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"Part of the experience of reading Jane Austen is to allow someone who lives in California to know that there are other ways, other delights."

Bibliography Laboratory, in which I have a small printing press and some binding equipment that I work with from time to time.

Q: Is bookbinding a hobby of yours?

A: No, I resist calling this a hobby. It's fun to do, but if everything one did was a hobby then one would have to enlarge the term. Life is all one thing, not a series of compartments. No, I connect it to the other work I do. It's often of considerable importance to the interpretation of a text to find out how a book was put together. If a book has been misbound, for example, and you don't know why it doesn't make sense, you may be able to discern what went wrong by recapitulating the steps by which the book was put together.

Q: What is the value of a discipline such as literature?

A: Well, as I say every year to the undergraduates that I teach, the most important things they can learn to do in college as far as I'm concerned, are to read and write. It may be useful to think mathematically or to learn the elements of engineering, but the fundamentals of reading and writing come before those and accompany any kind of instruction they may be getting in those fields. And all my colleagues in every department in the university agree that those things are of great importance. So it's not the simple-minded wish of an English teacher—which I consider myself to be—but a strongly felt need on everyone's part. But that doesn't say what needs to be said about the literary experience, which I feel is as important as any other artistic experience that young scholars may be exposed to. To me, we just wouldn't be human without music, painting, and literature, and I think it's a great thing to be exposed to them. And so I try to introduce students to things that I think they will be caught by.

Q: Are students today interested in literature?

A: It seems to me that the students nowadays at the University of California are of such high quality that they are willing to be responsive to the proper stimuli. I don't know whether that's really answering the question. I have to admit to being glad that the anguish of 1968 through 1970 is finished. I hope it is permanently finished, though there were many bitter lessons that we all learned in those years that have not worn off and shouldn't wear off. The question of relevance is not dead, but it now can be put in a more benign and promising atmosphere. It's not necessary that every page of *Pride and Prejudice* should relate directly to a day-to-day experience of a twenty-one-year-old person called Elizabeth who lives in San Diego or Stockton or Mendocino. Part of the experience of reading Jane Austen is to allow someone who lives in California to know that there are other ways, other delights.

Joyce B. Justus

Anthropology

For Joyce Justus, teaching is actually her third career choice. A native of Jamaica, Ms. Justus graduated from high school in Kingston and went to work for the government in a hospital chest X-ray department.

She tired of that and went on to become a social worker for the Jamaican government. It wasn't until age 29 that she began to think about furthering her own education at the university level.

During her years as a social worker she worked with anthropologist Michael Smith who encouraged her interest in the field by introducing her to the works of the late Margaret Mead.

"It dawned on me that any discipline that could have allowed Margaret Mead to go off and to experience what she went through in 1926 couldn't be all that bad," she reflects. "There must be something about anthropology that allowed a woman to do something like that at a time when most women were sitting at home."

Justus eventually made her way to UCLA—arriving after midnight with the help of a friendly cab driver—and went on to earn her doctorate there.

Her field research brought her back to her Caribbean home where she studied high school students in the Dominican Republic.

She came to UC San Diego in 1969, when the Anthro Department was in its infancy.

"What's great about this department," she says, "is that here everybody really likes teaching, even if we do different kinds of research."

"Most anthropologists learn that the easiest way to get into a society is through the kids."

Q: Where are you from?

A: I was born in Jamaica in the second largest urban center in the country, Montego Bay. Like every other Jamaican kid I moved from Montego Bay to Kingston to go to high school because there wasn't a high school in our town. In high school, we had exams developed in London, exported to the colonies. I'm a product of British colonial education.

I'm the second child in my family, and the first girl. My mother was an elementary school teacher. I grew up in a single parent family. My father died when I was six, my mother never remarried, and she and the four of us grew up together. My mother is one of those incredible people who has the ability to accomplish an enormous amount of work in a given period of time. And she also is one of those people for whom "no" is not an answer. Nothing is impossible, and so if you work hard enough you achieve whatever you want to achieve. Although my family was clearly middle class, and probably upper middle class in a Jamaican situation, because of the fact that my father died rather early and we were a single parent family, there was not as much money to go around as there would have been under other circumstances. I don't think it ever mattered, because we knew things were going to get better if we worked hard and did well at school and got ahead. After I left high school, I did a number of things. Teaching is career number three for me. First I went to work for the Jamaican government in an X-ray department in one of the major chest hospitals in the country. Then I worked with a health educator for a while, but I got bored with that.

Q: How long did you continue in civil service?

A: I became a social worker in 1957 and I worked at that until 1961. In 1961 I was pushing the top and figured that the way one would get ahead would be to get additional training. I thought I had as much, if not more, to contribute to the probation service than my own supervisor, for example. So I began to think about going to a university. At the same time, there was a long period of unrest in urban Kingston the reasons for which the Jamaican government wanted to research. The researchers wanted a female member of the team to go into the West Kingston slums and interview women. At that time most middle class Jamaicans who had the skills were really too frightened to go into this very difficult area. I had enrolled in a certificate program and had done very well. The anthropologist who had participated in the training contacted me and asked me if I was interested in doing this. Against the better judgment of my family and my friends, I agreed. It started a whole new career for me because in order to do that project I became affiliated with the university as a junior research fellow. I continued on and did additional projects with the university from '61 til '63, when I left to come to school in the States.

Q: What was the experience like?

A: It was really fascinating, because as a social worker I hadn't worked in Kingston at all. By choice I had worked in a rural area where life was very easy compared to life in urban Kingston. One of the first things I found out on one of my first trips into the slums was

quite distasteful. I don't have much to do with the "profession," in that sense. The art game has taken on many of the characteristics of the entertainment industry. Successful artists enjoy the kind of life-style you would expect to find there — lots of parties, lots of hustle.

When I left England I was living by selling my work, and doing rather well, but it turned out to be not at all the kind of life I had expected. What I thought happened was that you went to your studio every day and did your work, and once a month your dealer came and took the pictures away and you got a check and went on working. In fact, you find yourself spending an inordinate amount of time talking to your next buyers, the critics, the art-establishment people, all the people involved with the selling mechanism. I didn't have my first regular job until I came to the University of California in 1968, and my response to my first paycheck was, "Hey, I don't have to talk to any of those dealers anymore." I haven't had a show in a commercial gallery since then. It isn't even an issue of principle; it is just that there are things I like to do and things I don't like to do, and I can't see any reason why I shouldn't choose for myself.

Q: You don't find you get a certain satisfaction from people buying your work?

A: Of course I get satisfaction from people buying my work. I don't have any objection to selling things. What I find distasteful is the automatic parallel between "success" and sales. The art world seems to judge an artist by his prices, or at least by what people *think* his prices are. I think that's sort of disgusting. But you know it's pretty much what goes on throughout the society.

I mean you have to get back to a point where the doing of the art is sufficient. You don't do it only because someone is going to pay you for it. You do it because you want to do it, no matter what it costs you. I'm essentially European, you see; I believe in learning and knowledge for their own sake.

Q: What do you teach your students?

A: We're involved in a double game here, I've always felt. On the one hand, there is the highly professional training that we're involved in with our graduate students, and to a lesser extent, with some of our undergraduate majors. On the other side of it there is the mass of people coming here and saying they want to be this or that but not really knowing what they mean. It would be absurd to design a curriculum upon the assumption that everyone in a beginning drawing class was going to become a professional artist. My own view is that you have to give them something which will be valuable to them whether they're going to be artists or not.

I try to give them an understanding of the mechanisms which underlie what they're trying to do: drawing, painting, whatever. I try also to give them a sense of history, a feel for the fact that the world wasn't invented at the moment they became aware of it, that what they see is merely a cross-section of a continuum. But above all, I try and give them the understanding that they have to be responsible for their own decision-making. They have choices. Most of them have recognized already that most of the people they know are bored by the time they are forty. What I try to make clear is that the only way to avoid being bored is to make themselves responsible for what they do. I'm trying to teach people how to think. We spend a good deal of time talking in my classes, and the students are always surprised to find how quickly their drawing gets better as a result of spending less time doing it and more time thinking about it.

> "If a student comes to the university or to an art school thinking he wants to study art, he's likely to have a very outdated notion of what it means to be an artist, and he's in for a lot of surprises."

Q: How did you get interested in the computer's potential for making art?

A: I'm interested in the human being's potential for making art. I'm not fundamentally involved with machinery. I'm interested in what one can do with one's mind, and my use of the machine is only interesting to the degree that it reveals something about that. As a painter in the sixties, I did what painters do: I was making paintings. By the end of the sixties, it seemed to me that there were more interesting things going on outside my studio than inside it.

My first introduction to computing was completely negative. There was a big exhibition in London involving the use of computers in art, and seeing it had the effect of making me believe that there must be more to it than that, because most of it was pattern-making of a rather trivial order, neither more nor less trivial for having been done with a computer. Then I came out here and I met, quite by accident, a graduate student in the music department who offered to teach me programming, and I agreed out of simple curiosity. Looking back, I seem to have begun computing through a series of accidents.

On the other hand, I've been extraordinarily lucky in my "accidents," because as I just finished telling you, when I was in high school I studied mathematics and art, and then did radar in the air force. One's life is put together from a series of intuitive moves, and you may not understand why you're making them at any given point. It's easy enough afterwards. Several of the people who know me best, my younger brother for example — himself also a painter — say now that they aren't at all surprised that I went into computing. It seemed to be a perfectly "natural" move from my painting. It didn't seem that natural to me for the first few years. And I don't think I was doing anything valuable until I reached the point where I could say that I really didn't care whether what I was doing was art or not.

Pauline Oliveros

Music

Sounds which defied traditional musical interpretation first came to Pauline Oliveros when she was a teenager in Houston, Texas. She says she began hearing musical sounds in her mind which excited her, but which did not conform to the constraints of conventional composition.

Oliveros followed her own creative instincts, and as a composer and performer she developed the techniques through which she could best express the music of her imagination.

Professor of music at UC San Diego and a member of the faculty since 1967, Oliveros today is recognized as a pioneer in the development of experimental music. She served as director of the University's Center for Music Experiment from January 1977, to September 1979, and during that time she helped establish the facility as a world-renowned performance and research center.

After working for years with electronic music, Oliveros now has turned to more basic forms of expression. The noted composer's latest works are sonic meditations, some of which are basically the release of long tones regulated by breathing cycles and the natural action of the vocal chords. Other meditations have a different kind of focus.

She is studying karate to learn about movement, body language and consciousness, and she is said to have an affinity for elephants because they are natural meditators.

"My house is surrounded by a lot of vegetation and lots of birds that make beautiful sounds," says Oliveros. "More and more I desire to be in natural environments, away from the sounds of technology. I like the rhythms of natural forces . . ."

Q: When did you begin to develop an interest in music?

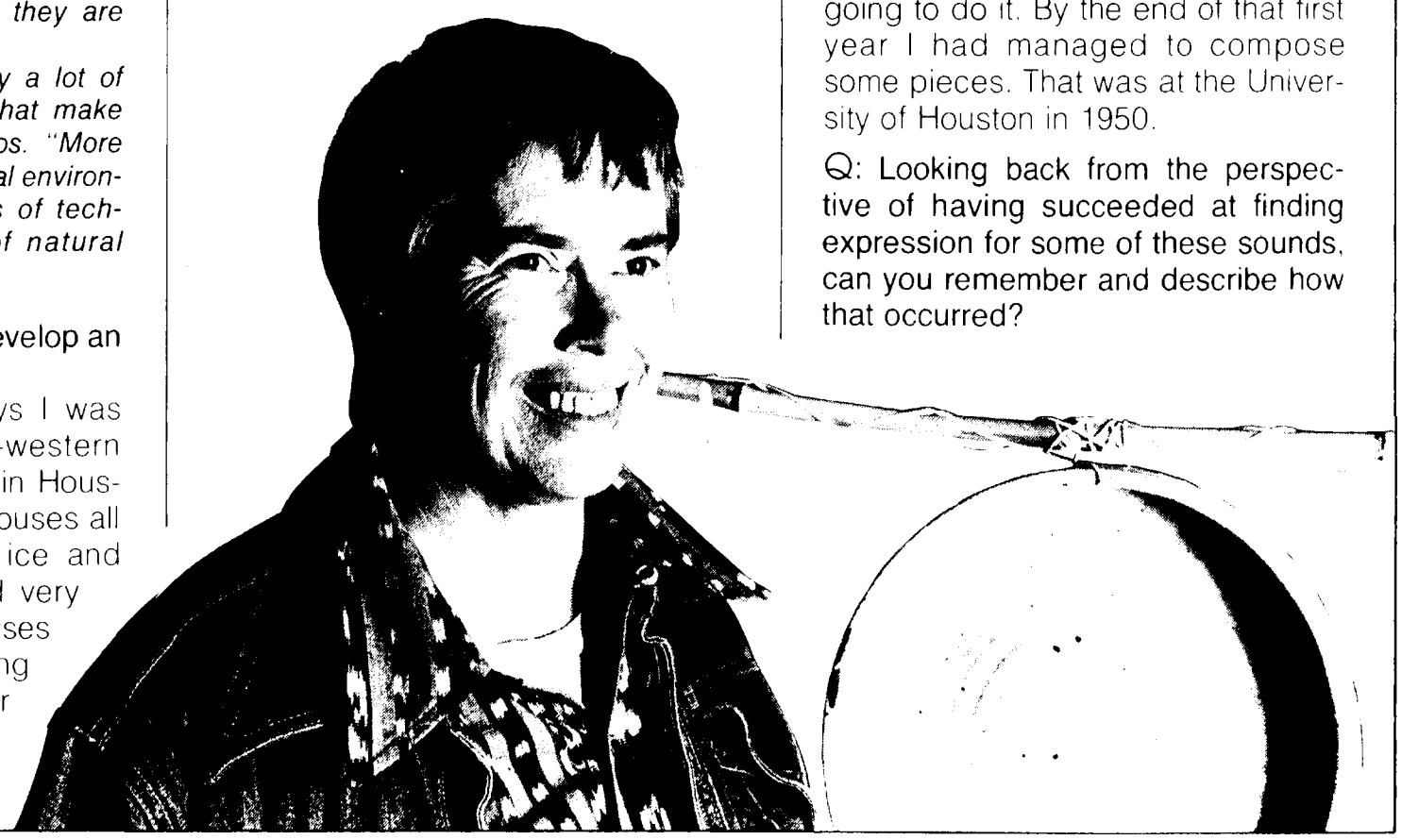
A: During my teenage days I was very interested in country-western music because I was living in Houston, Texas. There were ice houses all around where you bought ice and cold drinks and so on, and very often in front of those ice houses there would be a little string band sitting and playing for pennies or whatever we would give them. Every once in a while I would go down and sing with them, and my mother would come and take me home. She was the piano teacher in the neighborhood and she felt that this was not exactly the right thing for me to do. Nevertheless, a girl friend and I used to sing together all the time during my high school years. We learned all the old hillbilly songs around and sang them very loudly on the bus going to football games and generally had a very good time. At the same time I was always going to symphony concerts and learning to play my accordion, and also the French horn.

When I was about sixteen years old, my high school English teacher assigned creative projects to be completed in one semester. We were free to do any project that we dreamed up. It happened that we were reading some poetry by Tennyson — I don't remember which poem it was — and I heard sounds in my mind. I think that was the first time that I was aware of imaginary sounds being triggered in me. They came in an involuntary way. I got very excited and told my teacher that I wanted to compose music for this poem, and that would be my project. However, I didn't do that because there was no way for me to do it. There was no way for me to make accessible in any written form what I was hearing.

Q: You couldn't play it on the piano?

A: No. The sounds that I was hearing were not ordinary. That was the beginning of a long struggle for a translation into reality of what my imagination was saying. There wasn't anything magic about it. It was simply the struggle of finding out how to do this. Musical training is aimed for the most part toward making performers and listeners, but not composers and instrument makers. So I had a long and frustrating time. I went to college and took traditional theory, which didn't help me a bit. I took a composition course which led to a long series of confrontations with the composition teacher. I would take the assignment and go home and struggle with it in my own way, looking for what I was hearing, and he would say, "Don't do that, you have to do this." He finally gave up and let me do what I was doing because I just simply had in mind what I wanted to do and I was going to do it. By the end of that first year I had managed to compose some pieces. That was at the University of Houston in 1950.

Q: Looking back from the perspective of having succeeded at finding expression for some of these sounds, can you remember and describe how that occurred?



"I don't think I hear in the way I heard when I was sixteen. That was a very open state. As you get older your experience weighs what may happen. I hear that way in my dreams."

A: I can relate it this way: I played solo instruments until I was in junior high school and then in junior high school I learned to play the tuba. I had to go off in a room by myself to learn how to play it. When the teacher thought I was ready, I came into the band. Sitting down with a group of fifty people playing instruments is a very extraordinary experience if you've never done it before — to sit in the middle of it and then to try to fit yourself in. The sonic impression that I had those first times was of a wall of sound. There were not many openings, so I didn't know that what I was hearing was differentiated until I began to fit myself in gradually. The sounds that I heard in my imagination were not exactly that either. They were heard more as an overall experience not as a succession of discrete events.

It wasn't until the sixties when I was working with electronic music that I came close to the things that I really was hearing in my early years. It was an interesting connection because it was the electronic sounds that I was beginning to get hold of and get out instrumentally. The attitudes and the goal were different than the music that I was familiar with at the time.

Q: What has been and what is now the experience of women in music, particularly in the U.S.?

A: A lot of the younger women aren't experiencing the blocks and difficulties of my generation. Some of the role casting is breaking down, although not entirely. It's going to take a long time, but there is an opening and more interest and encouragement. There are a lot of young women that are interested in composing and conducting. In the past, women were actively discouraged from those roles.

You can look into the nineteenth century at the case of Fanny Mendelssohn, Felix Mendelssohn's sister, who was apparently as talented, if not more than Felix; she was told by her father that she wasn't to compose, and she actually gave some of her themes to her brother. I didn't encounter that; nobody tried to discourage me from composing. I ran into a few people who used omission, which is a very powerful kind of discouragement, but no teacher that I had ever told me that. There was only the French horn teacher, who thought I should be doing something else. I just quit taking lessons from him very quickly.

Q: How would you say that the concept of experimental music has changed during your career in composing?

A: In the 50s attention was centered around formalistic principles embodied in neoclassicism and serial technique. Serial technique was the attempt to organize every aspect of the composition through serial processes. Pieces almost composed themselves through logical systematic procedures. This came out of Schoenberg's twelve tone technique. Neoclassicists such as Stravinsky looked to the formalisms of the classic period. When I began composing in the 50s, my work resembled in sound some of the pointillistic serialized music of Webern but it wasn't serialized. I only wrote down what I heard. I would listen, and when I would get the next sound I would put it down. That was my note to note procedure. Then, as I advanced, I would be able to get a whole gesture down, but I didn't use a serial system. The next influence was John Cage, whose work seemed very much opposite of serial organization, but it was another kind of organization. People get nervous and say, "Isn't that just random organization," and I say, "Well, people are sort of chance operations and you seem very organized." It's like two sides of a coin, in a way, a very complicated way of working. You could say that Cage represents yin and the serial technique represents yang. Those are two strong influences on the shape of music. The inclusion of electronic instruments made a tremendous impact through the 60s, so that today we have an elaboration of both with the aid of electronic means. There is also the reaction of leaving technology and going back to a very radical point. I do that with my sonic meditations, in which I often work without any instruments or any technology whatever.

Q: How has your approach to composing changed over the years?

A: Now it's more conceptual because the group work has been so deep. There is more of an instantaneous understanding of an activity and what the result will be. If I give an instruction like "color your breath with sound" I know what will happen. I certainly still hear things but I don't think I hear in the way I heard when I was sixteen. That was a very open state. As you get older your experience weighs what may happen. I hear that way in my dreams.

Q: Does everything that you do have a musical component in your mind?

A: Since 1972 I've been studying karate so now I'm a third level brown belt. It's not supposed to have anything to do with music, but it does. I've been studying karate for attention and consciousness, as a tool, rather than as self-defense. I wanted to learn a body language, and I wanted karate for the dynamic language that it is. I have translated things that I learned in karate and used them in meditation techniques and musical events. I guess it's almost impossible not to make those relationships.

Hannes Alfvén

Applied Physics And Information Science

For six months of each year Hannes Alfvén is a familiar face on the UC San Diego campus.

The seventy-one-year-old physicist, who won the Nobel Prize in 1970, divides his time equally between La Jolla and Stockholm's Royal Institute of Technology in his native Sweden.

Alfvén's research into a field he called magnetohydrodynamics, which is applicable in geophysics, planetary sciences and astrophysics, earned him the Nobel, but he has probably achieved as much notoriety for his earthly concerns about the role of the scientist in society.

He is an outspoken opponent of nuclear weapons and nuclear power. Working in collaboration with Professor Gustav Arrhenius, also at UC San Diego, Alfvén is currently at work challenging existing theories about the origin and evolution of the solar system.

His list of awards and honors is lengthy and includes the Franklin Gold Medal from the Franklin Institute and the Lomonosov Gold Medal, the highest award given by the U.S.S.R. Academy of Sciences.

Q: When did you first become interested in astronomy?

A: My interest in the structure of the solar system began at the age of seven, I guess, when I read Flammarion's *Astronomy*. It was one of the first books I ever read in my life and I only read it partially as it was terribly difficult to do. But it was very interesting.

Q: And what did you do as a student to follow up on that?

A: My parents and some other relatives were very interested in amateur astronomy, and I learned all the names of stars and constellations. When I was about fifteen, around the time the wireless was invented, I used all my spare time and all the money I could get hold of in making radio receivers. I still remember the proud moment in 1922 or 1923 when it worked and I received the first radio communication from a broadcasting station. It was one of the most memorable moments of my life. I realized that I was interested in electricity and astronomy, and the combination of those is plasma astrophysics. And that is what I have devoted most of my interest to.

Q: Have you been studying in this field since you were a child?

A: No, I cannot say that. I have had many side trips. When I began at the university I started in nuclear physics in Uppsala, Sweden. That was in 1926.

Q: Was there nuclear physics in 1926?

A: Oh, yes! It was the most fascinating field of physics. In 1929, I spent some time with Lise Meitner in Berlin. Some years later I spent a year at Cambridge with Rutherford and had plans to be a nuclear physicist. But then, at the time when everybody rushed into nuclear physics, I went the opposite way and got more and more interested in astrophysics. This did not mean that I immediately gave up my interest in nuclear physics, however. I became a member of the Swedish Atomic Energy Commission, which was organized immediately after Hiroshima, in 1945. I worked hard for many years to promote the introduction of nuclear energy in Sweden. At the same time, I also became interested in politics. When the first Swedish atomic energy company, which was half-government and half-private, was started in order to exploit nuclear energy, I became a member of the board. That brought me into the field of science policy and I became a member of the Swedish science advisory board of the government. Then twelve years ago, in 1967, I came to this country and learned to my great surprise that atomic energy was not as good as I had thought. Here we have Harold Urey who has been opposed to atomic energy from the beginning, and quite a few others. I learned from the general debate in this country that there were very strong objections to nuclear energy. Now I am often listed as an antinuclear scientist. It is the profession of the scientist to change his views whenever new arguments arise. The spirit of science is to change the views of ourselves and of everybody else, of our general outlook of the world. But I can very well understand that people who have devoted a lifetime to developing nuclear energy as many scientists have, and industries who have invested billions of dollars in nuclear energy, and politicians who have made it their careers to promote nuclear energy, do not change so easily when new facts come.

Q: What changed your view?

A: It was the facts that one could easily see, namely that nuclear energy was so intimately coupled with nuclear bombs, that the production of radioactive poisonous material is so enormous that it is almost inconceivable that it will be possible to take care of them. It is obvious that there are many other ways of solving the energy problem from the

scientific and technical point of view. It is not at all difficult to cover our needs of energy.

Q: You developed a new theory about how solar systems were formed. Were you awarded the Nobel Prize for this?
A: Well, not actually. The Prize was for introducing what is called magnetohydrodynamics, for the realization that electromagnetic forces are of decisive importance in cosmical physics and the whole of plasma physics. My main interest was plasma physics, but the research I conducted was such that half of it could be applied to the thermonuclear problem and half of it to astrophysics. I have always been interested in the technical application of science. I hate the old so-called ivory tower attitude. It is absolutely necessary for a scientist to realize that he is a member of society and has a responsibility there. I have always tried to find technical applications for my research.

Q: As you look back on it, has it been a good thing for you to have won the Nobel Prize?
A: Yes, because it has been possible for me to take up very important political questions. My opinions in these fields carry more weight.

Q: Are you going to retire or stay involved in research?
A: Well, I have retired from my Swedish chair, but when I am in Sweden I work full-time in research. And actually, from a scientific point of view, the last five years have been the best time in my life. People say that when somebody gets the Nobel Prize it means the end of a career, of scientific productivity. I think everybody would agree that I have probably done my best work since the Prize. My main interest now is going one step further back, mainly to cosmology.

Q: The origin of the universe?
A: Yes, or rather the lack of origin of the universe. The usual idea is that there was a big bang and everything started. There is no scientific foundation for this. It is just a sort of fanatical belief which a number of people have.

Q: What do you believe?
A: I believe that there was no big bang, and that the whole approach to the cosmological problem should not be belief in a postulated event that took place ten billion years ago. I believe the whole approach is wrong. An important thing is whether the universe is symmetric with regard to matter and antimatter. Antimatter is exactly the same as ordinary matter, only the positive and negative charges are reversed. There are convincing arguments, as far as I can see, that the universe is symmetric. But this is in conflict with the big bang theory. It is unfortunate that people do not want to discuss these issues.

Q: Is your view now in the minority?
A: Oh, yes. I have always had a minority view. I had a minority view when I started with plasma physics. The profession of a scientist is to have a minority view, because the day a scientist makes a discovery he automatically joins the minority.

Q: How do you think the universe began, if not by the big bang?
A: I'm not sure there was a beginning. The creation at a certain moment is something which generally has not been accepted. In the old religions, in the Indian religion, for example, there is no beginning, there is no end. In the old classic cosmologies, Aristotle has said the universe is ungenerated and indestructible. And if you read the *Bible*, "Genesis" does not begin by telling you that God created the world out of nothing. The views which are expressed there were the same as those that penetrated the old classical world, namely that creation consisted of God or the gods bringing order into a chaotic universe. But the universe was just as old as the gods. They were all eternal.

Q: Does it bother your scientific mind that something could exist without a first cause?
A: No, on the contrary. If you speak about a big bang which happened at a certain moment, my immediate question is, "What happened before that?" and I think this is something that virtually everybody thinks about. There may very well have been many events happening much earlier than the time when people date the big bang, and there may be many celestial objects, much matter, far outside what is called the limit of the universe today.

"I hate the old so-called ivory tower attitude. It is absolutely necessary for a scientist to realize that he is a member of society and has a responsibility there."

Q: What would you like to know that you don't know now?
A: I would like to know quite a few things about plasmas in space in general, and, more specifically, about the evolution of the solar system and the evolution of the universe.

Q: Do you think that scientists now have too much of an "ivory tower" attitude?
A: Well, yes, there are quite a few people who have that attitude, and who do not understand completely that what a scientist does has a destructive effect. In my view, there are three epochs in scientific evolution. There was a time when science was equivalent to natural philosophy. People just speculated and experimented. Then came a period which started about one hundred years ago when science became of technical importance and lead to an avalanche in the industrial revolution. Science then was a synonym for progress in general, and it has given us the enormous rise in the standard of living which we have been lucky enough to experience during the last hundred years. Since about Hiroshima and World War II, if you would like to have a date for it, it has been obvious that science is more destructive. About half the scientists in the world are working for military purposes, and I think the scientists are really a threat to our survival. This is the third and tragic phase in the evolution of science.

Q: How would you mitigate these circumstances?
A: This is not very easy to do. Most scientists do not want to know. They say, "I do my job and it doesn't matter to me how the industrialists, the politicians, or the military use my new results." But this is a completely irresponsible attitude which a scientist cannot have any more.

In the nuclear field I think that both nuclear bombs and nuclear energy are too dangerous to be allowed on the whole. Of course, the nuclear bombs are a more serious problem than is nuclear energy, but they are connected so intimately that we cannot have nuclear energy without nuclear bombs.

Yen Lu Wong
Drama

When Yen Lu Wong first came to the United States it was not to become a dancer, but rather to become a doctor.

As the youngest of seven children born to a banker in southwest China, her interest in the arts was not encouraged. "Becoming a dancer in China was not something a nice girl from a nice family would do," she said.

Her father had wanted to study medicine, but was forced to give it up; so Ms. Wong was sent off to Tufts University as a biology major with the hope that someday she would enter the medical profession. She did earn her B.S. in biology at Tufts and during that time was introduced to the famed Martha Graham, one of the world's best known dancers and choreographers.

A scholarship in dance enabled her to study with Graham and eventually become a member of the Graham apprentice dance company.

She earned an M.A. in International Theatre at the University of Kansas and continued dance studies with Louis Horst, Robert Cohan, and Alwin Nikolais.

Her work in dance, theatre and the art of movement was synthesized in studies with Irmgard Bartenieff, renowned associate of Rudolf Laban and a pioneer in movement analysis, leading to her certification by the Laban Institute of Movement Studies, New York.

She came to UC San Diego as an assistant professor of drama in 1974. She currently teaches courses in dance and the art of movement.

During the past few years Ms. Wong has travelled the world giving workshops, and is doing research on cultural differences in movement.

Q: What is the difference between dance as taught in a university and dance taught elsewhere, such as in a studio?

A: I think we have to distinguish why you take dance in the university from taking dance in studios. I think there are basic differences, and people who don't understand the differences sometimes are disappointed or misled. My approach to dance in the university is on a humanistic level; that is, dance as a means of understanding the human condition. I am using a very broad definition of dance, which really includes rituals, space, time, human relationships, humankind and nature, and an individual's relationship with something bigger. Regarding spatial elements, on a biological level we are talking about the space within us and, on a social level, we are talking about closeness, proximity, and distance, all subtle structures of interpersonal relationships.

Dance is also part of a much larger phenomenon which we call culture. In this sense one sees that dance performance is only a very small part of the dance experience. Taking dance classes opens you to the phenomenon of participation, which to me is an end in itself. You are not taking class to "perform," but because of its intrinsic value in the sense of experience. That experience is total because more than any art form, dance unites the body and the mind, and it unites it in a holistic way.

When you experience something like this, dance takes on another characteristic which is healing. This goes back to the very ancient role of dance, the healing art, seen individually through shamans and collectively through rituals. This is true of Greeks, true of Chinese, and today of many primal peoples whose dance tradition is still intact.

Q: How does dance fulfill that healing role?

A: Well, we can talk about movement and motion as changing worlds. Emotion is out of motion, so as you change motion you change worlds. When you sit in an office and work from nine to five only in that posture, you're exhausted; but anyone can tell you, if you go out jogging or play a game of tennis, something happens. You feel better; you have relieved the tension of having to hold on to a static pattern.

But the difference between dance and just physical exercise, whether it is jogging or calisthenics or even tennis, is that the dance is not only personal but interpersonal as well. I am not implying that if you dance alone you are not dancing. What I mean is that you share a social milieu and that energy generated by a group reinforces. In that sense you are not renewing yourself only. In our everyday life, the dichotomy between mind and body exists.

When you dance they are united. In that aspect it's healing; in the social aspect you are sharing a much larger energy. In that whole context you can see dance as a form of healing.

Q: Do you think of your life as a dance, without dichotomy?

A: I believe very much that you can't do something which is not meaningful to you; in other words, you can't divorce your everyday life from your art. I know some people can, but I can't. When students come to

"My approach to dance in the university is on a humanistic level; that is, dance as a means of understanding the human condition."

study, first we try to help them experience, and I say help them because dance is not an integral part of our lives. We view it as more or less a spectator's sport. We go to see Nureyev do his exciting things as we would see any good football or basketball or baseball player, or gymnastic person. So the introduction for these students is to get in touch with something very basic that all people are capable of, this expressive force. I don't want to convey the idea of an unstructured, interpretive approach. Rather than doing a dance about blue sky, we want to work on certain structures which are connected to the culture. So again, the students have to deal with their lives, what is meaningful for them. This happens on two levels. One is understanding what makes dance, that you are dealing with your own force, with time, with a sense of flow and continuity, with spatial tensions and at the same time with content, and that is the meaning of these movements.

Q: Can everyone dance, or is dance limited to a few talented individuals?
A: Everybody can dance. We dance in spite of ourselves, because we have been discouraged about expressing ourselves with movement. Any kind of animation in certain aspects of our culture is taboo. Jokes about people who gesture a lot express our animosity, for example. If something really touches you, and you are so happy you jump up and down, you are demonstrating the vestiges of some of the natural tendency to dance. Disco is certainly a form of dancing, and it is only because we put such a demarcation line between everyday dancing and stage dancing, and so much money is put into stage dancing, that somehow the dancing that we do on the everyday level seems not to be exalted.

Q: Does everyone who takes your course want to become a professional?
A: No, far from it. First, when I work with students, as all teachers, I learn from my students. A teacher learns what doesn't make sense, and also learns to question through their questioning. I hope at the end of ten weeks that my students understand that dance is not about steps, but that it is a total experience, on a kinesthetic, emotional, intellectual basis, and at the same time that they are also able to view dance not on a subjective level but on an objective level. It's the same for a person taking music. He or she is not only playing the musical instrument, but is also able to understand the conceptual basis and abstract basis of music. And when you have that ability you are able to go deeper as a performer, if you choose that, or go into other areas of the dance discipline.

Q: Do you feel that most people will profit from taking dance even if they decide to be aerospace engineers?
A: I hope so. What I am saying comes from a deep conviction, an almost messianic stance. I am not saying you are going to lose ten pounds, or you are going to be slim. This is what a lot of young people think, girls especially. What I am saying is that there's going to be a fundamental experience which is going to help you re-evaluate how you put together reality. It's going to help you look at things differently. If you are in aerospace, you better know what spatial relationship is, and what effect certain designs have on the human body. These are very important things.

Q: Do you think that your students can get a better understanding of their bodies?
A: I hope that they learn to recognize that technologically their bodies are a part of them. I hope they experience less of a sense of alienation, that the body is out there somewhere to be manipulated, and in our culture unfortunately, punished.

Q: What does movement tell you about a culture? How does the way people move relate to their culture?
A: Well, I don't want to make generalizations, like in body language when you cross your legs, you mean don't advance. When we deal with movement, we deal with one of the complex series and interlocking phenomena which we call communication, of which verbal communication is one aspect. So when we look at movement, we look at the body part. When you gesture, do you just gesture with your finger, or does the whole arm come into it; when you nod, is your chin only involved, or is the whole weight of your body behind it. What kinds of spatial configurations come about. Do you do a winding figure eight or do you tend to jab. What kind of energy is behind it in terms of weight, space, time, flow. It's all of these factors interwoven in a process that we use to understand movement. These are, of course, characteristics of movement. I can say that people in Southern California move differently from those of the East and New York especially. There is a rhythm difference. Part of that perhaps is caused by the hectic pace of New York. You are conditioned by the environment. These are very superficial things I am talking about; they are the result of clothing, for example. People who wear boots, and very tight shoes, walk differently than those who go barefoot. So the whole area of walking, alone, can tell us a great deal about where the person comes from. It's the same if somebody speaks and you can say, "Oh yes, he's from Chicago," or from Iowa. We begin to find patterns like that, and culturally movement can tell us also what is approved and what is not approved. For a long time girls didn't wear jeans or pants; they couldn't possibly sit without clamping or crossing their legs; in general, making a very small space. By this small example you see the implications of movement. Today you came to talk to me face to face, rather than over the telephone because you wanted to see more than what my voice is saying: whether I mean what I am saying, whether I get what you are asking me. These are all reasons why we say movement is part of the whole complex phenomenon we call communication. And if we begin to educate our next generation in this regard, they can benefit from it on a personal level, on an artistic level, and also on a scholarly level.

"In our everyday life, the dichotomy between mind and body exists. When you dance they are united."

Ricardo Romo

History

Ricardo Romo, a former All-American runner, has worked his way from the barrio of San Antonio to assistant professor of history at the University of California, San Diego.

Romo is one of those rare individuals who was able to use his athletic prowess as a stepping stone to an academic career.

"I owe much of my success to my parents, of course, but also to several coaches and teachers who said: 'Hey you've got talent, and we're going to do what we can to see that it's not wasted,'" Romo recalls.

After graduating from the University of Texas with a Bachelor of Science degree in history and education, Romo went on to earn his Master's at Loyola University of Los Angeles and his Ph.D. in history at UCLA.

He is a specialist in the social and economic history of the Southwest and the history of the Mexican-American, and is currently director of the Chicano Studies Program at UC San Diego.

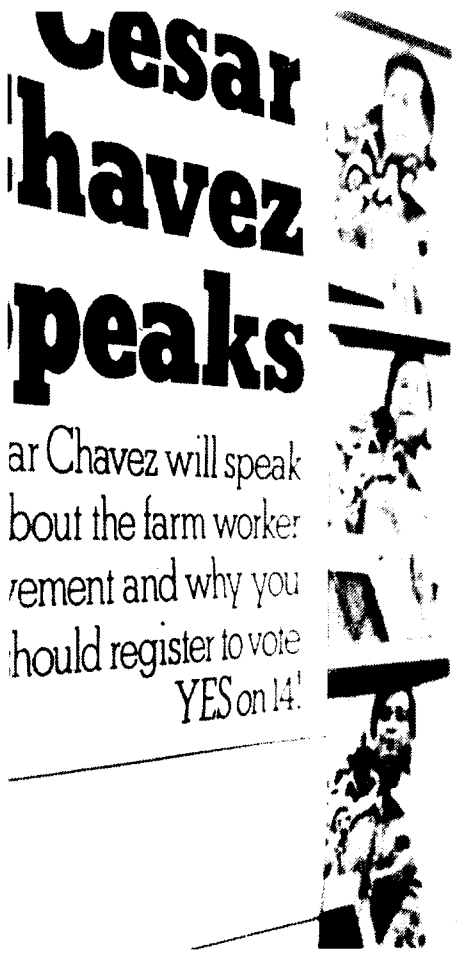
Romo is an activist in the Chicano movement, but he is one who feels the way to improvement for minorities is through education, academic pursuits, and scholarship.

Q: Are you a Californian?

A: I'm from the west side of San Antonio, the second largest barrio in the United States. I come from the very heart of that community, and I went to a parochial school that was one hundred percent Chicano. My father had a small grocery store, and I had a normal, usual type of childhood. I attended a trade high school where I discovered that I had track abilities in distance running. My interest in sports caused a major change in my life.

In high school there were a number of individuals and teachers who took a great interest in me. I was treated like a special person because of my athletic ability which earned honors for my school as well as for me. When I realized that they were concerned and did want to help, I continued doing well in my studies and never thought of dropping out of school. I remember the coach pulled me aside in the tenth grade and said, "You know, you have a lot of talent here and I'd like to see you go to college." When I graduated from high school I had received a track scholarship to go to the University of Texas. Because I had had the best time in the nation in 1962 as a high school runner, I was recruited by USC, Occidental, West Point, Navy, and a lot of big schools in the South and was offered about fifty scholarships.

I started majoring in physical education at Austin, and after a year decided that that wasn't for me, and began studying history. I had some good experiences in my first year at Texas. The University of Texas has about 45,000 students now. When I went there in 1963, they had about 30,000 students. There were only about twenty-five Chicanos on campus and I was the only one on a scholarship. The great majority of them came from wealthy families who could afford to send their kids there. My parents couldn't afford to send me to school.



At Texas, as a freshman, I ran the fastest time in the nation. As a senior, I became the first Texan to run a sub four-minute mile. The next year I got hurt in a track meet. You know how your whole life passes in front of you? That's what happened to me. I didn't know if I was ever going to run again. I injured my lower back and I began thinking, "What are you going to do when you're not running track anymore, when you don't have track to rely on, to assist you in getting exposure, in meeting people, providing the opportunity to travel, in having all these experiences." I realized that I had to consider a profession. My initial interest was to teach history, to work with young people, and to see if I could assist them with the same problems that I had had.

Q: Why history as opposed to social work?

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).
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.

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 science. 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

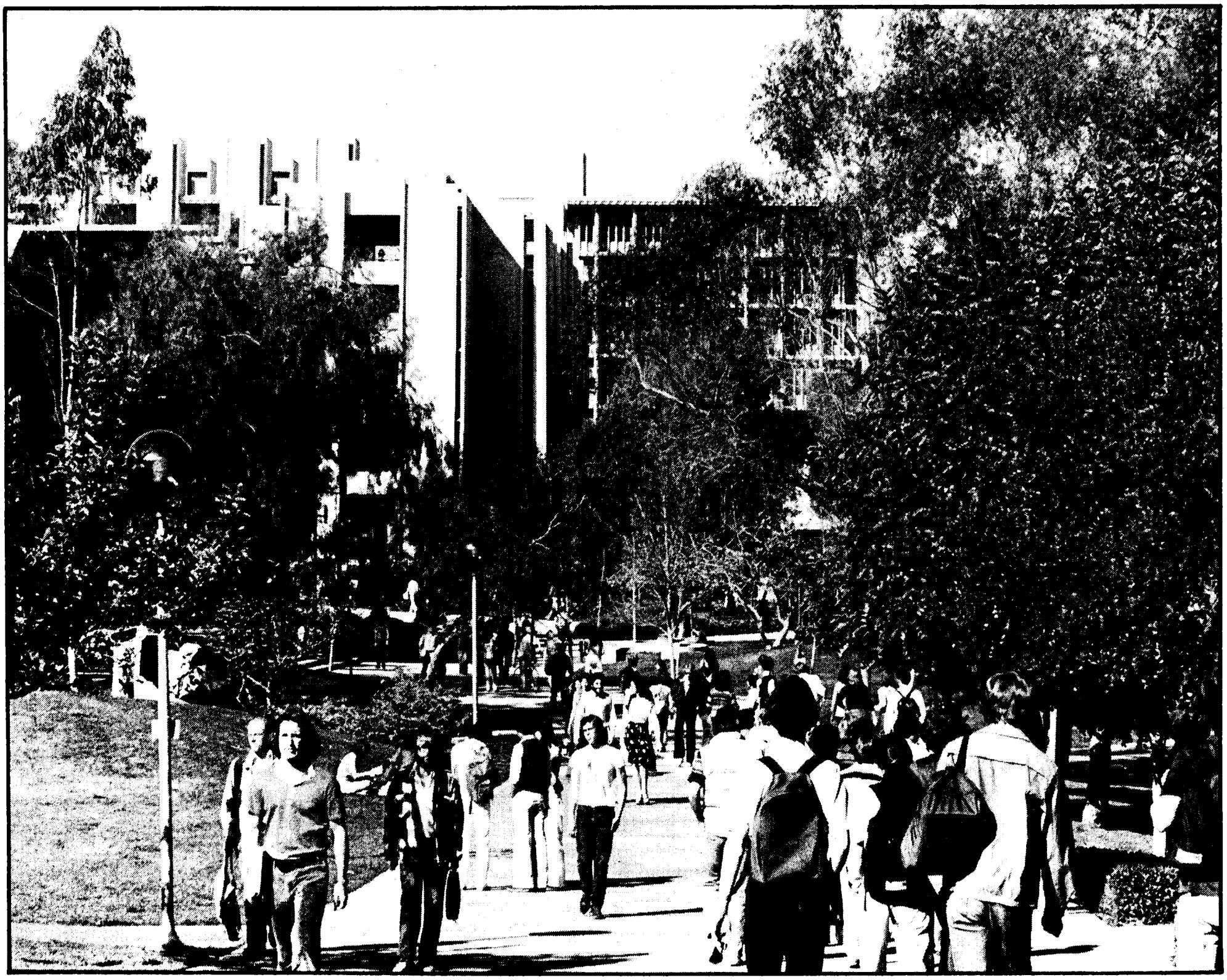
Freshman Year

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

Sophomore Year

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

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:

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 (a 199 only).

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

Honors in Muir College

Provost's Honors will be awarded each quarter to students who complete the previous quarter's program with distinction.

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

To be eligible for College Honors, a student must have completed at

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.	Associate Professor	Visual Arts
Bailey, Frederick G., Ph.D.	Professor	Anthropology
Balzano, Gerald, Ph.D.	Assistant Professor	Music
Bender, Edward, Ph.D.	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.	Associate 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
Cicerone, Carol, Ph.D.	Assistant Professor	Psychology
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
deCerteau, Michel, Ph.D.	Professor	Literature
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.	Professor	Mathematics
Francois, Jean-Charles	Associate Professor	Music
Friedman, Richard, Ph.D.	Assistant Professor	Literature
Fussell, Edwin S., Ph.D.	Professor	Literature
Gearhard, Suzanne, Ph.D.	Assistant Professor	Literature
Gilpin, Michael, Ph.D.	Associate Professor	Biology
Gragg, William B., Ph.D.	Professor	Mathematics
Graña, Cesar, Ph.D.	Professor	Sociology
Gusfield, Joseph R., Ph.D.	Professor	Sociology
Halpern, Francis R., Ph.D.	Professor	Physics
Harkins, Edward, Ph.D.	Assistant Professor	Music
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.	Associate Professor	Sociology
Katsell, Jerome H., Ph.D.	Assistant Professor	Literature
Kirkpatrick, Susan, Ph.D.	Associate Professor	Literature
Klima, Edward S., Ph.D.	Professor	Linguistics
Konecni, Vladimir, Ph.D.	Associate Professor	Psychology
Kuroda, Sige-Yuki	Professor	Linguistics
Ledden, Patrick J., Ph.D.	Lecturer with Security of Employment	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.	Associate Professor	Mathematics
Luo, Huey-Lin, Ph.D.	Associate Professor	APIS
MacConnel, Kim, M.F.A.	Assistant Professor	Visual Arts
MacLeod, Donald I.A., Ph.D.	Associate Professor	Psychology
Madsen, Richard, Ph.D.	Assistant Professor	Sociology
Mandler, George, Ph.D.	Professor	Psychology
Masry, Elias, Ph.D.	Professor	APIS
McClelland, James, Ph.D.	Assistant Professor	Psychology
Metzger, Thomas A., Ph.D.	Professor	History
Mills, Stanley E., Ph.D.	Professor	Biology
Mitchell, Allan, Ph.D.	Professor	History
Monteon, Michael P., Ph.D.	Assistant Professor	History

EARL WARREN COLLEGE

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 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 received an award from the Commonwealth Fund to develop a joint program designed to provide undergraduate preparation for qualified students aiming for careers in the health sciences and the health professions. Students may indicate an interest at the time of entry into Warren College; however, formal application and admission into the program occur during the freshman year. Further information may be obtained from the director of the program.

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.

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 in only three years, 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.

The College is 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 provided government services 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.

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 writing 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.
2. 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 is required for a significant number of majors; a student who does not take this subject 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 the Academic Senate must also be met.
3. 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 baccalaureate degree to students with a superior overall grade-point average at graduation. Superior grade-point average will be based upon the grade-point averages of the top 14 percent of the previous graduating class. The honors designations are *summa cum laude* (top 2 percent), *magna cum laude* (next 4 percent), and *cum laude* (next 8 percent). 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 motiv-

ated 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
Beck, Nathaniel L., Ph.D.	Assistant Professor	Political Science
Berg, Darwin K., Ph.D.	Assistant Professor	Biology
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.	Associate Professor	Drama
DeLuca, Marlene A., Ph.D.	Associate Professor-in-Residence	Chemistry
Farrell, Peter, M.M.	Professor	Music
Foster, Genette, Ph.D.	Assistant 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
Israel, Robert, M.F.A.	Assistant Professor	Drama
Kahr, 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.	Associate Professor	Chemistry
Lakoff, Sanford A., Ph.D.	Professor	Political Science
Langdon, Margaret H., Ph.D.	Professor	Linguistics

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.

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 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 the certified course list placed on file with the University by your high school principal. With one exception, any of the "a through f" courses may be used to satisfy admission requirements even if taken prior to tenth grade as long as your high school gives you credit for them. The exception is the "d" requirement; courses in laboratory science must be taken after completion of 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 through 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 who will graduate from high school in the school year 1980-1981)
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. A combination of any two semesters of biology, botany, physiology or zoology is acceptable.

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

ptitude test. (See *Examination Re-uirement* below, with the Table of rade-Point Averages and Corre-ponding Required Test Scores.)

The GPA is based only upon those the required "a through f" courses ken in grades ten, eleven and velve. Approved "a through f" ourses taken before the tenth grade pply to the subject requirement, but e not used in computing the GPA r the scholarship requirement. If u have gone beyond the minimum equirements 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 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.

lege 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 foreigr 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 from fifteen to nineteen. Courses beyond our requirements should be chosen to broaden your experience in such fields as social sciences and the fine arts, and should fit in with your personal plans for the future.

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

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, 560 Library East, 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. Before applying to UC San Diego you may obtain more information on many of these matters from the Office of Relations with Schools.

Applications from students who appear to have more than 135 quarter units (90 semester units) of transfer credit will be reviewed with the provost of whichever college at UC San Diego to which they have applied.

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

Fall Quarter 1980	**Nov. 1, 1979**
Winter Quarter 1981	**July 1, 1980**
Spring Quarter 1981	**Oct. 1, 1980**

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 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.

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 while in high school, transfer credit may be granted upon receipt of the college transcript.

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. On the application form you should also indicate the courses you intend to take before entering UC San Diego.

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 varies 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, final determination of eligibility cannot be made with more than one term to be completed. 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 non-refundable 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 requested 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

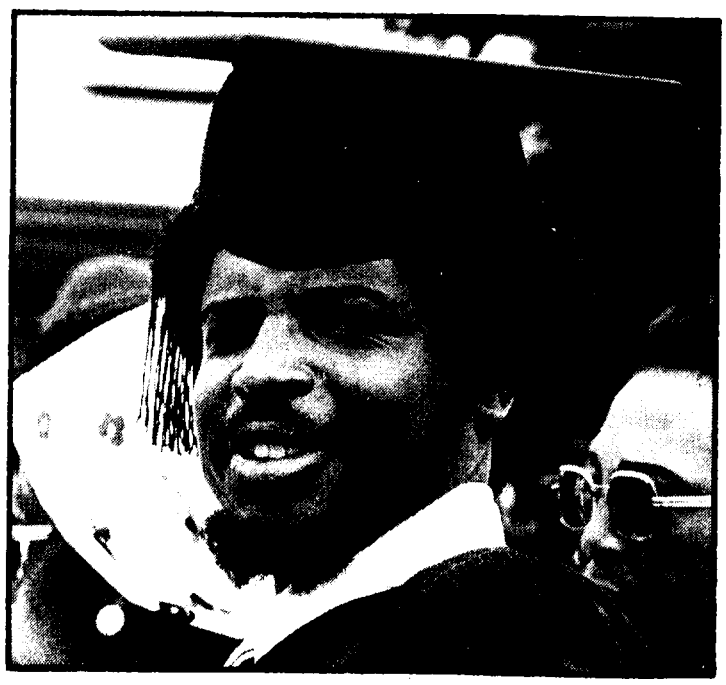
The exact cost of attending the University of California, San Diego, will vary according to personal tastes and financial resources of the individual. Generally, the total expense for three quarters, or a college year, is estimated at $3,600-$4,600 for California residents living away from home.

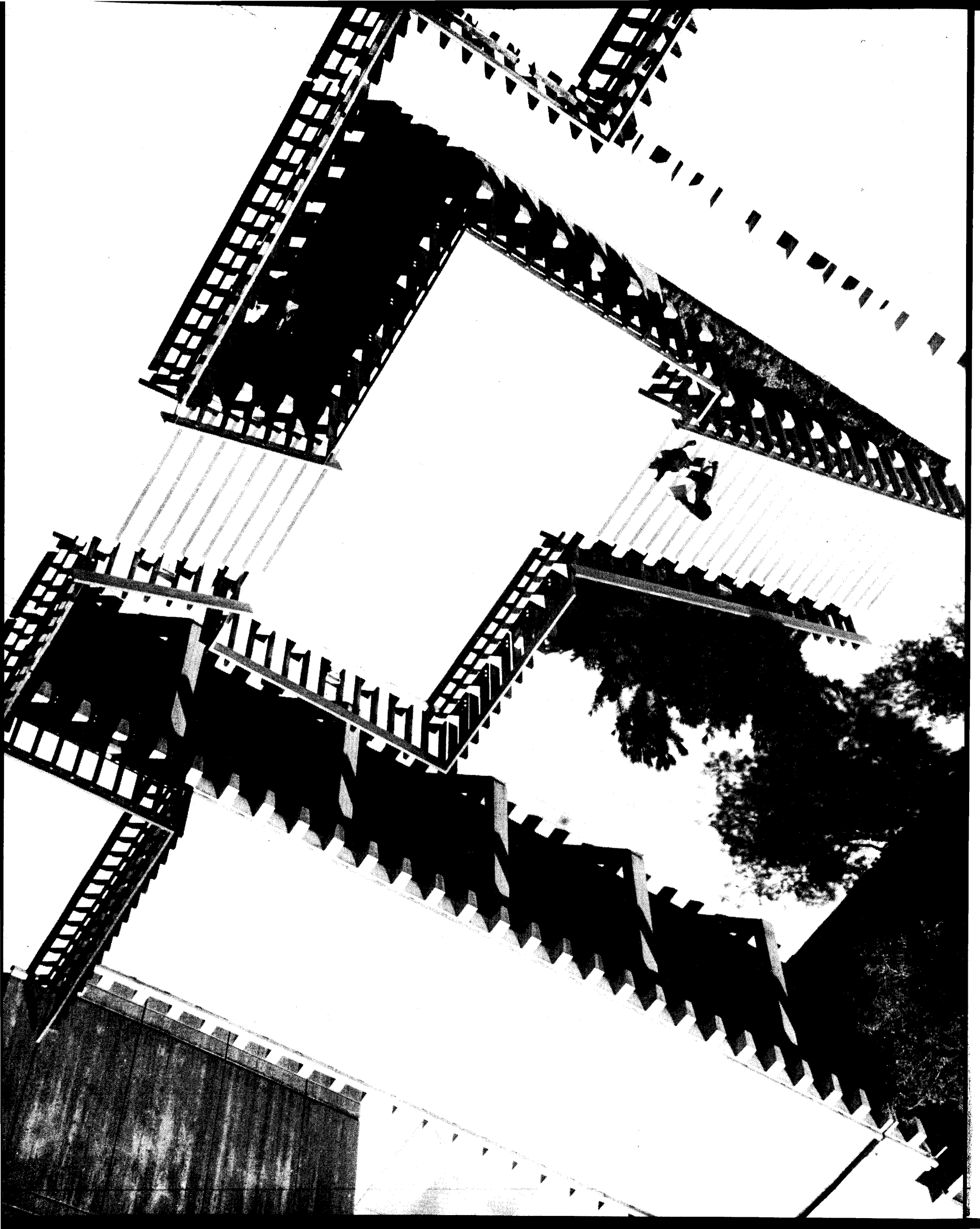
It is possible to live simply and to participate moderately in the life of the student community on a limited budget. The best that the University can do to assist the student in planning a budget is to indicate certain and probable expenses. For information regarding student employment, loans, scholarships, 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	$128	$128	$128	$384
Educational Fee	100	100	100	300
Campus Activity Fee	6	6	6	18
Student Center Fee	10	10	10	30
Board and Room in Residence Halls (Avg.)	717	717	717	2151
Books, Supplies (Approx.)	90	80	70	240
Personal Expenses (Approx.)	200	200	200	600
Total	$1251	$1241	$1231	$3723

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 distributed 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, Building 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.

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 distribute 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.

UC SAN DIEGO POLICY ON INTEGRITY OF SCHOLARSHIP

The following has been approved by the Academic Senate and the chancellor as campus policy.

The principle of honesty must be upheld if the integrity of scholarship is to be maintained by an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University grading. This means that all academic work will be done by the student to whom it is assigned, without unauthorized aid of any kind. Instructors, for their part, will exercise care in planning and supervising academic work, so that honest effort will be encouraged.

Academic Dishonesty

No student shall engage in any activity which involves attempting to receive a grade by means other than honest effort, for example:

No student shall knowingly, without proper authorization, procure, provide or accept any materials which contain questions or answers to any examination or assignment to be given at a subsequent date.

No student shall, without proper authorization, complete, in part or in total, any examination or assignment for another person.

No student shall, without proper authorization, knowingly allow any examination or assignment to be completed, in part or in total, for him or her by another person.

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

No student shall employ unauthorized aids in undertaking course work in or out of the classroom.

No student shall alter class assignments and then (re)submit

them for regrading without proper authorization.

Faculty Responsibilities

Faculty are responsible for stating clearly to students in their classes the instructional objectives of the course at the beginning of each term. One of the stated requirements of the course should be the successful completion of course material by the student, in compliance with the standards described above. Faculty members are also responsible for stating clearly to students the University Policy on Integrity of Scholarship and which forms of aid and collaboration on assignments are authorized for that course.

When an instance of academic dishonesty is discovered by a faculty member, it is his or her responsibility to act promptly. If, after consultation with the department chairperson (or the chairperson's designated representative), the faculty member is convinced a serious breach of academic honesty has occurred, the faculty member may assign a failing grade in the course because the student has not satisfactorily completed the course requirements. In less serious circumstances, the faculty member may employ more lenient measures. The faculty member shall not assign a failing grade until he or she has met with the student (or has given written notification to the student requesting a meeting). Pending such a meeting the faculty member shall not assign a grade and the NR procedure shall be invoked.

No matter what measures are taken, University regulations require that faculty members report all cases of dishonest academic practices to the dean of the student's college (or to the Dean of Graduate Studies).

Administrative Action

In addition to these academic measures, administrative action shall be taken by the dean of the student's college (or the Dean of Graduate Studies). The minimum administrative penalty is probation and the establishment of a disciplinary record. However, students who have committed serious or repeated breaches of academic honesty face the likelihood of dismissal or expulsion from the University.

A student who is guilty of academic dishonesty may not drop the course to avoid a failing grade without the approval of the instructor, regardless of the rules governing "drops".

Appeals

In order to prevent abuses of these policies the right of a student to appeal the decisions of a faculty member and administrator must be insured. In the future a student should be able to appeal both the grade and the administrative action to a campus judicial board composed of faculty, student, and administration representatives. The board would determine if there is sufficient evidence of academic dishonesty to justify administrative discipline; the grading action would be evaluated by the faculty representatives on the board in conjunction with the faculty member involved. Until such a judicial board is created, students may utilize current appeals procedures.

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 fifty-one.

Payment of Fees

All general University fees and deposits (university registration fee, educational fee, and tuition for nonresidents of California) must be paid at the time of registration, as announced by the chancellor. Other fees and deposits may be paid at this time if desired; in any event, all miscellaneous fees should be paid within one week of the date of registration or by the date announced by the chancellor. An additional charge will be made for failure to pay required fees or deposits by the dates announced (see "Miscellaneous Fees and Service Charges").

With the exception of appeals to the Attorney in Residence Matters regarding a student's residence classification, no claim for remission of fees will be considered unless such claim be presented during the fiscal year to which the claim is applicable. Students who wish to appeal a final decision on residence classification by their campus must do so in writing within 120 calendar days of notification of the campus final decision. Such appeals should be addressed to the Attorney in Residence Matters at the address given below in the section entitled "Nonresident Tuition."

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

Exemption from Fees

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

incurred in the performance of his duties.

Except for miscellaneous fees and service charges, campus student association or program fees, and nonresident tuition where applicable, no fees are charged to certain U.S. military dependents or survivors.

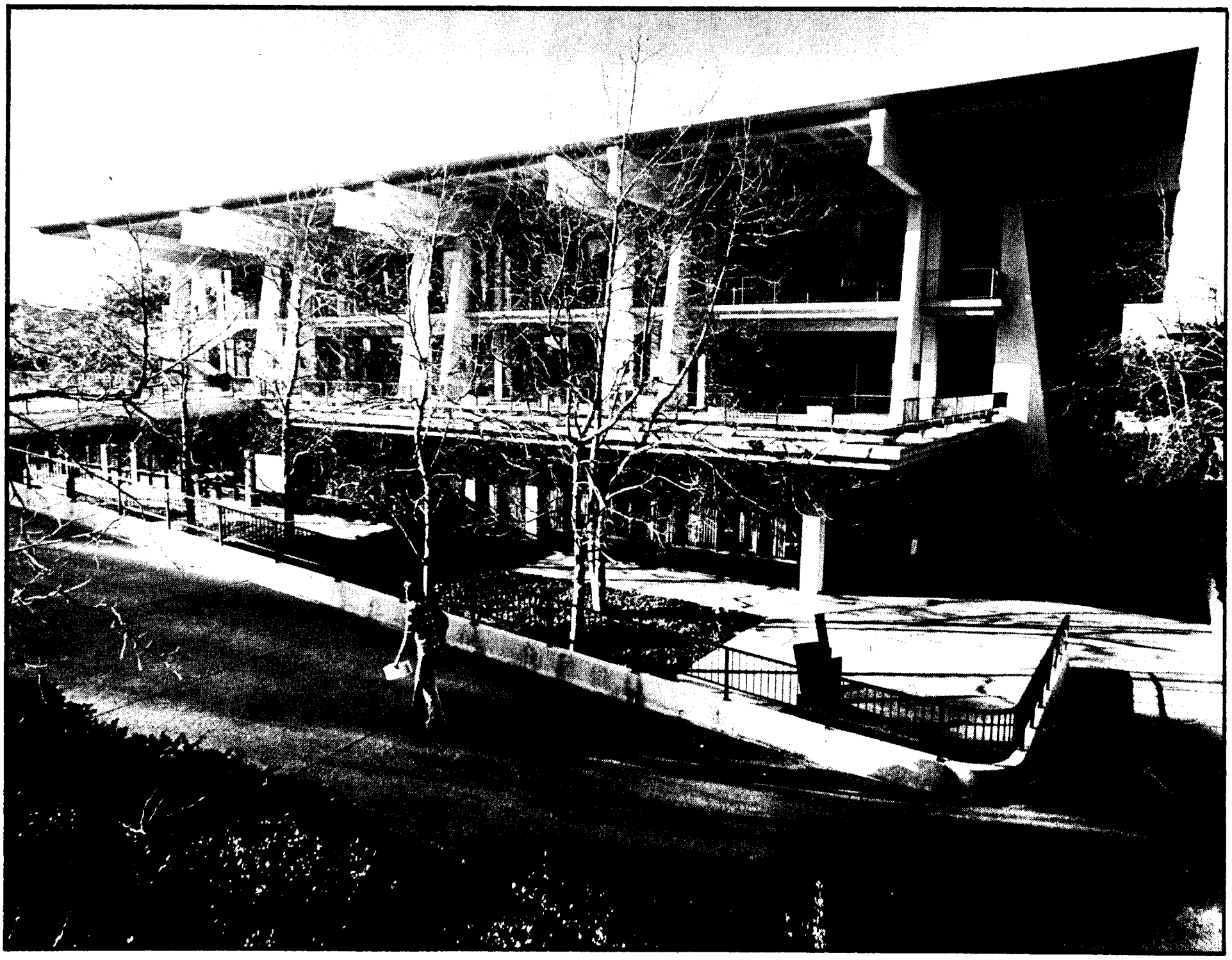
Students who believe themselves entitled to one of these exemptions must apply for a fee exemption before registering. Without this authorization students will not be permitted to register without payment of the entire fee. Graduate students should apply to the Dean of the Graduate Division at the campus they propose to attend. Undergraduate students normally should contact the dean of their college or school.

Nonresident Tuition

Students who have not established and maintained California residence for at least one year immediately prior to the residence determination date for the term during which they propose to attend the University, and who do not otherwise qualify for resident classification under California law, are required to pay nonresident tuition. Each student admitted to the University is advised of his or her provisional classification at the time of admission. Final classifications are made by the Deputy to the Attorney in Residence Matters, who is located in the Registrar's Office of the campus the student proposes to attend, or by the Attorney in Residence Matters, 590 University Hall, 2200 University Avenue, Berkeley, California 94720, on the basis of a Statement of Legal Residence completed by the student and signed under oath. Prospective students who have questions regarding their residence status should consult the *General Catalog* or contact the Attorney in Residence Matters at the address given above or should telephone (415) 642-3437 for further information.

University Registration Fee

The university registration fee is currently $128 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 regis-



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.

Grade Appeals

A. 1. If a student believes that non-academic criteria have been used in determining his or her grade in a course, he or she may follow the procedures described in this regulation.

2. Non-academic criteria means criteria not directly reflective of academic performance in the course. It includes discrimination on political grounds, or for reasons of race, religion, sex, or ethnic origin.

3. Appeals to this committee [see (B) (4)] shall be considered confidential unless both the complainant and the instructor agree otherwise. They may agree to allow the student representatives to the committee to participate in the deliberations of the committee, or they may agree to open the deliberations to members of the University community.

B. 1. The student may attempt to resolve the grievance with the instructor within the first month of the following regular academic quarter.

2. If the grievance is not resolved to the student's satisfaction, he or she may then attempt to resolve the grievance through written appeal to the department chairperson or equivalent, who shall attempt to adjudicate the case with the instructor and the student within two weeks.

3. If the grievance still is not resolved to the student's satisfaction, he or she may then attempt to resolve the grievance through written appeal to the provost of the college, the Dean of Graduate Studies, or the Dean of the School of Medicine, who shall attempt to adjudicate the case with the instructor, the chairperson and the student within two weeks.

4. If the grievance is not resolved to the student's satisfaction by the provost or dean, the student may request consideration of the appeal by the CEP Subcommittee on Grade Appeals (hereinafter called the Committee) according to the procedures outlined below. This request must be submitted before the last day of instruction of the quarter following the quarter in which the course was taken.

C. 1. The student's request for Committee consideration should include a written brief stating the nature of the grievance, including copies of any and all documents in his or her possession supporting the grievance. The submission of the brief to the Committee places the case before it and restricts any change of the challenged grade to a change initiated by the Committee, unless the Committee determines that all other avenues of adjudication have not been exhausted.

2. Upon receipt of the student's request, the Committee immediately forwards a copy of it to the instructor involved and asks the instructor, the department chairperson or equivalent, and the provost or dean for written reports of their attempts to resolve the complaint.

3. The Committee, after having determined that all other ave-

nues of adjudication have been exhausted, shall review the brief and the reports to determine if there is substantial evidence that non-academic criteria were used.

a. If the Committee finds substantial evidence that non-academic criteria were used, it shall follow the procedure in paragraph (D) below.

b. If the Committee decides the allegations are without substance, it shall serve written notification of its findings to the complainant and to the instructor within two weeks. Within ten days the complainant or the instructor may respond to the findings and any member of the Committee may appeal the Committee's findings to the full Committee on Educational Policy and Courses. If there are no responses, or if after consideration of such responses the Committee sustains its decision, the grade shall not be changed.

D. 1. If the Committee determines that there is evidence that non-academic criteria were used, it shall interview any individual whose testimony might facilitate resolution of the case. The complainant shall make available to the Committee all of his or her work in the course which has been graded and is in his or her possession. The instructor shall make available to the Committee all records of student performance in the course and graded student work in the course which is still in his or her possession. The complainant and the instructor shall be interviewed. At the conclusion of the case each document shall be returned to the source from which it was obtained.

2. The Committee shall complete its deliberations and arrive at a decision within two weeks of its determination that evidence of the use of non-academic criteria had been submitted. A record of the Committee's actions in the case shall be kept in the Senate Office for three years.

3. If the allegations of the complainant are not upheld by a preponderance of the evidence, the Committee shall so notify the complainant and the instructor in writing. Within one week of such notification, the complainant and the instructor shall have the opportunity to respond to the findings and the decision of the Committee. If there are no responses, or if after considering such responses the Committee sustains its decision, it shall so notify the complainant and the instructor in writing and the grade shall not be changed.

4. If the Committee determines that non-academic criteria were significant factors in establishing the grade, it shall give the student the option of either receiving a grade of P or S in the course or retroactively dropping the course without penalty. A grade of P or S awarded in this way shall be acceptable towards satisfaction of any degree requirement even if a minimum letter grade in the course had been required, and shall not be counted in the number of courses a student may take on a P/NP basis. If the student elects to receive a grade of P or S, the student may also elect to have a notation entered on his or her transcript indicating that the grade was awarded by the divisional grade appeals committee.

a. The Committee shall serve written notification of its findings and its decision to the complainant and the instructor. The complainant and the instructor may respond in writing to the findings and the decision of the Committee within one week of such notification.

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

E. These procedures are designed solely to determine whether non-academic criteria have been used in assigning a grade, and if so to effect a change of that grade.

1. No punitive actions may be taken against the instructor solely on the basis of these procedures. Neither the filing of charges nor the final disposition of the case shall, under any circumstances, become a part of the personnel file of the instructor. The use of non-academic criteria in assigning a grade is a violation of the Faculty Code of Conduct. Sanctions against an instructor for violation of the Faculty Code may be sought by filing a complaint in accordance with San Diego Division By-Law §230(D). A complaint may be filed by the student or by others.

2. No punitive actions may be taken against the complainant solely on the basis of these procedures. Neither the filing of charges nor the final disposition of the case shall, under

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

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,

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 1979-80

Anthropology	M.A., Ph.D.
Applied Physics	M.S., Ph.D.
Biology	Ph.D.
Chemistry	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.
Systems Science	M.S., Ph.D.‡
History	M.A., Ph.D.#
Information and Computer Science	M.S., Ph.D.
Linguistics	Ph.D.*
Literature	
Comparative	Ph.D.*
English and American	M.A., Ph.D.*
French	M.A., Ph.D.
German	M.A., Ph.D.
Spanish	M.A., 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	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, American History and Latin American History.

†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.

‡Pending

ADMINISTRATION

The Office of Graduate Studies and Research

The Office of Graduate Studies and Research is administered by a dean appointed by the chancellor. The dean is responsible 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 dean is a member 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 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 Systemwide 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 a particular program.

The graduate adviser's duties include:

1. Advising the dean on admission of graduate students.
2. Advising graduate students regarding their programs of study and other matters pertinent to graduate work.
3. Appointing individual advisers for each graduate student.
4. Approving official study lists.
5. Acting on the petitions of graduate students.
6. Insuring that adequate records are maintained on all graduate students in the department or group, 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 Program Review Committee and the systemwide Student Body Presidents' Council. The GSC also sponsors group, departmental, and campus-wide graduate student projects and social activities. Council meetings are always open, and any graduate student may apply to the Council for help in any graduate student matter.

Graduate Student Affirmative Action

The University of California, San Diego has made a commitment to increase the enrollment 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 effort 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 applicants who demonstrate the academic potential to complete requirements for advanced degrees. The Office of Graduate Studies and Research, together with graduate departments and groups, 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 graduate student affirmative action activities for women and minorities, the aged, and the physically handicapped may be obtained from the Office of Graduate Studies and Research, Building 103, 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 before selecting a plan for completion of degree requirements.

PROGRAMS OF STUDY

Plan I: Thesis Plan

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, consists 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.

Information covering thesis preparation is contained in the publication, *Instructions for the Preparation and Submission of Doctoral Dissertations and Masters' Theses*, which is mailed to students electing Plan I, upon their advancement to candidacy. The completed thesis is submitted to the thesis committee for review.

When all members of the committee have approved the thesis, a *Final Report of the Thesis for the Master of Arts or Master of Science Degree under Plan I* must be completed. 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

Following advancement to candidacy, the student electing Plan II must pass a comprehensive examination administered by the major department. *A Final Report of the Comprehensive Examination for the Master of Arts or Master of Science Degree under Plan II* is used to report successful completion of the examination requirement.

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.

GENERAL REQUIREMENTS

Academic Residence

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

A candidate must be registered in the final quarter in which the degree is to be awarded. (See Registration in the Final Quarter, page 112.)

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, with a total of no more than eight units of F and/or U grades, including a minimum of two quarters or more of residency, the student may file an *Application for Candidacy for the Thesis or Comprehensive, Plan I or II, for the Master of Arts or Science Degree*. An application for candidacy must be filed no later than two weeks after the first day of the quarter in which degree requirements are to be completed. (See Academic Calendar.)

Courses and Grades

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 or Master of Science degrees. Grades of IP and Incomplete, as well as NR, will automatically lapse to an F if they have not been removed when the final report for the degree is submitted to the Office of Graduate Studies and Research.

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 be accepted in satisfaction of one of the three quarters of residence and one-half of the total units required for the Master of Arts or Master of Science 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 candidate's final presentation and the oral defense of the thesis.

PROGRAM OF STUDY

Plan III: Modified Thesis Program

Following advancement to candidacy, the candidate must submit a thesis. The thesis committee, appointed by the chairperson of the department and approved by the Dean of Graduate Studies, consists of at least three faculty members (two from the department and at least one, preferably tenured, from a different department).

Seventy-two quarter units for visual arts and ninety quarter units for theatre, with a GPA equivalent to 3.0 in upper-division and graduate course work undertaken, are required for a Master of Fine Arts degree. Information covering thesis preparation is contained in the publication, *Instructions for the Preparation and Submission of Doctoral Dissertations and Masters' Theses*, which is mailed to students upon their advancement to candidacy. The completed thesis is submitted to the thesis committee for review.

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

Academic Residence

The minimum residence requirement is six academic quarters for visual arts and eight academic quarters for theatre, at least one of which must follow advancement to candidacy. Academic residence is met by satisfactory completion of six units or more per quarter, some of which must be graduate level. The entire residence requirement must be satisfied at UC San Diego.

A candidate must be registered in the final quarter in which the degree is to be awarded. (See Registration in the Final Quarter, page 112.)

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, with a total of no more than eight units of F and/or U grades, including a minimum of five quarters or more of residency, the student may file an *Application for Candidacy for the Modified Thesis, Plan III, for the Master of Fine Arts degree*. An application for candidacy must be filed no later than two weeks after the first day of the quarter in which degree requirements are to be completed.

Courses and Grades

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. Grades of IP and Incomplete, as well as NR, will automatically lapse to an F if they have not been removed when the final report for the degree is submitted to the Office of Graduate Studies and Research.

Graduate Work Completed Elsewhere

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

Educational Fee

The educational fee was established as a required fee 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.

In-Candidacy Educational Fee Grant of $120

(see Normative Time Program, complete information.)

The Normative Time Program provides an In-Candidacy Educational Fee Grant each quarter (currently $120) for students who have advanced to candidacy for the Ph.D. degree. When the individual's accrued time exceeds the normative time established for that degree by the major department or group, the candidate will resume paying full fees. Students who remain under old policies will not be eligible for this fee grant.

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 petititon 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 Petititon.*

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 the Registrar. See *Schedule of Classes* for schedule of refunds.

Parking Fee

Students who park motor vehicles (including motorcycles) on the campus are subject to parking fees. (See Parking 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 UC 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 assistance should note the following: "Pursuant to Section 7 of the Privacy Act of 1974, applicants for student financial aid or benefits are hereby notified that mandatory disclosure of their Social Security Number is required by the University of California to verify the identity of each applicant. Social Security Numbers are used in processing the data given in the financial aid application; in the awarding of funds; in the coordination of information with applications for federal, state, university, and private awards or benefits; and in the collection of funds and tracing of individuals who have borrowed funds from federal, state, university, or private loan programs."

Fellowships and Traineeships

Fellowship and traineeship 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. Part-time students and non-degree students are not eligible.

Stipends range from $3,200 to $4,980 and, unless otherwise stated, do not include tuition or fees in addition to stipends. Appointees must register for and complete a full program of graduate study and research each quarter (nine to twelve units of upper-division and graduate-level work) and must remain in good academic standing, as described under Standards of Scholarship.

Fellows and trainees on twelve-month tenure are required to devote full time to graduate study and research during the summer as well as during the academic year. A brief resume of proposed summer graduate study or research, approved by the

appropriate adviser, must be filed with the Dean of Graduate Studies before the end of the spring quarter preceding the summer portion of the fellowship or traineeship tenure.

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 UC San Diego are the following:

1. Graduate Opportunity Fellowships
2. Regents Fellowships.
3. San Diego Fellowships.
4. Fee Scholarships.
5. Tuition Scholarships.
6. Tuition and Fee Scholarships.
7. U.S. Public Health Service Predoctoral Traineeships.
8. Dissertation — Research Assistantships (California residents only).
9. Dissertation Fellowships (California residents only).

Assistantships

Graduate students may be employed by UC San Diego on a part-time basis (not to exceed 50 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 in a degree program in a department or group 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 $3,300 or less if single, or (2) combined gross income of married graduate student and spouse is $5,400 or less. This exemption must be revoked by filing a new Form W-4 either (1) within ten 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 upper-division and graduate-level work) leading to a higher degree and must remain in good academic standing, as described under Standards of Scholarship, page 107.

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, scholarships, 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 08541.

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 subscribes to the agreement of the Council of Graduate Schools of the United States, under which successful applicants for awards are given until April 15 to accept or decline such awards. An award accepted from one of the member universities may be resigned at any time through April 15. However an acceptance given or left in force after that date commits the student 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.

course. A student who has dropped out without completing the entire sequence may be assigned final grades and unit credit for any quarter(s) completed, provided that the instructor has a basis for assigning the grades and certifies that the sequence was not completed for good cause. An IP not replaced by a final grade will remain on the student's record. Courses graded IP are not used in calculating a student's grade-point average until graduation. At that time course units still graded IP on a student's record must be treated as units attempted in calculating the GPA; **thus units graded IP will be considered as F's or U'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 upper-division 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, all lower-division course work and noncredit courses shall be graded only 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. Conversely, a course in which a grade of U has been awarded may not be repeated on the basis of a letter grade. Degree credit for a course will be given only once, but the grade assigned for each enrollment shall be permanently recorded and 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 transcript 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 Graduate Studies and Research will direct the Office of the Registrar to 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 Univeristy 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 must complete an *Application for Graduate Admission and Award* 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 it is available.

Special Note to Foreign Applicants — In all applications for graduate admission, official records bearing the signature of the registrar or other responsible academic officer and the seal of the issuing institution are 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 08541.

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 08541.

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 UC 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 application 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 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 completed medical history form to the Student Health Service.

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 petititon 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 course work undertaken since last enrolled at UC San Diego, pay a readmission fee of $20, complete a *General Petititon* and a *Statement of Activities*. In addition, a Statement of Legal Residence is required for all students returning after an absence of two quarters or more. ***Readmission is not automatic.***

REGISTRATION REQUIREMENTS AND PROCEDURES

NOTE: Deadlines differ for new and continuing/returning 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.

Part-Time Student

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

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 date (no later than the end of the second week each quarter) will be assumed to be withdrawn from UC San Diego and will be dropped from the official register of graduate students. A student who is on leave of absence or who has withdrawn from the University is not entitled to withdraw books from the library or to use other University facilities or faculty time. A student must petititon for readmission to resume study at a later date, pay the non-refundable readmission fee, and be considered for readmission with all others requesting admission to that quarter.

Ph.D. degree candidacy will lapse for graduate students subject to normative time policies who fail to register and are not granted a formal leave of absence. To be reinstated to candidacy, a graduate student must be readmitted, enroll and register, be readvanced to candidacy, and pay the candidacy fee.

Registration in the Final Quarter for the Award of the Degree

A student completing course work, using University facilities including the library, or making any demands upon faculty time (other than final reading of the thesis or dissertation, or administering the comprehensive or doctoral examination), must register in the final quarter in which the degree is to be conferred.

Registration Procedures

A student is 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 petititon 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 by students 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 correct course codes for all course work, independent study, or research to be undertaken for each quarter of registration; and the *Preferred-Program Card* must be approved by the graduate adviser and filed with the Office of the Registrar. 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. Unofficial 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. A student who wishes to take units in excess of these limits must obtain the approval of the graduate adviser or department chairperson.

Graduate students holding half-time or less appointments as research assistants, teaching assistants, language assistants, readers, and other employment titles, or who receive support from traineeships, fellowships or scholarships paid through the University or directly to the student must enroll and register for a full-time program of graduate study and research (nine to twelve units each quarter).

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* including corresponding course codes. When changing units in a variable-unit course, a student must drop the course first, then add it with the correct number of units.

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

Add/Drop Change Cards reflecting 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.

Leave of Absence/Extension

A student who discontinues graduate study with the intention of resuming during a later quarter must file a formal *Leave of Absence, Extension and/or Withdrawal,* prior to leaving the campus. Whether or not the student is participating in the Normative Time Program will determine the length of leave(s) which can be approved. Graduate students participating in the Normative Time Program, who first registered at UC San Diego prior to fall quarter 1978 are limited to a maximum of three quarters of leave after fall 1978. For those doctoral students who elected not to participate in the program, 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. Students entering as graduate students beginning fall quarter 1978 and thereafter are subject to provisions of the Normative Time Program if they proceed to a Ph.D. degree and are limited to a maximum of three quarters of leave. See Normative Time Program.

Prior to the end of the second week of instruction of the quarter in which the leave is to begin, a student must complete a *Leave of Absence Form* and obtain the approval of the graduate adviser and the chairperson of the (major) department or group, receive clearance from Special Services, Student Financial Services, Office of the Cashier, and Loan Records Office, and obtain approval of the Dean of Graduate Studies. If a student has registered for the quarter in which a leave is being requested, the validated *Student Identification Card* must be attached to the leave of absence.

A student who has a long-term loan is considered out of school while on leave of absence and must set up an exit interview with the Loan Records Office before leaving the campus. Since rules and regulations pertaining to such loans are complex, it is to the student's advantage to determine loan requirements prior to seeking a leave of absence.

A student may request an extension of an approved leave *prior to the expiration of the leave.* (See Normative Time Program.)

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 re-enrolling 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.

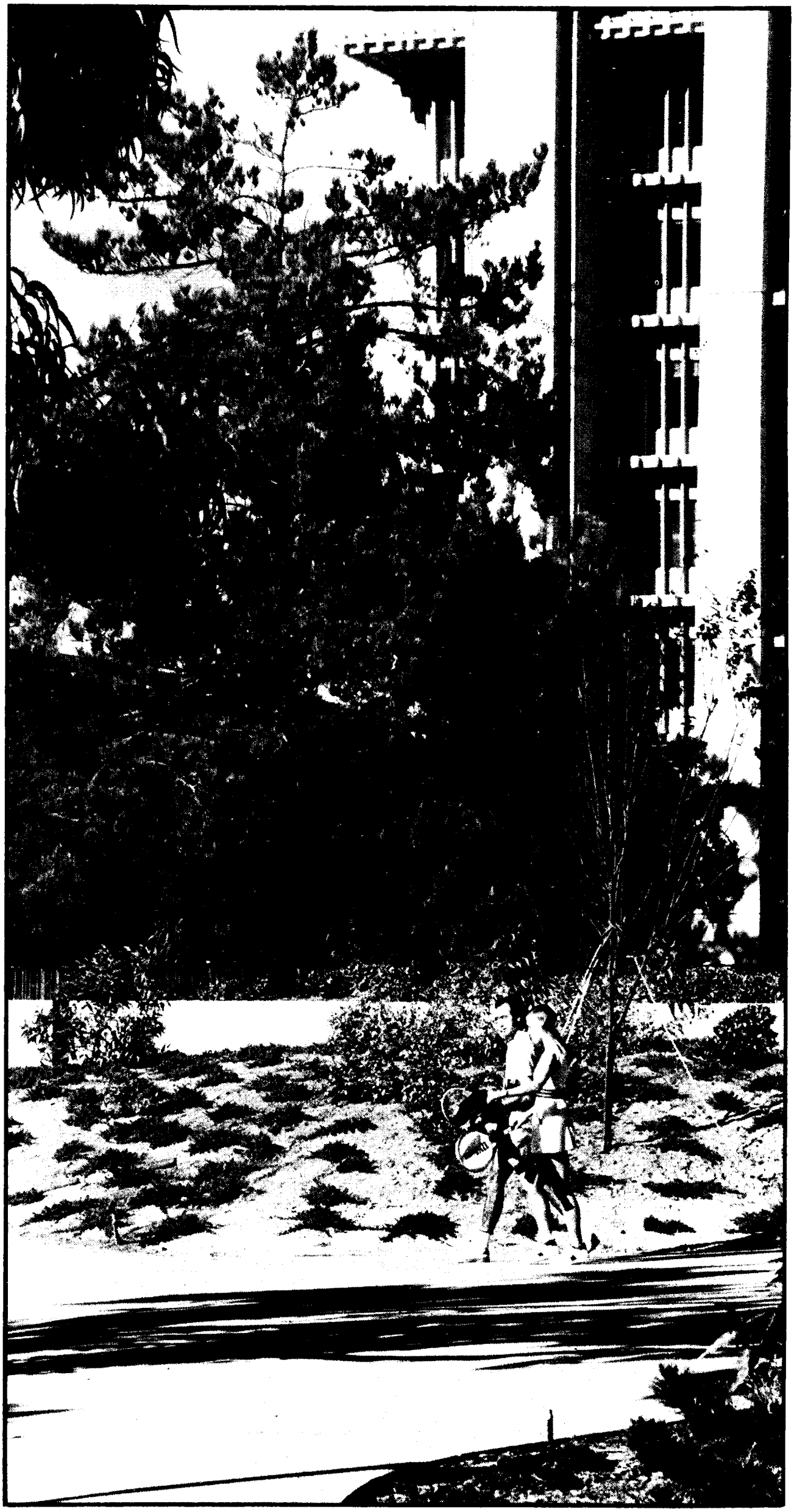
A student on leave of absence cannot be employed at UC San Diego, University Hospital, or University Extension in any capacity and may not hold a fellowship, traineeship, or similar appointment administered by the University.

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 *elapsed calendar days since the first day of instruction.* The date of withdrawal used in calculating the refund shall be the date on which the approved notice of withdrawal is submitted to the Office of the Registrar.

A registered student who stops attending classes 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 U in each course, thus jeopardizing eligibility for readmission.



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 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 assitance, 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 (452-4090)

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.

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.

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 77-78 school year more than 850 events took place.

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.

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* encourages students who have problems that may be limiting their effectiveness 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* encourages students who are uncertain of their major or of their career goals to explore their interests and skills, and the options available to them.
3. *Workshops* and a variety of groups 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* is a program which provides advising based on the 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* is stressed so that students acquire knowledge of career areas of choice, plan their education accordingly, and seek entrance in a career field most compatible with their needs.

Graduate/Professional School Program (Information: 452-3750)

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

1. *Professional School Advising Service* assists students who have narrowed their career focus to include admission to a professional school, i.e., medical/dental school, law school, graduate management programs. 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* provides students who are or will be receiving degrees from UC San Diego the opportunity to 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* helps students relate skills to occupational fields of choice, identify and approach potential employers, and learn job-hunting techniques through individual and group advising. Note: this service is recommended for students at all academic levels seeking part-time, summer, or career employment. (Information: 452-3750)
2. *Part-Time Employment* provides listings of off-campus, part-time, and summer employment opportunities available to currently enrolled students. (Information: 452-4500) 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* provides career-related employment lists which are received and posted from local, statewide, and national employers. (Information: 452-3750)
4. *On-Campus Interviewing Service* affords students the opportunity to interview for particular jobs in business, industry, and government. (Information: 452-3750)
5. *Teacher Placement Service* provides advising, placement files, and educational job listings to those degree candidates and alumni seeking teaching positions, particularly at two- and four-year colleges. (Information: 452-3750)

Career and Graduate School Library

Students and alumni are provided 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. (Information: 452-3750)

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 having filed the Statement of Intent to Register 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 availa-

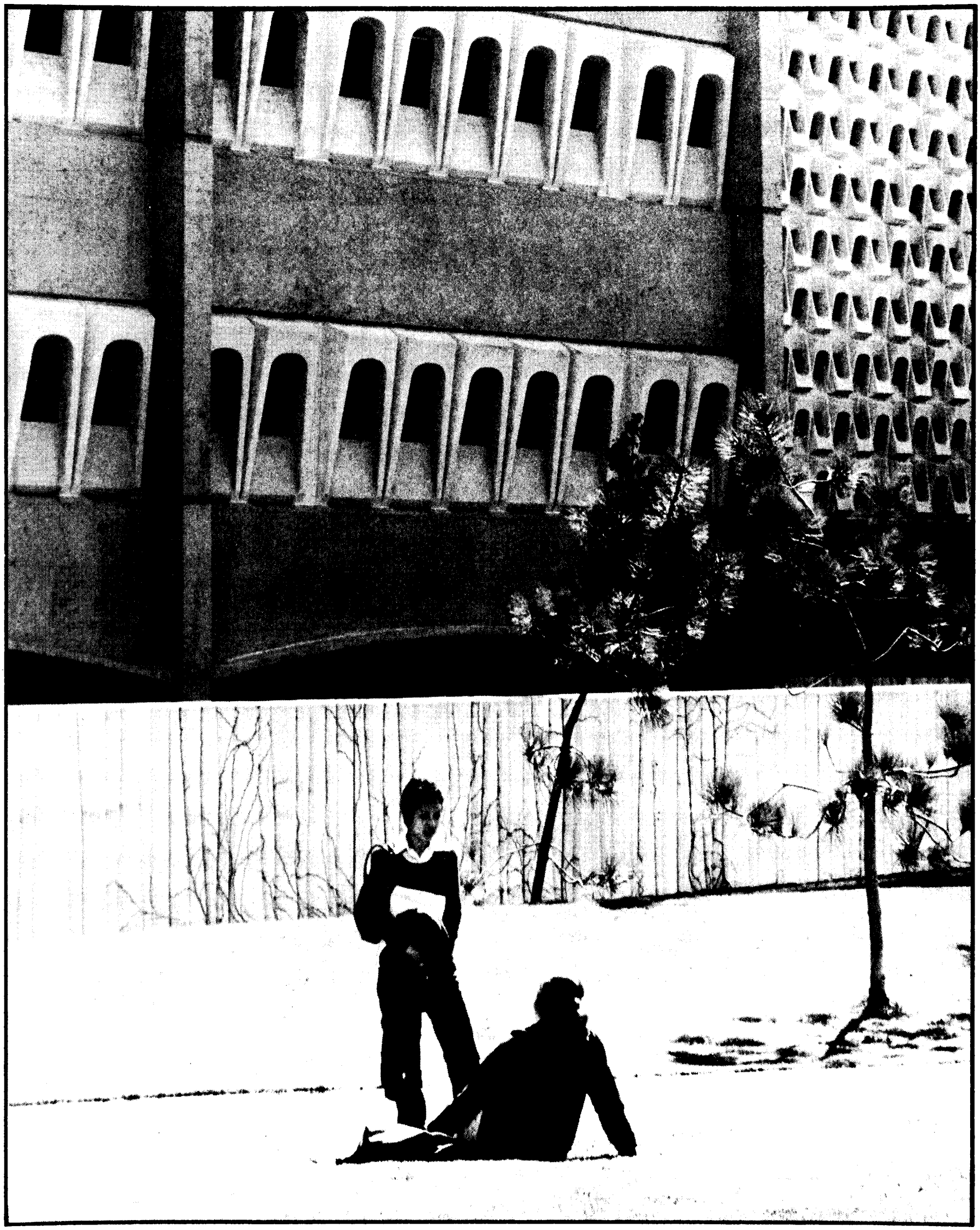
SCHOOL OF MEDICINE

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, Mathematics, 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) Veterans 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 were completed 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.

The goal of the medical curriculum, clinical experience, and faculty-student interactions is to develop individual, objective, and conscientious physicans 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 nearly one-fourth of classes during the first two years, and one-half during the last two years. The core curriculum in-



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. A copy of the student's field research proposal must be in the hands of all faculty members ten days before the oral qualifying examination. Fieldwork proposals may not exceed twenty double-spaced typed pages. A one-paragraph abstract of the proposal is not included in this space limit. Note that there is no obligation to reach twenty pages, and shorter proposals are acceptable. Graduate students may not use department personnel or equipment to make copies of pre-fieldwork proposals or dissertations or dissertation abstracts. The oral qualifying examination 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 chairperson/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, although only members of the anthropology faculty and of the student's doctoral committee may ask questions. A resume of the student's dissertation must be in the hands of all faculty members ten days before the dissertation hearing. A full copy of the student's dissertation must be in the hands of the student's doctoral committee members four weeks before the dissertation hearing. It is understood that the edition of the dissertation given to committee members will not be the final typing and that the committee members may suggest changes in the text at the hearing. 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."

Courses

NOTE: For changes in course offerings or additions made after publication of the *General Catalog*, check the *Schedule of Classes* issued fall 1979, winter 1980, and spring 1980.

Lower Division

12. Chinese Society and Culture (4)
A description and interpretation of the major institutions and culture patterns of traditional China.

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. (Not offered in 1979–80.)

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.

26. The Prehistoric World (4)
A review of human culture from the Neanderthals through the growth of Bronze Age empires, focusing on major cultural "inventions" such as agriculture, medicine, metallurgy, and writing, and on responses to environment and to population growth.

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 1979–80.)

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.* (May not be offered in 1979–80.)

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 1979–80.)

103. Chinese Popular Religion (4)
The religious world of ordinary Chinese of precommunist times, with some reference to major Chinese religious traditions. Particular emphasis on the relation between popular religion and other aspects of Chinese personality or culture. Background in anthropology or Chinese studies desirable. *Prerequisites: AN 22 or introductory anthropology at another university.* (May not be offered in 1979–80.)

104. Traditional African Societies and Cultures (4)
Attention to three main socio-political types of societies: egalitarian hunting and gathering groups; loosely organized agricultural and herding groups; and centrally organized kingdoms. Representatives of all three types considered and societies from all parts of sub-Saharan Africa studied intensively.

105. Social Anthropology (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 Anthropology (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.*

107 Psychological Anthropology (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 1979-80.)

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.* (May not be offered in 1979–80.)

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 antoher. *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.*

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 1979–80.)

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 1979–80.)

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.*

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.*

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 1979–80.)

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.* (May not be offered in 1979–80.)

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 1979–80.)

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. (May not be offered in 1979–80.)

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 1979–80.)

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. (Not offered in 1979–80.)*

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 1979–80.)

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 1979–80.)

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 1979–80.)

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 1979–80.)

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. (May not be offered in 1979–80.)

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.* (May not be offered in 1979–80.)

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 1979–80.)

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.

151. Political Anthropology (4)
An examination of the political processes at the local level with emphasis on examination of supports for various aspects of the processes considered (e.g., leadership, factionalism, etc.) *Prerequisites: AN 22 or introductory anthropology at another university.*

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 1979–80.)

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 1979–80.)

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*

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 1979–80.)

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 1979–80.)

162. Peoples 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.*

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 1979–80.)

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 1979–80.)

166. Religion and Society in the Near East (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.* (May not be offered in 1979–80.)

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 1979–80.)

171. Near East Seminar (4)
The seminar will focus on a special problem or a particular area of the Near East. May be repeated for credit one time. *Prerequisite: permission of instructor.* Some background of Near Eastern studies required. (May not be offered in 1979–80.)

172. Cultural Study of Interpersonal Behavior (4)
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. (May not be offered in 1979–80.)

173. Themes in Latin American Culture (4)
An introduction to Latin American cultures focusing on similarities and differences among case studies. Research paper within one area instead of exam. *Prerequisite: AN 22 or introductory anthropology at another university.* (May not be offered in 1979–80.)

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. (May not be offered in 1979–80.)

196. Thesis Research (4)
Independent preparation of a senior thesis under the supervision of a faculty member or committee. The final grade assignment will not be made until the third quarter and will be based on the thesis submitted. May be repeated for credit two times. *Prerequisite: students will be admitted by invitation of the department.*

197. Field Studies (4)
Individually arranged field studies giving practical experience outside the University. *Prerequisites: consent of instructor and department approval.* (Pass/Not Pass grades only.)

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 behavior science theories of aggression and their application to the comparative analysis of society. *Prerequisite: graduate standing.* (May not be offered in 1979–80.)

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 1979–80.)

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 1979–80.)

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 1979–80.)

205. Social Anthropology (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. Cultural Anthropology (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. Psychological Anthropology (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.*

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.*

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.* (May not be offered in 1979–80.)

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.

217. Current Theoretical Issues in Anthropology (3)
Discussion and evaluation of theoretical and methodological issues based on selected papers in the current anthropological and related literature. *Prerequisite: completion of first-year graduate program in anthropology.* (May not be offered in 1979–80.)

218. Cognitive Anthropology (3)
This course will consider the relation between cultural behavior and cognitive processes. Selected topics from the fields of ethnoscience, semantic and grammatical analysis, decision-making, and belief systems will be discussed. *Prerequisite: graduate standing in anthropology or psychology.*

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 1979–80.)

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 a social science or humanities.* (May not be offered in 1979–80.)

221. Interpretation of Culture and Society (4)
The patterns of beliefs and actions of particular peoples are studied in connection with their historical experience and personal motivations. Several short papers are assigned which involve the interpretation of the characteristic features of political institutions and individual behavior. Readings are taken from the ethnography of stateless peoples. (May not be offered in 1979–80.)

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 1979–80.)

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 1979–80.)

226. Research Seminar in Psychological Anthropology (3)
This is a seminar dealing concretely with the implementation of psychological research variables in cross-cultural or social structural contexts. It will particularly deal with problems of assessment, measurement, and an analysis in sociocultural research in relation to cognition, personality, and psychopathology. *Prerequisite: Graduate student in anthropology.* (May not be offered in 1979–80.)

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 1979–80.)

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.*

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 1979–80.)

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.* (May not be offered in 1979–80.)

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 1979–80.)

An 244. Enculturation: The Acquisition of Culture (3)
This seminar will review recent work in language acquisition and cognitive development in relation to the more inclusive process of the acquisition of culture known in anthropology as "enculturation." Ways of studying the child's emerging cultural competence will be explored. *Prerequisite: AN 106, 107 or 206, 207.* Undergraduate by permission. (May not be offered in 1979–80.)

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.*

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. *Prerequisites: graduate standing in anthropology.* (May not be offered in 1979–80.)

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 not be considered. *Prerequisite: graduate standing.* (May not be offered in 1979–80.)

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 1979–80.)

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 1979–80.)

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.* (May not be offered in 1979–80.)

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 1979–80.)

258. Selected Topics in Psychoanalytic Theory (3)
A critical survey of the psychoanalytic approach to selected topics in anthropology, such as totemism, religion, gender, social character and symbolism. The topic for each seminar will be posted in advance. *Prerequisite: graduate standing.*

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.* (May not be offered in 1979–80.)

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 1979–80.)

261. Bibliographic Resources in Anthropology (0-1)
This course will acquaint students with a wide range of bibliographic sources useful in anthropological research. *Prerequisite: open to graduate students in anthropology and selected undergraduates.* (May not be offered in 1979–80.)

269. Themes in the Anthropological Classics: Symbolism (3)
An evaluation of the current theoretical status of symbolic themes considered cross-culturally significant. Early concern with such themes as well as recent problems they have posed will be examined. *Prerequisite: graduate standing.* (May not be offered in 1979–80.)

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 1979–80.)

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.* (May not be offered in 1979–80.)

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.* (May not be offered in 1979–80.)

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.* (May not be offered in 1979–80.)

295. Master's Thesis Preparation (1-12)
The student will work on the master's thesis under the direction of the departmental committee chairperson. 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 the 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 four 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. *(Associate Director, IPAPS)*
J. W. Miles, Ph.D.
D. R. Miller, Ph.D.
W. Nachbar, Ph.D.
D. B. Olfe, Ph.D.
S. S. Penner, Ph.D. *(Director, UCSD Energy Center)*
E. Reissner, D. Eng., Ph.D. *(Professor Emeritus)*
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.
S. Rand, Ph.D.

Assistant Professors:
D. A. Gough, Ph.D.
A. V. Sebald, Ph.D.

* * *

W. B. Bush, Ph.D., *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*
A. Fronek, M.D., Ph.D., *Professor of Surgery and Bioengineering*
K. Fronek, M.D., Ph.D., *Research Psychologist*
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*
K. Messmer, M.D., *Adjunct Professor of Surgery*
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 programs and curricula of AMES emphasize education in fundamentals of engineering sciences. These principles provide a common foundation for all engineering subspecialties. Training with this emphasis is likely to serve students well during a career in which engineering practice may change rapidly.

The instructional and research programs are grouped into six major areas: engineering physics, solid and structural mechanics, fluid mechanics, systems science, chemical engineering, and bioengineering. The program is characterized by strong interdisciplinary relationships with the Departments of Physics, Mathematics, Biology, Chemistry, Economics, and Applied Physics and Information Sciences, and associated campus institutes such as the UCSD Energy Center, the Institute for Geophysics and Planetary Physics, the Institute for Pure and Applied Physical Sciences, Scripps Institution of Oceanography, and the School of Medicine.

The Undergraduate Program

AMES offers two separate undergraduate programs: one, a two-year upper-division major in applied science with options in applied mechanics, bioengineering, and systems science; the other, a four-year program in engineering with specializations in engineering sciences and chemical engineering. Either Bachelor of Arts or Bachelor of Sci-

engineering, Engineering Physics and Systems Science.

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 those 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 Applied Physics and Information Sciences, Economics, 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, UCSD Energy Center, 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 Examination Plan II (see "Graduate Studies: Master's Degree"). A strong effort is made to schedule M.S. level course offerings so that students may obtain their M.S. degree in one year of full-time study or two years of part-time study.

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 reevaluated 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. 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. degree in Engineering Sciences with a designated specialization in Aerospace Engineering, Applied Mechanics, Engineering Physics, Bioengineering, or Systems Science.

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—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 Graduate 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. (F)

11. Elements of Materials Science (4)
The structure 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.* (F)

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 2E-A.* (S)

14. 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).* (W)

16. 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).* (S)

17. Engineering Dynamics (4)
Kinematics and dynamics of particles, systems of particles and rigid bodies including motion relative to noninertial frames. Conservation laws for linear and angular momentum and for energy. Elements of mechanical vibrations. *Prerequisites: two quarters of physics and Mathematics 2DA or equivalent.* (W)

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. (F)

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. (S)

35. Society and the Sea (4)
Introduction to the oceans and their relationship to man. Selected topics include living and non-living resources, seaports and sea travel; legal, economic, military, and social aspects; coastal zone management, scientific research, and the sea and weather. (W)

90. Freshman Seminar (0)
Freshman seminars organized around the research interests of various faculty members. *Prerequisites: freshman standing and consent of instructor.* (F-W-S)

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.* (F)

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.* (F,W,S)

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.* (W)

105A-B. Introduction to Mathematical Physics (4-4)
Ordinary differential equations, Fourier series, Sturm-Liouville theory, elementary partial differential equations, and finite integral transforms with applications to physical problems.(Students may not receive credit for both AMES 105A-B and APIS 105A-B-C.) *Prerequisites: Mathematics 2DA and Natural Science 2A-B, or equivalent. (Mathematics 2D is not an adequate substitute for Mathematics 2DA.)* (F,W)

105AH-BH-CH. Introduction to Mathematical Physics (4-4-4)
Ordinary differential equations, Fourier series, Sturm-Liouville theory, elementary partial differential equations, complex variables, asymptotic methods and integral transforms with applications to problems in vibrations, wave motion, electric circuits, heat conduction, fluid dynamics, and traffic flow. This is an honors course intended primarily for students who intend to go on to graduate school or have a strong interest in applied mathematics. The content of AMES 105AH will be sufficiently close to that of AMES 105A to permit the sequence 105A-BH-CH, but 105BH is a prerequisite for 105CH. (Students may not receive credit for both AMES 105AH-BH-CH and APIS 105A-B-C.) *Prerequisites: Mathematics 2DA and Natural Science 2A-B, or equivalent. (Mathematics 2D is not an adequate substitute for 2DA.)* (F,W,S)

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. *Prerequisites: AMES 12 or equivalent course in classical thermodynamics.* (F)

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.* (F)

113. Chemical Reactor Engineering (4)
Analysis of chemical reactors, flow and non-flow processes, homogenous and heterogeneous chemical kinetics, catalysis. *Prerequisites: Mathematics 2DA and Chemistry 132 or equivalent.* (W)

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.* (S)

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.* (S)

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 105AH or Mathematics 110A; Mathematics 2EA recommended.* (F)

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 of circular shafts. Stresses and deflections in beams. Limit design of beams. Four hours lecture, coordinated experiments and demonstrations. (F)

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.* (W)

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.* (S)

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.* (S)

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.* (F)

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.* (W)

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.* (S)

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.* (F)

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.* (S)

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. (F,W,S)

150. Topics in Applied Mechanics (4)
Preparation of engineering reports on series of applied problems illustrating methodology from various branches of applied mechanics, e.g., heat transfer, fluid flow, structural analysis and vibrations. *Prerequisites: AMES 10, 12, 101A, 105A-B or 105AH-BH, 121A, 130A-B. Equivalents may be substituted with consent of instructor.* (W)

162A-B-C. Statistical Communication Theory (4-4-4)
Review of probability theory, combinational 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.* (F,W,S)

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 or 105AH, AMES 142A or equivalent.* (W)

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 2LA, AMES 163A.* (S)

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)

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.* (S)

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.* (W)

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.* (F)

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.* (W)

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.* (S)

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.* (S)

175E. Microprocessor Control Laboratory (4)
Laboratory/lecture course on the use of microcomputers in the performance of experiments and the interactive control of subsystems. Analog and digital data handling and conversion. Filtering, restoration, and detection of signals. Construction techniques including system design, parts selection, parts ordering, assembly, and performance evaluation. Project utilizing a microprocessor to sense its environment, compute desired changes in that environment, and manipulate the environment to bring about the desired changes. *Prerequisite: systems science senior standing or consent of instructor.* (W)

180A. Principles of Bioengineering I (4)
General principles of electronics related to biomedical instrumentation. Basic circuits. Specialized amplifiers. Electrocardiography. Ultrasonic instruments. Electrical safety hazards. *Prerequisites: upper-division standing, medical school, or consent of instructor.* (F)

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 or 105AH-BH during the junior year.* (W)

180C. Principles of Bioengineering III (4)
Biomaterials and artificial internal 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.* (S)

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 grades only.) *Prerequisites: B average in major and permission of department chairman.* (F,W,S)

198. Directed Group Study (1-4)
Directed group study on a topic or in a field not included in the regular department curriculum, by special arrangement with a faculty member. (P/NP grades only.) *Prerequisite: consent of instructor.* (F,W,S)

199. Independent Study for Undergraduates (4)
Independent reading or research on a problem by special arrangement with a faculty member. (P/NP grades only.) *Prerequisite: consent of instructor.* (F,W,S)

Graduate

205. Graduate Seminar (0)
Each graduate student in AMES is expected to attend a weekly seminar of his or her choice dealing with current topics in fluid mechanics, solid mechanics, bioengineering, systems science, applied ocean sciences, or energy. (Satisfactory/Unsatisfactory grades only.) (F,W,S)

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 interdepartmental 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, methods 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 105AH-BH-CH, 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 105AH-BH-CH 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. *Prerequisite: 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. *Prerequisites: 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. 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 and Renal Physiology (3)
Mechanics of breathing. Gas diffusion. Pulmonary blood flow. Stress distribution. Gas transport by blood. Kinetics of O_2 and CO_2 exchange. V_A/Q relations. Control of ventilation. Glomerular and proximal tubule functions. Water metabolism. Control of Na and K in kidney. *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, neutophiles, 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 (3)
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. This course does not apply toward the M.S. graduation requirements. (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 weighted residuals. Specifics include Dirichlet and Neumann problems, Cauchy concepts, Green functions, Riemann mapping, eigenfunctions, phase-plane analysis, steepest descents, multiple scales, WKB method, matched asymptotic expansions, transform techniques, Fredholm theory, Wiener-Hopf method, Galerkin method. *Prerequisites: AMES 105AH-BH-CH.*

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.)

Electrical Engineering and Computer Sciences [Formerly Applied Physics and Information Science [APIS]]

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.
Elias Masry, 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:
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Michael L. Fredman, Ph.D.
†Sing H. Lee, Ph.D.
††George J. Lewak, Ph.D.
Huey-Lin Luo, Ph.D.
Barnaby J. Rickett, Ph.D.
Walter J. Savitch, Ph.D.

Assistant Professors:
William F. Appelbe, Ph.D. (Visiting)
Walter A. Burkhard, Ph.D.
William E. Howden, 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*
William B. Hodgkiss, Ph.D., *Assistant Professor, Scripps Institution of Oceanography*

†On leave Fall, 1979; Spring 1980
††On leave 1979-80

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 or 65 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 138. 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 Electrical Engineering and Computer Sciences. 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 departmental 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 or 65

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 178	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 or 65

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, APIS 135A,
APIS 138
technical elective (3 quarters)

Senior Year
APIS 154A-B-C, APIS 146A-B,
APIS 146C or APIS 136
technical elective (3 quarters)

Electronics Option
Junior Year
APIS 105A-B-C, APIS 152A-B-C
APIS 140A, APIS 135A,
APIS 138
technical elective (3 quarters)

Senior Year
APIS 131A-B-C or Physics 100A-B-C,
APIS 146A-B, APIS 146C or APIS 136
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 170A-B, APIS 138
technical elective (3 quarters)

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 acoustics, optics, continuum mechanics, and materials 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 or 65

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

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 135A 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 135A or Physics 152
APIS 146A-B-C
APIS 152A-B-C or APIS 154A-B-C or APIS 146AL-BL-CL, APIS 138

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 135A 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 135A or Physics 152
Physics 140A-B
APIS 146A-B-C

(*) Warren College students may take

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 research assistantships are $472 per month, with the possibility of full-time employment during the summer months. For a half-time teaching assistantship the stipend is $598 per month. 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 1979-80. 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").

Lower Division

†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 3B, and for APIS 50C, Mathematics 2C is required.* Mr. Lugannani

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, 13A, or 65 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. Bowles.

†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.

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 65 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's 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.) (W)

*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 the fundamental physical and mathematical structures of computer software engineering. Topics include: machine structure and assembly language programming, program control structure, program data structure, and analysis of program correctness and performance. Three hours' lecture. *Prerequisite: Grade of A or B in APIS 61 or 65, or consent of instructor.* (F,S) Staff

Upper Division

105A. Introduction to Mathematical Physics (4)
Functions of a complex variable with applications to Laplace transforms, conformal mapping, two-dimensional electrostatic and flow problems. Review of ordinary differential equations, series solutions. *Prerequisite: Math 2DA, EA, Science 4A-B-C or equivalent.* Mr. Lewak

105B. Introduction to Mathematical Physics (4)
Special functions, eigenfunction problems. Fourier series, review of vectors, grad, div, curl, multi-dimensional integrals, Green's, and Stoke's theorems, curvilinear coordinates, maxima, minima, calculus of variations, partial differential equations. *Prerequisite: APIS 105A.* Mr. Lewak

105C. Introduction to Mathematical Physics (4)
Applications of material from APIS 105A and B, such as solutions of the wave, heat flow, and Poisson equations, Green's function methods. *Prerequisite: APIS 105B.* 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, Amperes 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

135A. Semiconductor Physics (4)
Review of quantum theory, crystalline lattices, band theory of solids, electron statistics, carrier motion in semiconductors, junction theory, semiconductor devices related to p-n junction diodes. Three hours' lecture. *Prerequisites: Nat. Sci. 2C, Sci. 4C, and APIS 105 concurrently.* (W) Mr. Luo

135B. Transistor Physics (4)
Physics of semiconductor devices, mainly bipolar junction transistors (BJT), field-effect transistors (FET) and metal-oxide-semiconductor transistors (MOS). Discussion of energy-band diagrams, general characteristic equations, device parameters, and various models. Three hours' lecture. *Prerequisite: APIS 135A.* (S) Staff

136. Fundamentals of Semiconductor Device Fabrication (4)
Crystal growth, controlled diffusion, determination of junction-depth and impurity profile, epitaxy, oxidation and photolithography techniques, monolithic process. Three hours' lecture. *Prerequisite: APIS 135A,B or equivalent.* (S) Staff

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

138 Digital Circuits Laboratory (4)
Introduction to standard integrated circuits for electrical engineers: 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. One hour's lecture, six hours' laboratory. *Prerequisite: APIS 70, or consent of instructor.* (Students who have taken APIS 175B may not take APIS 138 for credit.) (S) Staff

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 patterns. 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 transform, sampling representation, linear systems, filters, z-transforms, feedback systems. Random variables, probability distributions, expected values. Correlation functions and spectral densities of stochastic processes, the Gaussian process, random noise in linear systems. *Prerequisite: APIS 50A-B-C.* Mr. Holstrom

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

Frank M. Huennekens, Ph.D., Adjunct Professor of Biology
Leslie E. Orgel, Ph.D., *Adjunct Professor of Chemistry*

* * *

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
Junior Year		
(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	(Biol) Chem 112****
	(Phy) Chem 105**	
Senior Year		
(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) 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, 147 and 267 or Biology 101, 149B, and 156. Chemistry 199 may not be substituted for required or elective courses. Students are encouraged but not required to 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, 4422 Mayer Hall.

* * *

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.

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 1979–80

The following schedule of course offerings is available for first-year graduate students in the Department of Chemistry:

FALL	WINTER	SPRING
213 Macromolecules	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.

(2) 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.

(3) 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 their relation to enzyme structure are emphasized. *Prerequisites: elementary physical chemistry, organic chemistry and biochemistry.* (W)

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)

167. Biochemistry of Lipid Diseases (3)
The metabolism of lipids from the basic biochemistry to human disease implications will be the central theme of this course. The aim will be first to 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)

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 Departments 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 inteded 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. (W)

217. Human Biochemistry (4)
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 emphases will be placed on basic aspects of chemo- and immuno-therapy, mechanism of action of anti-cancer 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)

269. Biological and Biochemical Approaches to Cancer (2)
Invited speakers from outside as well as from within the University will present lectures on current topics in the biology and chemistry of cancer; a separate session will be held weekly in which the instructor will meet with students to discuss the significance and contents of the lecturer's talk. (W)

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.
Maurice Montal, 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.
Christopher J. Wills, Ph.D.

Associate Professors:
Jack W. Bradbury, Ph.D.
Stuart Brody, Ph.D.
Willie C. Brown, Ph.D.
Maarten J. Chrispeels, Ph.D.
Richard A. Firtel, Ph.D.
Michael E. Gilpin, Ph.D.
Stephen H. Howell, Ph.D.
S. Ian T. Kennedy, Ph.D.
William F. Loomis, Jr., 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.
Juan Yguerabide, Ph.D.

Assistant Professors:
Bruce S. Baker, Ph.D.
Darwin K. Berg, Ph.D.
Adelaide T.C. Carpenter, Ph.D.
Ted. J. Case, Ph.D.
P.A.G. Fortes, M.D., Ph.D.
William B. Kristan, Jr., Ph.D.
Ramon Piñon, Ph.D.
Deborah Spector, 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*
Francis H.C. Crick, Ph.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*

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. An average GPA of 2.0 or higher must be maintained in these twelve courses. Generally, three hours of preparation per week is required for each undergraduate unit of credit in the lecture courses listed.

Although not required, all biology majors should seriously consider taking one of the year-long sequences of lower-division courses for biology majors during their first two years. These sequences include a principle course (Natural Science 1C or 2E, Biology 9, or Biology 21), Zoology (Biology 11), Zoology Lab (Biology 11L), and a third lecture course (Biology 10, 15, or 22). These courses are useful introductory courses and provide material not necessarily found in the upper-division courses.

Transfer students must take nine such upper-division biology courses at UC San Diego to complete a biology major.

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 the 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. 198 and 199 courses may not be substituted for a formal laboratory course under any circumstances.

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. The research will culminate in a senior thesis prepared in conformity with rigorous standards and an oral report to an audience which includes members of the biology department faculty. 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, 126, 127 (or 131–132) and Biology 101R and 105R. Credit for Biology 102 ia 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 petititon 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 wishing to start the program during the summer preceding the senior year.

Recommended Schedule

FALL	WINTER	SPRING
Junior Year		
Biology 101R	Biology 173	Biology 105R
Chemistry 140A	Chemistry 140B	Chemistry 127
Chemistry 143A	Chemistry 126	(or Chem. 132)
(½ course)	(or Chem. 131)	Chemistry 105A
		(½ course)
Senior Year		
Biology 102	Biology 114R	Biology 124
Biology 111R	Biology 123	

NOTE: Either 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 2246.

Non-Majors: Non-contiguous Minor Biology

Students majoring in a field outside the natural sciences may complete a non-contiguous minor in biology by taking some such combination as: Natural Sciences 2F or 2FL, Biology 123 or 124, 129, 173, and 174. 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

Prerequisities for the junior year biology course in Muir College are Science 3A-B-C (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, 143A, 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; however, physics should be taken prior to Biology 110.)

Upper-division 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, Biology Building, Room 1218.

All students must take genetics (Biology 101) and biochemistry (Biology 105).

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 Molecular Biology
Cellular Biology—Biology 114M or 114R Cell Biology
Population Biology—Biology 122, 115, 163 or 173
Organismic Biology—Biology 10 and Biology 11
or Biology 136
or Biology 139
or Biology 141
or Biology 149A
or Biology 149B
or Biology 151
or Biology 174

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 110) 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 107L Microbiology
Biology 112 Cell Biology
Biology 119 Genetics
Biology 143L Neurobiology
Biology 149AL Physiology
Biology 149BL—Physiology
Biology 149BL—Physiology
Biology 152—Microbial Genetics
Biology 161—Field Ecology and Behavior

Recommended Schedule:†

FALL	WINTER	SPRING
Sophomore Year		
		Genetics
Junior Year		
Biochemistry	Molecular Biology*	Cell Biology*
	Population Biology*	Physical Biochemistry*
Senior Year		
	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 a year-long sequence of lower-division courses for biology majors during their first two years (see "Major Programs" above). 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

Third College offers a biology major which can be developed in one of four ways. The General Biology Program is intended for students who wish to maintain a flexible curriculum without specialization. The other three programs require a choice of one of three concentration areas, human biology, physiology and microbiology, and are intended for students who wish to achieve a fuller understanding of a particular area among the major biological disciplines. It is also possible to adapt the Third College biology major to include the other departmental concentration areas—cell biology, genetics, population biology and biochemistry. Students who plan to follow one of these four departmental areas should first consult with their faculty adviser. All students, however, should consult the appropriate concentration area adviser to be sure that they meet the needs of the program.

Lower-Division Requirements

Prerequisites for entering the major biology programs in Third College are: Science and Technology 12A, 12AL, 12B, 12BL, 12C, 15A, 15B, 15BL, 15C, 15CL, 11A or equivalent. Math 1A-B-C but preferably 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

In the junior year, students begin the series of eight upper division core courses, which present the fundamental principles of organic chemistry, physical chemistry, biochemistry, genetics, and cell and molecular biology. In the junior and senior years, the students also take the biology courses necessary to fulfill the program of their choice.

Recommended Schedule:

FALL	WINTER	SPRING
Junior Year (core requirements)		
Chemistry 128	Biology 101T	Biology 102
Chemistry 140A	Biology 105T	Biology 138
Chemistry 143A	Chemistry 140B	

Completion of Major (Junior and Senior Years)
In addition to taking seven additional upper-division biology courses selected from the program of their choice, students are required to take three courses outside the major.

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 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 (three quarters). Math 2A, B, C or Math 1A, B, C is required. Math 2A, B, C is strongly recommended for biology majors; Math 1A, B, C is for students not intending to go beyond the first year of calculus and does not provide adequate background for most physics sequences. It does, however, meet Warren College biology major requirements.

Physics (two quarters). Choose from the following sequences:

Science 4A, B, C
Physics 2A, B, C
Natural Science 2A, B, C
Science & Technology 15A, B, C

Inorganic Chemistry (Choose three quarters lecture, two laboratories from the following two sequences)
Chemistry 4A, B, C + 4AL, 4BL
Science 3A, B, C + 3AL, 3BL

Lower-Division Biology (Choose one quarter from the following courses)
Biology 9
Biology 21
Biology 10
Biology 11
Natural Science 1C
Natural Science 2E

Organic Chemistry (in the sophomore year)
Chemistry 140A, B or 143A (Laboratory)
or
Chemistry 141A, B, C and 143A (Laboratory)

Upper-Division Requirements

Warren College biology majors must complete a total of twelve upper-division biology courses. Six are required CORE courses and six electives may be chosen by the student. Additionally, students will be required to complete two minor areas outside the major.

Core Courses:

Biochemistry (105)
Genetics (101)
Molecular Biology (111 or 138)
Physiology (139 or 149A)
Population Biology (122, 172, or 173)

Upper-Division Laboratory (choose one of the following)
Biology 102
Biology 107L
Biology 112
Biology 119
Biology 149AL
Biology 152
Biology 161

Other Considerations:

Additional information on the Warren College biology program, including the suggested year-long sequence of lower-division courses for biology majors, 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 114 or 138) plus at least four courses from among:

FALL	WINTER	SPRING
Biology 151	Biology 123	Biology 112
Biology 156	Biology 125B	Biology 124
	Biology 127	Biology 125A
	Biology 147	Biology 145
		Biology 166

Genetics Concentration Area

Adviser: Dan L. Lindsley (Bonner Hall, Room 2230)

Program: Any core sequence but must include genetics (Biology 101R, 101M, or 101T), cell biology (Biology 114R, 114M, or 138), population biology (Biology 162, 172, or 173), and biochemistry laboratory (Biology 102). In addition five courses including at least one laboratory course (marked with *) chosen in consultation with the program adviser from among those listed below must be taken. Two quarters of Biology 220 may be substituted for one full course.

FALL	WINTER	SPRING
Biology 133	Biology 119*	Biology 124
Biology 162	Biology 123	Biology 125A
Biology 220	Biology 125B	Biology 137
Biology 227A	Biology 127	Biology 141
Math 80A	Biology 135	Biology 152*
Math 80B	Biology 173	Biology 172
	Biology 220	Biology 220
	Biology 227B	Math 80A
	Chemistry 122	Math 80B
	Math 80A	
	Math 80B	

Microbiology Concentration Area

Adviser: Willie C. Brown (Muir Biology Building, Room 4268)

Program: Any core plus:

FALL	WINTER	SPRING
Biology 157	Biology 158 Biology 107L	Biology 159

Plus three courses from the following list

Biology 126	Biology 127	Biology 152
S.O 287A†	Biology 135	SIO 287C*
	Biology 147	SIO 287D*
		SIO 291

*SIO 287C and SIO 287D offered alternate spring quarters.
†SIO 287A offered alternate fall quarters.

Population Biology Concentration Area

Adviser: Christopher J. Wills (Muir Biology Building, Room 3268)

Program: Any core plus:
Biology 173 plus:

FALL	WINTER	SPRING
Junior Year		
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
Biology 162	Biology 160	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 4256)
and, William B. Kristan
(Bonner Hall, Room 1309)

Program: Any core, but including one quarter of thermochemistry or physical chemistry, plus:

FALL	WINTER	SPRING
Junior Year		
Biology 129	Biology 139	Biology 166†
Senior Year		
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 Piñon (Bonner Hall, Room 2402)

Program: Third College core or equivalent, plus:

FALL	WINTER	SPRING
Biology 149A	Biology 146 Biology 149B	Biology 141

Plus three courses from among

Biology 129	Biology 137	Biology 145
Biology 137	Biology 147	Biology 153
Biology 149AL	Biology 149BL	Biology 159
	Biology 173	Biology 172

Some of these electives may be taken during the junior year.

Biochemistry Concentration Area

Adviser: Morris E. Friedkin (Basic Science Building, Room 4080)

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
	Chemistry 116	Biology 110
Chemistry 113	Chemistry 122	Biology 168
	SIO 281	Chemistry 117

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.

Close collaboration with members of the Department of Chemistry is a vital and stimulating aspect of the biology program. Additional strength and breadth in biology are 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 and Courses 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 Fish

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 Frank J. Rokop, Muir Biology Building, Room 2254.

Courses

Lower Division

The Department of Biology cooperates in the teaching and administration of the natural sciences sequence 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.")

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. *Not open to biology majors.* Corequisite: Chemistry 6A. (W)

6. The Chemistry and Genetics of Cells and Organisms (4)
For non-biology majors, an introduction to elementary chemistry, 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 adaption. *Not open to biology majors.* (F)

8. General Microbiology (4)
General principles of microbiology for nonbiology majors with emphasis on the cell biology of microorganisms and of the cells with which they interact in causing diseases of plants 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)

9. Principles of Biology (4)
An introduction to the general principles of modern biology with emphasis on the chemical and physical bases of living processes, including heredity, cell structure and function, differentiation, and levels of organization. Three hours lecture, one hour recitation. *Prerequisite: Chemistry 6A or equivalent. Biology or equivalent.*

10. Plant Biology (4)
Principles of plant anatomy, morphology, physiology, growth and development, including photosynthesis, roots, and reproduction and crops. Three hours lecture. *Prerequisite: Biology 9 or Biology 2 or equivalent.* (S)

11. Zoology (4)
Diversity in form and function of animals, including relationships, ecology, populations, and evolution. Three hours lecture. *Prerequisite: Biology 9 or Biology 2 or equivalent.* (F,W)

11L. Zoology Laboratory (2)
A laboratory course in animal biology. Four hours laboratory. *Prerequisite: Biology 11 or concurrent enrollment in Biology 11.* (W,S)

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.

At least four of these courses must be other than 195 and 199.

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) and Chemistry Instruction (Chem 195) majors may not take chemistry courses on a "Pass/Not Pass" basis. Chemistry 195 and Chemistry 199 must be taken on a "Pass/Not Pass" basis. 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
Junior Year		
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 or for 126 and 131 or for 127 and 132.

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
Junior Year		
(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**	
Senior Year		
(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 elect-ives 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 of complementary courses in physics, mathematics, AMES, or APIS.

Major Program in Chemistry for Chemical Physics Concentrators (Typical Program)

FALL	WINTER	SPRING
Junior Year		
Chemistry 130	Chemistry 131	Chemistry 132
Chemistry 141A	Chemistry 141B	
osics 110A	Physics 110B	Mathematics 110
Che 100A	or 100B	Chemistry 143C*
Chemistry 143A	Chemistry 105A	Chemistry 105B
Senior Year		
Chemistry 120A	Chemistry 120B	Chemistry 133
Chemistry 102A	Mathematics 120A	Mathematics 120B 133

*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
Junior Year		
ES 101	ES 103	ES 102
Chem 130	Chem 131	Chem 132
Chem 141A	Chem 141B	ES 120
Chem 143A (1/2)	Chem 105A (1/2)	Chem 105B (1/2)
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
Freshman Year*		
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)
Sophomore Year		
Physics 2A	Physics 2B	Physics 2C
Chemistry 140A**	Chemistry 140B**	Math 2D (Calculus)
Junior Year		
Chemistry 141A**		
Chemistry 143A	Chemistry 143B	
Chemistry 130***	Chemistry 131	Chemistry 132
Senior Year		
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 without 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. These may be any upper division courses in chemistry or related fields. At least four of these must be other than 195 and 199. 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
Freshman Year		
Chemistry 4A	Chemistry 4B	Chemistry 4C
Writing 10A	Writing 10B	Chemistry 4AL
Mathematics 2A	Mathematics 2B	Mathematics 2C
Minor*	Minor*	Minor*
		Elective**
Sophomore Year		
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. The physics or mathematics is to be selected to arrange it so that at least one of the minors can be started as early as possible.

**The student undecided among chemistry, biochemistry and biology should consider the above program with the addition of Biology 1 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.

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 mathematics at least through integral

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: gases, 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. *Prerequisite: 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 (4)
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.* (Satisfactory/Unsatisfactory grades 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 (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. (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 anti-cancer 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)

269. Biological and Biochemical Approaches to Cancer (2)
Invited speakers from outside the University as well as from the University will present lectures on current topics in the biology and chemistry of cancer; a separate session will be held weekly in which the instructor will meet with the students to discuss the significance and contents of the lecturer's talk. *Prerequisite: biochemistry or molecular biology course.* (W)

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 only.) 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 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 (i.e., existing political analysis of the societal context in which "La Raza" has sought to maintain and develop its culture). *Prerequisite: upper-division standing or 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 155Q. Colloquium in Mexican-American History (4)
This course will examine the historical literature concerned with the Mexican-American people in the United States. Specific topics of discussion will relate to migration, urbanization and assimilation of this population from the mid-nineteenth century to the present. *Prerequisite: upper-division standing and permission of instructor.*

Chicano Studies 198. Directed Group Study (4)
Directed group study on a topic or in a field not the subject of the regular academic curriculum by special arrangement with a faculty member. (P/NP grades only.) *Prerequisite: 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.) *Prerequisite: 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

Professors:
Thomas A. Metzger, Ph.D. *(History)*
Wai-Lim Yip, Ph.D. *(Literature)*

Associate Professors:
Matthew Y. Chen, Ph.D. *(Linguistics)*

access programming for special interest groups and local cablecasting. May be repeated two times. *Prerequisites: Communications 100E and consent of instructor.*

118. Television as a Social Force (4)

(Numbered 115 1978-79; 101C previous to 1978.)
Primarily a research and production course. Students undertake the research, design and production of a series of videotaped programs that serve some pressing social need. *Prerequisites: Communications 101B and consent of instructor.*

119. 8mm Film Workshop (4)

(Numbered 120 1978-79; 110 previous to 1978.)
An introduction to the practical and social aspects of 8mm film production. Basic camera, exposure and sound techniques are presented. Each student produces one or two short films during the course. A brief view of film literature. *Prerequisites: Communications 100E and consent of instructor.*

120. 16mm Film Workshop (4)

(Numbered 122 1978-79; 114 previous to 1978.)
Basic professional methods: crew and equipment operation techniques; double sound systems; multiple-track editing; etc. Students write and produce short films. *Prerequisites: Communications 119 and consent of instructor.*

Communication and Human Information Processing Courses

121. Literacy, Social Organization and the Individual (4)

This course will examine the historical growth of literacy from its earliest precursors in the Near East. The interrelation between literate technology and social organization and the impact of literacy on the individual will be twin foci of the course. Arriving at the modern era, the course will examine such questions as the impediments to teaching reading and writing skills to all normal children in technological societies and the relation between literacy and national development in the Third World. *Prerequisite: Communications 100C or consent of instructor.*

122A-B./Sociology 104A-B Communications and the Community (4)

This course will prepare students to conduct research in a variety of community settings on the institutional and media-derived patterns of communication that affect people's everyday lives. In the first quarter, students will review existing methods of obtaining information about community experiences and attitudes concerning language use, interaction with government institutions (such as schools, hospitals, government licensing agencies) and the mass media (radio, television, newspapers). The second quarter will be devoted to designing a study of communications as it affects some aspect of the community in interaction with important institutional settings for communications or the media. Techniques will include interviewing, participant observation, and experimentation. *Prerequisite: Communications 100C or consent of instructor.*

129./Psychology 171 Disorders of Communication (4)

(Numbered 164 1978-79)
This course is a survey of miscommunication, both verbal and nonverbal. It focuses on, although is not restricted to, forms of miscommunication that are labeled pathological, e.g., schizophrenia, aphasia, and childhood autism. Investigation of these problems takes several perspectives. Pathological forms of communication are discussed in communications theory, cognitive and behavioral science terms. Both the situational nature of communication disorders and their development within a given individual are discussed. In addition, a socio-historical perspective is taken on the development of prevailing concepts concerning pathological forms of communication. *Prerequisite: Communications 100C, or consent of instructor.*

131./Anthropology 118 Cognitive Anthropology (4)

This course will consider the relation between cultural behavior and cognitive processes. Selected topics from the fields of ethnoscience, semantic and grammatical analyses, decision-making, and belief systems will be discussed. *Prerequisite: Anthropology 22, Communications 100C or consent of instructor.*

132./Anthropology 172 Cultural Study of Interpersonal Behavior (4)

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. Video tape and other recording techniques will be employed. *Prerequisite: Anthropology 22, Communications 100C or consent of instructor.*

135./Psychology 101 Introduction to Developmental Psychology (4)

A lecture course on a variety of topics in the development of the child, including the development of perception, cognition, language and sex differences. *Prerequisite: Psychology 60, Communications 100C, or consent of instructor.*

136./Psychology 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: upper-division standing. Communications 100C or consent of instructor.*

137./Psychology 115 Laboratory in Cognitive Psychology (4)

Lecture and laboratory work in human information processing. *Prerequisites: Psychology 105, Communications 136, Psychology 111, Communications 100C and consent of instructor.*

138./Psychology 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. *Prerequisites: Psychology 101/Communications 135 or Psychology 105, Communications 136, Communications 100C or consent of instructor.*

139./Psychology 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, Communications 136, APIS 61, Communications 100C or consent of instructor.*

140./Psychology 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. *Prerequisite: Psychology 105/Communications 136, APIS 61, Communications 100C, or consent of instructor.*

142./Psychology 145 Psycholinguistics (4)

Presentation of the psychology of language, including its biological basis, the development in children, and its use by the adult. Of particular interest will be the question of the relevance of linguistic descriptions to psycholinguistics. *Prerequisite: Psychology 105/Communications 136 or Linguistics 1 and 2, Communications 100C or consent of instructor.*

Communication and Culture Courses

144. Language and Society (4)

(Numbered 140 1978-79; 132 previous to 1978.)
This course deals with the socio-economic forces affecting the evolution of standardization of language, bilingualism, diglossia and language maintenance. These processes are studied particularly in relation to the Spanish and English language in the USA. *Prerequisite: Communication 100B or consent of instructor.*

146./Psychology 146 Culture and Thought (4)

An examination of the major theories and relevant data concerning the way in which culturally organized experience influences the nature of thinking. Historical records, anthropological field reports and experiments will be examined for the senses in which they are relevant to understanding presumed relations between culture and thought. Particular emphasis will be placed on the kinds of conclusions that can be supported by different kinds of data, and the shifting meaning of basic terms, when one surveys different areas of research on this topic. *Prerequisite: Communications 100B or consent of instructor.*

151./Anthropology 125. Language and Culture (4)

This course explores language acquisition, idiolects, social dialects, levels of linguistic 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. *Prerequisite: Communications 100B or consent of instructor.*

152./Sociology 152. Myth 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. *Prerequisite: Communications 100B or consent of instructor.*

154./Sociology 103. Acquisition of Social Rules (4)

A 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. *Prerequisite: Sociology 1A,1B,2, Communications 100B, or consent of instructor.*

155./Sociology 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. *Prerequisite: Sociology 1A,1B,2, Communications 100B or consent of instructor.*

156./Sociology 116. 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 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. *Prerequisite: Sociology 1A,1B,2, Communications 100B or consent of instructor.*

157./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. *Prerequisite: Sociology 1A,1B,2, Communications 100B or consent of instructor.*

158./Sociology 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, communication agencies and markets for popular and high culture. *Prerequisite: Sociology 1A,1B,2, Communications 100B, or consent of instructor.*

159./Sociology 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. *Prerequisite: Sociology 1A,1B,2, Communications 100B, or consent of instructor.*

160./Sociology 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 discussion 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. *Prerequisite: Sociology 1A,1B,2, Communications 100B, or consent of instructor.*

Communications as a Social Force Courses

167A-B./Political Science 174A-B. Statistical Methods/Data Analysis (4)

(Numbered 165A,B 1978-79; 174 A,B previous to 1978.)
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. *Prerequisite: Communications, 100A or consent of instructor.*

168A-B./Political Science 107A-B. Voting, Campaigning and Elections (4)
(Numbered 170A,B 1978–79. 107A,B previous to 1978.)
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 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 is examined. *Prerequisite: Communications 100A or consent of instructor.*

169./Political Science 164. Political Consequences of Electoral Systems (4)
A comparative survey of the major dimensions of the electoral arrangements used in contemporary democratic states: the electoral formula (majority and plurality systems, the various forms of proportional representation, the semi-proportional systems), district size, and electoral thresholds. The effects of different electoral systems on party competition will be analyzed in terms of the relationships between votes and seats, the fragmentation or concentration of party systems, and the encouragement of electoral alliances. *Prerequisite: Communications 100A or consent of instructor.*

170./Political Science 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 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 seminal questions around which this course will be organized. *Prerequisite: Communications 100A and consent of instructor.*

171./Anthropology 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, Communications 100A or consent of instructor.*

172./Sociology 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 and language. *Prerequisite: Sociology 1A,1B,2, Communications 100A, or consent of instructor.*

173./Sociology 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 newspapers and television. It will also deal with how the news is constructed; 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. *Prerequisite: Sociology 1A,1B,2, Communications 100A, or consent of instructor.*

174./Sociology 105. Popular Culture (4)
An historical and comparative analysis of selected forms of the transmission of culture. The major emphasis will be directed toward the understanding of the leisure and artistic activities in contemporary mass societies. *Prerequisite: Sociology 1A, 1B, Communications 100A, or consent of instructor.*

175. Popular Communications (4)
An investigation of the relationship between mass communications and popular culture. Historical, esthetic, and political consideration of the evolution of popular expression 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. *Prerequisite: Communications 100A or consent of instructor.*

177. Comparative Systems of Propaganda (4)
Considers how variant ideologies and culture 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. *Prerequisite: Communications 100A or consent of instructor.*

178. Mass Communications: Theories, Perspectives and Methods (4)
Various sociological theories, methods and perspectives which have been adopted in studying mass communication. What is "mass" communication? Lenin and the Frankfurt school. Labelling and the media. Party, democracy in America and "press freedom." Park and Lippmann. Functionalism. The audience effects tradition. Uses and gratifications. Content analysis and semiology. *Prerequisite: Communications 100A or consent of instructor.*

180. Political Economy of Mass Communications (4)
The social, legal and economic forces affecting the evolution of mass communications institutions and structure in the industrialized world. The character and the dynamics of mass communications in the United States today. *Prerequisite: Communications 100A or consent of instructor.*

181. Political Economy of International Communications (4)
The character and forms of international communications. Emerging structures of international communications. The United States as the foremost international communicator. Differential impacts of the free flow of information and the unequal roles and needs of developed and developing economies in international communications. *Prerequisite: Communications 100A or consent of instructor.*

184. Media Analysis (4)
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. *Prerequisite: Communications 100A or consent of instructor.*

186. Film Industry (4)
A study of the social organization of the film industry throughout its history, addressing such questions as who makes films, by what criteria and for what audience. The changing relationships between studios, producers, directors, writers, actors, editors, censors, distributors, audience and subject matter of the films will be explored. *Prerequisite: Communications 100A or consent of instructor.*

189. Radio and Society (4)
The social and technological constraints and freedoms of sound broadcasting in the United States. Constrastive analysis of radio communications systems abroad and an examination of radio's potential as a community-oriented system. *Prerequisite: Communications 100A or consent of instructor.*

Specialized Courses

190. Integrative Seminar in Communications (4)
A major goal will be to assist the student in integrating information about communication phenomena which are ordinarily considered as discrete topics, showing how individual behavior and social phenomena interact, and how these interactions are conditioned by dominant means of communication. It will re-examine the fundamental issues to which students were exposed in the introductory course and in their core courses. These issues center on the ways in which the means of communication mediate human behavior at different levels of social interaction for different purposes. Each of the major means of communication — language, writing, print, radio, television and film — will be the subject of a two week long "sub-unit." For each sub-unit students will discuss the social conditions under which the medium arose in the course of human history and is used in the modern world, the key features of the process of communication in each medium and the consequences for society and the individual of some aspect of current social practices. *Prerequisite: senior communications majors who have completed the core courses.*

193. Advanced Topics in Communications (4)
Specialized study in 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.*

195. Instructional Assistance in Communications (4)
Observation and critique of classroom procedures and content. Assisting in the instruction of a lower-division undergraduate communications course under the supervision of a faculty member. May be taken twice for credit. Pass/Not Pass only. *Prerequisites: attendance in course in a previous quarter and a grade of B or better and consent of instructor.*

197. Field Internships in Communications (4)
Supervised experience in developing and implementing projects requiring participation and involvement in a communication media operation in the community. Projects may cover television, newspapers, radio and similar areas. May be taken three times for credit. Pass/Not Pass only. *Prerequisite: Communications 100A,B,C or consent of instructor.*

198. Directed Group Study in Communications M(4)
Directed group study on a topic or in a field not included in the regular curriculum by special arrangement with a faculty member. Pass/Not Pass only. May be taken three times for credit. *Prerequisites: Communications 100A,B,C and consent of instructor.*

199. Independent Study (4)
Independent study and research under the direction of a member of the staff. Pass/Not Pass only. May be taken three times for credit. *Prerequisites: Communications 100A,B,C and consent of instructor.*

Note: Communications 193 may be accepted in the major as an elective only by petition.

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
John L. Stewart, 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. J.L. Stewart

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 instructor and guests to the group. L. Ross

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.

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. L. Ross

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.* J.L. Stewart (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 ethnics. L. Ross (S)

Cultural Traditions

OFFICE: 2024 Humanities and Social Sciences Building, Muir College
John L. Stewart, Ph.D., *Director*

* * *

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.
Alan Schneider, M.A.
Arthur Wagner, Ph.D.

Associate Professors:
Mary Corrigan, M.A.
Frantisek Deak, Ph.D.
Luther James *(Acting)*

Assistant Professors:
Jorge Huerta, Ph.D.
Robert Israel, M.F.A.
Richard Riddell, 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

(Proposed changes in the drama major are pending approval. Please see the department for the major requirements.)

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: Comey
Drama 50 A,B,C. Elements of Production
Drama 135. The Art of Directing
One course in Dance/Movement
Three courses in dramatic literature/history/criticism

The remaining six required upper-division courses may be taken as electives. IN ADDITION, each student pursuing the drama major must participate in major productions two quarters each year by enrolling in Drama 101, 102, 103, 104 or 105, and must participate in the major seminar, Drama 193.

NOTE: As the drama program grows, there are necessary changes being developed in curriculum and theatre production modes. Students considering the drama major should be sure to consult with the departmental undergraduate adviser to determine the exact details of the major at the time.

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, design 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 teatros 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.* (Not offered in 1979-80.)

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 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.* (Not offered in 1979-80.)

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.* (Not offered in 1979-80.)

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 1979-80.)

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 construction, 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.*

uation. 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 the 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.

California junior college students may apply for the Education Abroad Program after one year of active enrollment at UC San Diego. Transfer students from other colleges and universities are eligibie if they have completed at least one quarter in the University of California at the time of selection.

Student Conduct and Parental Approval

It is anticipated that the students selected for the Education Abroad Program will be of high caliber, committed to profiting from both the intellectual and social aspects of the experience. Since they will be guests in another country and another university, their conduct will reflect on both the University of California and the United States. 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 facilitates 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, 1979 for USSR (spring semester); November 9, 1979 for Brazil and United Kingdom-Ireland; January 25, 1980 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 pro-

grams in engineering are offered at the University of California, San Diego. Details are to be found in the sections devoted to the sponsoring departments.

Applied Mechanics — see Applied Mechanics and Engineering Sciences
Bioengineering — see Applied Mechanics and Engineering Sciences
Chemical Engineering — see Applied Mechanics and Engineering Sciences
Computer Engineering — see Electrical Engineering and Computer Sciences
Electrical Engineering — see Electrical Engineering and Computer Sciences
Engineering Sciences — see Applied Mechanics and Engineering Sciences
Engineering Physics — see Electrical Engineering and Computer Sciences
Systems Science — see Applied Mechanics and Engineering Sciences

French Literature

See Literature

Frontiers of Science

OFFICE: 1512 Humanities Library Building, 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 underline 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.* (Not offered in 1979-80.)

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.

118. Metaphysics. (4)
Survival depends increasingly upon the understanding of the complementarity among many fields. This course aims to expand the student's perspectives and working knowledge of the interaction between the sciences and the humanities in ways that will reconcile conflicts of these disparate views.

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.

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.* (S)

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.

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.

132. Foods and Nutrition (4)
This course will be concerned with a broad look at the history of foods, their preservation and distribution. The understanding of food is but a precursor to understanding the fundamental biological basis of nutrition, which will include a study of the digestive and assimilative aspects of human metabolism as well as the necessary nutrients demanded by a human organism for proper growth and development. Both excesses and deficiencies of the various substances will be studied. A careful look at food fetishes, fads and fancies will be examined.

133. Dimensions of Consciousness (4)
Creatively spanning the realms of integrative brain research, this course surveys the biological, cultural, and psychological dimensions of consciousness. The course presents authorities from many institutions who will highlight the frontiers of neuroscience against a background of humanities and arts. Its interdisciplinary approach transcends traditional boundaries, reflecting the dimensions emergent from our study of the mind. A student organized presentation

134. Conservation — the Preservation of Endangered Species (4)
The preservation of endangered species will be considered from the perspectives of ecology, population genetics, and public policy. (F)

HISTORY

OFFICE: Room 5024 Humanities and Social Science Building, Muir College

Professors:

Stanley Chodorow, Ph.D.
H. Stuart Hughes, Ph.D.
*Gabriel Jackson, Ph.D.
**Thomas Metzger, Ph.D.
Allan Mitchell, Ph.D., *(Chairman)*
*Earl Pomeroy, Ph.D.
Armin Rappaport, Ph.D.
*Ramón Eduardo Ruiz, Ph.D.
†Harry N. Scheiber, Ph.D.
James R. Scobie, Ph.D.

Adjunct Professor:

Leften Stavrianos, Ph.D.

Associate Professors:

††Judith M. Hughes, Ph.D.
††Alden A. Mosshammer, Ph.D.
Michael E. Parrish, Ph.D.
Edward Reynolds, Ph.D.
David C. 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.
Kathryn Norberg, Ph.D.
Paul G. Pickowicz, Ph.D.
Ricardo Romo, Ph.D.
Emory J. Tolbert, Ph.D.
*Leave of Absence, 1979-80
†Leave of Absence, winter, spring 1980
††Leave of Absence, winter 1980
**Leave of Absence, fall, winter 1979-80
†††Leave of Absence, spring 1980

The Major Program

Students majoring in the Department of History are required to take (1) a three-quarter lower-division course 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. Students must maintain a C average in history courses to graduate in this major.

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).

History

or

Humanities 11A-11B-11C

or

Humanities 12A-12B-12C

FIELDS

1. Europe
2. Western Hemisphere (United States and Latin America)
3. Non-western 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 one of the remaining fields.

Students electing Economic and Social History as their principal field of concentration will fulfill a distribution requirement as follows:

I. 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 used to satisfy the five-quarter requirement above).

III. Three quarter-courses in social or economic history topics.

IV. Three quarter-courses which are not in economic and social history.

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 an adviser.

Honors

The department offers a special program for outstanding students. Candidates for history honors are chosen during the spring quarter 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 the 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 historiography offered in the fall quarter of the senior year and a program of independent study leading to the completion of an honors essay on a topic of the student's choice. During the fall quarter of the senior year candidates select a topic and begin preliminary work on the honors essay in consultation with a major field adviser (History 196A). During the winter quarter the student pursues a course of independent study devoted to the completion of the honors essay (History 196B). The award of history honors is based on satisfactory completion of the colloquium in history and the honors essay. Students must also maintain an average of 3.0 or better in all work taken within the department. Honors candidates must include at least three colloquia in their regular course work.

Candidates for history honors should organize their work as follows:

1. Six quarter-courses in one of the major fields offered by the department, of which two or three should be colloquia;
2. Three quarter-courses in a field other than the primary one, of which one course should be a colloquium unless the requirement of three colloquia has been satisfied in the major field;
3. History 196Q Colloquium in History;
4. History 196A-B History Honors-Honors Essay.

History 196A. History Honors
A program on 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
Independent study under the supervision of a faculty member, leading to the preparation of an honors essay.

History 196Q. Colloquium in History
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 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 master's degrees in the fields of modern European history, Latin American history, and United States history. The department also provides the opportunity for students to design special M.A. programs in areas such as Third World, African, Chinese, and other fields. (See details below.) Applicants must submit their academic record, letters of recommendation, Graduate Record Examination scores, and one or two papers written for history courses. Ordinarily those admitted have at least a 3.0 grade-point average, with somewhat better grades in history and related subjects. The program begins in the fall quarter. Students wishing information regarding the possibility of part-time M.A. study should contact the department's graduate secretary. The deadline for making application is January 15.

General Requirements:

Candidates for the master's degree finish the program in one academic year of full-time study. The program requires completion of thirty-six units, of which twenty must be in colloquia. Master's students may enroll in a research seminar with the permission of the instructor. In addition to course requirements, students must pass a comprehensive oral examination. Students in European, Latin American, and certain special areas must demonstrate reading knowledge of at least one foreign language relevant to their course work. A score of 600 or above on the Educational Testing Service language examination satisfies this requirement.

Students may, with permission of the graduate committee, elect to follow a two-year part-time program if they are unable to pursue a full-time course of study because of employment, family responsibility, etc. In either case, they must successfully complete a minimum of thirty-six units, of which at least twenty units must be in colloquia, and meet the general university residency requirement (which states that a student must take at least six units in each of three consecutive quarters). The part-time students are required to take sequential courses in a single year (i.e., 208ABC, 240ABC, 250ABC). Depending on the course offerings, a part-time student may also take the optional upper division courses in summer session. (This option is pending approval of the Graduate Council for 1979–80.)

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 (thirty-six units) is normally distributed as follows:

I. History 106Q-107Q-108Q. Central problems of European history: 1500-1715, 1715-1850, 1850-1945. All entering graduate students in European history take these courses.

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. [NOTE: 107Q may be used to satisfy the requirement for either early modern or modern European history. It may not be used twice.]

IV. A graduate seminar.

V. One course in a discipline other than history, if relevant to the student's program.

Area of Concentration: Latin America

Background in this world area prepares students 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 (thirty-six units) normally should be distributed as follows:

I. History 240A-B-C. Literature of Latin American History, required of all entering graduate students in Latin American history.

II. Four Latin American history courses, including graduate seminars if appropriate to the student's plan of work.

III. Two courses, related to Latin America and selected in consultation with the student's adviser, from other areas of history or from other disciplines.

Area of Concentration: United States

This area of concentration offers the master's student a broad grounding in the literature of American history from the colonial period to the present. In addition to a core of courses, students specialize in a topical field of their own choosing. Training in a related discipline outside of history is encouraged. The requirement of nine courses (thirty-six units) is distributed as follows:

I. History 250 A-B-C. The Literature of American History. These seminars are required of all entering graduate students in American history.

II. Two courses (eight units) in a single topical field — diplomatic, economic, social and ethnic (including urban) history, the American West, or legal and constitutional history.

III. Four additional courses (sixteen units) chosen in consultation with the student's departmental adviser. Two of these may be in a related field outside the department.

IV. At least five of the nine courses must be colloquia or graduate level courses. Students may take directed readings, research seminars, or the 250 series to meet this requirement.

Special M.A. Program

Students who wish to work in specific areas, such as African, pre-modern European, Chinese, or Third World history, can develop an M.A. program in conjunction with a faculty member specialized in that area and petition the department for admission and approval.

In addition to course requirements each student must pass a comprehensive oral examination and meet language requirements as specified by the specialized faculty member and approved by the graduate committee.

PH.D. PROGRAM

Admission:

The Department of History offers the Doctor of Philosophy degree in the fields of European history, United States history, and Latin American history.

Applicants for admission to these programs must submit their academic record, letters of recommendation, Graduate Record Examination scores, and one or two papers, preferably written for history courses. The minimum grade-point average for admission is 3.0, with a higher average in history and related subjects. Proficiency in a foreign language is not a requirement for admission, but the department urges prospective applicants to begin study of at least one foreign language relevant to the proposed area of concentration as early as possible in their academic careers. With very few exceptions, students are admitted to begin their programs in the fall quarter. The deadline for making application is January 15.

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 political history 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. LATIN AMERICA

A. Major Fields
   1. The national period of Latin America with a specialty in Argentina, Brazil, Cuba, Mexico, or socio-economic history.
   2. Colonial Latin 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 geographical area outside the United States
   2. A related discipline

The department also offers graduate work in African and Chinese history. When appropriate, students may select minor fields in these areas.

Language Requirements: Students satisfy the foreign language requirements by achieving a score of 600 or higher on the Educational Testing Service language examinations. In the few cases in which the ETS examination is not appropriate, the department will prepare a special language examination.

1. Students in European history must pass two foreign language examinations. The graduate committee must approve the choice of the two languages. Other languages may be required when necessary for dissertation research. Students in British history may petition for the reduction of the language requirement to one.
2. Students concentrating in Latin American history must pass one foreign language examination. A second language may be required when necessary for dissertation research.
3. Students in United States history need not pass a foreign language examination. When relevant, a thesis adviser in this field may require the passing of such an examination.

Students must complete at least one foreign language examination 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 Latin American history may not take the first minor field examination before completing one language requirement. No student may take the final oral examination before completing all language requirements.

Course Work:

Graduate work in the department is 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., but is burdened by outside employment or family responsibilities, may petition for a reduction of the course load to eight 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 an academic career, the Ph.D. candidate in history is expected to assist in courses given by the department. In most cases, such assistance requires teaching in an introductory course for undergraduates. Where circumstances make the opportunity for this activity unavailable, a student may participate in some special research program. Apprenticeship training, for which students earn regular academic credit, is an integral part of the graduate program at UC San Diego and, as such, constitutes a requirement for the Ph.D.

Examinations:

Ph.D. candidates must take at least one examination in the spring of their second year and must complete all examinations by January of their third year. Minor field examinations will be written; the major field examination will be oral. In each minor field, one professor will compose and grade the written examination, although advisory readings may be requested. Students should know at least three months in advance who the examiner will be. Minor field examiners may give an oral examination when the student's performance is in doubt.

Students who wish to delay completion of their examinations must petition the graduate committee for an exception. Normally, examinations will be given in November, January, and May. Students who fail an examination may petition the graduate committee for permission to stand for it again in the next scheduled examination period. A second failure entails automatic dismissal from the program.

In addition to the formal examination procedure, the department reviews the performance and progress of each student at the end of the first year of residence. The graduate committee will inform students of the results of this review.

An M.A. degree may be awarded to continuing Ph.D. students on one of the following bases:

1. Successful completion of the qualifying examinations for the Ph.D.
2. Completion of the course work equivalent to that required for the M.A. (including a graduate seminar) and an oral examination.

Note: Students who wish to receive an M.A. 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. The student will defend the thesis before the 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 successfully defend the thesis.

Lower Divison

The Department of History cooperates in the teaching and administration of the Humanities 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 Latin 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. Staff.

3A-B-C. European Society and Social Thoughts (4-4-4)
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 to and as provocations for social change in Europe. Staff.

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 also on the contemporary significance of those events. The first quarter traces the origins of the European empires, the relationship between imperialism and underdevelopment in the Third World, and the beginnings of indigenous resistance to imperialism. The second quarter describes the breakdown of imperial order in the nineteenth and twentieth centuries, placing special emphasis on the course of Third World revolutions. The last quarter 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. Staff.

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, Mexican-American, the Black, Asian-American, and White ethnic groups. Staff.

19A. The Greco Roman World (4)
An introductory study of the Greco-Roman world, its literature, myth, philosophy, history, and art. (Not offered in 1979-80.) Mosshammer.

31A-B. Environment and Man (4-4)
Interaction of man and the environment. Disease, geography, technology, and climate as determinants. Man's culture and impact on his ecological context from various past and present contexts. First quarter emphasizes historical, archaeological and anthropological record and social-science models of explanation. Second quarter emphasizes ethical positions and attitudes to environment, the possible uniqueness of the West and the environmental movement of the last century. Ringrose.

Upper Division

The prerequisite for admission to upper-division courses in history is one of the following:

1. *Completion of one of the lower-division sequences (History 31 counts for only two quarters under this requirement.)*
2. *Upper-division standing.*
3. *Permission of the instructor.*

100A. History & Archeology of Israel & Ancient Near East (4)
A general survey of Israel and the Ancient Near East from the patriarchal period to the Babylonian Exile, with special emphasis on Biblical archeology and historical geography. Urman.

100B. The Holy Land in Later Antiquity (4)
The social, political, and economic history of the Holy Land during the period of Persian, Greek, and Roman domination, with special attention to historical geography and to the results of recent archeological investigations of the region. (Not to be offered 1979-80.) Mosshammer.

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 1979-80.) Mosshammer.

101Q. Special Topics in Greek History (4)
See *Colloquia* below.

102A. The Roman Republic (4)
The social, political, and cultural history of the Roman world from the foundation of the city of Rome to the time of Julius Caesar and the civil wars between Antony and Octavian (753-27 B.C.). Lecture and discussion. Mosshammer.

102B. The Roman Empire (4)
The social, political, and cultural history of the Roman Empire from the time of Augustus to the death of Constantine (27 B.C. - A.D. 338). Lecture and discussion. (Not offered in 1979-80.) Mosshammer.

102Q. Special Topics in Roman History (4-4)
See *Colloquia* below.

103A-B. Medieval England (4-4)
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 1979-80.) Chodorow.

104A-B. The Rise of Europe (4-4)
The development of European society and culture from the decline of the Roman Empire to 1300. Chodorow.

104Q. Special Topics in Medieval History (4)
See *Colloquia* below.

105A-B. Renaissance Italy, 1348-1564 (4-4)
The intellectual, political and economic transformation of late-medieval Italy from the Plague to the Council of Trent. Marino.

105Q. Special Topics in Early Modern History (4)
See *Colloquia* below.

106A. Reformation Europe 1494-1598 (4)
The intellectual and social history of the reformation and counter-reformation movements from the French invasions to the Edict of Nantes. Emphasis is upon reform from below and reform from above, the transformation of grass-roots spirituality through institutional control. Marino.

106B. Northern European Renaissance 1500-1616 (4)
The intellectual, political, economic, and social transformation of northern Europe during the sixteenth century. Emphasis is upon the new monarchies and the state, the origin of capitalism, as well as humanism and culture in the North. Marino.

106Q. Central Problems in European History from 1500-1715 (4)
See *Colloquia* below.

107A-B-C. The Old Regime and the French Revolution. (4-4)
A lecture-discussion course on continental Europe from 1600-1815, examining the social, political, and cultural history of Europe from the Thirty Years War to the close of the French Revolution. 107A covers the seventeeth century. 107B covers the eighteenth century. 107C deals with the French Revolution. 107A is not a prerequisite for 107B. 107B is not a prerequisite for 107C. (107C will not be offered in 1979-80.) Norberg.

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. (Not offered in 1979-80.) Staff.

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. (Not offered in 1979-80.) Luft.

109Q. Special Topics in Twentieth Century European Social Thought (4)
See *Colloquia* below.

110A. Russian History from the 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 impact. May be taken without 110B. Edelman.

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. Edelman.

110Q. Lenin and the Russian Revolution (4)
See *Colloquia* below.

111A. Renaissance and Reformation England (4)
An examination of social, political and intellectual develop-

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.* Staff

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 1979-80.) Staff

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 1979-80.) Scheiber

261A-B. United States, Colonial Period (4-4)
Prerequisite: graduate standing. (Not offered in 1979-80.) Ritchie

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 1979-80) Parrish

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 1979-80.) Parrish

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.* (Not offered in 1979-80.) Pomeroy, Parrish

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 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 1979-80.) Rappaport

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.* (Not offered in 1979-80.) Reynolds

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.) Staff

299. Thesis Direction (1-12)
Independent work by graduate students engaged in research and writing of doctoral theses. *Prerequisite: graduate standing.* (Satisfactory/Unsatisfactory grades only.) Staff

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 only.) Staff

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.) Staff

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.* Satisfactory/Unsatisfactory grades only.) Staff

Humanities

Office: 1512 Humanities-Library Building, Revelle College

* * *

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).* (Not offered in 1979–80.)

*Humanities 2-3-4 and 5-6-7 were not offered after 1975–76.

**(Not offered in 1979–80.)

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 Department of Anthropology, Community Medicine, Drama, History, Literature, Political Science, Psychiatry, Scripps Institution of Oceanography, Sociology, 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.

	Course title	Department	Course No.	Faculty	Quarter
General	Language and Society	Comm.	Comm 140	Moll, L.	S
	Comparative History of the Americas	History	Hist 1A-B-C	Ringrose, D./ Scobie, J./Parrish, M.	FWS
	Cultural Traditions	History	Hist 1A-B-C	Ringrose/Staff	FWS
	Third World: Origins and Consequences of Underdevelopment	History	Hist 6C	Monteon, M.	S
	Fiction and Film in 20th-Century Societies	Literature	Lit/Gen 4B	Kirkpatrick	W
	Literature and History: Third World Major Themes and Ideas	Literature	Lit/Gen 8	Sánchez, M.	FWS
	Spanish Literature in Translation: Cervantes	Literature	Lit/Gen 144	TBA	TBA
	Spanish Language in U.S.	Literature	Lit/Sp 162	Sánchez, R.	TBA
	Language and Society	Literature	Lit/Sp 164	Sánchez, R.	TBA
	History of the Spanish Language	Literature	Lit/Sp 165	TBA	TBA
	Creative Writing	Literature	Lit/Sp 166	Sánchez, R.	TBA
	Literary Criticism	Literature	Lit/Sp 170	TBA	TBA
	Studies in Literature and Society	Literature	Lit/Sp 171	TBA	TBA
	Critical Theory	Literature	Lit/Co 271	TBA	TBA
	Literature and Society Studies	Literature	Lit/Sp 272	TBA	TBA
	Genre Studies	Literature	Lit/Co 274	TBA	TBA
	Sociology of Development	Sociology	Soc 130	McDaniel	S
	The Politics of Industrialization	Sociology	Soc 147	Waisman, C.	TBA
	Comparative Rural Societies	Sociology	Soc 170	Blumberg, R.	F
	Urban Underclass Around the World	Urban and Rural Studies	URS 159	Blumberg, R.	S
Chicano Culture	Bilingual Communication	Comm.	Comm 193	Moll, L.	W
	Indigenous Roots of Chicano Theater	Drama	Drama 14	Huerta, J.	TBA
	Introduction to Contemporary Chicano Theater	Drama	Drama 15	Huerta, J.	TBA
	The Development of Chicano Theater	Drama	Drama 137	Huerta, J.	FW
	Race and Ethnicity in U.S.	History	Hist 7C	Romo, R.	W
	Colloquium in Ethnicity	History	Hist 159Q	Romo, R.	F
	The Development of Chicano Literature	Literature	Lit/Sp 150	TBA	TBA
	Chicano Prose	Literature	Lit/Sp 152	TBA	TBA
	Chicano Poetry	Literature	Lit/Sp 153	TBA	TBA
	Chicano Literature: The Narrative	Literature	Lit/Sp 253	TBA	TBA
Iberia	Spain in the 18th Century	History	Hist 134Q	Ringrose , D.	F
	Readings and Interpretations	Literature	Lit/Sp 10	TBA	FWS
	Composition and Conversation	Literature	Lit/Sp 25	TBA	FWS
	Readings in Spanish Literature and Culture	Literature	Lit/Sp 50	Sánchez, M.	FWS
	Spain in Medieval Prose	Literature	Lit/Sp 101	Lacarra, M.	TBA
	Topics in Medieval Poetry	Literature	Lit/Sp 102	TBA	TBA
	Topics in Golden Age Poetry	Literature	Lit/Sp 111	TBA	TBA

	Topics in Golden Age Prose	Literature	Lit/Sp 115	TBA	TBA
	Golden Age Drama	Literature	Lit/Sp 117	TBA	TBA
	Cervantes	Literature	Lit/Sp 119	TBA	TBA
	Major Works in the Modern Period	Literature	Lit/Sp 120	TBA	TBA
	The Romantic Movement	Literature	Lit/Sp 122	Kirkpatrick, S.	TBA
	The Generation of 98	Literature	Lit/Sp 125	TBA	TBA
	Modern Drama	Literature	Lit/Sp 127	TBA	TBA
	Modern Poetry	Literature	Lit/Sp 128	TBA	TBA
	Studies in Medieval Literature	Literature	Lit/Sp 214	TBA	TBA
	Golden Age Studies	Literature	Lit/Sp 224	TBA	TBA
	Studies in Modern Hispanic Literature and Culture	Literature	Lit/Sp 252	TBA	TBA
	The Modern Spanish Novel	Literature	Lit/Sp 255	TBA	TBA
	Research Practicum (in Madrid)	Literature	Lit/Sp 296	Catalán, D.	FWS
	Urban Sociology: Urban Folk Ways	Sociology	Soc 184	Graña, C.	W
Latin America	Topics in Latin-American History Since 1910	History	Hist 147Q	Monteon, M.	F
	The Urban Culture of South America, 1830-1920	History	Hist 148A	Monteon, M.	W
	Literature of Latin American History	History	Hist 240	Scobie, J.	W
	Mexican Literature	Literature	Lit/Sp 135	TBA	TBA
	Caribbean Literature	Literature	Lit/Sp 137	TBA	TBA
	Spanish-American Novel	Literature	Lit/Sp 140	TBA	TBA
	Spanish-American Poetry	Literature	Lit/Sp 141	TBA	TBA
	Spanish-American Short Story	Literature	Lit/Sp 142	TBA	TBA
	Spanish-American Essay	Literature	Lit/Sp 143	TBA	TBA
	Spanish-American Theater	Literature	Lit/Sp 144	TBA	TBA
	Spanish Language in America	Literature	Lit/Sp 163	Sánchez, R.	TBA
	Spanish-American Prose	Literature	Lit/Sp 258	TBA	TBA
	Spanish-American Poetry	Literature	Lit/Sp 259	TBA	TBA
	Politics and Society in Latin America	Sociology	Soc 164/290	Waisman, C.	TBA

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:

I. Within the Classical Studies Program, students may pursue a major concentrating upon Hebrew/Biblical courses offered in the Departments of Literature, History, and Philosophy.

II. Within the General Literature major in the Department of Literature, students may concentrate on Judaic Literature or on a combined program of Judaic and Classical Literature.

III. Special project majors in Revelle and Muir Colleges allow for a major in Judaic Studies.

In addition, Revelle and Muir Colleges have non-contiguous minors in Judaic studies; Warren 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.

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 Tradition (4)

Anthropology 169. Israeli Society (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)

Political Science 145. The Middle East in World Affairs (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 should consult the following chart to determine in which course to enroll.

Course	Previous Study
Language 1	none or junior high only or 1 year high school
Language 2	*2 years in high school; or 1 semester in college
Language 3	new students are not enrolled in Language 3
Language 4, 5, 6	3-4 years in high school; or 2-3 semesters in college
Literature 10	Language 4, 5 and 6 or Basic Language Program proficiency
Literature 25	Literature 10
Literature 15, 24	Literature 10 (native speakers)
Literature 50	Literature 10 or Basic Language Program proficiency

*Students with two years in high school (or 1 semester in college) cannot enroll in Language 1 courses in the fall quarter. Any exceptions require permission of the instructor; students not having special permission will be automatically dropped from the course. All students with two years of high school (or one semester of college) language will enroll in Language 2 in the winter quarter. However, exceptional language students with two years of high school (or one year of college) language may enroll in the fall quarter in Language 4.

Courses numbered 1-2-3-4-5-6 may not be taken for Pass/Not Pass.

Classes may not be added beyond the first week of instruction.

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.

With departmental approval students enrolled in Language 4, 5, or 6 may also enroll in Literature 10 courses.

*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.

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 Chinese (4)
Basic grammar and usage with initial emphasis on the spoken language. The written language will be progressively incorporated.

Lang/Ch 62. Elementary Chinese (4)
Continuation of Lang Ch 61. *Prerequisite: Lang Ch 61 or equivalent.*

Lang/Ch 63. Elementary Chinese (4)
Continuation of Lang Ch 62. *Prerequisite: Lang Ch 62 or equivalent.*

Lang/Ch 64. Intermediate Chinese (4)
Grammar, conversation, reading, and writing in Chinese. Continuation of Lang Ch 63. *Prerequisite: Lang Ch 63 or equivalent.*

Lang/Ch 65. Intermediate Chinese (4)
Continuation of work begun in Lang Ch 64. Intermediate Chinese. *Prerequisite: Lang Ch 64 or equivalent.*

Lang/Ch 66. Intermediate Chinese (4)
Continuation of work in Lang Ch 64. Intermediate Chinese. *Prerequisite: Lang Ch 65 or equivalent.*

Lang/Ch 167. Advanced Chinese (4)
Advanced conversation, reading, and writing in Chinese.

Continuation of Lang Ch 66. *Prerequisite: Lang Ch 66 or equivalent.*

Lang/Ch 168. Advanced Chinese (4)
Advanced conversation, reading, and writing in Chinese. Continuation of Lang Ch 167. *Prerequisite: Lang Ch 167 or equivalent.*

Lang/Ch 169. Advanced Chinese (4)
Advanced conversation, reading, and writing in Chinese. Contintuation of Lang Ch 169. *Prerequisite: Lang Ch 168 or equivalent.*

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 (4-4-4-4-4-4)
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 (4-4-4-4-4-4)
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

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/Lt. 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 (4-4-4-4-4-4)
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 (Iraqui), 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.

Law and Society

OFFICE: Provost, Revelle College

These courses may be used in partial fulfillment of the Revelle College Social Science Requirement.

Courses

26. Culture, Structure, and Thought (4)
This course will explore, first, the way lawyers, judges, and other professionals think and work, chiefly with reference to American law; second, how people in society (the public) think about law, and behave in reference to it. Special emphasis will be placed on legal culture, including legal reasoning, and on how social forces mold the law.

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 traditional 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 computer programming. 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. Because linguistics shares its object matter — language — with so many other disciplines, this major is unlike many others in that it

does not require that all courses be taken in the major department itself. The major in linguistics will consist of twelve upper-division courses: eight courses in the Department of Linguistics, complemented by four other courses in linguistics or from other departments, directly related to the study of language. (Of the twelve courses, a minimum of six linguistics courses must be taken in residence.) Linguistics 1 is a prerequisite for all upper-division courses.

Linguistics 101A, 101B, 102A, and 102B are required of all majors and will count as part of the minimum eight courses within linguistics proper.

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, except Linguistics 198 or 199.

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 successful completion (with grades of C 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 or project, and with the consent of the instructor and the adviser, linguistics majors with at least a 3.5 GPA in the major courses may request permission to undertake directed group study in linguistics (Linguistics 198) or independent study in linguistics (Linguistics 199). No more than one such course (to be taken Pass/Not Pass) may count toward the major. (Linguistics 198 or 199 will not qualify as one of the minimum eight courses in linguistics proper, but may satisfy one of the four additional courses.)

The Revelle College Major Program

1. Language Requirements I and II.
2. Eight upper-division courses in linguistics.
3. Four additional upper-division courses related to the study of language. These four courses may be taken in departments other than linguistics: for instance, the Departments of Mathematics, Applied Physics and Information Science, Philosophy, Psychology, Anthropology, Sociology, Communications, 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 College Minor Program

The linguistics minor consists of six courses, Linguistics 1, 101A, 102A, and one additional upper-division course in linguistics. The two remaining minor courses must be upper-division courses 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, Communications, 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. Eight upper-division courses in linguistics.
3. Four additional upper-division courses from linguistics and/or from other departments but relevant to the study of language.
4. Majors must take at least one course relevant to the study of language, not necessarily upper-division, from each of three areas: formal, social science, and humanities; for instance, the Departments of Mathematics, Applied Physics and Information Science, and Philosophy (formal); the Departments of Anthropology, Communications, Psychology, and Sociology (social sciences); the Departments of History and Literature (humanities). These courses should be selected in consultation with the linguistics adviser. Upper-division courses may simultaneously satisfy 3 and 4.

The Muir College Minor Program

The linguistics minor consists of six courses: Linguistics 1, 101A, 101B, 102A, and 102B, plus one additional upper-division course in linguistics.

The Third College Major Program

1. Language Requirements I and II.
2. Eight upper-division courses in linguistics.
3. Four additional upper-division courses from linguistics and/or from other departments but relevant to the study of language.
4. Majors must take at least one course relevant to the study of language, not necessarily upper-division, from each of three areas: formal, social science, and humanities; for instance, the Departments of Mathematics, Applied Physics and Information Science, and Philosophy (formal); the Departments of Anthropology, Communications, Psychology, and Sociology (social sciences); the Departments of History, and Literature (humanities). These courses should be selected in consultation with the linguistics adviser. Upper-division courses may simultaneously satisfy 3 and 4.

The Third College Minor Program

The linguistics minor consists of six courses: Linguistics 1, 101A, 101B, 102A, and 102B, plus one additional upper-division course in linguistics.

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 requirements 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 pro-

vide directed experience in writing prose fiction and non-fiction, drama and poetry, as well as intensive work in practical criticism. An indispensible feature of the program is that it involves students with the work of their peers. Those who think of themselves as writers will find courses regularly offered in the various genres to develop their own style and breadth of experience in composing and criticism. Those who are primarily interested in literary scholarship and in the teaching of writing will find the major both a context for writing extensively and for dealing critically with the act of written composition. Note that both lower and upper-division requirements for the writing major differ from those for other primary concentrations in the Department of Literature. The major consists of:

1. A lower-division creative writing course.
2. Any 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 Literature courses. Of these six courses, four must be upper-division courses, and three must be given substantially in a language other than English; at least one of these three must be an upper-division course. 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 166), as well as such upper-division language courses as Spanish Language in the United States (Lit/Sp 162). See the heading "Secondary Literature" above for detailed information on which lower-division courses may be used to meet this foreign language requirement.
   C. Upper-division electives chosen from Literature Department offerings to make a total of twelve upper-division courses.
4. 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/Sp 164 (Language and Society) and Lit/Sp 163 (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, the minors require six courses; at least three of the courses must be upper-division. Lower-division courses that are applicable toward the individual minors are listed below. In the case of Chinese, Classical Greek, Hebrew, Italian, and Latin, two of the courses may be tutorials. Students should consult a departmental adviser.

Lower-division courses applicable toward minors (Warren College minors should check individual college requirements):

English/American — Lit/En 21, 22, 23, 24
French — Two quarters of Lit/Fr 50; one quarter of Lit/Fr 25
German — Lit/Ge 15, 25, 51, 52, 53
Greek — Lit/Gk 1, 2
Hebrew — Lit/Heb 3, 51, 52
Italian — Lit/It 1, 2
Latin — Lit/La 1, 2
Russian — Two quarters of Lit/Ru 50; one quarter of Lit/Ru 25
Literature and Society — Lit/Gen 8A-B-C, Lit/Fr 50, Lit/Sp 50
Spanish — Two quarters of Lit/Sp 50; one quarter of Lit/Sp 25

General Minor — Any six literature courses. There must be three upper-division courses.

Writing Minor — Six upper-division courses chosen from Lit/Writing courses 110 through 150 and demonstrating range across at least two genres. Lit/Writing 194 and 195 may constitute two of the six courses required for the minor.

The Graduate Program

Doctoral Degree Program

Doctoral programs are offered in English and American literature, French literature, German literature, Spanish literature, and comparative literature. Students in the doctoral program may 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

Lit/Fr 25. Composition and Conversation (4)
A course designed for students who wish to improve their ability to speak and write French. *Prerequisite: Literature 10 or consent of instructor.*

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: Literature 10, Basic Language Program proficiency or consent of instructor.*

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.

110A The Modern Period

110B XVIIth and XVIIIth Centuries

110C Medieval and Renaissance

(The chronological order is reversed in order to reduce difficulties.)

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.

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.

Lit/Fr 122. Seventeenth Century (4)
Major literary works of the seventeenth century.

"Mémoires et Histoires" du XVIIIème. Le passé comme citation rhétorique et politique, la légende comme erreur combattue par l'érudition; le temps, comme interrogation théorique sur la décadence ou le progrès.

Lit/Fr 123. Eighteenth Century (4)
Major literary works and problems of the eighteenth century. (Not offered in 1979–80.)

Lit/Fr 124. Nineteenth Century (4)
Major literary works of the nineteenth century.

Flaubert

Lit/Fr 125. Twentieth Century (4)
Major literary works and problems of the twentieth century. (Not offered in 1979–80.)

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.

Lit/Fr 129. African Literature of French Expression (4)
(Not offered in 1979–80.)

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.*

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.

Voltaire: La prise du pouvoir du Vraisemblable.

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.

La voix dans le texte. Escriture et Oralité.

Famous Lovers. Héloise et Abélard, Le Roman de la Rose, etc.

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.*

Une littérature juridique et médicale dans les récits de voyage français du XVIeme au XVIIIème. Relations d'une science du corps social et d'une science du corps individuel.

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.*

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.*

Graduate

Lit/Fr 211. Introduction to Old French Language and Literature (4)
An introduction to the reading of Old French, and a study of the medieval period through original texts.

Lit/Fr 221. Sixteenth-Century French Literature (4)
(Not offered in 1979–80.)

Lit/Fr 224. Seventeenth-Century French Literature (4)
Consideration of one or more major figures, texts, or trends in seventeenth century French Literature.

Un discours amoureux: Logiques de la passion et théâtre du corps chez les mystiques français du XVIIIème.

Eighteenth-Century Studies.

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.

1830–40 in French: Readings of Balzac, Stendhal, L. Blanc, Cabet, Blanqui, Heine.

Lit/Fr 251. Twentieth-Century French Literature (4)
Selected topics in modern French literature and thought. (Not offered in 1979–80.)

Lit/Fr 296. Research Practicum (1-12)
Laboratory research on special topics under the direction of individual faculty members. Can be taken by individual or small groups. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.)

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.)

Lit/Fr 298. Special Projects (4)
Treatment of a special topic in French literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.)

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.)

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 or completion of Language 4, 5 or 6 with grade of B or better. If at any point in the linguistic sequence the student 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.

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.*

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

52. Classicism and Romanticism: Eighteenth and Nineteenth Centuries

53. The Twentieth Century

54. Baroque and Enlightenment (Not offered in 1979–80.)

Upper Division

Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

Lit/Ge 101. German Literary Prose (4)
The development of major forms and modes of German literary prose.

Fairy Tale

Lit/Ge 102. German Dramatic Literature (4)
(Not offered in 1979–80.)

Lit/Ge 103. German Poetry (4)
(Not offered in 1979–80.)

Lit/Ge 123. Eighteenth Century German Literature (4)
(Not offered in 1979–80.)

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.

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.

Lied

"New Subjectivity," "New Irrationalism": Trends of the Late Seventies

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.

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.

Lit/Ge 190. Seminars (4)
(Not offered in 1979–80.)

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.*

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.*

Graduate

Lit/Ge 202. Methods and Tools of Research (4)
(Not offered in 1979–80.)

Lit/Ge 203. Cultural History of the German Language (4)
(Not offered in 1979–80.)

Lit/Ge 210A-B. Middle High German (4-4)
(Not offered in 1979–80.)

Lit/Ge 221. Middle High German Classicism (4)
(Not offered in 1979–80.)

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.

Lit/Ge 238. Goethe (4)
(Not offered in 1979–80.)

Lit/Ge 241. German Romantic Prose (4)
A study of the critical and poetic works of major romantic writers with special attention to romantic poetology.

Lit/Ge 242. Nineteenth-Century German Liteature (4)
Consideration of one or more major figures, texts, or trends in nineteenth century German literature.

Lit/Ge 251. The Twentieth Century (4)
A study of the structural, philosophical and social aspects of twentieth-century German literature.

Decadence

Romanticism

Lit/Ge 252. Major German Authors (4)
A study in depth of the work of one major German author.

Brencht

Lit/Ge 271. Theory of Genres (4)
(Not offered in 1979–80.)

Lit/Ge 272. Genres, Trends and Forms (4)
Seminars on literary genres, trends, movements, schools and on aspects of literary forms and structures in any given era or over a certain period of time.

Lit/Ge 273. Literature and Art (4)
An investigation into themes and styles common to literature and visual arts.

Lit/Ge 296. Research Practicum (1-12)
Laboratory research on special topics under the direction of individual faculty members. Can be taken by individual or small groups. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.)

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.)

Lit/Ge 298. Special Projects (4)
Treatment of a special topic in German literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.)

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.)

Greek Literature

Lower Division

Lit/Gr. 1. Beginning Greek (4)
Fundamentals of Greek grammar, exercises in vocabulary and accidence in reading.

Lit/Gr. 2. Intermediate Greek (4)
Continuing instruction in Greek grammar, with reading of single texts. *Prerequisite: Lit. Gr. 1 or equivalent.*

Upper Division

Prerequisite: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

Lit/Gr. 100. Introduction to Greek Literature (4)
Reading and discussion of selections from representative authors. Review of grammar as needed. *Prerequisite: Lit. Gr. 2 or equivalent.*

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.*

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.*

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.*

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.)

Lit/Gr. 298. Special Projects (4)
Treatment of a special topic in Greek literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.)

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.

Lit/He 2. Intermediate Hebrew (4)
Continuing instruction in Hebrew grammar, with reading of basic texts. *Prerequisite: Lit/He 1 or equivalent.*

Lit/He 3. Intermediate Hebrew, Continued (4)
Continuing instruction in Hebrew grammar, with reading of basic texts. *Prerequisite: Lit/He 2 or equivalent.*

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.*

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.

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.

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.

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.

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 archaeological data; consideration of theological issues.

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.

Lit/He 126. The Modern Period (4)
Selected topics in modern Hebrew literature.

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.*

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.*

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.*

Italian Literature

Lower Division

Lit/It 1. Beginning Italian (4)
Fundamentals of Italian grammar, exercises in vocabulary and accidence and in reading.

Lit/It 2. Intermediate Italian (4)
Continuing instruction in Italian grammar, with reading of simple texts.

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.

Lit/It 101. Advanced Readings and Conversation in Italian Literature (4)
(Not offered in 1979–80.)

of poetic style, and the significance of the poetry to the historical context.

Sp 142. Spanish American Short Story (4)
Readings and interpretation of short story form in Latin America. Focus is primarily nineteenth or twentieth century.

Sp 143. Spanish American Essay (4)
A study of the essay in Spanish-American literature from either an historical or a topical point of view.

Sp 144. Spanish American Theatre (4)
This course studies the representative plays of the major dramatists of Latin America. Discusses and analyzes the dramatic works in light of their historical, social and cultural background. Considers their contribution to the development of a theatrical tradition in Latin America.

Sp 150. The Development of Chicano Literature (4)
A cross-genre survey of the major works in Chicano literature from its beginnings to the present, with primary emphasis on contemporary works. This course may be offered in English.

Sp 151. Themes and Motifs in Chicano Literature (4)
This course is organized around some of the significant themes and ideas expressed in specific Chicano writings. The importance of these themes to particular Chicano experience is considered.

Sp 152. Chicano Prose (4)
A study of the different genres of Chicano prose: essay, novel, short story, autobiography. Attention is given to the development of Chicano prose styles and the historical and cultural movement in which these forms develop.

Sp 153. Chicano Poetry (4)
The analysis and discussion of the major forms and modes of Chicano poetry, with primary emphasis on the developing styles of the poets and on the study of the texts' and the authors' historical moment.

Sp 154. Chicano Theatre (4)
This course provides students with a meaningful definition of Chicano theatre through the discussion and interpretation of major dramatic works, both past and present.

Sp 155. The Social Aspects of Chicano Literature (4)
This course examines and analyzes some specific relationships between Chicano literature and the social unit, such as the role that the Chicano and non-Chicano publishing company plays in the history of Chicano literature, both past and present.

Sp 160. Spanish 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.

Sp 161. Spanish Syntax and Morphology (4)
An analysis of Spanish syntax and morphology to increase the student's ability to speak and write Spanish.

Sp 162. Spanish Language in the United States (4)
A socio-linguistic study of the popular dialects in the U.S.A. and their relation to other Latin American dialects. The course will cover phonological and syntactic differences between the dialects as well as the influence of English on the Southwest dialects.

Sp 163. Spanish Language in America (4)
A study of the history, structure and peculiarities of the Spanish language in Latin America with selected readings from Latin American authors utilizing these dialects within their works.

Sp 164. Language and Society (4)
A comparison of language policy in Latin American and that of other Third World countries and its reflection in literature.

Sp 165. History of the Spanish Language (4)
Historical description of Spanish phonology, morphology and syntax based on readings of the different periods.

Sp 166. Creative Writing (4)
A workshop designed to foster and encourage writing in Spanish of students working on short forms of fiction. The workshop will include discussion of techniques and intensive writing.

Sp 170. Literary Criticism (4)
Major contemporary critical theories and the question of their applicability to contemporary Latin-American, Peninsular Spanish and/or Chicano literature.

Sp 171. Studies in Literature and Society (4)
Focus on interaction between literary expression and the study of society, covering issues such as the sociology of literature, the historical novel, literature and social change, the writer as intellectual.

Sp 172. Indigenista Themes in Spanish-American Literature (4)
Study of the varying literary modes during the nineteenth and twentieth centuries by which poets and narrators have interpreted the themes of Andean survival in Latin-America, primarily in Mexico and the Andean Highlands.

Sp 173. Problems in Spanish and Spanish-American Literary History (4)
Study of the issues involved in understanding the development process of literary expression; the problem of genre; the relation of literature to social institutions; the function of literary influence and tradition; the relation of popular and print cultures.

Sp 175. Themes in Brazilian Literature (4)
Consideration of selected writers, texts or problems in Brazilian literature.

Lit/Sp 190. Seminars (4)
(Not offered in 1979/80.)

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.*

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.*

Graduate

Lit/Sp 201. Reading Medieval Texts (4)
Introduction to the reading of medieval Spanish. It will provide the student with the linguistic and cultural background necessary to go on to more work in depth in the medieval field.

Lit/Sp 202. Spanish Language in America. (4)
Selected topics on the history, structure and peculiarities of the Spanish language in America.

Lit/Sp 203. History of the Spanish Language (4)
Readings and discussions in the monographic literature of a selected topic.

Lit/Sp 208. Textual Criticism in Spanish (4)
Tools and methods of scholarly research in literature for establishing texts from both manuscript and printed sources.

Lit/Sp 214. Studies in Medieval Literature (4)
Consideration of one or more major figures, texts, trends or problems in medieval Spanish literature.

Lit/Sp 216. Fifteenth-Century Spanish Literature and Culture (4)
Consideration of one or more major figures, texts, trends or problems in fifteenth century Spanish literature.

Lit/Sp 224. Golden Age Studies (4)
Consideration of one or more major figures, texts, trends, or problems in Spanish Golden Age studies.

Lit/Sp 226. Cervantes (4)
A critical reading of the "Quijote."

Lit/Sp 231. Eighteenth-Century Spanish Literature (4)
Consideration of one or more major figures, texts, trends, or problems in eighteenth-century Spanish literature.

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.

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.

Lit/Sp 254. Modern Spanish Poetry (4)
A historical approach to modern Spanish poetry.

Lit/Sp 255. The Modern Spanish Novel (4)
A historical approach to the modern Spanish novel.

Lit/Sp 258. Spanish-American Prose (4)
Consideration of one or more major figures, texts, trends, or problems in Spanish-American prose.

Lit/Sp 259. Spanish-American Poetry (4)
Consideration of one or more major figures, texts, trends, or problems in Spanish-American poetry.

Lit/Sp 271. Literary Theory (4)
Problems and approaches to literary theory in the context of Spanish and Spanish-American literature.

Lit/Sp 272. Literature and Society Studies (4)
Special topics in practical criticism involving social and economic historical perspectives.

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.

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.

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.)

Lit/Sp 298. Special Projects (4)
Treatment of a special topic in Spanish literature. Offered for repeated registration. (Satisfactory/Unsatisfactory grades only.)

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.)

Writing/Literature

Lit/Writing 10A-B-C. Composition (4)
(Not offered in 1979-80.)

Lit/Writing 110. Expository Writing (4)
Intensive practice in the various forms of expository writing.

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.

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.

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.

Lit/Writing 126. Personal Narrative (4)
A workshop designed to foster and encourage regular writing in personal narrative forms; discussion and scrutiny of student work.

Lit/Writing 130. Poetry (4)
A workshop designed to foster and encourage the writing of poetry, discussion and scrutiny of student work.

Lit/Writing 140. Drama (4)
A workshop designed to foster and encourage regular writing in various dramatic forms, discussion and scrutiny of student work.

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.

Lit/Writing 195. Apprentice Teaching of Writing (0 and 4)
Emphasis on practical aspects of teaching, but students will also conduct a seminar on the principles of teaching in these areas, practical use of classic notions of rhetoric, settling practical and individualized goals for each student and separating the single writing task into stages. No more than two tutoring courses may be counted toward the literature major. May be repeated for credit two times. (P/NP grades only.)

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.*

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.*

Studens 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 166. Creative Writing

Third College Composition Program 109. Research Writing

Mathematics

OFFICE: 7313 Applied Physics and Mathematics Building, Muir College

Professors:
Donald W. Anderson, Ph.D.
Edward A. Bender, Ph.D.
Errett A. Bishop, Ph.D.
John W. Evans, M.D., Ph.D.
Jay P. Fillmore, Ph.D.
Carl H. FitzGerald, 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.
Richard A. Olshen, Ph.D.
Eric Reissner, Ph.D.
Burton Rodin, Ph.D., *Chairman*
Helmut Röhrl, 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:
James R. Bunch, Ph.D.
Thomas J. Enright, Ph.D.
James P. Lin, Ph.D.
Alfred B. Manaster, Ph.D.
John A. Rice, 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.
Ronald J. Evans, Ph.D.
Michael H. Freedman, Ph.D.
Leonard R. Haff, Ph.D.
Jeffrey B. Remmel, 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.

* * *

James A. Koziol, Ph.D., *Associate Adjunct Professor*

* * *

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 4B and 4C are separate courses for students with weak backgrounds in high school mathematics. Mathematics 4B is algebra. Mathematics 4C is trigonometry.

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

The requirements for a minor in mathematics vary with the major and the college. Students should discuss the requirements with their college and major advisers.

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-

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, Ferman'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,S)

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-Louiville 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.

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.* (W,S)

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.* (W)

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.* (S)

140A-B-C. Foundations of Analysis (4-4-4)
Axioms, the real number system, topology of the real line, metric spaces, continuous functions, sequences of functions, differentiation, Riemann-Stieltjes integration, partial differentiation, multiple integration, Jacobians. Additional topics at the discretion of the instructor: power series, Fourier series, successive approximations 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.* (W,S)

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. Simplexes, Sperner lemma, Brouwer fixed-point theorem, linear programming, duality. Constrained maxima, Kuhn-Tucker theorem, mathematical programming. Three lectures. *Prerequisites: Mathematics 2C-D-E.* (F,W)

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, queuing 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 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. Metrizability. 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. *Prerequisite: Mathematics 100A-B-C or consent of instructor.* (F,W,S)

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. *Prerequisite: Mathematics 200A-B-C or consent of the instructor.* (F,W,S)

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. *Prerequisite: Mathematics 103A-B or Mathematics 100A-B.* (W,S)

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.* (W,S) (203C is not offered in 1979-80.)

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, Tchebotarev 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 of the partition function. *Prerequisite: consent of instructor.* (F) (204B-C are not offered in 1979-80.)

207A-B-C. Topics in Algebra (3-3-3)
In recent years, topics have included number theory, commutative algebra, non-communitative rings, homological algebra, and Lie groups. May be repeated for credit with

consent of adviser. *Prerequisite: consent of instructor.* (Not offered in 1979-80.)

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 Lp 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 1979-80.)

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. *Prerequisite: Mathematics 241A-B-C, or consent of instructor.* (F,W,S)

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.* (Not offered in 1979-80.)

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. *Prerequisite: Mathematics 140A-B, or consent of instructor.* (F,W,S)

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 1979-80.)

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.* (Not offered in 1979-80.)

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 1979-80.)

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 arabolic systems, boundary value problems for elliptic systems. Green's function, eigenvalue problems, perturbation theory. *Prerequisite: Mathematics 132A-B, or consent of instructor.* (Not offered in 1979-80.)

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. *Prerequisite: Mathematics 240A-B-C, or Mathematics 10A-B-C.* (Not offered in 1979-80.)

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.) (S)

237A-B-C. Topics in Differential Equations (3-3-3)
May be repeated for credit with consent of adviser. *Prerequisite: consent of instructor.* (Not offered in 1979-80.)

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.* (F,W,S)

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. *Prerequisite: Mathematics 240A-B-C, or consent of instructor.* (Not offered in 1979-80.)

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.* (F) (247B-C are not offered in 1979-80.)

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. *Prerequisite: consent of instructor.* (F,W,S)

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.* (F,W,S)

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.* (Not offered in 1979-80.)

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 1979-80.)

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.* (F,W,S)

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.* (Not offered in 1979-80.)

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.) (Not offered in 1979-80.)

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.* (F,W,S)

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.* (F,W,S)

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.* (Not offered in 1979-80.)

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.* (F,W,S)

opments. Neuroglial cells and neuron-glia interactions. Extrinsic controls of survival, growth and maturation of neural cells. Neurite growth and synapse formation. Potential for plasticity and regeneration in the nervous system. *Prerequisite: graduate students or consent of instructor.* (Satisfactory/Unsatisfactory grades only.) (S)

264. Behavioral Neuroscience (5)
The course is to cover different areas of behavioral biology such as: ethology, behavioral biology, learning and memory, perception, psychophysics. Some outside reading will be required. *Prerequisite: medical student, graduate student, or permission of instructor.* (S)

265. Neuropharmacology and Receptor Mechanisms (3)
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.*

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. *Prerequisite: neurosciences graduate students.* (Satisfactory/Unsatisfactory grades only.) (F,W,S)

Philosophy

OFFICE: 3112 Humanities-Library Building

Professors:
Henry E. Allison, Ph.D. *(Chairman)*
Edward N. Lee, Ph.D.
Stanley W. Moore, Ph.D. *(Professor Emeritus)*
Frederick A. Olafson, Ph.D.
Avrum Stroll, Ph.D.
Zeno Vendler, Ph.D.

Honorar Professor:
Herbert Marcuse, Ph.D. *(Professor Emeritus, Frankfurt and Berlin)*

Associate Professor:
Georgios H. Anagnostopoulos, Ph.D.

Assistant Professors:
Richard J. Arneson, Ph.D. *(Undergraduate Adviser)*
Gerald D. Doppelt, Ph.D.
S. Nicholas Jolley, Ph.D.
Robert B. Pippin, Ph.D. *(Graduate Adviser)*
Mark L. Wilson, Ph.D.
Barbara A. Winters, Ph.D.

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 110 (Symbolic Logic)
3. Seven additional upper-division courses in philosophy. With the approval of the undergraduate adviser, up to two upper-division courses from outside the Department of Philosophy but in 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
Junior Year		
Philosophy 101	Philosophy 102	Philosophy 103
Philosophy 110	Additional Phil. Course (Sect. 3)	Additional Phil. Course (Sect. 3)
	Additional Phil. Course (Sect. 3)	Additional Phil. Course (Sect. 3)
Senior Year		
Philosophy 104	Philosophy 105	Philosophy 106
Additional Phil. Course (Sect. 3)	Additional Phil. Course (Sect. 3)	Additional Phil. Course (Sect. 3)

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 ex-

amination 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 examinations 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 110; 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: Ethics (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: Metaphysics (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 Philosphy: Theory of Knowledge (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.)

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.

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.

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.

110. Symbolic Logic I (4)
An introduction to the study of logic using mathematical techniques. The completeness and consistency of the propositional calculus (which embodies the logical behavior of "and", "or", and "not") and the first-order predicate calculus (the logic of "all" and "some").

111. Symbolic Logic II (4)
Further development of the predicate calculus and the logic of identity. First-order theories, Löwenheim-Skolem theorem, etc. *Prerequisite: Philosophy 110 or consent of instructor.*

112. Advanced Logic (4)
An examination of topics in modal or other non-standard logics, incompleteness results, systems of set theory. Topics will vary from year to year. *Prerequisite: Philosophy 111 or consent of instructor.*

115. Philosophy of Mathematics and Logic (4)
Key problems in the philosophy of mathematics and logic. The relationship of mathematics to logic, intuitionism, mathematical realism, implication of incompleteness results, etc. *Prerequisite: Philosophy 10.*

116. The Structure of Science (4)
A study of key questions in the philosophy of science, such as "what constitutes a genuine scientific explanation?", "How is a theory confirmed by evidence?", and so forth.

117. Problems in Scientific Methodology (4)
An examination of philosophical difficulties encountered in the process of scientific research, e.g., problems of space and time, relationships between bio-logical or psycho-logical explanation and those of physics. Topics covered may vary from year to year.

120. Political Philosophy (4)
An examination of fundamental issues regarding the nature of the state, society, and government, usually by way of a comparison of the tenets of classical liberal theory and Marxism.

121. The State and Freedom (4)
An advanced course in political philosophy focusing on such topics as contemporary treatments of social justice and of human freedom from liberal, conservative, and radical perspectives.

122. Bio-Medical Ethics (4)
The course will examine moral issues arising in the medical

and biological sciences. Possible topics include: concept of health; patients' rights and professional responsibilities; behavior control; experimentation; genetic intervention; allocation of medical resources; and ethical issues concerning death, such as euthanasia, abortion, the rights of dying patients.

123. Ethical Theories (4)
An examination of issues in ethical philosophy, with emphasis on the work of major historical figures in this area.

124. Contemporary Moral Issues (4)
An examination of contemporary issues in ethics, such as abortion, the treatment of animals, euthanasia, suicide, war.

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.

130. Philosophy of Language (4)
Philosophical reflections on such linguistic universals as meaning, synonymy, analyticity, reference, grammar and speech acts. A selection of contemporary articles will be discussed. Some background in linguistics or philosophy is desirable.

131. Topics in the Philosophy of Language (4)
A careful examination of a selection of topics in the philosophy of language. A typical assortment: development of intensional and extensional fragments of English, the role and structure of propositions, conversation and linguistic contexts, formal and informal semantics.

135. Contemporary Analytic Philosophy: Russell and the Vienna Circle (4)
A course in the history of analytic philosophy dealing with the writings of Frege, Russell, Wittgenstein *(Tractatus)*, Quine, Tarski, Carnap.

136. Contemporary Analytic Philosophy: Moore and Wittgenstein (4)
A course in the history of analytic philosophy dealing with Moore, the later Wittgenstein, Wisdom, and Austin.

140. Phenomenology and Existentialism: From Nietzsche to Heidegger (4)
A study of the thought of Nietzsche, Husserl, and Heidegger with emphasis on the development of the phenomenological movement.

141. Phenomenology and Existentialism: Sartre and His Critics (4)
A study of existential phenomenology, through the works of its major representatives such as Sartre, Merleau-Ponty and others, as well as other recent philosophical movements on the European continent.

150. Aesthetics (4)
An examination of major concepts and issues in aesthetics, such as truth, expression and imagination, the nature of the aesthetic attitude and of critical evaluation.

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.

153. Film Aesthetics (4)
A consideration of some special problems in aesthetics relevant to film as an art form. Topics may include: the problem of a film's authorship, whether there are unique assumptions in film criticism and the relation between those assumptions and others relevant to literature, drama and visual art; unity, theme, narration, and structure in film; "high art" - "low art" distinctions; films as representational.

160. Philosophy of Religion (4)
This course provides a general introduction to the philosophy of religion through the study of classical and contemporary texts. Among the issues to be discussed are the existence and nature of God, the problem of evil, the existence of miracles, the relation between reason and revelation, and the nature of religious language.

161. Religious Existentialism (4)
This course will deal with the existential approach to the religious life and with conceptions such as faith, freedom, and guilt. Authors studied in a particular term may vary and will include Pascal, Kierkegaard, Dostoievski, Buber, and Tillich.

162. Philosophy of Law (4)
An introduction to selected topics and problems such as the nature of law and legal systems, the relationship of law to morality, theories of punishment and legal responsibility, issues of civil disobedience, privacy, paternalism, and affirmative action.

164. Philosophy of History (4)
A study of classical and contemporary conceptions of history and historical knowledge.

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 presupposition or consequence of theory; the role of values, etc.

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 around 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. Knowledge and the External World (4)
An examination of some of the fundamental issues about the nature of knowledge gained through sensory experience, such as scepticism, the structure of knowledge, justification of knowledge claims, the nature of perception, sense-data theory, the problem of other minds.

173. Knowledge and Necessity (4)
A course in theory of knowledge dealing with topics such as: the nature of our knowledge of the necessary truths of mathematics and logic, the estimation of the probability of untested hypotheses, the validity of the distinction between *a priori* and *a posteriori* knowledge (and related distinctions).

174. 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.

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.

185. Special Topics (4)
A course devoted to a specific philosophical problem.

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 tests 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. Barry Cunningham, M.A.
J. Charles Millenbah, M.A.
Robert C. Moss, M.S.
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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 waterpolo, 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, ballroom dance, belly dance, conditioning, fencing, frisbee, gymnastics, handball/raquetball, disco, Israeli dance, jazz dance, judo, karate, outing, SCUBA, snow skiing, table tennis, tennis, 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.

Outdoor Recreation

Special events are scheduled off campus including backpacking, cross country skiing, rock climbing, kayaking, mountaineering. Workshops, seminars and discussions on wilderness cookery, first aid, and orienteering are given. Unique experiences in non-competitive activities for students.

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, women's, and coed 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

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; or Science and Technology 15A-B-BL-C-CL.
(2) Chemistry: Natural Science 2D-DL-F-FL; or Science 3A-AL-B-BL; or Chemistry 4A-AL-B-BL; or Science and Technology 12A-AL-B-BL.
(3) Biology: Natural Science 2E.
(4) Mathematics: Mathematics 2D-E-F or 2DA-EA-F.

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
Junior Year		
Physics 100A	Physics 100B	Physics 100C
Physics 110A	Math 110	Restricted Elective
Chemistry 140A	Chemistry 140B	Physics 120A
Chemistry 143A	Biology 101	
Senior Year		
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; or Science and Technology 15A-B-BL-C-CL.
(2) Chemistry: Natural Science 2D-DL-F-FL; or Science 3A-AL-B-BL; or Chemistry 4A-AL-B-BL; or Science and Technology 12A-AL-B-BL.
(3) Biology: Natural Science 2E.
(4) Mathematics: Mathematics 2D-E-F or 2DA-EA-F.

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
Junior Year		
Physics 100A	Physics 100B	Physics 100C
Physics 110A	Biology 101	Physics 120A
Chemistry 140A	Chemistry 140B	Chemistry 143A
		Biology 105
Senior Year		
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 is essentially the same as the standard physics major augmented by courses in earth sciences.

The following courses are required for the physics major with specialization in earth sciences:

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; or Science and Technology 15A-B-BL-C-CL.
(2) Chemistry: Natural Science 2D-DL-F; or Science 3A-3AL-B; or Chemistry 4A-AL-B; or Science and Technology 12A-AL-B-BL; or upper-division chemistry course with associated lab.
(3) Mathematics: Mathematics 2D-E-F or 2DA-EA-F.

b. Upper division:
(1) Physics: 100A-B-C, 110A-B, 120A-B, 130A, 140A-B.
(2) Earth Science: 101, 102, 103, 120.
(3) Mathematics: 110.
(4) Restricted Electives: Two upper division or graduate courses to be chosen with the approval of the earth science adviser.

c. Suggested Schedule:

FALL	WINTER	SPRING
Junior Year		
Physics 100A	Physics 100B	Physics 100C
Physics 110A	Physics 110B	Physics 120A
Earth Science 101	Math 110	Earth Science 102
	Earth Science 103	
Senior Year		
Physics 120B	Physics 140B	Restricted Elective
Physics 130A	Restricted Elective	Earth Science 120
Physics 140A		

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, appren-

ticeship 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
Physics 225A (General Relativity) winter

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 equations. 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. *Prerequisite: Mathematics 4C or equivalent.* (Not offered in 1979–80.) (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. *Prerequisite: Physics 31A.* (Not offered in 1979–80.) (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. *Prerequisite: Physics 31B.* (Not offered in 1979–80.) (S)

Upper Division

(See also Course Listings: "Frontiers of Science")

100A. Electromagnetism (4)
Coulomb's law, electric fields, electrostatics, conductors and diaelectrics, steady currents, elements of circuit theory. Four hours' lecture. *Prerequisite: Mathematics 2D-E; co-registration Mathematics 2F.* (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, Mathematics Mathematics 2F.* (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: Mathematics 2D-E; co-registration Mathematics 2F.* (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, Mathematics 2F.* (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.* (Not offered in 1979-80.) (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.* (Not offered in 1979–80.) (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-B or equivalent, elementary quantum physics.* (Not offered in 1979–80.) (S)

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 1979–80.) (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 1979–80.) (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.* (Not offered in 1979–80.) (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.* (Not offered in 1979–80.) (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 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. Specialty 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 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 invariation. 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 1979–80.) (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 1979–80.) (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 1979–80.) (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 1979–80.) (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 1979–80.) (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 (3)
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 1979–80.) (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 1979–80.) (F)

233. Elementary Particle Theory (4)
Current problems in elementary particle theory, especially the theory of strong interactions. *Prerequisites: Physics 215.* (Satisfactory/Unsatisfactory grades permitted.) (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 1979–80.) (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 1979–80.) (S)

239. Special Topics (1-2)
From time to time it will be possible to present self-contained

Martin Shapiro, Ph.D. (Fall Quarter)
†Herbert F. York, Ph.D.

Associate Professors:
Peter A. Gourevitch, Ph.D.
Gary C. Jacobson, Ph.D.
Samuel H. Kernell, Ph.D.
Samuel L. Popkin, Ph.D.

Assistant Professors:
Nathaniel L. Beck, Ph.D.
Ellen T. Comisso, Ph.D.
Peter F. Cowhey, Ph.D.
Ann L. Craig, Ph.D.
David D. Laitin, Ph.D. *(on leave, 1979-80)*
Susan L. Shirk, Ph.D. (on leave, 1979-80)

†Affiliated from Program on Science, Technology and Public Affairs

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 preregistration.***

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)

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 instructor.* (Not offered in 1979-80.)

104. 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.

105A-B. Technology and Society (4-4)
In the first quarter, the focus is on the making of U.S. science policy and the role of scientists in politics. In the second quarter, the theory of post-industrial society is examined, along with various policy issues, including the limits to growth controversy and energy policy. (105B not offered in 1979-80.) (F,W)

105-C. Technology and Society (4)
This course concentrates on the policy issues raised by biomedical scientific advance. The topical content varies from year to year but includes such areas as fertility control, fertilization *in vitro*, recombinant DNA, life support systems and genetic engineering. Emphasis is placed on necessary mechanisms for interaction of scientific expertise and other perspectives in policy-making. (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 for 107B.* (F,S)

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 1979-80.)

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.)

112C. Law and Politics — Comparative Legal Cultures (4)
A systematic and comparative treatment of the role of courts in various national settings. The impact of the judicial system on the interplay between the legal and political cultures of Western democratic societies, of communist and some developing countries, will be examined.

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)

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.*

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.*

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 for 114B.* (W,S)

115A-B. American Political Parties (4-4)
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. *Prerequisite: 115A for 115B.* (F,W)

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 1979-80.)

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)

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.

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. (Not offered in 1979-80.)

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. (F)

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)

133C. Vietnam: Special Topics in the Study of Revolution (4)
An intensive examination of selected theoretical issues in the study of the political economy of revolution and counter-revolution. *Prerequisite: Permission of instructor.* (S)

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.* (Not offered in 1979-80.)

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) (Not offered in 1979-80.)

141A-B. Soviet Politics (4-4)
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,W) *Prerequisite: Political Science 141A for 141B*

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 1979-80.)

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.

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. (S)

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. (Not offered in 1979-80.)

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 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) (Not offered in 1979-80.)

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. *Prerequisites: 155A–Political Science 12 and one quarter of economics, 155B – Political Science 155A.* (F,W)

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 1979-80.)

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 1979-80.)

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)

161. Marine Policy (4)
This course aims to provide a theoretical and factual framework for the study of marine policy and to examine four or five cases involving controversial issues. Among the issues: the porpoise-tuna controversy; manganese nodules and deep-sea mining; coastal management and nuclear power; and liability for oil spills.

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 eighteenth century onwards. *Prerequisite: open only to students who have had previous courses in political theory or political philosophy.*

163. Seminar — Special Topics in American Politics (4)
An undergraduate seminar designed to give students who have already had some course experience in upper-division American politics classes an opportunity to study some aspect of current American politics in greater depth in a small group setting. *Prerequisites: PS 10 and two upper-division classes in American politics.* (F)

164. Political Consequences of Electoral Systems (4)
A comparative survey of the major dimensions of the electoral arrangements used in contemporary democratic states: the electoral formula (majority and plurality systems, the various forms of proportional representation, and semi-proportional systems), district size, and electoral thresholds. The effects of the different electoral systems on party competition will be analyzed in terms of the relationships between votes and seats, the fragmentation or concentration of party systems, and the encouragement of electoral alliances. (W)

165. Seminar: Advanced Topics in Comparative Politics (4)
A comparative analysis of the party systems of democratic regimes and their effects on the formation of government coalitions and government stability. Special attention will be paid to the work of the major comparative theorists of party systems, from Duverger to Sartori. The theories of coalition formation to be examined include those that attempt to predict which coalition is likely to be formed and those that seek to relate cabinet stability to the type of cabinet coalition. (S)

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.

171. Seminar: American National Security Policy (4)
Seminar in selected national security topics. Special emphasis will be placed on current U.S. military posture and arms control policies and the rationales behind them. Other topics will include the strategic balance, the NATO Warsaw Pact confrontations, the Middle East, SALT, and other arms control forums. *Prerequisite: Political Science STPA 170.*

173. Positive Political Theory (4)
The course is intended to acquaint undergraduates with a wide variety of mathematical models used in political science. The approach will be non-technical. The goal of the course is to give the student an understanding of the utility of such models for the study of political phenomena.

174A-B. Statistical Methods/Data Analysis (-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, corporativism, 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) *Prerequisites: senior standing, G.P.A. of 3.5 in political science or permission of the department.*

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)

edge 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 standards for allowing a student to continue beyond the first year are completion of all department requirements, satisfactory completion of the first-year research project (including the oral presentation), a B+ 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 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 calender 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 exerimental 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 1979-80.)

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 1979-80.)

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.* (Not offered in 1979-80.)

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 1979-80.)

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 1979-80.)

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.*

137. Cognition and the Brain (4)
An examination of the relationship between higher mental function and neurology in a developmental adaptive framework. This will include the classical literature on neurological disorders in adults and children. Theories and mechanisms will be discussed in an attempt to elucidate structural and functional relations between cognitive processes and the brain. *Prerequisites: Two of the following: Psych 101, 105, 106 or graduate standing.*

138. Alcohol and Its Problems (4)
The following areas will be studied: psychopharmacology, neuropharmacology and biochemical pharmacology of alcohol; fetal alcohol syndrome; alcohol addiction and animal models; social psychology of alcohol; problems of controls of alcoholism; and interactions with alcoholics.

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 1979-80.)

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 psychological processes. *Prerequisites: Psychology 105 or Linguistics 1 or 12.*

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.* (Not offered in 1979-80.)

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 1979-80.)

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 1979-80.)

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 101 and any one of Psychology 120, 121.* (Not offered in 1979-80.)

mental, 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 physical 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-C, 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 placement examinations during registration week of the fall quarter, and a comprehensive department 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 requirement 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, 223, AMES 294 A-B-C, one of SIO 240, 260 or 280 plus two additional SIO courses selected with approval by the student adviser.

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

207A. Digital Signal Processing I (3)
Sampling; A/D and D/A conversion; discrete linear system theory; z-transforms; digital filters; recursive and nonrecursive designs; quantization effects; fast Fourier transforms; windowing; high speed correlation and convoluting; discrete random signals; finite word length effects. *Prerequisite: APIS 151A-B-C or equivalent.* Hodgkiss (F) (Satisfactory/Unsatisfactory grades permitted).

207B. Digital Signal Processing II (3)
Power spectrum estimation; homomorphic signal processing; applications to speech, radar/sonar, picture, biomedical, and geophysical data processing. *Prerequisite: SIO 207A or consent of instructor.* Hodgkiss (W) (Satisfactory/Unsatisfactory grades permitted.)

207C. Digital Signal Processing III (3)
Single and multi-channel data processing in a time varying environment; adaptive filters; high resolution spectral estimation; linear prediction; adaptive beamforming. *Prerequisite: SIO 207A-B or consent of instructor.* Hodgkiss (S) (Satisfactory/Unsatisfactory grades permitted.)

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.* 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. *Prerequisite: 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. Alfven 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, base 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. Mudie (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)

234. Seminar on Essentials of Geophysics (3)
This course is intended to cover the essentials of solid-earth geophysics in a qualitative manner but in greater detail than can be expected in an undergraduate course. The course will be based upon the text of Bott. To give students experience in presenting ideas in public, the format of the class will be one in which individual students take responsibility for certain chapters of the text. Parker (F) (Satisfactory/Unsatisfactory grades permitted)

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.* Curray (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 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; isotope geochemistry of calcareous microfossils; Pre-Quaternary paleoceanographic applications. Berger, Thierstein (W) (Satisfactory/Unsatisfactory grades permitted.)

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; prop-

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 187. Practicum in Learning English (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

Charles R. Cooper, Ph.D., Professor of Literature *(Director of the Program)*

* * *

The Third College Composition Program (TCCP) provides Third College students with intensive courses in writing and analytical reading in a wide array of discourse types and modes: personal experience narrative, reportage, research, explanation, persuasion. Classes are small and focus on context-building and on pre-writing exercises for what will be written each week. Students engage in peer criticism of writing already completed. Each student has an individual conference with his or her instructor weekly. Based on placement examination results, students will be placed either in the 10A-B-C sequence or in the 10B-C sequence. A grade of C or better in both 10B and 10C fulfills the Third College writing requirement.

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)
A basic course in the writing of explanatory and persuasive discourse. Special attention will be given to achieving consistent control of the correct forms of standard edited English and to increasing sentence variety and fluency. The course will also concentrate on the process of composing in writing and on the nature of written language, especially the differences between informal conversation and writing. Students will write often and revise, engage in peer discussion and critiques of papers, and attend a weekly conference with the instructor.

Extensive readings will be required on various personal and social issues. Students required to take 10A must also take 10B and 10C.

TCCP 10B. Expository Writing I (4)
A course in the writing of expressive and explanatory discourse, with emphasis on personal experience narrative (autobiography, first-hand biography, chronicle) and on reportage (observations, interviews, case studies). Attention to correctness and to syntactic variety. Special emphasis on the various patterns of narrative and reportage and on personal voice and style. Students will keep a writer's journal, write several pieces of narrative and reportage, revise their writing, engage in peer discussion and critiques of papers, and attend a weekly conference with the instructor. A special feature of this course will be guided practice in various small-group discussion activities.

Students will read widely in narrative and reportage.

This course is required of all students in Third College.

TCCP 10C. Expository Writing II (4)
A course in the writing of explanatory and persuasive discourse, with special emphasis on the various patterns of explanation and persuasion. Particular attention will be given to decisions writers must make about their readers, decisions involving language register, appropriate amount and kind of information, and effective persuasive techniques. Students will write often and revise, engage in peer discussion and critiques of papers, and attend a weekly conference with the instructor. The course culminates with a brief, documented research paper, where students will learn to use the Modern Language Association (MLA) Style Sheet form of documentation.

Extensive readings will be required on current social, economic, and political issues.

This course is required of all Third College students.

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)*

Associate Professors:
Edward Reynolds, Ph.D. *(History)*
Sherley Ann Williams, M.A. *(Literature)*

Assistant Professors:
Richard J. Arneson, Ph.D. *(Philosophy)*
Ricardo Romo, Ph.D. *(History)*
Marta E. Sanchez, Ph.D. *(Latin American and Chicano Literature)*
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 phonet-

ics 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 1979–80.)

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 1979–80.)

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 1979–80.)

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—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 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 discussing 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)

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 1979–80.)

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 1979–80.)

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 1979–80.)

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*

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. (Not offered in 1979–80.)

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 1979–80.)

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 1979–80.)

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. *Prerequisite: upper-division standing.* (Not offered in 1979–80.)

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 1979–80.)

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 American 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 1979–80.)

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 1979–80.)

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 1979–80.)

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 in the black national minority within the U.S. (Not offered in 1979–80.)

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 1979–80.)

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 1979–80.)

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 "LaRaza" 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 with 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 1979–80.)

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.*

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 1979–80.)

TWS 190. Undergraduate Seminars
Seminars will be organized on a topics basis with readings, discussions, and papers. Specific subjects to be covered will change each quarter depending on particular interest of instructors or students. May be repeated for credit.

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. *Prerequisite: upper-division standing.*

199. Independent Study (2 or 4)
Tutorial, individual guided reading and research projects (to be arranged between student and instructor) in an area not normally covered in courses currently being offered in the department. (P/NP grades only.) *Prerequisites: upper-division standing and approval of instructor.* (F,W,S)

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. *(Assoc. Prof., Sociology)*
Robert J. Heifetz, Ph.D. (on leave)
Faustina Solis, M.S.W. *(Community Medicine)*

Assistant Professor:
Alonzo B. Anderson, Ph.D. *(Psychology)*

Director of Field Studies:
Phyllis S. Green, Ph.D.

The Undergraduate Program

The undergraduate program in Urban and Rural Studies is designed to provide a broad educational experience. Persons who wish to become actively engaged in a variety of professional careers can gain skills and understanding of research techniques and other educational and community activities. The multidisciplinary orientation is used to integrate the contributions that the sciences and related professions make to an understanding and solving of urban problems.

The curriculum in Urban and Rural Studies provides students with a broad exposure to theoretical constructs and empirical applications of various disciplines as they relate to the human problems of society. Many basic concepts and perspectives come primarily from the social sciences through URS offerings or in collaboration with existing departments. The goal of the curriculum is to educate action-oriented students who can bridge gaps between disciplines and begin to provide a multidisciplinary synthesis of the complex dimensions of contemporary human experience.

To receive the B.A. degree with a major in Urban and Rural studies, the student must meet the general education requirements of Muir, Revelle, Third, or Warren College. The requirements in Urban and Rural Studies follow.

URS majors must complete the following lower-division courses:

1. URS 30: Introduction to Urban Studies
2. Mathematics 6A and 6B or more advanced mathematics (Note: more advanced mathematics, e.g., Mathematics 1 or 2, and calculus sequence is recommended for students planning to attend graduate school)
3. Economics 3A, 3B, or Economics 1A, 1B (Note: Students planning to take upper-division economics courses must also take Economics 1C in addition to Economics 3A/3B, or Economics 1A/1B)
4. Sociology/Social Science Sequence: Sociology 1A, 1B, or URS 24 and one additional quarter of the Third College lower-division social science sequence, or any other two quarters of introduction course to a social science.

Sixteen upper-division courses constitute the major and are distributed as follows:

7 URS courses consisting of URS 101, 111A, 121, 131, 186A/B, and 190.

6 Courses in the same discipline and approved by the student's adviser. These courses must represent a clearly defined body of knowledge. These six courses (in the same discipline) constitute a minor and must compliment a concentration area. The concentration areas are described below.

3 Upper-division courses from a combination of humanities and ethnic-related studies and approved by the student's adviser.

The four core courses taken during the *junior* year provide the basic framework for *both* the major and the minor. These courses, in their sequence are:

Fall Quarter: URS 101: Introduction to Research Methods
URS 111A: Social Policy and Social Planning
Winter Quarter: URS 121: Metropolitan Development and Analysis
Spring Quarter: URS 131: Community Dynamics and Ethnicity (this course is a prerequisite for all field studies)

The courses have a general systems theory approach to problem solving. Through these courses, the student develops competence in the theory and concepts. In addition, tools and skills are acquired for examining large-scale, complex social problems. These core courses also provide an understanding of how decisions are made and how policy is formulated in social, political, and economic institutions.

Following completion of these core courses, each student chooses a concentration area in which to explore in greater depth a particular focus within the major of Urban and Rural Studies. These concentration areas are: Planning and Urban Development (PUD), Comparative Urbanization and Development (CUD), Human Resources (which is composed of a health sequence and an applied social science sequence), and Law. These courses serve to integrate three program components: the minor; URS 186A/B, the field work experience; and, the URS 190, senior seminar experience. The student's overall program is facilitated through close collaboration with the faculty adviser.

The Minor Program

The minor in Urban and Rural Studies is composed of the junior year core sequence as described above and two other upper-division courses taken in one of the concentration areas. Students who minor in Urban and Rural Studies are also strongly encouraged to take URS 186A: Field Work in Urban and Rural Studies.

Courses

Lower Division

16. Introduction to Urban Anthropology (4)
Contemporary dilemmas and evolution of urban life. Topics include: family and kinship; race, class, and ethnic relations; poverty and affluence; community and neighborhood; work and leisure organization; modern problems of planning, development, resource use, and change in an urbanizing world. (W)

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. (Not offered in 1979-80.)

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. (F)

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.) (Not offered in 1979-80.)

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) (W)

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. (Not offered in 1979-80.)

30. Introduction to Urban Studies (4)
Provides the overview of urbanization as an expression of modern society. Considers contemporary social issues, urban problems, institutional responses, and political dynamics. Requires visitations by students to selected agencies in San Diego. Is designed to give basic concepts and perspectives to Urban and Rural Studies majors. (F)

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. Solis and Ngubo.

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.* Same as Psychology 60.

Upper Division

100A-B-C. Urban Social Problems (4-4-4)
A research-oriented course focusing on institutions and communities in the urban area. Readings will be drawn from social science studies on urban issues and from studies on policy and planning. It integrates theoretical approaches to the study of various urban issues with applied supervised research. *Prerequisite: URS major, upper-division standing and consent of instructor.*

101. 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. *Prerequisites: consent of instructor and upper-division standing in social sciences.* (F)

102A-B. Research in Policy Formation (4-4)
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.* (W,S)

104. Introduction to Social Psychology (4)
An intensive introduction and survey of current knowledge in social psychology. *Prerequisite: Psychology 60, or Mathematics 80A, or URS 20, or permission of instructor and department stamp.* Same as Psychology 104.

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. *Prerequisite: two quarters of a social science, sophomore standing or consent of instructor.* (F)

111A-B Social Policy and Social Planning (4-4)
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. *Prerequisite: upper-division standing or consent of instructor.* (F,W)

112. 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. *Prerequisite: URS Major, upper-division standing or consent of instructor.* (S)

115A-B. Policy and Planning in Higher Education (4-4)
URS 115A 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. (W)

URS 115B 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.

117. 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.* (Not offered in 1979-80.)

119. 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 131 and or URS 111.* (Not offered in 1979-80.)

121. 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.* (W)

122. Social Impact of Urbanization (4)
Focus on distribution of social costs and benefits of urbanization-industrialization process. Through comparative analysis, will identify forces generating various forms of urbanization, and evaluate human consequences of that process. *Prerequisite: upper-division standing or consent of instructor.* (Not offered in 1979-80.)

123. 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. (Not offered in 1979-80.)

131. 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. *Prerequisites: URS Major, upper-division standing or consent of instructor.* (S)

134. 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. *Prerequisites: URS senior majors or permission of instructor.* (Not offered in 1979-80.)

137. 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. *Prerequisites: upper-division standing in social sciences and consent of instructor.* (Not offered in 1979-80.)

143. 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.* (Not offered in 1979-80.)

144. 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. *Prerequisite: upper division standing and consent of instructor.* (F)

145. Introduction to Preventive Health Care (4)
This course will analyze needs of populations, highlighting current major public health problems such as chronic and communicable diseases, environmental hazards of diseases, psychiatric problems and additional diseases, new social mores affecting health maintenance, consumer health awareness and health practices, special needs of economically and socially disadvantaged populations. *Prerequisite: URS 144.* (F)

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, political 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.* (W)

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. *Prerequisite: upper-division standing or permission of the instructor.* (S)

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. *Prerequisite: upper-division standing or permission of instructor.* (Not offered in 1979-80.)

150. The Black Ghetto (4)
Examination of the black ghetto from about 1880 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.* (Not offered in 1979-80.)

151. Social Psychological Aspect of Black Identity (4)
This course examines formal theory on personality format or 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.* (Not offered in 1979-80.)

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.* (S)

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.* (F)

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.* (W)

155. Group Processes (4)
An introduction to the social psychological study of human behavior in small groups. Special emphases 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.* Same as Psychology 155.

tion 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 ½" video tape, ¾" video cassettes, and super 8 film. Crossl sted 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.

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.*

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.*

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.*

176. Video Strategies (Studio Techniques) (4)
This is a production course designed for the student wishing to explore video as a contemporary art form. Its 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 Film, Video and Photography (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 Film, Video and Photography (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.*

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.

184. Environmental Film Series (4)
This collection of courses gathers under one cover films that are strongly marked by period, geography, the culture within which they received their dominating local quality. These courses pay particular attention to the stamp of place—climate, dress, habitation, language, music, politics—as well as the filmic moves that helped color such work as environmental. The series takes in the following subjects: Third World Films, The Munich Films (the new wave of Germans who made their first features in Munich following 1967), Japanese Movies, Films of the American thirties and their relationship to current thought, American Westerns, Ethnographic Film, Brazil's Cinema Novo, etc. Specific topics to be covered will vary with the instructor. May be repeated twice for credit. No prerequisites.

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.*

185C. Adv. Film Production — Super 8/Sound (6)
This course focuses on individual or group projects in Super8 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 1979–80.)

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 theinstructor.* May be repeated for credit once. (Not offered in 1979–80.)

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.

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 1979–80.)

192. Seminar in Art History (4)
This course will cover a number of topics in art history. The content covered each time will vary with the instructor. May be repeated once for credit. *Prerequisites: two upper division art history courses or consent of instructor.*

193. Experimental Film, Video and Photography (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.*

194. Optical Printing (4)
This 16mm film production course's fundamental thrust will be to examine how various image manipulation techniques can generate and convey meaning. The course must necessarily operate at a highly advanced technical level and its initial weeks will introduce students to the VA optical printer, animation camera and similar equipment. A representative sampling of optically printed films will be shown and studied for both meaning and technique. Knowledge of photographic and camera fundamentals is virtually necessary, and a high degree of personal motivation is absolutely necessary. A short finished film will be required at the end of the course. May be repeated once for credit. *Prerequisite: 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. (Not offered in 1979–80.)

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. (Not offered in 1979–80.)

214. Intentionality (4)
This course is concerned with an inquiry into the possibility and conditions of interpretation of works of visual art. How are the wider contexts of the work, the intentions — conscious or otherwise — of its author, the immediate psychic and material circumstances of its creation, its envisioned function, and the *persona* specified for eventual interlocution, encoded into its structure? Previous theoretical approaches to these issues will be examined, alternative analytical models suggested, and these tested in detailed analyses of specific works of art.

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. (Not offered in 1979–80.)

218. Marcel Duchamp (4)
A critical examination of the work of the most radical of the twentieth-century artists.

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.

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.

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)
This course is designed to help articulate the work of advanced students and is developed along lines varying according to the faculty member directing the course. May be repeated for credit.

244. Charting and Subject Matter (4)
This course focuses on a methodology for establishing autobiographical material, ordering it and presenting it in various media.

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.*

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.*

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 exhibitions 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.

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 varing 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. Warren College 10A-10B are offered P/NP only.

10A-10B. The Writing Course (4-4)
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 whatever form they wish. *Prerequisite: facility in the use of English as a language.* P/NP only.

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.

17. Public Speaking (4)
Through lectures and practice, students will gain an understanding of the principles of verbal and nonverbal communication, and will develop the skills in organization and delivery necessary for the effective communication of ideas. *Prerequisite: Consent of the instructor.* Note: Warren College 17 does not count toward a minor in writing in Warren College.

199. Special Projects
Special projects in writing and related topics for students who desire work beyond the normal courses available. Pass/Not Pass only. *Prerequisite: upper-division status.*

The Academic Internship Program The Academic Internship 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 fieldwork experience as a complement to their classroom education.

While on internship, students are 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 a sponsoring organization's activities. Students might work in a political office in Washington, D.C., a conservation group in San Francisco, a legal-aid office in Los Angeles, a medical laboratory in San Diego, or any number of other possibilities.

While "on assignment" students are supervised by an agency sponsor. In addition, each student has a faculty sponsor who evaluates the student's written report of the field studies experience. Upon satisfactory completion of all requirements, the student will earn four, eight, twelve, or sixteen units, repeatable up to sixteen units.

The Academic Internship Program is 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 internship are required to see the coordinator at least two quarters before they wish to be enrolled in the program. Students have the option of undertaking one or more academic internships during their junior or senior years.

197. Academic Internship Program (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.*

APPENDIX

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.

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 forty-five 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		
	Bachelor's	Master's	Doctorate
	Average Monthly Salary[1]		
Engineering	$930-1,290	$1,030-1,410	$1,260-1,840
Humanities	510- 935	665-1,200	
Life Science	545-1,000		
Management		1,100-1,545	
Physical Science	760-1,260		1,280-1,720
Social Science	560- 975	730-1,180	
Probable or Definite Job Commitment[2]			
Engineering			77.4%
Humanities			59.2
Life Science			66.0
Management			80.7
Physical Science			70.5
Social Science			56.6

[1]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.

[2]Source: *The Job Market for UCLA's 1974 Graduates.* Percentages are based only upon those students who planned to work immediately after graduation.

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 Emeritus, ***Melvin Calvin***
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 Emeritus, ***Josephine Miles***
Department of English
454 Wheeler Hall
UC Berkeley
Berkeley, CA 94720

University Professor Emeritus,
Glenn T. Seaborg
Department of Chemistry
Associate Director
Lawrence Berkeley Laboratory
Berkeley, CA 94720

University Professor ***Neil J. Smelser***
Department of Sociology
490 Barrows Hall
UC Berkeley
Berkeley, CA 94720

University Professor Emeritus, ***Edward A. Teller***
501F Building 111; P.O. Box 808
Lawrence Livermore Laboratory
Livermore, CA 94550

University Professor ***Charles H. Townes***
Department of Physics
557 Birge Hall
UC Berkeley
Berkeley, CA 94720

University Professor Emeritus, ***Harold C. Urey***
Department of Chemistry
5314 Mayer Hall
UC San Diego
La Jolla, CA 92093

University Professor Emeritus,
Sherwood L. Washburn
Department of Anthropology
232 Kroeber Hall
UC Berkeley
Berkeley, CA 94720

University Professor Emeritus,
Lynn T. White, Jr.,
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

Mike Curb
Lieutenant Governor of California

Leo T. McCarthy
Speaker of the Assembly

Wilson Riles
State Superintendent of Public Instruction

Cheryl F. Biles *(1979)*
President of the Alumni Association of the University of California

Forrest A. Plant *(1979)*
Vice President of the Alumni Association of the University of California

David S. Saxon
President of the University

Lee Wenzel *and* **George David Kieffer**
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)
Yvonne Brathwaite Burke (1990)
Glenn Campbell (1984)
Edward W. Carter (1982)
William K. Coblentz (1980)
John F. Henning (1989)
DeWitt A. Higgs (1982)
John H. Lawrence, M.D. (1988)
Vilma S. Martinez (1990)
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Verne Orr (1988)
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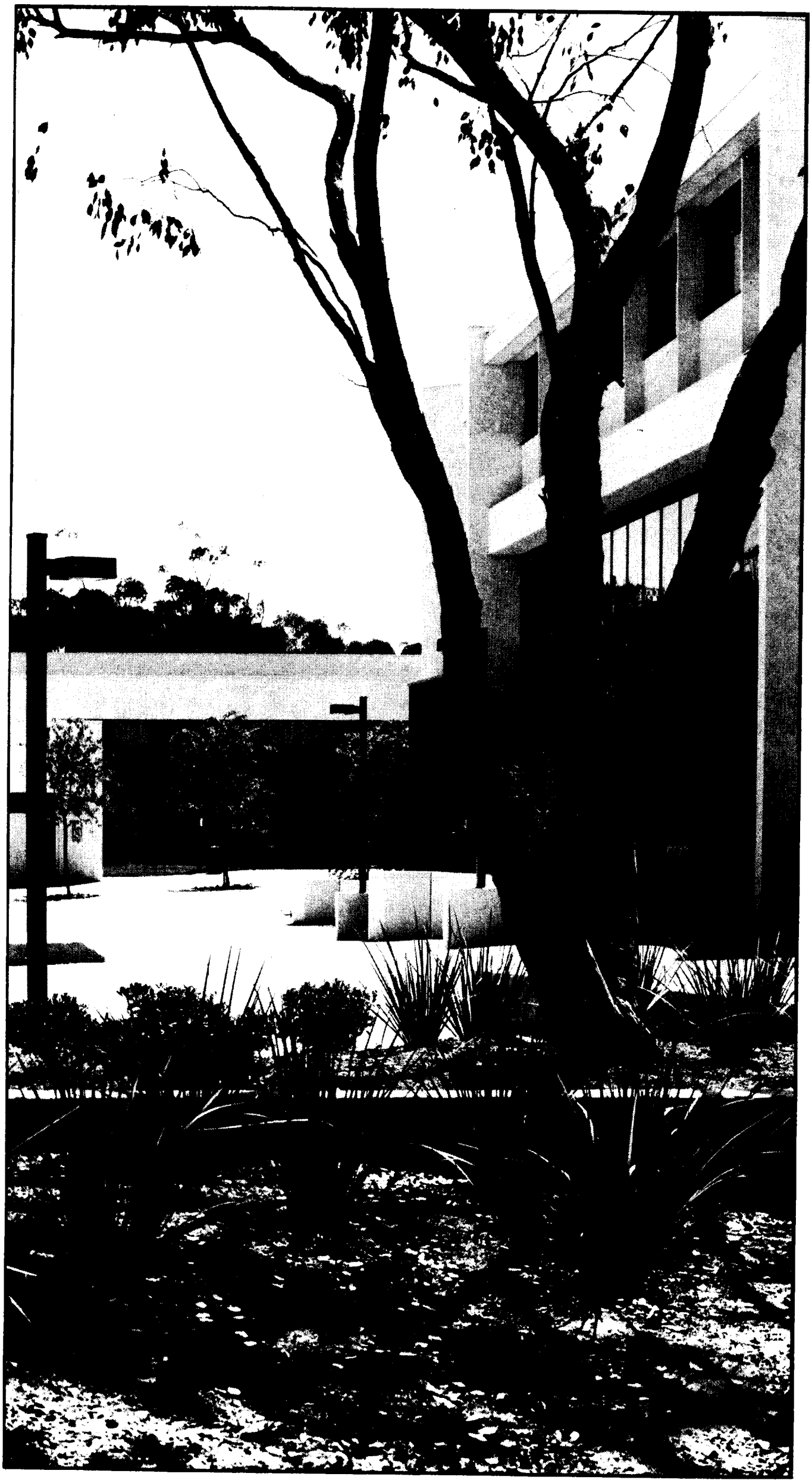
UC San Diego Facts and Figures (as of Winter, 1979)

On-campus student enrollment (Spring Quarter)	
Undergraduate	7818
Muir	2354
Revelle	1876
Third	1660
Warren	1928
Graduate	1306
Medical School (excluding 419 hospital residents, interns and nurse practitioners)	425
Total Students	9549
On-campus teaching faculty members	810
Fellows, National Academy of Sciences	53
Fellows, American Academy of Arts and Sciences	49
Nobel Prize Laureates	6
Total land area — UC San Diego	
Main campus	1,211
Outlying areas	703
Total Acres	1,914
Books in Library collection	1,313,761
University Extension enrollment	10,000
Grade-point averages	
Lower-division undergraduate	2.81
Upper-division undergraduate	3.05
Graduate	3.81
Number of undergraduates in ten most popular majors (Spring, '79)	
Biology	1622
Psychology	488
Chemistry	325
Applied Physics and Information Science (Electrical Engineering and Computer Science)	548
Applied Mechanics and Engineering Sciences	441
Literature	295
Communications	362
Economics	388
Political Science	260
Sociology	230

Based upon previous three years' experiences, 89.6% of all undergraduates enrolled at UC San Diego in the fall quarter will also be enrolled for the spring quarter. Questions or more detailed information should be directed to the Office of the Associate Vice Chancellor-Planning, Analytical Studies.



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   - ☐ I am a potential applicant.
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     I am a high school student, ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior
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   - ☐ I am in college, contemplating graduate study in _____ (subject).
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   - ☐ I reside in another state.
     I am a student at UC San Diego, ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior ☐ Graduate Student _____ (subject) ☐ Medical Student
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   - ☐ I am a staff member at UC San Diego.
     I am a ☐ faculty ☐ staff member at _____.
7. Additional comments: _____ _____ _____

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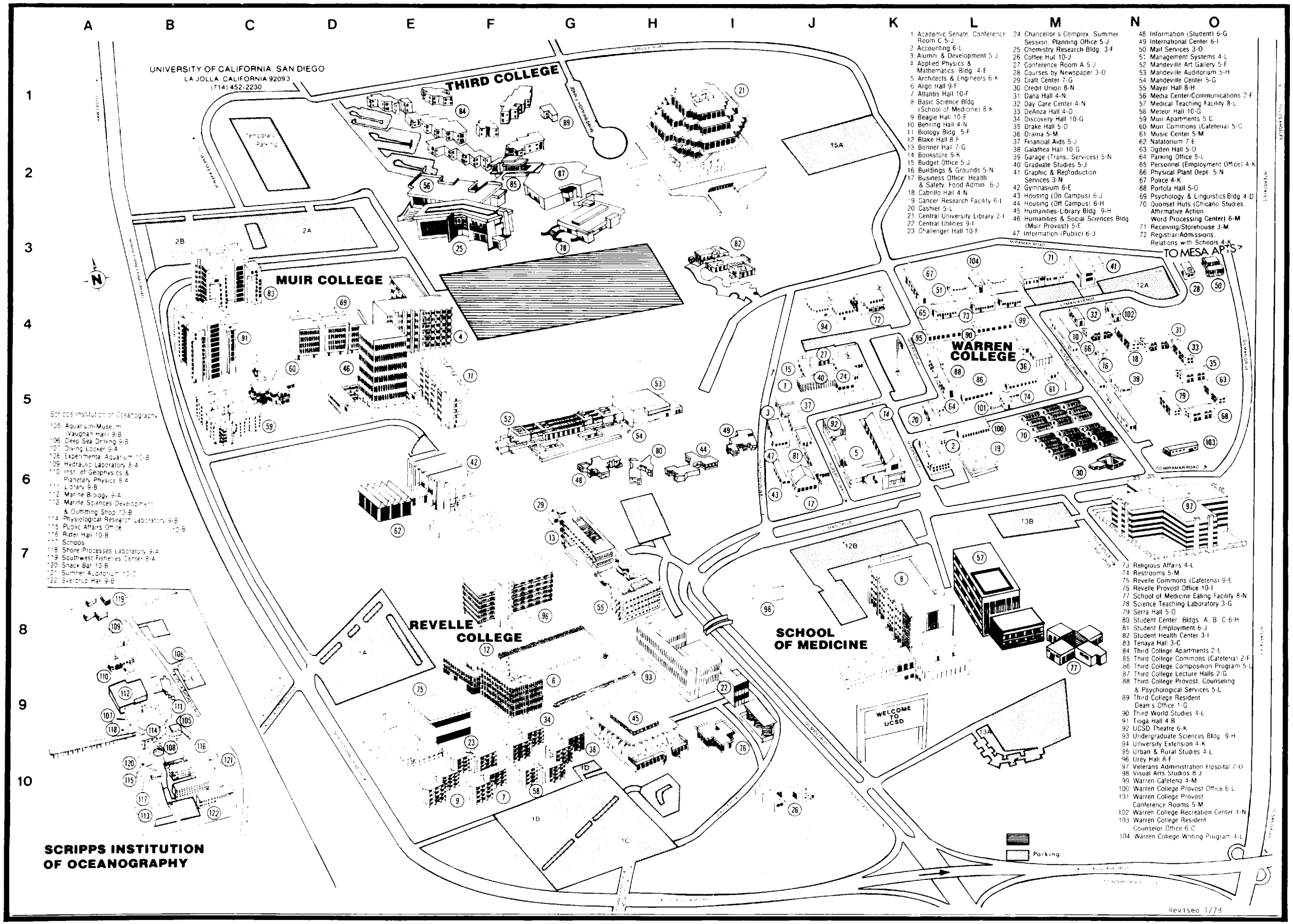

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