hours a day, four days a week for fifteen weeks in the classroom as well as prepare courses, have parent-teacher conferences, and teacher-principal conferences. During this time the candidate will be given thorough practical experience in classroom instruction and continuous and diversified responsibilities. *Prerequisites: affirmed TEP candidacy and concurrent registration in TEP 191C. (F)*

### **TEP 183-189. Practica in Learning (see below)**

#### **TEP 191A. Innovative Instructional Practices (4)**

This is one of a three-course sequence providing a theoretical and practical grounding in various pedagogical techniques which are consistent with the child's developmentally acquired ability to learn. Typically diverse subject areas are integrated into a single intercurricular course of study by emphasizing activity inquiry techniques of instruction. *Prerequisite: affirmed teacher candidacy. (W)*

#### **TEP 191B. Innovative Instructional Practices (4)**

This is one of a three-course sequence providing a theoretical

and practical grounding in various pedagogical techniques which are consistent with the child's developmentally acquired ability to learn. Typically diverse subject areas are integrated into a single intercurricular course of study by emphasizing activity inquiry techniques of instruction. Students pursuing the 'bilingual emphasis' are provided instruction in bilingual teaching techniques within the framework of this course. *Prerequisite: TEP 191A. (S)*

#### **TEP 191C. Innovative Instructional Practices (6)**

This is one of a three-course sequence providing a theoretical and practical grounding in various pedagogical techniques which are consistent with the child's developmentally acquired ability to learn. Typically diverse subject areas are integrated into a single intercurricular course of study by emphasizing activity inquiry techniques of instruction. *Prerequisites: TEP 191A-B and concurrent registration in TEP 180. (F)*

## Elementary Aide Program

The UC San Diego Elementary Aide Program enables students to engage in classroom aide activity in elementary schools. The program provides a vehicle for students to gain practical experience about the learning process in actual classrooms and to relate this experience to theories of interpersonal relations, cross-cultural communications and education. The courses in the program are open to all UC San Diego students and are particularly recommended for minority students and/or candidates to the Teacher Education Program. The student may serve as an aide for a total of three quarters as long as he or she works in a different subject area each quarter. The following courses are available every quarter; the course description is the same for all seven courses except that the subject areas differ. The prerequisite for all seven courses is consent of the instructor.

#### **TEP 183. Practicum in Foreign Language (4)**

The primary focus of the course will be on the learning process. Students will be assigned to work with a small number of elementary school students under the supervision of a participating teacher in a local school. The student will instruct children in a foreign language at least four hours per week. Concurrent with classroom aide activity the student will be involved in a seminar concerning theories of learning and interpersonal communications. *Prerequisite: consent of instructor. (F,W,S)*

#### **TEP 184. Practicum in Learning/English as a Second Language (4)**

(F,W,S)

#### **TEP 185. Practicum in Learning/Mathematics (4)**

(F,W,S)

#### **TEP 186. Practicum in Learning/Science (4)**

(F,W,S)

#### **TEP 188. Practicum in Learning/Social Sciences (4)**

(F,W,S)

#### **TEP 189. Practicum in Learning/Fine Arts and History (4)**

(F,W,S)

## Third College Composition Program

OFFICE: Building 402, Warren College

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Third College Composition Program (TCCP) provides Third College students with intensive courses in writing and analytical reading with an emphasis on comparative, analytical and argumentative strategies. Classes are small

and focus on context-building for what will be written each week, and on peer criticism of student writing already completed. Each student has an individual conference with his or her instructor weekly. Students take the TCCP placement exam and are placed in A, B, or C levels in the 10A-B-C course sequence. A grade of "C" or better at any level fulfills the Third College freshman writing requirement. Students who need more than one quarter take an in-progress grade into the next course of the three-course sequence.

A tutorial course (TCCP 11) offers students individualized help in improving their writing ability. This course is open to both lower- and upper-division students. Also offered is an upper-division course (TCCP 109) focusing on research writing with particular emphasis on the humanities and social sciences. Priority is given to Third College students.

## Courses

### TCCP 10A. Composition (4)

Intensive practice in writing short pieces of expository prose. The course is organized to give students experience in various rhetorical strategies, from definition writing to argumentation. The readings reflect this spectrum. *Prerequisite: placement exam.*

### TCCP 10B. Intermediate Expository Writing (4)

A focus on analytical, comparative, and argumentative writing. Students develop experience in writing under pressure as for essay examinations and in organizing term-paper length compositions. *Prerequisite: placement exam.*

### TCCP 10C. Advanced Freshman Writing (4)

Individualized writing projects related to the students' dominant academic interests. Students with the advice of an instructor frame writing projects of varying scope, subject matter, and rhetorical design. *Prerequisite: placement exam.*

### TCCP 11. Special Study in Composition (1-4)

A lab-tutorial which focuses on individual writing needs. Students confer individually with instructors on a regular weekly basis, both to plan attack strategies for writing projects and to discuss the revision of drafts. NOTE: This course may be taken as an adjunct to, or independently of, the 10A-B-C sequence. In itself, TCCP 11 does not fulfill the Third College general education requirement for composition, which is met only by the completion of a TCCP 10 course. *Prerequisites: TCCP 10A-B-C or equivalent and consent of instructor.*

### TCCP 109. Research Writing (4)

Advanced practice in compositional and information-gathering techniques necessary for effective term papers of medium length. Students will develop one term paper in weekly stages over the quarter and will have additional weekly practice in expository writing — analytical, classificatory, and comparative. *Prerequisites: upper-division standing and completion of a lower-division writing course.*

## Third World Studies

OFFICE: Building 410, Warren College

### Professors:

Carlos Blanco-Aguinaga, Ph.D. (*Spanish Literature, Coordinator of Third World Studies*)

Sylvia Wynter, M.A. (*Spanish and Comparative Literature*)

### Associate Professors:

Edward Reynolds, Ph.D. (*History*)

Sherley Ann Williams, M.A. (*Literature*)

### Assistant Professors:

Richard J. Arneson, Ph.D. (*Philosophy*)

Richard Romo, Ph.D. (*History*)

Rosaura Sanchez, Ph.D. (*Literature, Coordinator of Bilingual Sequence*)

Emory J. Tolbert, Ph.D. (*History*)

### Acting Assistant Professor:

Carlos Waisman, M.A. (*Sociology*)

### Adjunct Professor:

Leften S. Stavrianos, Ph.D. (*History*)

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The Third World Studies Program has three main objectives:

1. To provide a perspective on world affairs and problems which has not been historically available — namely, an understanding of the Third World and of its relationship to the West from a Third World perspective. In order to understand this perspective, it is necessary to see how the West has viewed and presently views the Third World. Thus, the program becomes totally inclusive. 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.
2. To provide a means of cutting across disciplinary lines in order to integrate past and present knowledge concerning the Third World and its relationship with the West. The program is not conceived as being exclusively historically oriented or as being predominantly a social-science program, but rather one that synthesizes *both* the social sciences and the humanities.
3. To provide an understanding of the relationship between internal Third World societies (Asian-American, Black, Chicano and Native American) and external Third World societies (African, Asian and Latin American) through a comparative approach. Third World societies are compared as they existed before contact with the West, in the various colonial relationships with the West, as well as in their evolution to independence and nationhood in the twentieth century. There is insistence on both the similarities and differences which Third World societies have among themselves and the similarities and differences with Western societies.

**The Major Program** Students interested in the area of Third World studies may choose either an interdisciplinary major with a disciplinary focus (anthropology, economics, history, literature, political science, sociology, etc.) or a specific departmental major within the humanities or social sciences.

All students majoring in Third World studies are expected to satisfy the lower-division Third World studies requirement of Third College in addition to the *interdisciplinary or departmental* major requirements. (Refer to the appropriate department under: "Courses, Curricula and Programs of Instruction.") It is also recommended that students consult the coordinator of Third World studies or a Third World studies faculty member, in the department of the selected major.

In addition, the literature component of Third World studies offers courses in Chicano dialectology; Spanish phonetics and Spanish for Chicanos (see "Literature"); Chicano literature and Black U.S. literature; also, a general literature/Third World major is now being planned.

## Courses

### Lower Division

#### 1A. History of the Third World to the Nineteenth Century (4)

Definition of the Third World, its origins in the fifteenth century, its historical evolution into a global system by the nineteenth century, and the nature and consequence of its relations with the European metropolis. (F) (Not offered in 1978-79)

#### 1B. History of the Third World in the Twentieth Century (4)

Impact on the Third World of the two World Wars and of the Russian and Chinese Revolutions. Winning of political independence, problems of economic dependence, and current conditions and prospects. (W) (Not offered in 1978-79)

#### 1C. History and Cultural Development in the Third World (4)

The colonization and conquest of Third World peoples by the West were accompanied by certain ideological assumptions which negated the equal human status of the colonized, devalued their indigenous cultures, and negated the validity of their past. The struggle of Third World peoples against colonization has therefore necessarily implied the negation of these assumptions, through political struggle, and through cultural movements — popular, 'native' religions, popular culture, theoretical formulations, the rewriting of history and the creation of art and literature. (S) (Not offered in 1978-79)

#### 6A-B-C. The Third World: The Origins and Consequences of Underdevelopment (4-4-4)

The history of the Third World — Asia, Africa and Latin America — is surveyed from the fifteenth century to the present. Emphasis is placed not only on the events of the past but on the contemporary significance of those events. The first quarter traces the origins of European empires, the inter-relationship between these empires and the process of underdevelopment in the Third World, and the beginnings of indigenous resistance to imperialism. The next quarter describes the breakdown of imperial order in the nineteenth and twentieth centuries, placing special emphasis on the course of Third World revolutions. Finally the course examines the contemporary dilemmas of underdeveloped areas — reviewing the weight of the past on the present — and discusses different strategies, both political and economic, for solving these dilemmas. (F,W,S)

#### 7A-B-C. Race and Ethnicity in the United States (4-4-4)

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, power and protest in modern America. Attention is focused on Native-American, Mexican-American, the black, Asian-American, and white ethnic groups. (F,W,S)

#### 9. Reading and Interpretations: Spanish for Native Speakers (4)

Spanish for native speakers is designed to emphasize the development of greater speaking and writing abilities, as well as reading skills by means of lectures, class discussions, composition and readings from Chicano and Latin American authors. Equivalent to Lit:Sp 10. *Prerequisite: consent of instructor.* (Not offered in 1978-79)

#### 10. Institutions of Third World Societies (4)

A survey of pre-colonial Third World social and cultural systems, with emphasis on the family, the political and economic institutions and their inter-relationships. (Not offered in 1978-79)

## Urban and Rural Studies

### 11. The Third World and Europe (4)

An introduction to theories and paradigms of social and cultural change through a study of contact and exchange between Europe and the Third World, with special attention to the development of new institutional forms and social patterns. (Not offered in 1978-79.)

### 12. Development in the Third World (4)

An analysis of development in the Third World, with special emphasis on social and economic change. (Not offered in 1978-79.)

### 21, 22, 23. Literature and History: The Third World

An analysis of a major theme common to selected ethnic literature in the United States and to certain literatures of the Third World. The course is organized around major literary genres. Themes vary from year to year.

Fall *Literary forms and the Third World*

Winter *Fiction and the Third World*

Spring *Drama, Poetry and the Third World*

### 24. Composition and Conversation: Spanish for Native Speakers (4)

This course is designed for native speakers who have had formal training in the language but who need to expand their knowledge of grammar, vocabulary, and idiomatic expressions at both the speaking and writing levels. Readings will be from Chicano and Latin American authors. Equivalent to Lit:Sp 25. *Prerequisite: consent of instructor.* (Not offered in 1978-79.)

### 43. Introduction to African Politics

The differential impact of British, French, Portuguese and Belgian colonialism is examined along with the African nationalist responses which developed during the second half of the twentieth century. (S)

Limited to freshmen and sophomores; Upper-division students with permission of instructor.

## Upper Division

### 101A. History and Theory of Imperialism (4)

The course is an introduction to Western expansion and colonization of the Third World, the rise of capitalism and the meaning of imperialism as the foundation of the common modern historical experience shared by all Third World peoples. It fulfills the Third College general education requirement in Third World studies and, as such, can be taken as a complete one-quarter course or as part of a three-quarter sequence. A required prerequisite for all Third World studies majors. Students who have completed 1A will not receive credit for 101A. *Prerequisite: upper-division standing.* (Not offered in 1978-79.)

### 101B. Social Change in the Third World (4)

An analysis of social relations in colonial institutions with special emphasis on the impact of alien domination on the cultures, and self-definition of colonial subjects. *Prerequisite: upper-division standing.* (Not offered in 1978-79.)

### 101C. Modernization, Revolution, and Authorization (4)

This course will be an examination of the different political consequences of modernization — liberal democracy, right-wing authoritarian and fascist regimes, and socialist regimes. The course will aim at testing propositions that link different types of industrialization with the emergence of these outcomes. An effort will be made to inquire at which stages of modernization, and in which type of social structures, each of these regimes is more likely to succeed. *Prerequisites: upper-division standing.* (Not offered in 1978-79.)

### 102A. The U.S. Territorial Expansion Policy and its Effect on Indian Removal: 1492-1865 (4)

This course will cover the territorial expansion of the U.S. and the forced removal and conflict during the years 1492 to 1865. The Indian Removal Act of 1830 and the Civil War will be discussed in detail. (Not offered in 1978-79.)

### 102B. The U.S. Territorial Expansion Policy and its Effect on Indian Removal: 1865 to the Present (4)

This course will cover the history of Native Americans from 1865 to present. The major topics to be discussed are: 1) Indian participation in the Civil War, 2) the assault against the Plains Indians, 3) the treaty period, 4) the Reservation Period, 5) Indian participation in World War I and World War II. Also to be discussed will be major legislation affecting Indians in contemporary times. (Not offered in 1978-79.)

### 103. The Native American in Contemporary Society (4)

The instructor plans to give the student a working knowledge of problems and issues faced by Native Americans in contemporary society. The major topics will be the Bureau of Indian Affairs, the U.S. Public Health Service, the Relocation System, and Indian Education. (Not offered in 1978-79.)

### 104. Biographies of Great Native Americans (4)

This course will examine the accomplishments and lives of outstanding Native Americans, both past and present, who have left their mark on history. Students will be required to research the lives and personal accounts of one or more prominent Native Americans and present the details in class. Students will be graded upon their classroom presentation, as well as on a term paper resulting from their personal research. (Not offered in 1978-79.)

### 105. The History of Indian Education: 1568 to Present (4)

This course will cover the history of Indian education starting from the first school established for Indians in 1568 to the present. Some of the major topics to be discussed are: 1) reservation and off-reservation boarding schools, 2) mission schools, 3) Carlisle Indian School, the first off-reservation boarding school established for Indians. Also to be discussed will be federal funds that support Indian education and contemporary problems faced by Indians in colleges and universities. (Not offered in 1978-79.)

### 110. Introduction to Fiction Writing (4)

Writing skills are as varied as the individual's background, experience, or inclination. This course aims at bringing the fundamental aspects of fiction writing to beginning writers' work so that they may explore and develop their own potential. *Prerequisite: consent of instructor.* (Not offered in 1978-79.)

### 113. Novels of the Third World (4)

The novels of African, Caribbean, and Indian writers and the works of Latin American novelists will be studied. (Not offered in 1978-79.)

### 115. Writing Workshop: Short Story (4)

A workshop for students seriously interested in writing the short story. Intensive study of the means of expression provided by the different literary forms. Discussion and scrutiny of original work of student. May be repeated for credit. *Prerequisites: submission of original work already completed, upper-division standing and consent of instructor.* (Not offered in 1978-79.)

### 116. Writing Workshop: Long Narrative (4)

A workshop for students seriously interested in writing the long narrative. Intensive study of the means of expression provided by the different literary forms. Discussion and scrutiny of original works of students. May be repeated for credit. *Prerequisites: submission of original work already completed, upper-division standing and consent of instructor.* (Not offered in 1978-79.)

### 130. Political Ideology and the Third World (4)

This course studies the concepts of ideology and political consciousness with special attention to their application to the situation of Third World peoples abroad and the black national minority within the U.S. (Not offered in 1978-79.)

### 131. 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: nationalism, neo-imperialism, political change. *Prerequisite: juniors and seniors only or consent of instructor.* (Not offered in 1978-79.)

### 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. (Not offered in 1978-79.)

### 133. Contemporary Chicano Issues (4)

The course, interdisciplinary in nature, will study the contemporary Chicano experience from cultural, social, and historical perspectives, and provide students with information and understanding of the important characteristics of the Chicano community by providing a critical analysis of the societal context in which "La Raza" has sought to maintain and develop its culture. *Prerequisite: consent of instructor.*

### 134. Political Philosophies of Third World Leaders (4)

The course is a study and comparison of the political philosophies of modern Third World leaders. Since a major concern of the course is the problems that such leaders have met within the applications of their theoretical preconceptions to the actual political situations, a biographical approach shall be taken. Particular attention shall be paid to the influence of indigenous non-Western political and religious customs and outlooks upon the political viewpoints of the leaders under study.

### 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.*

### 141. Literary Images of the Black Woman (4)

This course is structured around the idea that there are three basic images of the black woman: that held by society; that held by black men; and the one held by the women themselves. The course will explore all three views with special emphasis on the way black women view themselves. *Prerequisite: upper-division standing.* (Not offered in 1978-79.)

### 153. Introduction to 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. This course is offered in English. May be repeated for credit as topics vary. *Prerequisite: upper-division standing or consent of instructor.*

### 154. Chicano Prose (4)

The analysis and discussion of the novel, the autobiography, the essay and collected short fiction by Chicano writers, with primary emphasis on the developing prose styles of the writers and on the study of the texts' and the authors' historical moment. May be repeated for credit as topics vary. *Prerequisites: speaking and reading knowledge of Spanish; upper-division standing or consent of instructor.* (Not offered in 1978-79.)

### 155. 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. May be repeated for credit as topics vary. *Prerequisites: speaking and reading knowledge of Spanish; upper-division standing or consent of instructor.* (Not offered in 1978-79.)

### 156. Themes and Motifs in Chicano Literature (4)

The analysis and critical discussion of the principal themes and dominant motifs in Chicano literature, the reasons for their appearance, and their relation to similar and/or different aspects found in other U.S. minority literatures. May be repeated for credit as topics vary. *Prerequisites: speaking and reading knowledge of Spanish; upper-division standing or consent of instructor.* (Not offered in 1978-79.)

### 198. Directed Group Studies

Directed group study on a topic or in a field not included in the regular department curriculum, by special arrangement with a faculty member. *Prerequisites: 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 approval of instructor.* (F,W,S)

## Tutoring/Aide Program (See Teacher Education Program)

## Urban and Rural Studies

OFFICE: Building 411, Warren College

### Professor:

Charles W. Thomas, Ph.D. (*Coordinator of Urban and Rural Studies Program*)

### Associate Professors:

Rae L. Blumberg, Ph.D. (*Acting Assoc. Prof., Sociology*)

Robert J. Heifetz, Ph.D.  
Faustina Solis, M.S.W. (*Community Medicine, on sabbatical*)

**Assistant Professor:**

Alonzo B. Anderson, Ph.D. (*Psychology*)

**Supervisor of Field Studies:**

Olive P. Ngubo, M.S.W.

**The Undergraduate Program** The undergraduate program in urban and rural studies is designed to provide a broad educational experience for persons who wish to become actively engaged in a variety of professional careers requiring a broad understanding of the problems of urban and rural life, including participation in advanced degree programs, programs of research and other educational and community activities. The program is interdisciplinary in its orientation, emphasizing the contributions that the social sciences and related professions can make to an understanding of urban and rural problems. It provides the student the opportunity to understand the relationship between research and the practices of other social sciences and professions.

For students planning to go on to graduate studies it is recommended that undergraduate programs include courses such as statistics, quantitative research methods and at least introductory courses in economics.

The curriculum in urban and rural studies will provide students with a broad exposure to the theoretical constructs and empirical applications of various disciplines as they relate to the human problems of our society. The goal of the curriculum is to train action-oriented students who can bridge the apparent gaps between disciplines and begin to provide an interdisciplinary synthesis of the complex dimensions of the urban and rural environment.

**Lower Division** Lower-division offerings in urban and rural studies are designed to provide a comprehensive orientation to the urbanization process as approached from the social-science disciplines of anthropology, economics, political science, psychology, sociology, and history. Any three of these courses meet the Third College general-education requirement and in addition may serve as lower-division social-science electives for Revelle and Muir Colleges.\*

**The Major** To receive the A.B. degree with a major in urban and rural studies, the student must meet the requirements of Muir, Revelle, Third, or Warren College and the following requirements in urban and rural studies.\*\*

Sixteen upper-division courses to be distributed as follows:

- 6 specially designated courses taken from the departmental offerings in sociology, anthropology, economics, political science, psychology. (All six to be in the same discipline.)
- 2 courses from another social science, or history.

8 URS courses to include: 111, 120A and 120B, 130, 186 (Field Studies), 190 (Senior Seminar).

In the senior seminar, URS 190, seniors will construct a final paper or other document which will be in the form of a "senior thesis" acceptable for filing in the URS Resources Reading Room.

\*The field component is seen as a test of theory, concepts and strategies learned in the classroom through the above course sequence, as well as serving in part as a service to the community. In so relating students and faculty to community issues, university education and research will be kept relevant to the issues of the day, testing theory with practice, while developing new and innovative relations with communities traditionally underserved by institutions of higher education.

\*\*The faculty will encourage individualized educational programs leading to the A.B. degree in urban and rural studies brought to them by students. Such programs will be reviewed by the faculty and will serve to promote innovation within the established educational norms of the University. As soon as possible after the student has declared a major in urban and rural studies, a faculty adviser will be assigned to assist the student in developing a program of study.

## Courses

### Lower Division

**20. The Concept of Community (4)**

A modular examination of urbanization in contemporary life styles with reference to mobility, crowding, density and environmental space, as well as human territoriality. Demographic and social-psychological determinants are used to explore identification, role-performance, social processes and stress. Staff.

**21. Urban American Society (4)**

A sociological introduction to urban America, touching on the following topics: cultural tradition, industrialization, capitalism and the welfare state; careers, work and leisure; changing family forms; stratification, distribution of wealth, power and prestige; ethnic and racial groups; predicting future trends. Staff.

**22. Urban Economics (4)**

Topics to be included: (a) an overview of capitalistic free-market economy ("economics in a nutshell"); (b) economic reasons for the existence of cities; (c) factors influencing the location of people and firms within and between cities (migration); (d) urban problems (pollution, housing, transportation, crime, poverty); (e) urban government (revenues and expenditures, taxes, governmental service.)

**23. Contemporary American Ethnography (4)**

An introduction to anthropological perspectives on urbanization. Topics include: family and kinship, poverty and affluence, community and neighborhood, spatial location of groups and sub-groups.

**24. Society in Action (4)**

Social stratification, typologies, and indicators of a social stratification. Social class, conflict and social change. Fundamental theoretical approaches to the study of the above social phenomena. Within the course the family, education, and economic structures will be discussed in the context of social classes and conflict. (Staff)

**25. Law and Society (4)**

This course will examine aspects of the legal process, including how and when the process is invoked, judicial decision-making, the role of the lawyer. Illustrative cases will be drawn from diverse areas, for example, commitment of the mentally ill, conscientious objection to the draft, economic equalization under the Constitution.

**26. Comparative Politics and Development (4)**

An interdisciplinary approach to the study of comparative politics. The course will emphasize selected issues of development and change, with special emphasis on countries of the Third World. Staff.

**41. Introduction to Human Care Services (4)**

The course provides an overview of human care services with emphasis on social, legislative and political factors in the organization and distribution of programs and services under public or voluntary auspices. Impact of professionalism and

consumerism. Selected fields: social services, health care and special institutional services. Instructors: Solis and Ngubo

**60. Introduction to Statistics (4)**

Introduction to the experimental method in psychology and to mathematical techniques necessary for experimental research. Prerequisites: one year of mathematics or permission of instructor.

## Upper Division

**104. Introduction to Social Psychology (4)**

An intensive introduction and survey of current knowledge in social psychology. Prerequisites: Psychology 60, or Mathematics 80A, or URS 20, or permission of instructor and department stamp.

**107A-B. Research in Policy Formation (4)**

Use of technical methods in the analysis of urban problems and policy development. Stress of the course is on quantitative techniques used for problem identification and solution. Analytical tools in the course are grouped by subject matter as a means of operationalizing research as it relates to public policy. Prerequisites: URS major and upper-division standing, and an introductory course in statistics or consent of instructor.

**108. Introduction to Research Methods (4)**

Introduction to methods of studying human phenomena in urban and rural settings. Lectures will give critical expositions of the uses of observation, personal/official documents, problem identification, hypothesis generation, sampling procedures and research design. Familiarity with statistical techniques unnecessary. Prerequisite: consent of instructor.

**109. Urban Social Problems (4)**

A research-oriented course focusing on institutions and sub-communities in the urban area. Readings will be drawn from sociological studies of urban communities and from studies of public policy and planning. Students will work on individual or joint projects. Prerequisites: URS major, upper-division standing and consent of instructor.

**110. Introduction to Planning and Urban Development (4)**

Introduction to theories and definition of urbanism and planning. Relationships between urban development, planning and questions of resource distribution are examined in their social, ethnic, spatial, and political contexts. Among the planning theories examined are: comprehensive, centralized, indicative, incremental, and spatial. Prerequisites: two quarters of a social science, sophomore standing or consent of instructor.

**111. Community Dynamics and Ethnicity (4)**

An examination of the interaction of migration and urbanization on community as a social system. Characteristics of agencies and organizations which deliver services or influence changes will be approached from the use of ethnicity as a conceptual model. Prerequisite: consent of instructor.

**112. Community Conflict and Change (4)**

Investigates socio-economic and political phenomena bearing on man's continued coexistence with his environment and institutions. Topics examined include community dynamics, translating information into policy, translating policy into legislation, translating policy and information into programs, techniques for program analysis and evaluation. Prerequisite: consent of instructor.

**113. Community Resource Development and Organization (4)**

Course covers the organization of community resources and political, social, economic and motivational factors related to their establishment and maintenance, will study organizations and services in urban areas of San Diego and make comparative studies of these organizations in rural areas. Field trips and student projects supplement class discussion. Prerequisite: URS senior majors or permission of instructor.

**114. Community Development and Organization (4)**

Analyzes effects of conflicts of institutions, social mobility, individuation, anomie and ethnocentrism on community dynamics. Examines positive interactions between delivery systems and ethnocentrism. Linkages or frames of reference built upon aspects of systems theory applicable to the social sciences. Prerequisite: consent of instructor.

**119. Social Impact of Urbanization (4)**

Focus on distribution of social costs and benefits of urbanization-industrialization process. Through comparative

## Visual Arts

analysis, will identify forces generating various forms of urbanization, and evaluate human consequences of that process. Prerequisite: upper-division standing, or consent of instructor

### **120A-B. Social Policy and Social Planning**

Introduces concepts, origins, functions, processes, organization and evaluation of social policy and social planning as one form of state response to social costs of economic development. 120B explores comparative social policy and planning and their social consequences as background for considering alternative strategies for more effective mobilization of resources to achieve desired futures. Heifetz.

### **121A-B. Policy and Planning in Higher Education (4-4)**

URS 121A outlines origins and functions of higher education, relationship between labor force needs and educational resources; critically evaluates changing educational, research and service missions of higher education; reviews tactics, strategies and outcomes of student protest and institutional response.

URS 121B continues above themes with comparative analysis of higher education in selected countries, focusing thereafter on student task groups seeking to understand, cope with and influence the direction of various university functions to better meet student-worker-community needs.

### **122. Health Policy and Planning (4)**

Outlines determinants of community health, trends in health needs and resources, evaluates performance in meeting needs, analyzes factors accounting for performance and explores means and prerequisites for improving that performance. Focus on San Diego. Prerequisite: upper-division standing or permission of instructor.

### **129. Deficit Modeling and Social Policy (4)**

Labeling and its effects of allocation of resources, decision-making, and implications for improving human welfare are examined. Emphasis is given to expressions of social policy where blaming the victims or deficit modeling characterize social objectives for ethnics of color. Prerequisites: URS 110 and/or URS 120.

### **130. Metropolitan Development and Analysis (4)**

Analysis of the economic, social and administrative factors of metropolitan development with respect to the relationships of the community to its region (function) and to its internal organization (structure). Particular emphasis on the linkages of the metropolitan subsystems and their roles in the development process. Prerequisites: upper-division standing in the social sciences and permission of instructor.

### **131. Planning Theory (4)**

Historical development of the rationales for planned action, and a focus on current theories concerning the linking of scientific knowledge to organized social actions. The course provides a basis for determining the limits of planned guidance procedures, including the determination of the elements involved in the decision-making process. Prerequisites: URS Major, upper-division standing or consent of instructor.

### **140. The Housing Environment (4)**

An introductory course examining the forces controlling housing. Emphasis will be placed upon the definition of the market, social factors, and economic policy. Written case studies will be examined dealing with the development process, and lectures will be supplemented by attendance at relevant public meetings held in the San Diego area.

### **144. Introduction to Community Health (4)**

Defines health determinants of a community, measurement of health and illness, current major health problems, causes and prevention. Course will include basic principles of epidemiology, control of infectious diseases, and control of non-infectious hazards of the physical, chemical, biological, and/or social environment. Prerequisites: upper-division standing and consent of instructor.

### **145. Orientation to Health Care Organization (4)**

The focus of the course will be to provide an orientation to the current organization of preventive and curative services — ambulatory, inpatient, and residential care. Focus will be on social, political, and cultural issues related to provisions of care and patterns of delivery. Prerequisites: upper-division standing and consent of instructor.

### **146. Case Studies in Health Care Programs (4)**

The purpose of this course is to select identified populations with special needs and review their status of care, factors influencing incidence of disease and health problems, politi-

cal and legislative measures related to the provision of care. This group would include population at risk (health-wise) — the poor (rural and urban), mothers and children, elderly. Prerequisites: URS 145, upper-division standing and consent of instructor.

### **147. Influences on Health Systems (4)**

This course will focus on health resources in the United States in terms of health facilities, manpower, and financing, and the relationship of these resources to quality. The course will also include a brief analysis of proposals for national health insurance and an overview of health systems in other countries. Prerequisites: upper-division standing or permission of the instructor.

### **148. Nutrition — U.S.A. (4)**

The purpose of this course is to emphasize the importance of nutrition to health. The course will give the student an understanding of the science of nutrition, and the kinds of health problems associated with poor nutrition. It will help students interpret the principles of nutrition in selecting an adequate diet, and will teach them where to look for reliable sources of nutrition information, and how to evaluate claims made through product advertising. Prerequisites: upper-division standing or permission of the instructor.

### **150. The Black Ghetto (4)**

Examination of the black ghetto from about 1860 to the present. Trends in migration, the patterns of economic and social adjustment, shifts in ideology and protest, and the demand for community control are referenced themes. Prerequisite: consent of instructor.

### **151. Social Psychological Aspect of Black Identity (4)**

This course examines formal theory on personality formation in terms of the life style of Afro-Americans. Emphasis is devoted to the interdependence between personal characteristics, Afro-American culture and the social conditions which foster blackness as a personality construct. Prerequisite: upper-division standing or permission of instructor.

### **152A. Personal and Social Development (4)**

A lecture-discussion course on the human life span from birth to young adulthood. Content areas include: personal-social states and adaptive processes for infancy and early childhood, childhood, adolescence and young adulthood. Prerequisite: Psychology 10A-B-C or permission of instructor.

### **152B. Personal and Social Development (4)**

A continuation of 152A with emphasis on the human development period from the upper limits of young adulthood to old age. Topics included are: effective social behaviors and change of life in males and females; social roles and effective behavior; personal-social opportunities for enhancement of self-esteem; attitudes toward dying, and, social disengagement and aging. Prerequisite: URS 152A or permission of instructor.

### **153. Society, Motivation and Personality (4)**

This course will provide an examination of the interplay between values, activities, and emotional components of behavior. Topics to be covered in depth include: social support systems, understanding values, motivations and drives, basic needs and their gratification, coping and expression, and psychological health. Prerequisites: URS 152A/B; upper-division standing and/or consent of instructor.

### **155. Group Processes (4)**

An introduction to the social psychological study of human behavior in small groups. Special emphasis will be given to interpersonal relations, structure, leadership and cohesiveness. The course will combine lecture, discussion and small group experience methods. Prerequisites: Psychology 104 or permission of instructor and department stamp.

### **156. Ethnic Attitudes (4)**

This course examines beliefs and values of ethnic groups in the United States with emphasis on behavioral and social consequences. The origin and development of racial attitudes will be studied, with an emphasis on the attitudes of African and European Americans. Prerequisites: URS 20 or URS 21 or URS 111, or permission of instructor and department stamp.

### **159. The Urban Underclass (4)**

This course focuses on the marginal peoples making up the surplus labor population in both underdeveloped countries and the United States. Theories of poverty and underemployment stressing structural factors are emphasized. The family structure, life and employment histories of the urban poor are related to the larger political economy. Prerequisite: upper-division standing or permission of instructor.

### **160. Introduction to Law and the Judicial Process (4)**

This course deals with forces influencing the making of the law, especially as it is made in the process of adjudication, and with the nature of the judicial process itself. It draws upon the work of lawyers, political scientists, historians, sociologists and moral philosophers.

### **163. Contemporary Legal Issues (4)**

Analysis and discussion of current legal problems and their impact on society. Topics to be covered will include drug laws, the environment, obscenity and free speech, search and seizure and their constitutional implications. Prerequisites: URS 160 and consent of instructor. Staff.

### **168. Socio-Economic Change in Developing Areas (4)**

This course reviews theories and definitions of development, traces the Industrial Revolution in the West and Japan, and analyzes how the colonialism and world economy fostered by the industrial capitalist countries affected development of Third World nations. Finally, some alternate development paths pursued by underdeveloped countries are examined. Prerequisites: upper-division standing or consent of instructor.

### **170. Comparative Rural Societies (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 ones. Prerequisite: upper-division standing or permission of instructor.

### **186. Field Work in Urban and Rural Studies (4-16)**

In an attempt to define and study some unique process of community life, students will develop and implement projects requiring their participatory involvement in some community. Projects may cover such areas as health (medical and psycho-social), education, housing and welfare. Prerequisites: junior standing, URS major and consent of faculty fieldwork supervisor. Required course for urban and rural studies majors. May be repeated for credit.

### **190. Senior Seminar**

Fundamentals of professional and scientific behavior through oral and written reports of students' field experiences. Principles and practices of research design, ethical issues and professional conduct. Staff.

### **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. May be repeated for credit.

### **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 approval of instructor.

## Visual Arts

OFFICE: 214 Mandeville Center for the Arts

### **Professors:**

David Antin, M.A.  
Harold Cohen, Diploma of Fine Arts  
Manny Farber  
Newton Harrison, M.F.A.  
Madlyn M. Kahr, Ph.D. (Acting)  
Allan Kaprow, M.A.

### **Associate Professors:**

Eleanor Antin, B.A.  
Standish Lawder, Ph.D. (Chairman)  
Sheldon Nodelman, Ph.D.

### **Lecturer w/Security of Employment:**

Jehanne Teilhet, Ph.D.

### **Assistant Professors:**

Darrell Davison, Ph.D.  
Fred Lonidier, M.F.A.  
Patricia Patterson (Acting)



Moira Roth, Ph.D.  
Philip Steinmetz

**Lecturers:**

Claudio Fenner-Lopez, M.A.  
Dan Sullivan

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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 with an opportunity to concentrate on areas involving significantly different esthetic 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 esthetic attitudes and reinterpretation of genres. Because of the explorational 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, or photography, are offered also.

**College Requirements** The Department of Visual Arts teaches courses applicable toward the Muir and Warren general education requirements, the Revelle fine arts requirement, and the Revelle minor. Third College students may satisfy the humanities and arts requirement under program B of the general education requirement.

**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, 8mm and 16mm film as well as many offerings in art history/criticism. There are neither facilities nor courses for the pursuit of crafts or graphics.

**Group I: Lower Division** Seven courses required

- \*1 Introduction to Art-Making
- \*2 Introduction to Art-Making
- \*3 Introduction to Art-Making
- \*10 Theory of Art
- \*14 19th- and 20th-Century Art
- \*Choice of any two:
  - 13A Intro to Arts of Non-Literature Cultures
  - 11 Prehistoric and Ancient Art
  - 12 Medieval Art

16 Renaissance and Baroque Art  
84 History of Film

\*Required for all studio majors.

**Group II: Upper Division** Four courses required (Note: Visual Arts 1, 2, 3 and either 10 or 14 must be completed before taking Group II courses) Choose four from:

- 160 Photography
- 170 Introduction to Media
- 105A Drawing
- 106A Painting
- 107A Sculpture
- 104A Performance

**Group III: Upper-Division Studio** (Intermediate and Advanced Level)

Five courses required. Upper-division studio courses such as Intermediate Drawing or Various Forms of Illusionism satisfy these requirements. Check with department for full course listings.

**Group IV: Upper-Division Non-Studio**

Four courses required. Upper-division art history/criticism courses such as Hard Look at the Movies, Renaissance Art or Seminar in Contemporary Art satisfy these requirements. Check with department for full course listings.

**Art History/Criticism Major** This major is intended to provide students with a comprehensive and integrated foundation in the history, theory and criticism of the visual arts. The application of the techniques of historical and critical analysis to a range of the major periods, genres and media of artistic expression — including twentieth-century technological media — is stressed. Departing from a unified base, the major permits eventual emphasis upon either art history or art theory/criticism. Students considering the possibility of graduate work are advised to achieve proficiency in one or more of the principal foreign languages needed for scholarly research in addition to the requirements set forth below.

**Lower Division** Eight courses required  
\*Two studio courses chosen from:

- 1 Introduction to Art-Making
- 2 Introduction to Art-Making
- 3 Introduction to Art-Making
- 160 Photography
- \*10 Theory of Art
- \*11 Prehistoric and Ancient Art
- \*12 Medieval Art
- \*16 Renaissance and Baroque Art
- \*14 19th- and 20th-Century Art
- \*13A Intro. to Arts of Non-Literate Cultures (Students focusing in theory/criticism are required to take Visual Arts 84, History of Film in place of one of the following courses: Visual Arts 11, 12, 13A, 14 or 16.)

**Upper Division** Twelve courses required. At the upper-division level, students decide whether to focus on art history or art theory/criticism. Two upper-division courses are required for all majors:

- \*102A History of Criticism
  - \*103 Art Historical Methods
- Of the remaining ten upper-division courses, the student will take six in the area of speciali-

zation and four in the other area. Specific course listings for art history and theory/criticism are available from the department.

\*required for all history/criticism majors

**Communications/Visual Arts Major**

This program is designed to develop conceptual, analytical and technical skills in photography, video and film-making (8mm and 16mm) by combining courses in history/criticism and production with those of the Communications Core Curriculum. Creative skills as well as aesthetic, analytic and critical skills will be developed.

**Communications Core Curriculum**

- Seven courses required
- 100A Introduction to Media Communications (Crosslisted w/VA 170)
- 100B Introduction to Macro Communications
- 100C Introduction to Micro Communications
- One Micro Course
- One Macro Course
- One Speciality: two courses chosen from either Micro, Macro or Media listings

**Criticism and History Courses**

Five courses required. Students can select five courses in media criticism and history offered by the Department of Visual Arts. A complete list of applicable courses is available from the department.

**Production/Studio Courses** Seven courses required. Students can select seven courses in media production from those offered in communications or visual arts. A complete list of applicable courses is available from the department.

†Media, Micro and Macro courses are listed under the Department of Communications.

**Master of Fine Arts Program** The program is designed to provide an intensive professional training for the student who proposes to pursue a career within the field of art — including art-making, criticism, theory. The UC San Diego program is unusual in that, while encouraging the full development of the student's particular interests, it seeks to provide an integrated and comprehensive introduction to the possibilities available in the most diverse and challenging form of contemporary artistic production, to the intellectual strategies which underlie them and to the implication of these strategies and the choices which they entail. The word "art" is used here to denote a broad range of activities, and we do not differentiate between students in terms of traditional technique and media-based classifications. All art-making activities are considered as serious intellectual endeavor, and all students in the program find themselves confronted by the need to develop their intellectual and critical abilities and their verbal skills in the working out of their artistic positions. There are no craft-oriented programs, nor facilities for doing any; nor do we have any courses in art education or art therapy. The courses are intended to develop in the student a coherent and informed understanding of the past and of recent developments in art and art theory. Again,

the department aims to establish a confident grasp of contemporary technological possibilities, including those involved in film, photography, and the electronic media. For reasons of efficiency, much of the teaching and learning is done in structured courses — lectures, seminars, study groups. Attendance to these requirements is not intended to replace the student's individual work, nor to underestimate the central importance of that work and its development. That aspect of the student's activity is expected to be continuously self-motivated, and to form the dynamic background against which the program of study operates and makes sense, just as faculty do their teaching against a background of continuous professional activity. No two students will necessarily follow the same path through the degree program, and the constitution of individual programs of courses will depend upon the analysis of individual needs and interests, worked out by the student in collaboration with his or her faculty adviser. A certain number of theory-oriented courses are required.

#### Admission Requirements

**Grade-Point Average** — An over-all GPA of 3.00 and a 3.50 in a student's major is required.

**Personal Interview** — Interviews may be requested for prospective candidates.

**Art History** — Students are expected to have at least six art history courses 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 will be expected to make up the six courses in excess of the seventy-two units required for the degree.

**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 the form of slides, video tape or film. These will be returned upon review of the application. Please 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 to the graduate admissions office on or before January 15, 1979. Work and statement 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.:

**Departmental Review** — This review generally takes place in the third or fourth quarter in residence, although it can occur in the fifth quarter. Students make a formal presentation of their work to a faculty committee. This includes a paper and an oral examination. This presentation is considered a departmental examination; if the work is judged not to be adequate at that time, students can be dismissed regardless of their GPA.

**Seventy-two units of course work** — An apprentice teaching course is required; minimum one quarter — three units. (Specific information on course distribution requirements can be obtained from the department).

**M.F.A. final presentation** — During the last quarter in residence, each student is required to present to the public a coherent exhibition of his or her work.

**Oral examination** — A committee of three visual arts faculty and one outside tenured faculty member 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 1500 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 recent 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 will write a 40-50 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

##### Lower Division

#### 1. Introduction to Art-Making (4)

An introduction to the process of art-making with special reference to the generation of meaning through the juxtaposition of given elements and the interaction between such elements and their intermediate and wider contexts. Materials, objects, images and experience of everyday life will be utilized.

#### 2. Introduction to Art-Making (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.

#### 3. Introduction to Art-Making (4)

This course will employ drawing, watercolor painting, found photographs and verbal material to construct serial and narrative work. Art forms such as cartoon strips, illustrative manuscripts and photo-journalist works will be analyzed and used as models. Studio work will vary in size and format from small hand-made books and scrolls to large wall pieces.

#### 10. Theory of Art (4)

Introduction to the significant structure of art works. If an art work "means something" it is possible to ask "how" it means it and "what" it means. These questions will be asked in relation to examples of representational and non-representational art works from a great variety of periods and culture. The course will deal with photography, architecture and performance as well as painting, sculpture and drawing.

#### 11. Prehistoric and Ancient Art (4)

The origins of our figurative tradition in the art of the European paleolithic, the constitution of monumental form in the Bronze Age in the Near East, and the classical achievements of Greece and Rome. (Not offered in 1978-79.)

#### 12. Medieval Art (4)

The nature and function of art in the service of a new spiritual order in the last phase of antiquity; its efflorescence in Byzantium and the interaction of the antique heritage with Northern traditions in the Romanesque and Gothic to form a new, distinctively European art.

#### 13A. Arts of Non-Literal Cultures (4)

An introduction to the arts of non-literal cultures which will consider aspects of Paleolithic art, early Egyptian art, tribal and folk arts as well as other primarily oral cultures. The emphasis will be placed on the artist, the aesthetic process and the end product, and the relationship of the art to the culture as a whole.

#### 14. Nineteenth- and Twentieth-Century Art (4)

A survey of nineteenth- and twentieth-century art (with emphasis on painting) which will be presented on both a chronological and theoretic level. Course begins with art of the French Revolution and ends with art of the 1970's.

#### 16. Renaissance and Baroque (4)

The emergence of a humanist and naturalist art out of the Gothic tradition and the re-awakened ideals of antiquity in the early Renaissance; the diffusion of this art throughout Europe in the Renaissance and its transformation in the proto-modern art of the Baroque.

#### 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 film-makers, including those of Europe, Russia and the United States.

### Upper Division

#### 102A. History of Criticism (4)

Significant critical works will be read and discussed. Examples will be drawn from the philosophical, theoretical literature from Plato through Kant, as well as from the craft and conservative traditions exemplified by writings like Dannini, Aretino, Reynolds and Diderot. Required for all art history/criticism majors. *Prerequisite: one upper-division art history or criticism course required, two recommended.* (Not offered in 1978-79.)

#### 102B. History of Criticism (4)

A continuation of Visual Arts 102A which will deal with work from Kant to Heidegger, with readings in the criticisms of the professional art critics from Baudelaire through Clement Greenberg, Harold Rosenberg and Michael Fried. *Prerequisite: Visual Arts 102A or consent of the instructor.*

#### 103. 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 alternate possibilities. Open to art history/criticism majors and visual arts graduate students only. Should be taken in the senior year. Required for art history/criticism majors. *Prerequisite: one upper-division art history course required, two recommended.*

#### 104A. Performance (4)

A workshop for artists to extend their art-making possibilities through use of their own bodies as both physical and psychological material and its potential for interaction with other human and non-human materials. Includes study of contemporary artists already working in this area. *Prerequisites: Visual Arts 1, 2, 3 and 10 or 14.*

**104B. Intermediate Audience-Oriented Performance (4)**

A continuation of techniques and viewpoints developed in VA 104A but with an emphasis on performing for audiences. Autobiographical (solo) and social (group) performance, narrative performance, objects and spaces that perform, games and entertainments, ritualism and transcendental performance are among the topics that may be covered. *Prerequisite: VA 104A or consent of instructor.*

**104E. Non-Audience-Oriented Performance (4)**

A continuation of techniques developed in VA 104A, but with an emphasis on non-audience-oriented performance derived from everyday behavior and its effect upon feeling and meaning. *Prerequisite: VA 104A or consent of instructor.*

**105A-B-C. Drawing (4-4-4)**

A — A course in beginning drawing covering line, value, texture, gestures, forms, and composition. These concepts will be introduced by the use of models, still life, and landscapes. The different media that will be used include charcoal, pencil, ink, conte. *Prerequisites: Visual Arts 1, 2, 3 and 10 or 14.*

B — A continuation of 105A. The student will be exposed to a wider variety of means in representation. The connotational range of different sorts of "marks" and represented "spaces" will be explored. *Prerequisite: Visual Arts 105A.*

C — For advanced students. Students will be given the opportunity to explore the relation between their own energy and idiosyncrasy as draftsmen-artists and the quasi-objective demands of representing various types of real and virtual space. May be repeated once for credit. *Prerequisites: Visual Arts 105A and one additional upper-division drawing course or consent of instructor.*

**105D. Life Drawing (4)**

Using both nude and clothed models the course explores the body as a human language that can be read and depicted from study of the body's stance, gesture, intention and style. *Prerequisites: two upper-division drawing courses.*

**106A-B-C. Painting (4-4-4)**

A — A studio course focusing on the problems involved in transferring information and ideas onto a two-dimensional surface. Specific assignments to be determined by the professor. *Prerequisites: Visual Arts 1, 2, 3 and 10 or 14.*

B — A studio course in painting, stressing individual creative problems. Specific problems to be investigated will be determined by the individual professors. May be repeated once for credit. *Prerequisite: Visual Arts 106A.*

C — A studio course in painting, stressing individual creative problems. May be repeated once for credit. *Prerequisites: Visual Arts 106A and one additional upper-division painting course or consent of instructor.*

**107A-B-C. Sculpture (4-4-4)**

A — A studio course focusing on the problems involved in transferring information into three-dimensional objects. Specific problems to be investigated will be determined by the individual professors. *Prerequisites: Visual Arts 1, 2, 3, and 10 or 14.*

B — An intermediate studio course in sculpture, stressing individual problems. Specific problems to be investigated to be determined by individual professors. May be repeated once for credit. *Prerequisite: Visual Arts 107A.*

C — A studio course for serious students of sculpture on the advanced levels. Stress will be placed on individual creative problems. May be repeated once for credit. *Prerequisites: Visual Arts 107A and one additional upper-division sculpture course or consent of instructor.*

**107D. Representational Sculpture (4)**

This course will deal with systems of representation in sculpture, material problems and narrative problems. May be repeated once for credit. *Prerequisites: Visual Arts 107A and one additional upper-division sculpture course or consent of instructor.* (Not offered in 1978-79.)

**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. *Prerequisite: consent of instructor.* May be repeated for credit once.

**113B. African and Afro-American Art (4)**

This course is a critical aesthetic survey of West African arts in their cultural setting and the subsequent art styles which survived the transplant in the slave areas of the Americas. Emphasis will be placed on those West African tribes who were captured into slavery. *Prerequisite: Visual Arts 13A or consent of instructor.*

**113C. Polynesian Art (4)**

This course serves as a critical analysis of what the arts of Polynesia can tell us about the Polynesian culture at the time of contact with western culture. This course will cover Tonga, Samoa, Society Islands, Marquesas, New Zealand, Hawaii and Easter Island. *Prerequisite: Visual Arts 13A or consent of the instructor.* (Not offered in 1978-79.)

**113D. Melanesian Art (4)**

This course will analyze the role of the arts, artists, and the aesthetic process in the living cultures of Melanesia — Solomon Islands, New Guinea, New Britain, New Zealand, New Hebrides and Australia. *Prerequisite: 13A or consent of instructor.* (Not offered in 1978-79.)

**113E. Sociology of Primitive Art (4)**

This is an advanced course which will analyze theories on what the arts can tell us about a culture, e.g. why do people in pre-literate cultures, who live in rectangular houses, tend to emphasize rounded forms in their art. *Prerequisites: Visual Arts 13A and consent of instructor.* (Not offered in 1978-79.)

**113F. Primitivism of Modern Art (4)**

This course will be concerned with the different ways modern artists (Gauguin to Moore) were influenced by primitive art. May be repeated once for credit. (Not offered in 1978-79.)

**113G. Afro-American Art (4)**

This is an advanced course which will examine the subsequent West African art styles that survived the transplant in the slave areas of the Americas, Haiti and Cuba. The process of acculturation, in regards to the visual arts, folk tales and customs will also be emphasized. *Prerequisite: Visual Arts 13A or consent of instructor.* (Not offered in 1978-79.)

**113H. Western and Non-Western Rituals and Ceremonies (4)**

This course will examine the image-making process and contextual use within specific ceremonies and/or rituals. Content will focus on Christian and non-Christian imagery with emphasis on the cultures of West Africa, Melanesia, Nepal and the American Indians. *Prerequisite: Visual Arts 13A.*

**113J. Women Artists in Non-Literate Cultures (4)**

The course will explore the issues surrounding the role of women as artists in a number of non-literate cultures including Nepal, Oceania, Africa and the Americas.

**115A. "Ancient" Art History (4)**

An undergraduate seminar emphasizing critical problems in the architecture, painting, sculpture and mosaics of Rome. Readings will include Brown, Kaehler, MacDonald and others on architecture, Hamberg, Wegner, and Nodelman on sculpture, Lavin and Clarke on mosaics. *Prerequisite: Visual Arts 11 or consent of instructor.* (Not offered in 1978-79.)

**115B. Renaissance in Fifteenth-Century Italy (4)**

Fifteenth-century architecture, sculpture and painting in Italy. *Prerequisite: Visual Arts 16 or consent of instructor.*

**115C. Baroque Art (4)**

The architecture, sculpture and painting of the seventeenth-century, principally in Rome and its trans-Alp expansion. *Prerequisite: Visual Arts 16 or consent of the instructor.*

**115H. Pre-History of Western Art (4)**

The art of Europe and the Mediterranean in the Paleolithic period in its relationship to human consciousness with consideration of its historical consequences for the later art of the West. *Prerequisite: Visual Arts 11 or consent of the instructor.*

**115J. Late Antique Art (4)**

This course will deal with architecture, sculpture and painting across the transition from antique to medieval style from the second to the sixth century, A.D. *Prerequisite: Visual Arts 11 or consent of the instructor.* (Not offered in 1978-79.)

**115K. Narrative Structure in the Visual Arts (4)**

An investigation of the strategies of representation of events in time within the visual arts, and their significance for the meaning and effect of the work. Typical cases from a range of art historical periods and situations will be scrutinized; ancient art will be emphasized. *Prerequisite: either Visual Arts 11, 12, 14, or 16 or the consent of the instructor.* (Not offered in 1978-79.)

**115M. Greek Art (4)**

This course will cover the major arts of Greek architecture, sculpture and painting during the Archaic, Classic and Hellenistic periods. (Not offered in 1978-79.)

**115N. American Art 1900-1950 (4)**

The course will examine the work and attitudes of such movements as the Alfred Stieglitz group, Precisionism, Regionalism through to Abstract Expressionism. Individual artists and movements will be studied in the context of their cultural and political-economic milieu. *Prerequisite: Visual Arts 14 or consent of instructor.*

**115O. Late Medieval and Gothic Art in Central Europe and Italy (4)**

A study of European art from the rise of the civic commune to the coming of the Black Death. *Prerequisite: Visual Arts 12 or consent of instructor.* (Not offered in 1978-79.)

**115P. Early Christian and Byzantine Art (4)**

The emergence of Christian art and iconography from paleo-Christian times through the "Peace of the Church". All areas where Christian art emerged in the Roman Empire and the earliest formal monuments from about A.D. 200 to approximately A.D. 450 will be covered. Sources of Christian iconography in eastern mysticism and the interdependencies of the Roman state, local traditions with the new faith will be examined in terms of their social implications. *Prerequisite: Visual Arts 11 or 12 or consent of instructor.*

**115Q. Northern Renaissance Art (4)**

Major artistic developments in the Netherlands, Burgundy, France and Germany will be traced through the period from 1380 through 1519, with special emphasis on the social and intellectual changes manifest in the art of this period. *Prerequisite: Visual Arts 16 or consent of the instructor.*

**115R. Gothic Art in Italy, 1250-1420 (4)**

A survey of religious and secular art of Italian cities and castles with special emphasis on formal and symbolic sources in monastic reforms, spiritualist movements, the Black Death, the Avignonese papacy and other historical conditions. *Prerequisite: VA 12 recommended.*

**115S. Early Medieval Art, 500-1000 (4)**

A review of the art of the West after the collapse of the Roman Empire, through the period of the invasions, Hiberno-Saxon art, the Carolingian revival and the Ottonian period in Germany to the end of the millennium. *Prerequisite: VA 12 recommended.*

**115T. Spanish Painting and Its Effect on Nineteenth-Century French Art (4)**

This course will focus on the Spanish artists El Greco, Ribera, Zurbaran, Velazquez, Murillo and Goya and the impact of their work on the development of nineteenth-century painting, particularly in France. *Prerequisite: VA 16 recommended.*

**115U. Nineteenth-Century Symbolist Thought (4)**

An exploration of symbolist painting through the conceptual framework of poetic theory. Correspondence, suggestion, synthesis, repetition, ambiguity, derangement of the senses, primitivism and other significant concepts of symbolist ideology will be explored through their manifestations in art. *Prerequisite: VA 14 recommended.*

**115V. Roman Art (4)**

The major arts of architecture, sculpture and painting during Rome's imperial centuries (ca. 200 B.C.-400 A.D.) will be scrutinized against the background of their Greek and Etrusco-Italic inheritance and within their contemporary social, political and intellectual context, with a view to an understanding of the central role of the art of Rome as the foundation of Medieval and later Western art.

**116. Egyptian Art (4)**

A survey of the painting, sculpture and architecture of Egypt, beginning with the pre-historic period through the XX dynasty of the New Kingdom. The course will view these art forms within their historical, social and religious contexts. *Prerequisite: Visual Arts 11 or consent of the instructor.* (Not offered in 1978-79.)

**117. Eighteenth-Century Art History (4)**

A general survey of the painting, sculpture and architecture of the eighteenth century in Europe and America. *Prerequisite: Visual Arts 16 or consent of instructor.*

**118. Nineteenth-Century Art History (4)**

A survey of nineteenth-century art in Europe and America stressing stylistic developments from Neo-Classicism to Post-Impressionism. *Prerequisite: Visual Arts 14 or consent of instructor.* (Not offered in 1978-79.)

## Visual Arts

### 119. Twentieth-Century Art History (4)

An examination of the major art forms and movements of the twentieth century in their cultural context. *Prerequisite: Visual Arts 14 or consent of instructor.*

### 120. Aspects of Contemporary Art (4)

This lecture course will consist of a selection of topics (to be changed each time the course is taught) in contemporary art from the 1950's through pop art, minimalism, and conceptual art to the genres of the 1970's. *Prerequisite: VA 14 or consent of instructor.*

### 121. A Critical History of Photography (4)

A critical examination of photographs and photographers. Attention will be focused on the ideas and arguments of major movements and important individual artists. The importance of historical ideas in their relation to contemporary photographic issues will be stressed as well as the problems of the medium as an art form. *Prerequisite: Visual Arts 14*

### 123. Media Theory (4)

Introduction to, and history of, the major theories underlying photography. Covers the interaction between media and other art forms such as painting, drama and literature. While traditional forms of criticism will be analyzed, emphasis will be upon semiotic, sociological and communication/information models of inquiry. Overlaps of theory in film and video will also be discussed. (Not offered in 1978-79.)

### 124. Art Criticism (4)

The 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.

### 126. Matisse and Picasso (4)

A study of two major painters of the early twentieth century. Matisse, the "conservative" modern and Picasso, the "radical" modern. Particular emphasis will be placed on their respective innovations in the context of their colleagues at the time. *Prerequisite: Visual Arts 14 or consent of instructor.* (Not offered in 1978-79.)

### 145A-B. Representational Painting (4-4)

A — This is a studio course which aims to examine the options open to a painter who wishes to work with pictorial subject matter. Participants will be asked to analyze their artistic directions with respect to format, drawing, subject, and execution. Instruction will be given in all these areas. Students will be expected to research assigned artists and art forms. May be repeated for credit once. (Not offered in 1978-79.)

B — A continuation of 145A on the intermediate level. May be repeated for credit once. *Prerequisite: Visual Arts 145A* (Not offered in 1978-79.)

### 147. Animal Drawing (4)

Studio course which develops visual knowledge of and skill in capturing the form, movement and texture of birds, animals and fish. Special emphasis will be placed on understanding the environment of the animals and their behavior in that environment. The class will meet alternately on campus, at the zoo, the Museum of Natural History, Scripps aquarium and local farms. Students will be expected to carry out given assignments as well as initiate their own projects. May be repeated once for credit. *Prerequisite: Visual Arts 105A.* (Not offered in 1978-79.)

### 148. Calligraphic Drawing (4)

This is a studio course exploring for contemporary purposes such verbal-visual art forms as Japanese calligraphy and the figurative drawing which grows out of it, Persian manuscripts, Surrealist concrete poetry and American cartoons which operate equally through text and image. *Prerequisite: Visual Arts 105A or consent of instructor.* (Not offered in 1978-79.)

### 160. Photography (4)

An in-depth exploration of camera combination darkroom techniques in black and white. Emphasis is placed on developing reliable control of the fundamental materials and procedures through lecture, field and lab experience. Basic discussion of image making included. *Prerequisites: Visual Arts 1, 2, 3, and 10 or 14*

### 166A-B. Camera Techniques (4-4)

A — An intermediate course involving refined control over different films, developers, papers, and other photographic techniques. *Prerequisite: Visual Arts 160.*

B — An advanced-level course involving refined control over

different films, developers, papers, and other photographic techniques. *Prerequisites: Visual Arts 166A and Visual Arts 167A.* (Not offered in 1978-79.)

### 167A-B. Photographic Strategies (4-4)

A — An introduction to the aesthetic problems in photography. *Prerequisite: Visual Arts 160.*

B — An advanced study of the aesthetic problems of photographic image to cultural phenomena. Students will work on individual projects each quarter and will be evaluated according to their own progress made during the quarter. *Prerequisites: Visual Arts 166A and Visual Arts 167A.* May be repeated for credit twice. (Not offered in 1978-79.)

### 168. Color Techniques in Photography (4)

Instruction in color photography and printing. Lectures on theory and demonstrations in shooting and printing color negatives. *Prerequisites: Visual Arts 160, 166A, 167A (168).*

### 170. Introduction to Media (4)

An introductory course dealing with the theory of communication through portable video recording equipment and super 8 film. The theory of the relationship of camera to eye to viewer will be explored. Experimentation will be explored through laboratory experiments and projects using both 1/2" video tape, 3/4" video cassettes, and super 8 film. Crosslisted with Communications 100A. Offered fall quarter only.

**NOTE:** This course is a prerequisite to ALL visual arts film and video production courses as well as the beginning of the core media courses on campus.

### 172. Video Studio Techniques (4)

A foundation course exploring video as a communications tool, an art form and an experimental medium. This course will introduce the student to the television studio, its equipment and possibilities. Emphasis will be placed on the application of video techniques in the controlled environment of the television studio. *Prerequisite: Visual Arts 170.* Crosslisted with Communications 125. Offered winter quarter only.

### 173. Scripting for Film and Video (4)

The course emphasizes the use of scripts for conceptualizing the organizing ideas for film or video prior to actual production. Existing tapes and films will be critiqued. Small groups will produce a three-minute tape or film to increase their understanding of the relationship of scripting to production. As a final project, each student will develop a script from treatment through two drafts and a storyboard. *Prerequisite: VA 170 or Communications 100A (formerly Communications 171).*

### 175A. Video Production (4)

A studio course in the use of video as an art form. Most aspects of video production will be studied — scripting, shooting, editing and sound. May be repeated once for credit. *Prerequisite: consent of instructor.* (Not offered in 1978-79.)

### 175B. Advanced Studio Techniques — Video (4)

This course emphasizes producing and directing in "real time" from video scripts developed during or prior to the course. May be repeated once for credit. *Prerequisites: upper-division or graduate status and consent of the instructor.* (Not offered in 1978-79.)

### 175C. Advanced Video Workshop (4)

Students will work both individually and collectively in the scripting, research and production of short videotapes from five to ten minutes in length. The course will examine the interface between video and other arts (rather than using video as a passive recording medium), and this approach will largely determine the generic themes and visual styles of the final projects. A high degree of prior knowledge of video will be required of all students. *Prerequisites: knowledge of fundamental portapak video and black/white video techniques or consent of instructor; upper-division or graduate status.* (Not offered in 1978-79.)

### 176. Video Strategies (Studio Techniques) (4)

This is a production course designed for the student wishing to explore video as a contemporary art form. It conceptual orientation will explore imaging techniques and devices of video to encode fundamental modes of visual experience which are analogous to the expressive means of other pictorial arts. The student will be introduced to such image manipulation systems as chroma-key matting, character generation, video feedback, and the special-effects generator within the controlled environment of the television studio. Final project required. *Prerequisite: VA 170 or Communications 100A (formerly Comm. 171).*

### 178. Video Criticism (4)

An examination of video as an art form with particular emphasis on recent work of independent video artists. The specific expressive nature of the video image, questions of form and meaning, and the evolving relationship of video art to the other arts will be studied. *Prerequisite: permission of instructor.*

### 179. Narrative Media (4)

This is a production course investigating the concept of narration in media. Studying images and editing from film, video and photography, the course will examine a number of points including the nature of "fiction," the function of a storyline and the interaction of characters in a narrative. Students will be required to present a final project in 8mm film, 16mm film, video or photography. *Prerequisite: VA 185A or 186A or 172 or 176 or 167A or consent of instructor.*

### 180. Documentary Media (4)

This is a production course investigating the concept of documentation in media. Studying images and editing from film, video and photography, the course will study the representation of "truth" in documentary with stress on the viewpoint of the artist as manifested in the final work. Students will be required to present a final project in 8mm, 16mm, video or photo. *Prerequisite: VA 185A, 186A, 167A or 172 or 176 or consent of instructor.*

### 181. Munich Films, 1967-77; Ten Years That Shook the Film World (4)

This lecture series examines the ongoing renaissance in German films in terms of politics, economics and art, paying particular attention to its progenitors, the haunting exoticism of F. W. Murnau, and those emigre directors (Von Sternberg, Wilder, Lang) whose expressionist techniques and cynical outlook strongly influenced the dark, suspenseful Hollywood thrillers known as Film Noir. *Prerequisite: VA 84 recommended.*

### 182. Experimental Film (4)

An inquiry into the form, meaning, and historical context of works of cinematic art made as a personal means of expression outside the "movie industry". Course will deal with avant-garde films of the 1920's (Dada, Surrealist, German Expressionist, and Soviet Constructivist), American avant-garde cinema of the past two decades will be studied. Focus will be placed on such developments as personal film, structural film, film as poetry and the expansion of experimental film through various technology and situations.

### 183. Art of the Silent Cinema (4)

An intensive investigation into the form and meaning of silent cinema, with particular emphasis on interrelationships between film and other arts during the 'teens' and 'twenties'. The European avant-garde film will be studied in detail.

### 185A. Film Strategies—8mm (4)

Using the medium of 8mm film, this production course will explore strategies in film production and familiarize students with the visual grammar and syntax of 8mm film. Specific attention will be paid to camera work, sound and editing along with developing an awareness of the potentials of the medium. A final project in 8mm film will be required. *Prerequisites: VA 160, 170 and 84 or consent of instructor.*

### 185B. Film Making — 8mm (6)

This course will stress small three-minute productions. A more critical stance will be taken toward the epistemology and phenomenology of film-making and viewing. The student will make several three-minute films and a final three-minute film, all with an eye to increasing the student's ability to deal with complex artistic intention. *Prerequisite: Visual Arts 185A or consent of the instructor.* May be repeated for credit once. (Not offered in 1978-79.)

### 185C. Adv. Film Production — Super 8/Sound (6)

This course focuses on individual or group projects in Super 8/Sound executed within small production units (length of final film not to exceed five minutes). The course emphasizes editing single system and production planning. Students provide all film and pay processing. *Prerequisite: upper-division, graduate status or consent of instructor.* (Not offered in 1978-79.)

### 186A. Film Strategies — 16mm (4)

This production course is designed to heighten the students' understanding of film strategies utilizing the medium of 16mm film. The techniques of camerawork, lighting, editing, sound, printing and processing will be covered. A final project in 16mm film will be required. *Prerequisite: VA 185A or consent of instructor.*

**186B. Film Workshop — 16mm (6)**

A theatrical orientation toward the film. Emphasis will be placed on creating the script and on the complexities of creating space and images to make use of the cinema. The meaning of acting in the context of film will be developed and criticized. Differences between acting for film and stage will be emphasized. A ten-minute film will be required for the final project, and it will be critically evaluated. *Prerequisite: Visual Arts 186A or consent of the instructor.* May be repeated for credit once. (Not offered in 1978-79.)

**186C. 16mm Film Editing (4)**

The course is designed to study the problems of editing from both a theoretical and practical point of view. Films will be studied on the flatbed and students will also edit stock shot film. May be repeated once for credit. *Prerequisite: experience with photography, film or video.*

**187. 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 for credit twice. (Not offered in 1978-79.)

**188. Hard Look at the Movies (4)**

Examine 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. *Prerequisite: Visual Arts 84.* May be repeated for credit once.

**189. 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. May be repeated for credit three times. *Prerequisite: Visual Arts 84.*

**190. Problems in the Theory of Modernism (4)**

Explorations among the central conceptions underlying the practice and effect of the radical art in the modern epoch. *Prerequisite: Visual Arts 14 or consent of the instructor.* May be repeated for credit once. (Not offered in 1978-79.)

**192. Seminar in Contemporary Art (4)**

A series of seminars studying the art-making and critical issues in the period of the 1950's to the present including such topics as pop art, minimalism, conceptual art, performance, etc. Specific topics will be arranged each quarter. May be repeated twice for credit. *Prerequisites: VA 14 and 120 required - VA 119 recommended.*

**193. Experimental Media (4)**

This is a production course investigating a wide range of experimental work in film, video and photography. Extending beyond the generic definitions of documentary and narrative, the course will examine alternative possibilities in the media arts. Students will prepare projects in 8mm film, 16mm film, video or photography. May be repeated twice for credit. *Prerequisite: VA 185A or 186A or 176 or consent of instructor.*

**195. Teaching in Visual Arts (4)**

Each student will meet with a section once a week under the direction of the instructor. 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 for credit three times. *Prerequisite: consent of the instructor.*

**196. 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.

**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.

**199. Special Studies in the Visual Arts (4)**

Independent reading, research, or creative work under direction of a faculty member.

## Graduate

**204. Performance (4)**

This is a graduate course investigating the possibilities of performance in the field of art. May be repeated for credit.

**205. Advanced Problems in Drawing (4)**

Students will be given the opportunity to explore the relation between their own energy and idiosyncrasies as draftsmen artists and the quasi-objective demands of representing various types of real and virtual space. May be repeated for credit.

**206. Advanced Problems in Painting (4)**

A studio course in painting, stressing individual problems. May be repeated for credit.

**207. Advanced Problems in Sculpture (4)**

A course in sculpture stressing individual problems. May be repeated for credit.

**208. History of Performance (4)**

The course will survey the origins and development of performance, a current art-making mode combining theater and sculpture, etc. Both New York and West Coast performances will be discussed as well as the issues of critical criteria for this new art form.

**213. Sociology of Primitive Art (4)**

A graduate-level primitive art history course which will analyze and question theories on what the "arts" of nonliterate people can tell us about their culture.

**215. Primitivism of Modern and Contemporary Art (4)**

This seminar will investigate the notions of primitive art, primitivism, modernity and their interrelations in the process of image-making.

**216. The Object (4)**

An inquiry into the world of artifacts (some of them "works of art") by which man is surrounded, and the ways in which they function as agents of communication and modifiers of consciousness.

**217. Modern Points of View (4)**

Course will be structured thematically (Marxist, psychoanalytic, Formalist viewpoints, etc.) and chronologically — Diderot through the nineteenth century (with emphasis on Baudelaire) to the present.

**218. Marcel Duchamp (4)**

A critical examination of the work of the most radical of the twentieth-century artists.

**219. Meaning/Medieval Art (4)**

A course exploring the meaning of its art-making by interrelation of genres normally treated as distinct disciplines; architecture and sculpture treated in relation to medieval theater; the whole against the background of philosophical and political propaganda.

**220. Contemporary Art History (4)**

The course will deal with the themes and problems that have arisen recently in twentieth-century painting, sculpture, and art criticism.

**230. Advanced Problems in Art Criticism (4)**

Seminars for advanced students in art criticism and art history in relation to the problems set by the real phenomenon of art production. Specifically advanced, individual projects will be required of graduate students. May be repeated for credit.

**231. Semiotics (4)**

A structural analysis of art as seen in the context of cultural communication.

**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.

**234. Words and Pictures (4)**

A course ranging from the hieroglyphs in Egyptian bas-reliefs to the contemporary use of language in conceptual art, this course investigates the interaction of words and images. Book and manuscript illustrations, scientific illustration, titles, labels and concrete poetry will also be discussed.

**235. Criticism (4)**

This course will concentrate on teaching graduate students to articulate critical positions vis-a-vis their own work and that of their contemporaries. At least three papers will be required. Can be repeated twice for credit.

**236. Art Criticism (4)**

This course is largely for people who intend to write criticism. It will attempt to explore various approaches to criticism largely through the writings of contemporary art critics, though literary and film criticism will also be considered. Each student will be expected to write and deliver several short critical papers on subjects within his or her competence. May be repeated for credit.

**237. Advanced Projects in Art (4)**

A course specifically designed to investigate the many areas existing outside the more formal fields of painting and sculpture, as self-charting and subject matter, a seminar in conceptual art. May be repeated for credit.

**238. Art Composition (4)**

Discussion of composition, moving from media to media — from a Fra Angelico fresco to a 1930's comic strip. An examination in depth of the chief influences that go into the structuring of modern art works.

**244. Charting and Subject Matter (4)**

This course focuses on a methodology for establishing autobiographical material, ordering it and presenting it in various media.

**245. Representational Painting (4)**

A studio course which aims to examine the options open to a painter who wishes to work with pictorial subject-matter. Participants will be asked to analyze their artistic directions with respect to format, drawing, subject and execution. May be repeated for credit.

**266. Advanced Problems in Photography (4)**

An advanced study of the aesthetic and technical problems of photography and the relationship of photographic image to cultural phenomena in general. May be repeated for credit.

**275. Graduate Video Production (4)**

An intensive workshop in the use of video as an art form. Concept, script, shooting, editing and sound will be explored. Will include individual and group projects. *Prerequisite: consent of instructor.*

**276. Video Autobiography (4)**

Students will explore ways to express autobiographical statements through portapak video. Each student develops an individual video autobiography. *Prerequisites: prior knowledge of portapak camera techniques and 3/4" electronic editing.*

**278. Graduate Video Seminar (4)**

The seminar will examine video as an art form, with particular emphasis on recent works of independent video artists. The specific expressive nature of the video image, questions of form and meaning, and the evolving relationship of video art to the other arts will be studied in depth.

**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 once for credit. *Prerequisite: experience in portapak or in studio production.*

**285. Advanced Problems in Film-Making (6)**

For students who have learned the fundamentals of filmmaking but need to further refine the skills of the medium on an advanced level. *Prerequisite: Visual Arts 185B.* May be repeated for credit.

**286. Advanced Film Workshop (6)**

For the most advanced graduate students who have a grasp of the fundamentals of film-making, this course will be primarily concerned with the application of technique to the creation of specific images. May be repeated for credit. *Prerequisite: Visual Arts 186B or consent of the instructor.*

**288. Advanced Problems in Film (4)**

A film course dealing with all aspects of film criticism and film writing, stressing individual problems. May be repeated for credit.

**290. Graduate Seminar (3)**

A course in art theory and practice in which graduate students relate their own work to one of the several traditions in present art or develop their rationales for rejecting these traditions and developing differently. Must be taken twice — once each year.

**294. Graduate Film Seminar (4)**

Designed to deal with a wide variety of practical aspects of the film, including direction, script-writing, criticism, and photography. *Prerequisite: consent of instructor.*

**295. Individual Studies for Graduate Students (1-12)**

Individual research for graduate students in preparation for their comprehensive examinations for the M.F.A. degree.

**296. Introductory Department Seminar (0)**

This course is designed as an orientation for first-year graduate students and will include an introduction to the art

and philosophy of the faculty of the Department of Visual Arts. Each week a faculty member will present his or her work and discuss the purpose and theoretical intention behind it. Required for first-year graduate students. No credit will be given.

**297. Seminar in Art Theory (4)**

A seminar led by different faculty members each quarter, providing an intensive analysis of the theoretical aspects of the visual arts. May be repeated for credit.

**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 the instructor.*

**500. Apprentice Teaching (1-3)**

Apprentice teaching in undergraduate courses given or participated in by the Department of Visual Arts. Graduate students are required to teach a minimum of one quarter — three units — to fulfill degree requirement.

## Warren College

OFFICE: Provost, Warren College

**The Writing Program** The foundation of the Warren College Writing Program is Warren College 10A-10B, which is required of every Warren College student and is usually taken in the freshman year. The purpose of this course is to teach students to write both authentically and communicatively through constant practice and editing, and to criticize with a sense of the varying demands of varying contexts. Classes are small and focus on group criticism of student work; responsibility for the success of the class rests with the students as well as the instructor. Frequent individual conferences with instructors are encouraged. Warren College 10A concentrates on overcoming hesitancy to write, building facility and fluency, and increasing sensitivity to language and the basic structures of prose. The class typically works from free writing through narrative toward argument. Warren College 10B focuses on teaching students to maintain the authentic voice developed in 10A, while stressing writing that is argumentative rather than narrative, and deals with material drawn from secondary sources and texts. This second quarter focuses particularly on responsible use of evidence and critical observation of the social environment. Students are required to write a minimum of eight thousand words per quarter.

**1A-B-C. Writing English as a Foreign Language (4-4-4)**

An intensive tutorial in English composition and grammar for speakers of other languages. Emphasis is on developing the skills of written English necessary for university coursework in general, and the college writing programs in particular. *Prerequisite: placement exam (May be offered in 1978-79)*

**10A. The Writing Course (4)**

A workshop course in writing required of all Warren College students. Students will be taught to use writing as skill and discipline. By the end of the second quarter of the course, students should be able to communicate in written form whatever they have occasion to communicate in whatever form they wish. *Prerequisite: facility in the use of English as a language.*

**10B. The Writing Course (4)**

A workshop course in writing required of all Warren College students. Students will be taught to use writing as a skill and discipline. By the end of the second quarter of the course, students should be able to communicate in written form whatever they have occasion to communicate in whatever form they wish. *Prerequisites: Warren College 10A or equivalent; facility in the use of English as a language.*

**11. Writing Workshop (4)**

An advanced writing course for those who have completed the writing requirement of their college, offering complete freedom of choice in the form of writing to be done. The course will include weekly presentation and criticism of work in progress. *Prerequisites: Warren College 10A-B or equivalent.*

**12. Poetry (4)**

The emphasis in this course will be on the particular problems encountered in the writing of poetry and will include the study of some modern American poets. Weekly presentation and criticism of work will be required. *Prerequisites: Warren College 10A-B or equivalent and consent of the instructor.*

**13. Research Writing (4)**

This course will focus on a large-scale investigative project more complex than the average term paper. Research methods, modes of argument, epistemological problems and the various stages of construction of a large research project will be covered. *Prerequisites: Warren College 10A-B or equivalent and consent of the instructor.*

**14. Technical Writing (4)**

This course will deal with the creation of papers and reports suitable to the disciplines of science and engineering as well as problems encountered in writing for professional and/or popular audiences. Weekly presentation and criticism of work in progress will be required. *Prerequisites: Warren College 10A-B or equivalent and consent of the instructor.*

**15. Journalism (4)**

This course deals with the special demands of journalistic writing, along with some consideration of the practical day-to-day experience of finding, researching and writing stories for a particular audience, with strict deadlines. *Prerequisites: Warren College 10A-B or the equivalent and consent of the instructor.*

**16. Writing for Publication (4)**

Emphasis will be on the practical business of finding a market and selling one's work. This course will include weekly presentation and criticism of work in progress. *Prerequisites: Warren College 10A-B or equivalent and consent of the instructor.*

**The Academic Field Studies Program** The Academic Field Studies Program is designed to enhance a Warren College student's education by providing off-campus internship experiences. The program gives students the opportunity to gain practical work experience as a complement to their classroom education.

All Warren College students have the option of undertaking one or more academic field studies during their junior or senior year. In special circumstances sophomores may be allowed to participate. While on assignment, students will be working full or part time for a public or private organization. Placements are designed so that each student's major area of academic study is matched with the sponsoring organization's responsibilities and activities. Students might work in a political office in Washington, a conservation group in San Francisco, a legal-aid office in Los Angeles, medical laboratory or business in San Diego or any number of other possibilities.

While "on assignment" students are supervised by an agency sponsor. Each student also has a faculty sponsor who evaluates the student's written report of the field studies experience. Upon satisfactory completion of this requirement, the student will earn four to sixteen units. Field studies are repeatable up to a total of sixteen units.

Field studies are a valuable form of professional training which provides students the opportunity to test out their career interests in an off-campus setting. The field studies program is also a research opportunity, which encourages students to personally test academic theory and principles.

Students planning an academic field study are required to see the coordinator at least two quarters before they wish to be enrolled in the program.

**197 Academic Field Studies (4-16)**

Individual placements for field learning which are integrated with academic programs will be developed and coordinated by the College. 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 pre-enrollment period. *Prerequisites: consent of instructor and submission of a written contract.*

**199. Special Projects (4)**

Special projects in writing and related topics for students who desire work beyond the normal courses available. Pass/Not Pass only. *Prerequisites: upper-division status.*

# Appendix

## Affirmative Action Policy

The University of California, in compliance with Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, and Section 504 of the Rehabilitation Act of 1973, does not discriminate on the basis of race, color, national origin, religion, sex or handicap in any of its policies, procedures, or practices. This nondiscrimination policy covers admission and access to, and treatment and employment in, University programs and activities, including, but not limited to, academic admissions, financial aid, educational services, and employment.

Inquiries regarding the University's equal opportunity policies (race, color, national origin, religion, sex, and handicap) may be directed to the Dean of Student Affairs, Student Center (B-023), La Jolla, California 92093, telephone 714-452-4370.

## Accessibility and Confidentiality of Student Records

Under the provisions of the Family Educational Rights and Privacy Act of 1974, every student is accorded the right to inspect and review education records directly related to the student's status as a student that are held by any unit or department on the campus.

The right of inspection is available to students who are or have been in attendance and extends to those materials which are intended for university use or which are available to parties outside the university system. Third parties shall not have access to education records or information pertaining to students as students without the written consent of the particular student about whom such information is sought.

Student requests to inspect education records pertaining to their status as students shall be granted within 45 days after the request has been made. (Students shall have an opportunity for a hearing to challenge the content of the records to insure that the records are not inaccurate, misleading, or otherwise in violation of their privacy or other rights, and to provide an opportunity for the correction or deletion of any such inaccurate, misleading, or otherwise inappropriate data contained therein.)

The full text of the Family Educational Rights and Privacy Act of 1974 is available at these locations:

1. Office of the Vice Chancellor and Dean of Student Affairs, Student Center;
2. Office of Admissions and Registration, 102 Administrative Complex;
3. Central University Library;
4. Provosts' Offices of Revelle, Muir, Third, and Warren Colleges; and,
5. Office of the Dean of Graduate Studies and Research, 108 Administrative Complex.

## Salary and Employment Information

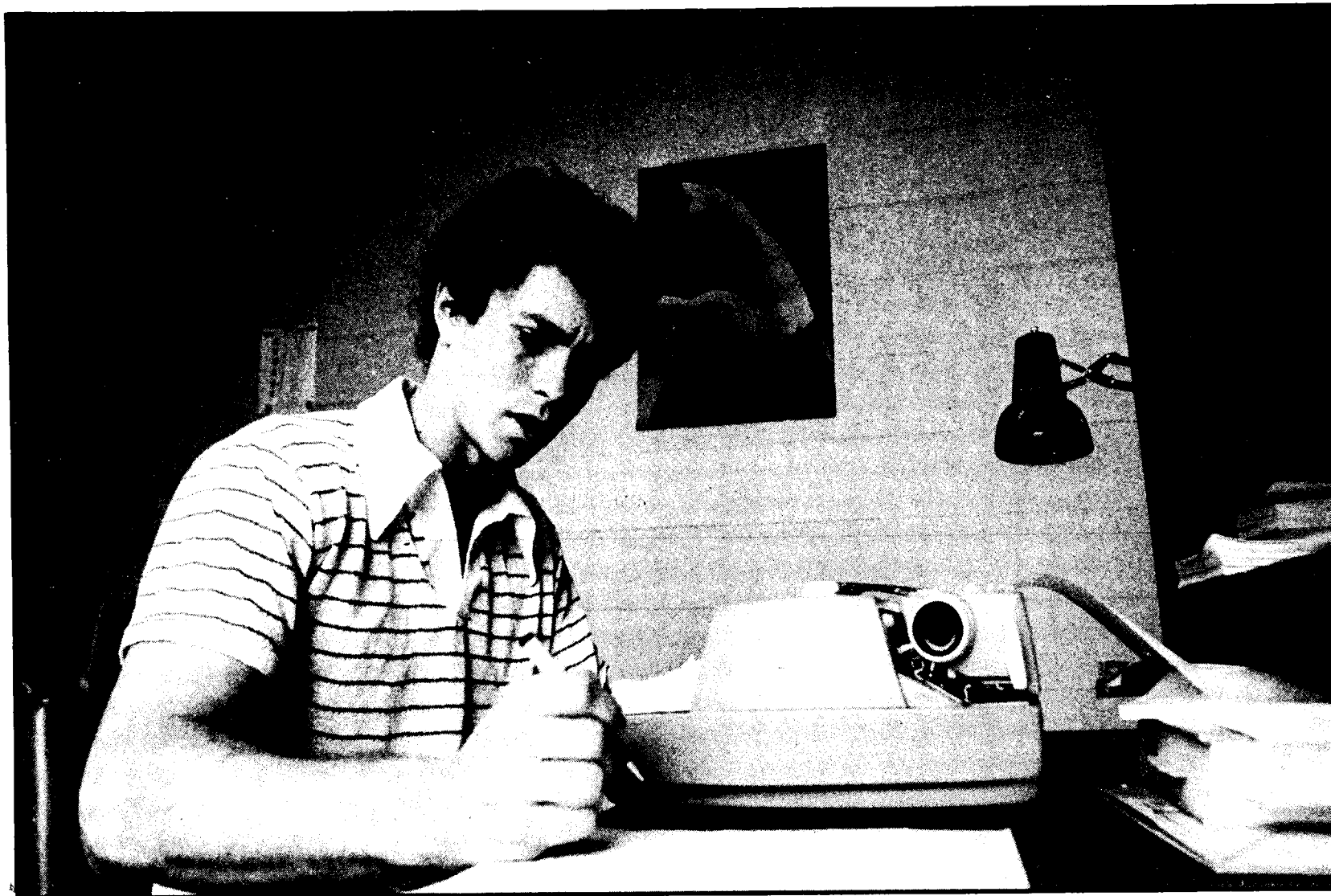
FIELD OF STUDY	DEGREE LEVEL OF GRADUATES			PROBABLE OR DEFINITE JOB COMMITMENT <sup>2</sup>
	BACHELOR'S	MASTER'S	DOCTORATE	
	AVERAGE MONTHLY SALARY <sup>1</sup>			
Engineering	\$930-1,290	\$1,030-1,410	\$1,260-1,840	77.4%
Humanities	510- 935	665-1,200		59.2
Life Science	545-1,000			66.0
Management		1,100-1,545		80.7
Physical Science	760-1,260		1,280-1,720	70.5
Social Science	560- 975	730-1,180		56.6

<sup>1</sup>Source: A national survey of a representative group of colleges conducted by the College Placement Council, representing the eighty percent range of offers throughout the country. It should be noted that a wide variation in starting salaries exists within each discipline based on job location, type of employer, personal qualifications of the individual, and employment conditions at the time of job entry.

<sup>2</sup>Source: *The Job Market for UCLA's 1974 Graduates*. Percentages are based only upon those students who planned to work immediately after graduation.

### 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.



## History of the University

The University of California was established in 1868. Initially located in Oakland, it moved to its first campus, Berkeley, in 1873. Today, along with the Berkeley campus, the University has campuses at San Diego, Irvine, Los Angeles, Riverside, Santa Barbara, Santa Cruz, Davis and San Francisco.

Instruction on these campuses covers all of the broad and essential areas of human knowledge, including the arts, sciences and literature. Each campus has its own organization, objectives, and style of academic life. Each offers a unique set of programs and facilities.

The University is governed by a board of Regents. The Regents appoint the President of the University, who is the executive head of the University, and, with the advice of the President, appoint the chancellors, directors and deans who administer the affairs of the individual campuses and divisions of the University.

UC San Diego — The University of California, San Diego — is situated adjacent to the community of La Jolla near the northern limits of the city of San Diego. The San Diego campus traces its origins to the closing years of the nineteenth century when Berkeley zoologists selected La Jolla as the site for a marine station. This project, which eventually was named the Scripps Institution of Oceanography, became a part of the University of California in 1912. When in the late 1950's the Regents decided to establish a general

campus of the University at San Diego, the Scripps Institution — with its small though distinguished staff of scientists — formed the nucleus of the new institution.

At first, only graduate studies and degrees in the physical and natural sciences were offered. In the fall of 1964 the campus accepted its first undergraduates, offering a basic lower-division curriculum to prepare students for majors in the humanities, social sciences, biological sciences, physical sciences and mathematics.

Occupying more than 1200 acres, the UC San Diego campus spreads from the seashore at the northern edge of La Jolla, where the Scripps Institution is located, across a large portion of the adjacent Torrey Pines Mesa, high on bluffs overlooking the Pacific Ocean. Much of the land is covered with groves of eucalyptus, grown from seed brought from Australia.

The Master Plan for UC San Diego calls for establishment of a series of interrelated colleges on the bluff site. Each college will be designed to accommodate approximately 2300 students. Together, the various colleges will offer a wide variety of undergraduate and graduate programs. The objective is to give students and faculty the opportunity of working together in small academic units while, at the same time, enjoying the advantages of a major university. Four colleges — Revelle, John Muir, Third, and Earl Warren — are in operation.

UC San Diego is accredited by The Western Association of Schools and Colleges.



# University Professors

The title University Professor is reserved for scholars of international distinction who are recognized and respected as teachers of exceptional ability. Appointments to this title are permanent, and may be made from among the distinguished tenured staff of the University of California, or from individuals outside the University.

University Professors are available for intercampus travel for purposes of discussions with staff and students on subjects related to research, teaching, and other matters of interdisciplinary interest.

University Professor *Melvin Calvin*, Emeritus  
Laboratory of Chemical Biodynamics  
Lawrence Berkeley Laboratory  
UC Berkeley  
Berkeley, CA 94720

University Professor *Murray Krieger*  
Department of English and  
Comparative Literature  
Humanities Office Building  
UC Irvine  
Irvine, CA 92664

University Professor *Josephine Miles*, Emeritus  
Department of English  
454 Wheeler Hall  
UC Berkeley  
Berkeley, CA 94720

University Professor *Glenn Seaborg*  
Department of Chemistry  
Associate Director  
Lawrence Berkeley Laboratory  
Berkeley, CA 94720

University Professor *Neil Smelser*  
Department of Sociology  
490 Barrows Hall  
UC Berkeley  
Berkeley, CA 94720

University Professor *Edward Teller*, Emeritus  
501F Building 111; P.O. Box 808  
Lawrence Livermore Laboratory  
Livermore, CA 94550

University Professor *Charles Townes*  
Department of Physics  
557 Birge Hall  
UC Berkeley  
Berkeley, CA 94720

University Professor *Harold Urey*, Emeritus  
Department of Chemistry  
5314 Mayer Hall  
UC San Diego  
La Jolla, CA 92093

University Professor *Sherwood Washburn*  
Department of Anthropology  
232 Kroeber Hall  
UC Berkeley  
Berkeley, CA 94720

University Professor *Lynn White Jr.*, Emeritus  
Department of History  
6345 Bunche Hall  
UCLA  
Los Angeles, CA 90024

# The Regents of the University of California

## Regents Ex Officio

Edmund G. Brown, Jr.  
*Governor of California and President of the Regents*

Mervyn M. Dymally  
*Lieutenant Governor of California*

Leo T. McCarthy  
*Speaker of the Assembly*

Wilson Riles  
*State Superintendent of Public Instruction*

Donald G. Reithner  
*President of the Alumni Association of the University of California*

Gene E. Pendergast, Jr.  
*Vice President of the Alumni Association of the University of California*

David S. Saxon  
*President of the University*

Cheryl F. Biles and Forrest A. Plant,  
Regents-designate (non-voting).

## Appointed Regents

The term of office of appointed Regents is twelve years, and terms expire on March 1 of the year indicated. The student Regent (indicated with an asterisk) is appointed for a one-year term which expires on June 30 of the year indicated.

Gregory Bateson (1988)  
Glenn Campbell (1984)  
Edward W. Carter (1982)  
William K. Coblentz (1980)  
*Chairman of the Board*  
Frederick G. Dutton (1978)  
John F. Henning (1989)  
DeWitt A. Higgs (1982)  
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## UC San Diego Facts and Figures (as of Winter, 1978)

On-campus student enrollment (Spring Quarter)	
Undergraduate .....	8,068
Muir .....	2,657
Revelle .....	2,033
Third .....	1,585
Warren .....	1,793
Graduate .....	1,374
Medical School (excluding 410 hospital residents, interns and nurse practitioners) .....	403
Total .....	9,845
On-campus teaching faculty members .....	
Fellows, National Academy of Sciences .....	688
Fellows, American Academy of Arts and Sciences .....	48
Nobel Prize Laureates .....	49
.....	5
Total land area — UC San Diego	
Main campus .....	1,211 acres
Outlying areas .....	703 acres
Total .....	1,914
Books in Library collection .....	1,252,025
University Extension enrollment .....	7,250
Grade-point averages	
Lower-division undergraduate .....	2.9
Upper-division undergraduate .....	3.0
Graduate .....	3.8
Number of undergraduates in ten most popular majors (Fall, 1978)	
Biology .....	1,751
Psychology .....	480
Chemistry .....	381
Applied Physics and Information Science .....	346
Applied Mechanics and Engineering Sciences .....	335
Literature .....	313
Communications .....	312
Economics .....	311
Political Science .....	274
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# NOTES

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MUIR COLLEGE

WARREN COLLEGE

REVELLE COLLEGE

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  - 106 Deep Sea Drilling 9-B
  - 107 Diving Locker 9-A
  - 108 Experimental Aquarium 10-B
  - 109 Hydraulic Laboratory 8-A
  - 110 Inst. of Geophysics & Planetary Physics 8-A
  - 111 Library 9-B
  - 112 Marine Biology 9-A
  - 113 Marine Sciences Development & Outfitting Shop 10-B
  - 114 Physiological Research Laboratory 9-B
  - 115 Public Affairs Office Scripps Bldg 10-B
  - 116 Ritter Hall 10-B
  - 117 Scripps Director's Office 10-B
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  - 121 Summer Auditorium 10-C
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- 3 Alumni & Development 5-J
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- 8 Basic Science Bldg (School of Medicine) 8-K
- 9 Beagle Hall 10-E
- 10 Behring Hall 4-N
- 11 Biology Bldg 5-F
- 12 Blake Hall 8-F
- 13 Bonner Hall 7-G
- 14 Bookstore 6-K
- 15 Budget Office 5-J
- 16 Buildings & Grounds 5-N
- 17 Business Office Health & Safety Food Admin 6-J
- 18 Cabrillo Hall 4-N
- 19 Cancer Research Facility 6-L
- 20 Cashier 5-L
- 21 Central University Library 2-I
- 22 Central Utilities 9-I
- 23 Challenger Hall 10-F
- 24 Chancellor's Complex, Summer Session, Planning Office 5-J
- 25 Chemistry Research Bldg 3-F
- 26 Coffee Hut 10-J
- 27 Conference Room A 5-J
- 28 Courses by Newspaper 3-O
- 29 Craft Center 7-G
- 30 Credit Union 6-N
- 31 Dana Hall 4-N
- 32 Day Care Center 4-N
- 33 DeAnza Hall 4-O
- 34 Discovery Hall 10-G
- 35 Drake Hall 5-O
- 36 Drama 5-M
- 37 Financial Aids 5-J
- 38 Galathea Hall 10-G
- 39 Garage (Trans. Services) 5-N
- 40 Graduate Studies 5-J
- 41 Graphic & Reproduction Services 3-N
- 42 Gymnasium 6-E
- 43 Housing (On Campus) 6-J
- 44 Housing (Off Campus) 6-H
- 45 Humanities-Library Bldg 9-H
- 46 Humanities & Social Sciences Bldg (Muir Provost) 5-E
- 47 Information (Public) 6-J
- 48 Information (Student) 6-G
- 49 International Center 6-I
- 50 Mail Services 3-O
- 51 Management Systems 4-L
- 52 Mandeville Art Gallery 5-F
- 53 Mandeville Auditorium 5-H
- 54 Mandeville Center 5-G
- 55 Mayer Hall 8-H
- 56 Media Center/Communications 2-E
- 57 Medical Teaching Facility 8-L
- 58 Meteor Hall 10-G
- 59 Muir Apartments 5-C
- 60 Muir Commons (Cafeteria) 5-C
- 61 Music Center 5-M
- 62 Natatorium 7-E
- 63 Ogden Hall 5-O
- 64 Parking Office 5-L
- 65 Personnel (Employment Office) 4-K
- 66 Physical Plant Dept 5-N
- 67 Police 4-K
- 68 Portola Hall 5-O
- 69 Psychology & Linguistics Bldg 4-D
- 70 Quonset Huts (Chicago Studies, Affirmative Action, Word Processing Center) 6-M
- 71 Receiving/Storehouse 3-M
- 72 Registrar/Admissions Relations with Schools 4-K

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