the california state university and colleges

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA



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1973-75 CATALOG

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

March 1974

198 units required for graduation

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ACADEMIC CALENDAR 1973–74

SCHEDULE	*Summer Quarter 1973*	*Fall Quarter 1973*	*Winter Quarter 1974*	*Spring Quarter 1974*
System-wide initial application period for winter quarter 1974	June 1–30			
Deadline to apply for admission to following quarter	September 4	November 16	February 15	May 10
Beginning of university year.....	July 2			
Beginning of quarter for faculty....		September 17		
Orientation of new students		September 18–19		
Classes begin for all students.....	July 2	September 20	January 2	April 1
Last day to drop classes without penalty	July 9	September 26	January 8	April 5
Last day to add classes or register late.....	July 12	October 1	January 11	April 10
Last day to drop and receive refund	July 16	October 4	January 16	April 16
Last day to apply for current quarter graduation.....	July 27	October 19	January 25	April 19
Withdrawal from classes after this date permitted only in emergency clearly beyond student's control..	August 10	November 7	February 22	May 17
System-wide initial application period for spring quarter 1974.....	August 1–31			
System-wide initial application period for fall quarter 1974		November 1–30		
Current student deadline for next quarter scheduling.....	August 10	November 8	February 14	May 2–Summer May 23–Fall
System-wide initial application period for winter quarter 1975				June 1–30
Final examinations.....	August 29–31	December 3–7	March 18–22	June 10–14
Commencement				June 15

Academic Holidays

Independence Day	July 4			
Columbus Day.....		October 8		
Veterans' Day		October 22		
Thanksgiving.....		November 22–23		
Christmas		December 10– January 1		
Lincoln's Birthday			February 12	
Washington's Birthday			February 18	
Memorial Day				May 27

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CALENDAR 1973

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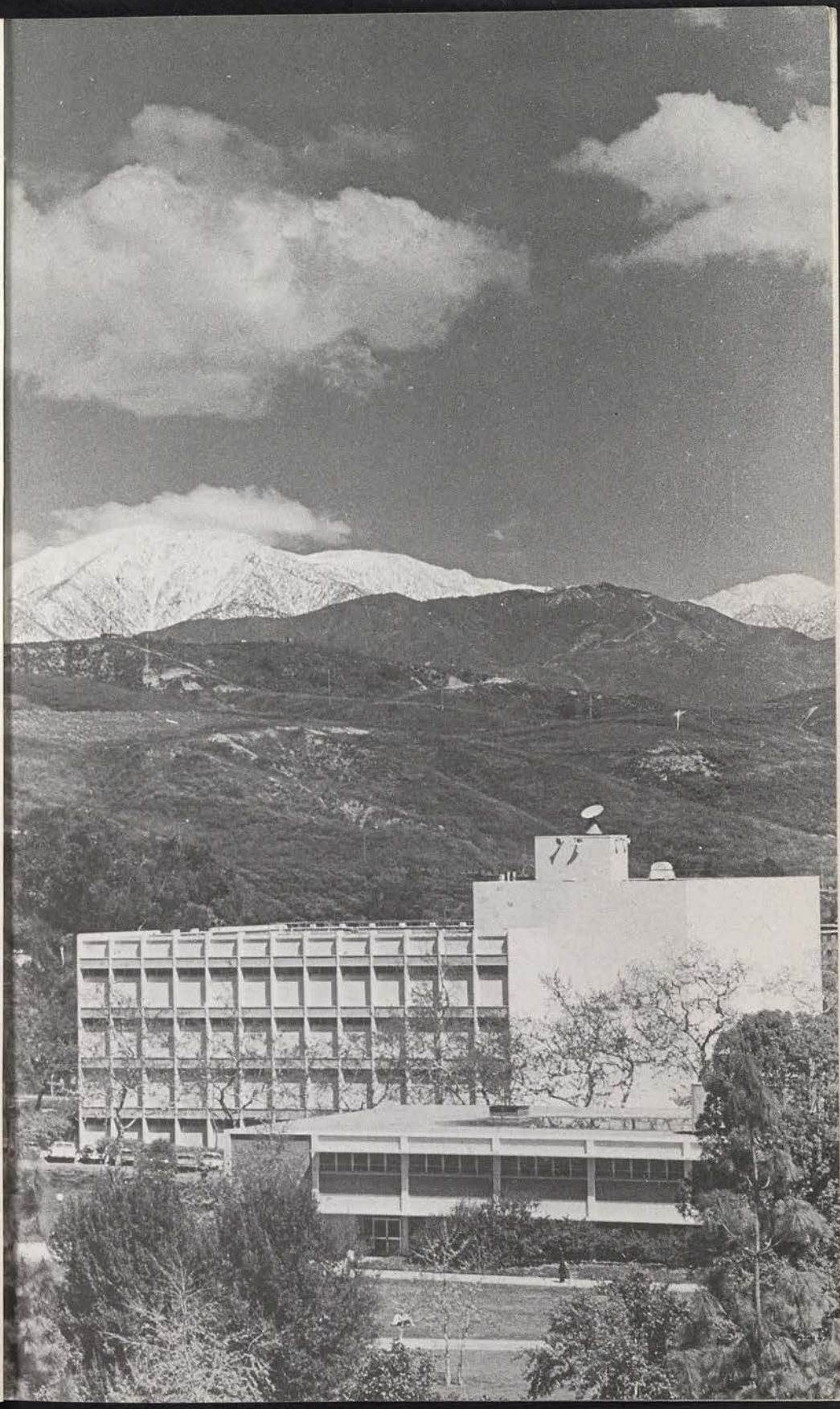
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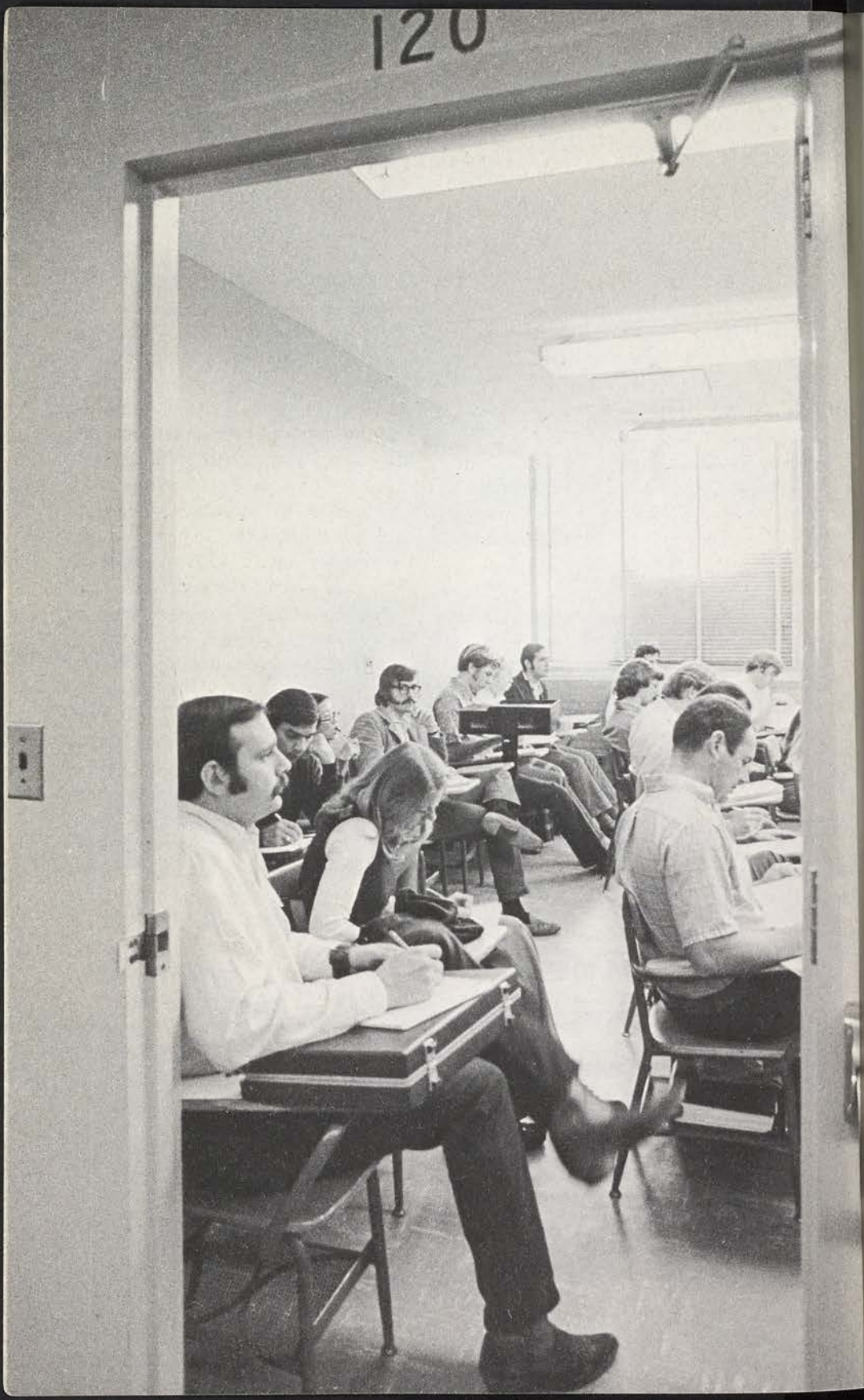
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THE CALIFORNIA STATE UNIVERSITY AND COLLEGES

The individual California State Colleges were brought together as a system by the Donahoe Higher Education Act of 1960. In 1972 the system became The California State University and Colleges and fourteen of the nineteen campuses received the title *University.*

The oldest campus—California State University, San Jose—was founded in 1857 and became the first institution of public higher education in California. The newest campus—California State College, Bakersfield—began instruction in 1970.

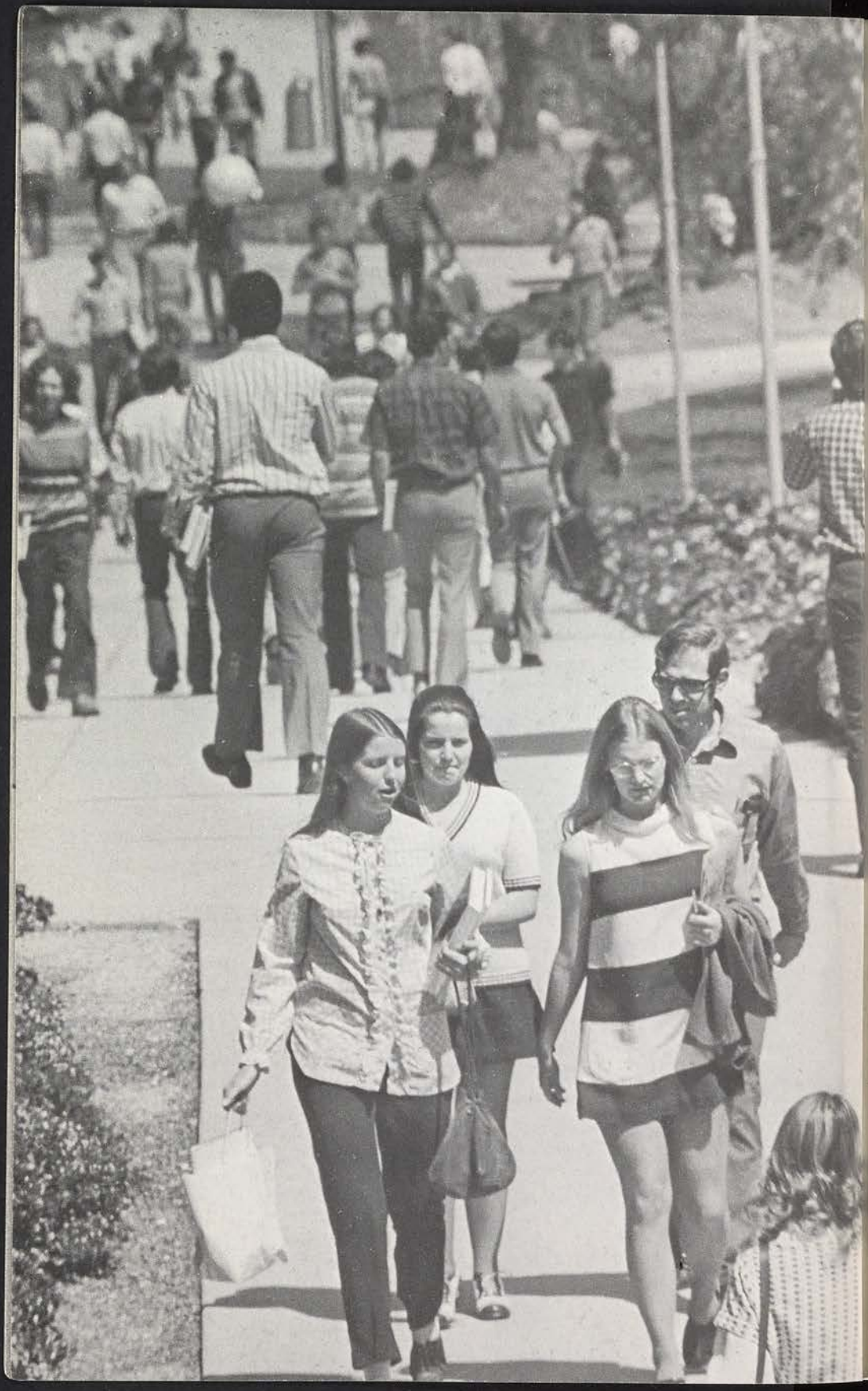
Responsibility for the California State University and Colleges is vested in the Board of Trustees, whose members are appointed by the Governor. The Trustees appoint the Chancellor, who is the chief executive officer of the system, and the Presidents, who are the chief executive officers on the respective campuses.

The Trustees, the Chancellor and the Presidents develop systemwide policy, with actual implementation at the campus level taking place through broadly based consultative procedures. The Academic Senate of the California State University and Colleges, made up of elected representatives of the faculty from each campus, recommends academic policy to the Board of Trustees through the Chancellor.

Academic excellence has been achieved by The California State University and Colleges through a distinguished faculty, whose primary responsibility is superior teaching. While each campus in the system has its own unique geographic and curricular character, all campuses, as multipurpose institutions, offer undergraduate and graduate instruction for professional and occupational goals as well as broad liberal education. All of the campuses require for graduation a basic program of "General Education-Breadth Requirements" regardless of the type of bachelor's degree or major field selected by the student. A limited number of doctoral degrees is offered jointly with the University of California.

Presently, under the system's "New Approach to Higher Education," the campuses are implementing a wide variety of innovative programs to meet the changing needs of students and society. Among pilot programs under way are off-campus degree programs, weekend colleges, self-paced learning programs, and special testing programs to accelerate student progress toward a degree.

Enrollments in fall 1972 totaled 278,000 students, who were taught by a faculty of 15,500. Last year the system awarded over 55 percent of the bachelor's degrees and 35 percent of the master's degrees granted in California. Almost 360,000 persons have been graduated from the nineteen campuses since 1960.



AVERAGE ANNUAL COSTS AND SOURCES OF FUNDS PER FULL TIME EQUIVALENT STUDENT IN THE CALIFORNIA STATE UNIVERSITY AND COLLEGES

The nineteen campuses of The California State University and Colleges are financed primarily through funding provided by the taxpayers of California. For the 1973/74 year, the total costs of operation are $555.1 million, which provide continuing support for 233,290 full-time equivalent (FTE [1]) students. This results in an average cost per FTE student of $2,379 per year. Of this amount, the average student pays $225. Included in this average student payment is the amount paid by nonresident students. The remaining $2,154 in costs are funded by State and federal taxes.

Averages do not fit all students alike or even any specific student. To arrive at an average figure that is meaningful, the costs outlined above exclude "user fees" for living expenses, housing, and parking, as well as costs for extension and summer session work. Computations are based on full-time equivalent students, not individuals, and costs are prorated by system totals, not by campus. The average costs for a full-time equivalent student in the system are depicted in the following chart:

1973/74 PROJECTION OF TOTAL COSTS OF CAMPUS OPERATION

(Including Building and Land Amortization)

Projected Enrollment: 233,290 FTE

Source	*Amount*	*Average Cost Per Student (FTE)* [1]	*Percentage*
State Approp. (Support)	$442,143,744	$1,895	79.7
State Funding (Capital Outlay) [3]	29,161,250	125	5.3
Student Charges	52,402,254	225[2]	9.5
Federal (Fin. Aids)	31,375,098	134	5.5
Total	$555,082,346	$2,379	100.0

[1] For budgetary purposes, full-time equivalent (FTE) translates total head count into total academic student load. The term assumes that a full-time student in The California State University and Colleges is enrolled for 15 units of academic credit. Some students enroll for more than 15 units; some students enroll for fewer than 15 units.

[2] The average costs paid by a student include the materials and service fee, health facilities fee, college union fee, student body fee, and the nonresident tuition. This amount is derived by taking the total of all student fees and dividing by the total full-time equivalent student enrollment. Individual students may pay more or less than $225 depending on whether they are part-time, full-time, resident or nonresident students.

[3] The system's more than 14,000 acres of land and the wide range of facilities and equipment on the 19 campuses are currently valued at approximately $1.2 billion. Amortized over a 40-year period, they are valued at $125 per FTE student.

TRUSTEES OF THE CALIFORNIA STATE UNIVERSITY AND COLLEGES

EX OFFICIO TRUSTEES

Hon. Ronald Reagan *Governor of California and President of the Trustees*	State Capitol Sacramento 95814
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Hon. Wilson C. Riles *State Superintendent of Public Instruction*	721 Capitol Mall Sacramento 95814
Dr. Glenn S. Dumke *Chancellor of The California State University and Colleges*	5670 Wilshire Blvd. Los Angeles 90036

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Appointments are for a term of eight years expiring March 1 of the years in parentheses. Names are listed in order of appointment to the Board.

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9200 Sunset Blvd., Los Angeles 90069

Daniel H. Ridder (1975)
604 Pine Ave., Long Beach 90801

George D. Hart (1975)
111 Sutter St., San Francisco 94104

Alec L. Cory (1973)
530 "B" St., Suite 1900, San Diego 92101

Edward O. Lee (1974)
2000 Center Street, Berkeley, California 94704

Karl L. Wente (1976)
5565 Tesla Road, Livermore 94550

W. O. Weissich (1977)
1299 4th St., San Rafael 94901

Robert A. Hornby (1978)
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Los Angeles 90060

Wendell W. Witter (1979)
45 Montgomery St., San Francisco 94106

Mrs. Winifred H. Lancaster (1977)
P.O. Drawer JJ, Santa Barbara 93102

Gene M. Benedetti (1978)
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Robert F. Beaver (1976)
254 East 27th St., Los Angeles 90011

Roy T. Brophy (1980)
2160 Royale Rd., Suite 20, Sacramento 95815

Mrs. C. Stewart Ritchie (1980)
1064 Creek Dr., Menlo Park 94025

Frank P. Adams (1973)
235 Montgomery St., San Francisco 94104

Richard A. Garcia (1979)
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The California State University and Colleges
5670 Wilshire Boulevard
Los Angeles, California 90036
(213) 938-2981

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H. E. Brakebill	*Executive Vice Chancellor*
Norman L. Epstein	*Vice Chancellor and General Counsel*
D. Dale Hanner	*Vice Chancellor, Business Affairs*
Harry Harmon	*Vice Chancellor, Physical Planning and Development*
C. Mansel Keene	*Vice Chancellor, Faculty and Staff Affairs*
W. B. Langsdorf	*Vice Chancellor, Academic Affairs*

THE CALIFORNIA STATE UNIVERSITY AND COLLEGES

California State College, Bakersfield
9001 Stockdale Highway
Bakersfield, California 93309
(805) 833-2011

California State College, Dominguez Hills
1000 E. Victoria Street
Dominguez Hills, California 90247
Leo F. Cain, President
(213) 532-4300

California State University, Fullerton
Fullerton, California 92634
L. Donald Shields, President
(714) 870-2011

California State University, Hayward
25800 Hillary Street
Hayward, California 94542
Ellis E. McCune, President
(415) 884-3000

California State University, Long Beach
6101 East Seventh Street
Long Beach, California 90840
Stephen Horn, President
(213) 498-4111

California State University, Los Angeles
5151 State University Drive
Los Angeles, California 90032
John A. Greenlee, President
(213) 224-0111

California State College, San Bernardino
5500 State College Parkway
San Bernardino, California 92407
John M. Pfau, President
(714) 887-6311

California State Polytechnic University, Pomona
3801 West Temple Avenue
Pomona, California 91768
Robert C. Kramer, President
(714) 598-4141

California Polytechnic State University, San Luis Obispo
San Luis Obispo, California 93401
Robert E. Kennedy, President
(805) 546-0111

California State University, Chico
1st & Normal Streets
Chico, California 95926
Stanford Cazier, President
(916) 345-5011

California State University, Fresno
Shaw and Cedar Avenues
Fresno, California 93710
Norman A. Baxter, President
(209) 487-9011

California State University, Humboldt
Arcata, California 95521
Cornelius H. Siemens, President
(707) 826-3011

California State University, Sacramento
6000 J Street
Sacramento, California 95819
James Bond, President
(916) 454-6011

California State University, San Diego
5402 College Avenue
San Diego, California 92115
Brage Golding, President
(714) 286-5000
Imperial Valley Campus
720 Heber Avenue
Calexico, California 92231
(714) 357-3721

California State University, Northridge
18111 Nordhoff Street
Northridge, California 91324
James W. Cleary, President
(213) 885-1200

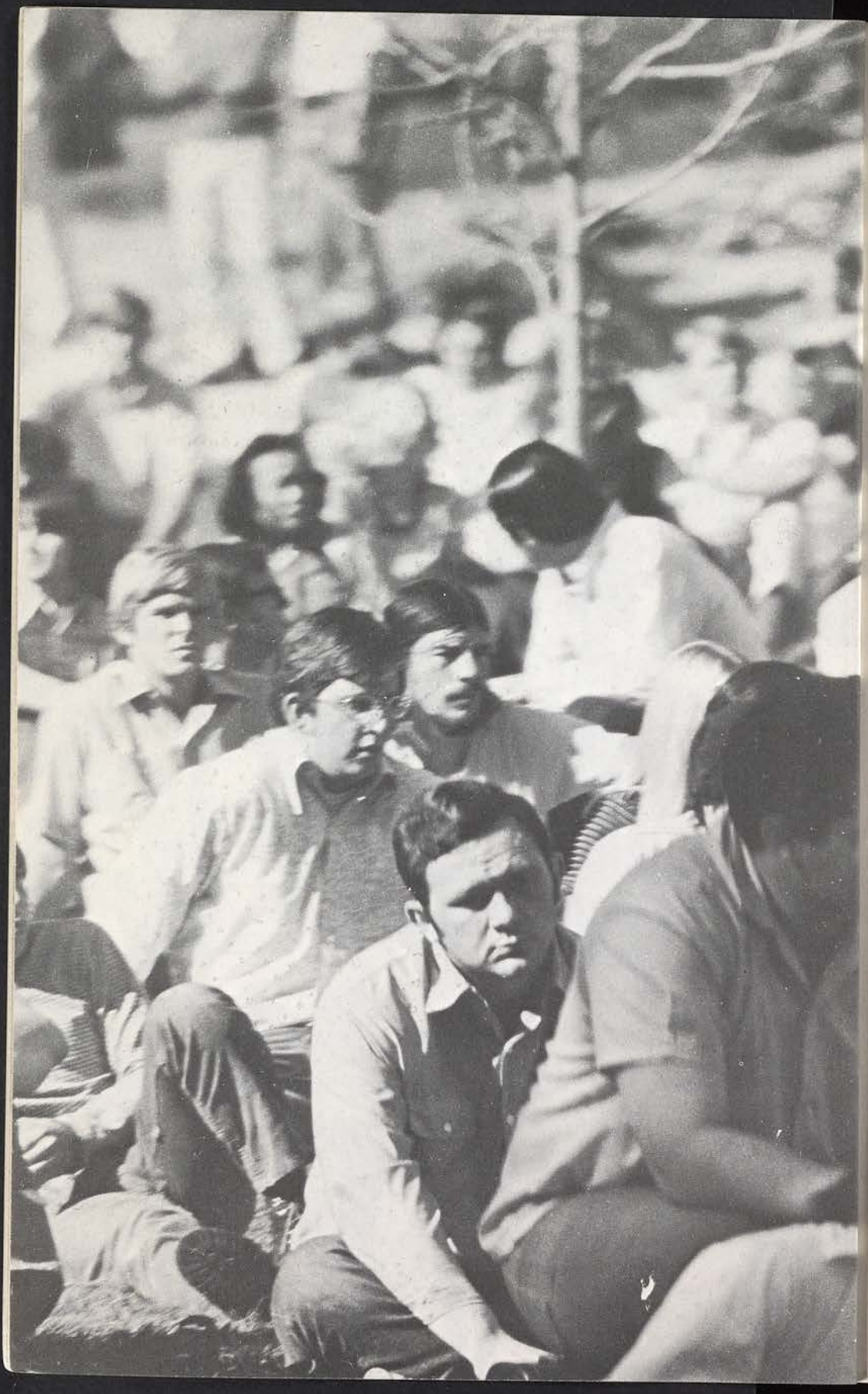
California State University, San Francisco
1600 Holloway Avenue
San Francisco, California 94132
Paul. F. Romberg, President
(415) 469-9123

California State University, San Jose
125 South Seventh Street
San Jose, California 95114
John H. Bunzel, President
(408) 277-2000

California State College, Sonoma
1801 East Cotati Avenue
Rohnert Park, California 94928
Thomas H. McGrath, President
(707) 795-2011

California State College, Stanislaus
800 Monte Vista Avenue
Turlock, California 95380
Carl Gatlin, President
(209) 634-9101





GENERAL ADMINISTRATION

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Vice President for Academic Affairs
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Vice President For Administration And Student Affairs
James Bell

Director of Business Affairs
William E. Fox

Associate Vice President for Administration
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Dean of Graduate Studies
Robert L. Maurer

Dean of Undergraduate Studies
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Dean of School of Agriculture
Frederick E. Beckett

Dean of School of Arts
Albert J. Aschenbrenner

Acting Dean of School of Business Administration
James C. Petersen

Acting Dean of School of Engineering
Rodney D. Sutherland

Acting Dean of School of Environmental Design
H. Frederick Koeper

Dean of School of Science
Vincent E. Parker

Director of Teacher Preparation Center
Alvin H. Thompson

Director of the University Library
Harold F. Wells

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CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

Robert C. Kramer, *President*

California State Polytechnic University, Pomona offers higher education in an atmosphere of free inquiry and social awareness. It offers its students the education and the opportunity to acquire skills, intellectual habits, critical attitudes, and broad perspectives which will help them function in and contribute to a changing society.

Since its founding, the University has specialized in practical, occupationally centered learning. Today, it continues this role and also offers a liberal education to its students and prepares them for professional roles in a variety of fields. Its main purpose is to teach, but it also recognizes that research is important to good teaching and to the search for truth. Freedom of thought and expression are expected and encouraged in the classroom, the laboratory, and the co-curricular programs of the University.

Fundamentally, a university serves many communities through the success of its graduates, but it directs neither its curricula nor its students to the immediate needs of any community. Nonetheless, it recognizes the importance of continuing education for all who desire to increase their knowledge in order to meet society's changing requirements. The value of higher education lies in students prepared to take part in broadly construed social activities and to change and grow with them.

The goals of this University include a number of specific objectives:

1. To provide for all, regardless of origin, educational opportunities of excellent quality and to foster continued professional development.

2. To develop programs which strengthen the student's powers of inquiry, creativity, and adaptability for study and experimentation; to deveop a capacity for disciplined thought, for breadth of sympathy, for discernment of values.

3. To find new and creative ways to foster the interaction among the technologies, the arts, and the sciences which lead to technological and social change.

4. To foster the individuality of each academic area in the University while assuring mutual support for the common goals.

5. To encourage the aesthetic and cultural development of the students and of the many communities the University serves.

6. To strengthen a tradition of the University for joint enterprise among students, faculty, and staff in the development of excellence.

7. To include all segments of the University community in developing University programs and policies.

The quality of a center of learning depends upon the people who are drawn to it as an institution with defined objectives and vision. In reaching for excellence in the pursuit of learning and education, something of worth happens to those who reach, and as a consequent the human community is enriched.

HISTORICAL DEVELOPMENT

In 1966, the California Legislature established California State Polytechnic College, Kellogg-Voorhis as an independent state college. Thus ended almost three decades of direct legal and administrative relationship between this institution and Cal Poly, San Luis Obispo. This rapidly growing, changing institution is proudly aware that it has its roots in an unusual two-campus spe-

cialized institution with a polytechnic emphasis.

In 1938, the 157-acre Voorhis Campus near San Dimas, formerly the Voorhis School for Boys, became the Southern California branch of California State Polytechnic School of San Luis Obispo. In 1945, the parent institution was renamed California State Polytechnic College.

The 813-acre W. K. Kellogg Arabian Horse Ranch near Pomona was deeded to the State in 1949, and in 1956 it became the second campus of the college's southern facility. Six programs in agriculture leading to four bachelor of science degrees were offered that year. By 1959, the curriculum of the college also included six degree programs in the arts and sciences and four in engineering. In 1962, the Voorhis Campus became a continuing education center and a laboratory for students in agriculture and natural sciences.

Many changes that were to have a profound influence on the college were made in 1961. The implementation of the Master Plan for Higher Education saw the establishment of the California State University and College System with its own Board of Trustees. In that year, the Legislature enacted *Education Code* Section 22606 which identifies the primary function of the State Colleges as ". . . the provision of instruction for undergraduate students and graduate students, through the master's degree, in the liberal arts and sciences, in applied fields and in the professions, including the teaching profession." The Legislature recognized the special responsibility of this college as a "polytechnic college" by adding Education Code Section 24751 which authorizes the college to emphasize ". . . the applied fields of agriculture, engineering, business, home economics, and other occupational and professional fields."

The 1966 establishment of California State Polytechnic College, Kellogg-Voorhis, Pomona, was accompanied by the appointment of Dr. Robert C. Kramer as President.

Since 1956, the educational programs have grown from 6 undergraduate programs enrolling 550 men to 53 undergraduate and 13 graduate programs enrolling over 9,000 men and women. The number of degrees granted increased from 54 in June 1957 to over 1600 in June 1972.

On November 29, 1971, the Governor signed into law Assembly Bill 123, the enabling legislation to change the name of the California State Colleges to the California State University and Colleges and also authorizing changes in name of those colleges which would fill the description of university. This institution was one of those which met these criteria and on June 1, 1972, the name was changed to California State Polytechnic University, Pomona.

Accreditation

The university is accredited as a degree-granting institution by the Western Association of Schools and Colleges and is authorized by the California State Board of Education to recommend candidates for California Standard Teaching Credentials, both elementary and secondary specializations, in a number of subject areas.

The School of Engineering is accreditated by the Engineering Council for Professional Development for its baccalaureate programs in aerospace engineering, civil engineering, electrical and electronics engineering, and mechanical engineering.

The School of Environmental Design is accredited by the American Society of Landscape Architects for its program in landscape architecture and recognized by the American Institute of Planners for its program in urban planning.

The School of Science is accredited by the American Chemical Society for its program in chemistry.

UNIVERSITY SYMBOL

The Mace is the symbol of the University. The crest of the Mace consists of five main branches, which combine in the trunk to symbolize strength. The branches symbolize the five disciplines of learning basic to the curricula of the University: the sciences, technology, the arts, the humanities, and commerce.

At the crown of the tree, the branches converge to support a sphere, symbolic of beauty and perfection arising from a study of the sciences, man and his works, learning, and the search for truth. The staff of the Mace represents the strength of the University. On the upper section of the staff is inscribed "W. K. Kellogg Foundation" to honor the University's benefactor and the philanthropic agency created by him. On the knurl is inscribed the University's Motto: INSTRUMENTUM DISCIPLINAE—Application of Knowledge. On the lower section of the staff is inscribed "Charles B. Voorhis" to memorialize the donor of the Voorhis School for Boys in San Dimas, an integral part of the University, which was its first site in Southern California. At the base of the staff is a stylized California poppy representing the State of California, denoting that from the State and its people come the authority and support of the University.

The Seal is the symbol of the official acts of the University. It appears on official documents and represents a verification of the University's approval of actions and events. It bears the symbolic elements of the Mace. Surrounding the Seal are two concentric circles bearing between them the designation "California State Polytechnic University, Pomona" the founding date, 1938, and above the tree the Motto: INSTRUMENTUM DISCIPLINAE.

The Emblem is a stylized tree with five main branches having smaller branches to symbolize departments and other entities that arise from the parent structure. It is used on documents, publications, and other public forms.

The President's Medal symbolizes the office of President. It is conferred upon the President by the Chancellor, granting him his presidential authority. It reproduces the Seal of the University in medallion form, supported by a chain of silver links.

On the reverse is inscribed "Auctoritas ex Administratoris et Collegio": "authority from the Trustees and the College". This denotes the delegation of authority to the President by the Trustees of the California State University and Colleges with the advice and consent of the convocation of the University.

The Campus

LOCATION

Located south of the San Bernardino Freeway on the eastern slope of Kellogg Hill, the campus is one of the largest in the state college system. The buildings represent a careful blending of the tile-roofed Spanish ranch structures built by W. K. Kellogg and the modern laboratory and classroom buildings of concrete and red brick. Campus development has preserved the beauty of the ranch and its original plantings. The combination of agricultural crops and livestock areas with science, engineering, and liberal arts facilities provides for the full range of instruction in the Cal Poly program.

A multi-level interchange, which is a link for the San Bernardino, Corona, Orange, Foothill, Pomona and Riverside Freeways, is located at the north-east corner of the campus. Now only forty minutes from the downtown areas of Los Angeles and San Bernardino, the university is also within east freeway access from a multitude of other communities in Los Angeles, Orange, San Bernardino and Riverside counties.

ADMINISTRATION BUILDING

A large three-story structure facing the central Mall, the Administration building

* (1) houses the university executive and business offices, various support services, and instructional units. The latter include a computer center, equipped with a digital computer and data processing equipment; faculty offices for language arts, communication arts, and art; journalism and student publications laboratories; art instruction studios; and classrooms and conference rooms.

LIBRARY

The modern four-story library (15) which can accommodate more than a quarter of a million volumes was opened in 1969. The library is organized into subject divisional reading rooms providing specialized collections, indexes, and reference service. Direct access to the collections is permitted all students. Indoor and outdoor study areas are also provided. The building is constructed to allow the addition of two more floors to serve a growing student body and faculty.

AGRICULTURAL FACILITIES

The chief agricultural facility is the Agriculture building (2) which contain laboratories, classrooms, faculty offices, and the office of the Dean of the School of Agriculture. Additional laboratories and offices are located in the new Environmental Design building (7).

The Agricultural Engineering building (45) houses shops, laboratories and classrooms for instruction in farm power and machinery, agricultural mechanics, carpentry, irrigation, and surveying.

Agricultural programs are also conducted at the Fruit Industries-Agronomy unit (28) which includes a complete citrus packing house, and at the Ornamental Horticulture unit (19) which includes 15 plant production facilities.

Directly related to animal science and other agricultural programs are the production units: a beef unit, meats processing building, poultry plant and feed mill (30-34) and swine and sheep units (37-38).

The Arabian horse unit (26) and horse show arena are operated as an instructional facility and also used for the Sunday Arabian horse shows.

Campus acreage utilized by the School of Agriculture for instruction includes field, vegetable, and forage crops; irrigated and natural pastures; citrus fruit and avocados; and ornamental plantings.

ARTS FACILITIES

Facilities for the School of Arts are found in many areas of the campus. The school offices along with the Departments of Behavioral Science, History, and Social Sciences are located in the School of Arts building (5). Besides general classrooms and faculty offices, the building will also house the Audio-Visual Center, the broadcast laboratories of the Communication Arts Department and the Teacher Preparation Center. This structure was one of the early academic buildings constructed and formerly the library.

Journalism laboratories, student publications offices, art studios, and related faculty offices are located on the third floor of the Administration building (1).

The Performing Arts Center is a two-building complex for instruction in music and speech and drama. The Speech-Drama building (25) contains a 500-seat theater, a large rehearsal room adaptable as a small central-staging theater, make-up and costume rooms, scenery shops, classrooms, and offices. The Music building (24) includes choral and orchestra rooms, offices, individual practice rooms, and a music library.

The Physical Education facility (41-44) includes multi-purpose buildings for instruction in physical education, athletics,

* Numbers in parentheses indicate building locations on map on page 26.

recreation, and specialized health and physical therapy programs. These facilities include gymnasiums, swimming pools, handball and tennis courts, fields for team sports, a track, a baseball field and a football field.

BUSINESS ADMINISTRATION FACILITIES

School of Business Administration operations are centered in the two-story Business building (6) on the central mall. This structure contains classrooms, accounting and business machine laboratories, facilities for merchandising displays, faculty offices, and the office of the school dean. Some instructional facilities for the school are also located in the Engineering Center.

ENGINEERING FACILITIES

The Engineering facilities consist of seven buildings dominated by a five-story Engineering Center (9), containing the office of the Dean of the School of Engineering, classrooms, electronics laboratories, faculty offices, and a snack bar. Other structures contain equipment and facilities for instruction in aerospace, civil, chemical, electrical, electronics, industrial, and mechanical engineering, and engineering technology (10–14).

ENVIRONMENTAL DESIGN FACILITIES

The new, 50,000 square foot Environmental Design building (7) was occupied in early 1971. It houses laboratories and classrooms for architecture, landscape architecture, urban planning, as well as faculty offices and the school dean's office.

SCIENCE FACILITIES

The Science building (3), which was the first academic building on campus, contains two large lecture rooms, and classrooms, laboratories, and faculty offices for the Departments of Biological Sciences, Chemistry, and Physics and Earth Sciences. Specialized laboratories for biochemistry, botany, earth sciences, entomology, microbiology, radiation biology, radio chemistry, and zoology are located in the building. Mathematics classrooms and faculty offices are located in the Engineering Center.

STUDENT CENTER

The main building in the two-building Student Center is the 800-seat dining hall (97), which also includes a snack bar, outside patio, and dining rooms for faculty and staff and special groups. The lower level provides a recreation room and storage and display areas for the college store, El Patio. Located nearby is one of the original ranch buildings, called the Duplex (95); it houses the offices of the Associated Students, Inc. and the activities offices of the Student Personnel Division.

STUDENT RESIDENCE AREA

Six residence halls (20, 21, 22, 23, 57, 58) accommodating 1184 students line the Kellogg Road entrance to the campus. Behind the halls is a 600-seat residence student dining commons (70). Overlooking the pond is the residence reception center (59) which includes lounges and facilities for social events, and the residence hall activities office.

HEALTH CENTER

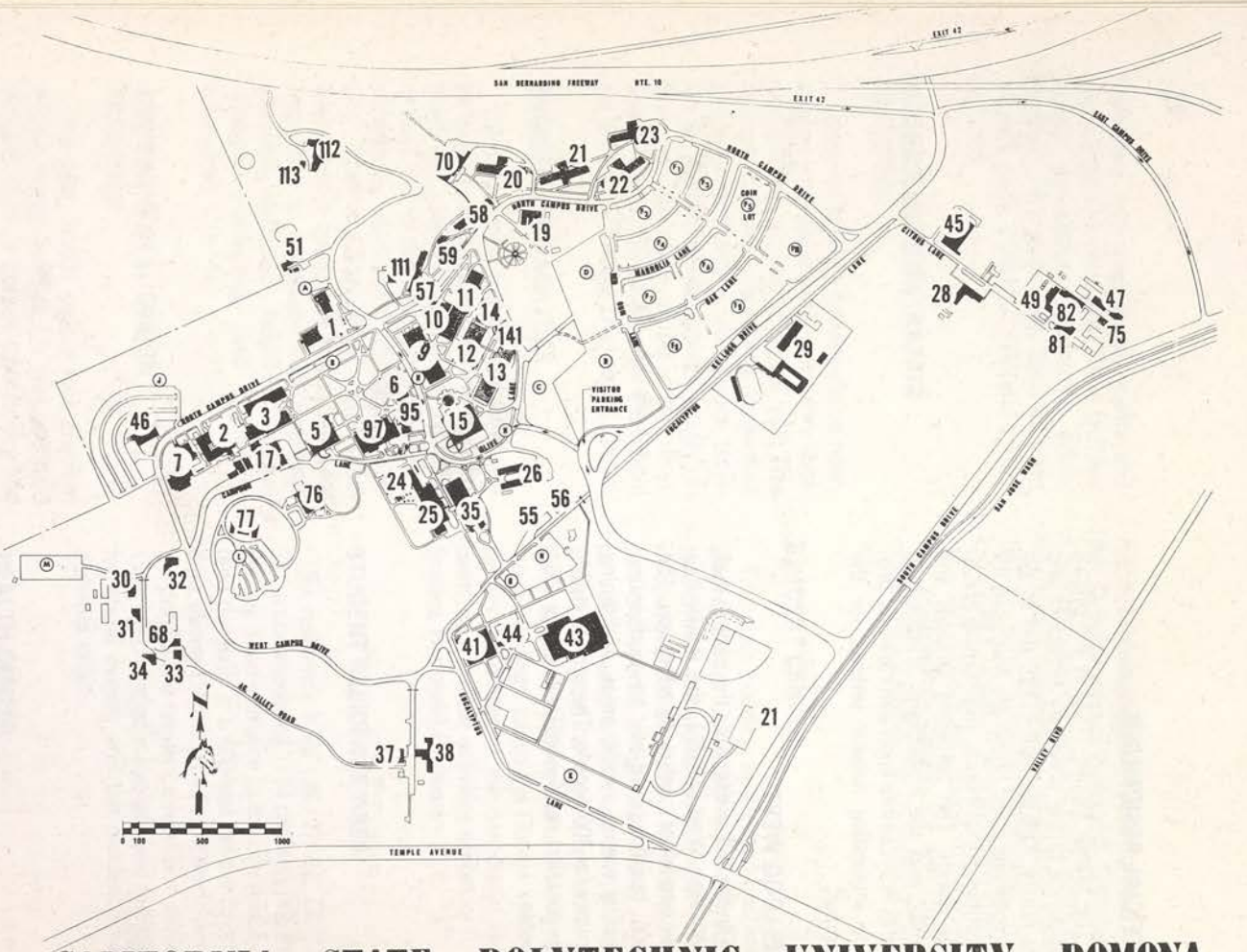
The Health Center (46) includes facilities for X-ray, physical-therapy, laboratory tests, and emergency care and treatment and beds for day care, as well as physicians' consultation, treatment, and examination rooms. Although there are no infirmary rooms, day-rest facilities are available.

OFFICIAL RESIDENCES

The Manor House (111) is the official residence of the university president and his family; Kellogg Hall (112) and its accompanying guest house are now used for meetings, social events, and housing of college guests. The adjoining grounds and ponds, and the collections of specimen plants in Sycamore and Palm canyons, provide interesting natural settings for the campus.

KELLOGG WEST

On the hill overlooking the central mall is Kellogg West (76-77), the university's new center for continuing education. The main building contains an auditorium, meeting rooms, exhibit areas, and dining facilities for 700 people. The second building contains residence facilities for 102 people.



	NUMBER AND BUILDING
1	ADMINISTRATION BUILDING
1a	AGRICULTURE CLASSROOM BUILDING
2	SCIENCE BUILDING
5	SCHOOL OF ARTS
6	BUSINESS BUILDING
7	ENVIRONMENTAL DESIGN BUILDING
9	ENGINEERING CENTER
10	METAL PROCESSES
11	CE, ME, MPE ENGINEERING
12	CENTRAL ENGINEERING
13	AEROSPACE/INDUSTRIAL ENGINEERING
14	WIND TUNNEL
15	LIBRARY BUILDING
17-18	FACULTY OFFICES
19	ORNAMENTAL HORTICULTURE UNIT
20	ENCINITAS HALL
21	MONTECITO HALL
22	ALAMITOS HALL
23	ALISO HALL
24	MUSIC BUILDING
25	SPEECH/DRAMA BUILDING
26	HORSE STABLES
27	FACULTY OFFICES
28	FRUIT/AGRONOMY UNIT
29	ARABIAN HORSE FACILITY*
30	AGRICULTURE
31	POULTRY UNIT/POULTRY HOUSES
32	BEEF UNIT/FEED SHED
33	FEED MILL
34	MEAT PROCESSES
35	STUDENT UNION *
37	SWINE UNIT/SHELTERS
38	SHEEP/WOOD UNIT
41	PHYSICAL EDUCATION BUILDING
43	GYMNASIUM
44	SWIMMING POOL
45	AGRICULTURE ENGINEERING BUILDING
46	HEALTH SERVICES BUILDING
47	AGRICULTURE ENGINEERING TRACTOR SHOP
51	ART LABS
57	PALMITAS HALL
58	CEDRITOS HALL
59	LA ESPINEGA CENTER
68	HAY STORAGE
70	LOS OLIVOS COMMONS
75	COLLEGE RECEIVING
76	KELLOGG WEST-EDUCATION/DINING
77	KELLOGG WEST-MAIN LODGE
81	PHYSICAL PLANT/UNIVERSITY POLICE OFFICES
82	RECEIVING/WAREHOUSE BUILDING
83-92	FACULTY OFFICES
95	DUPLEX BUILDING
97	CAMPUS CENTER DINING HALL
111	MANOR HOUSE
112	KELLOGG HALL
113	GUEST HOUSE
121	GROUNDS STORAGE

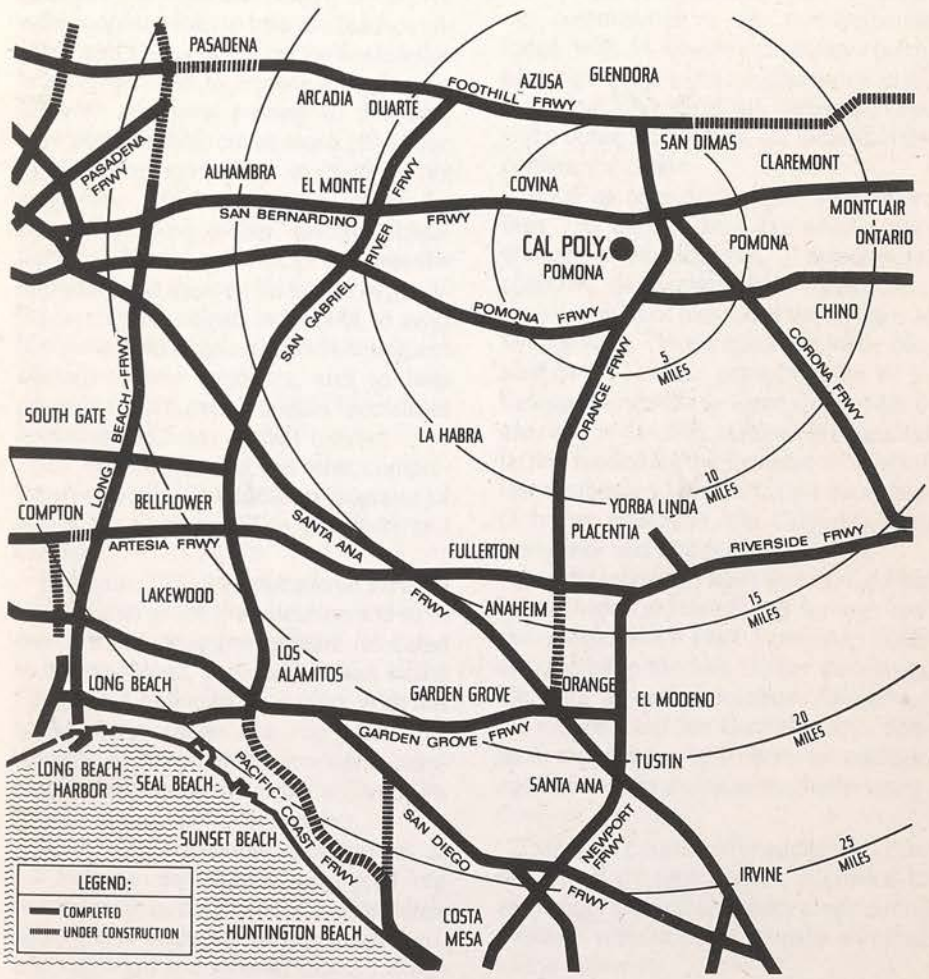
* UNDER CONSTRUCTION

	PARKING AREAS
A	ADMINISTRATION
B	FACULTY-STAFF
C	FACULTY-STAFF
D	STUDENT
F-1	PARKING METERS
F-5	COIN LOT
F 1-10	STUDENT
G	FACULTY-STAFF
H	VISITOR
J	FACULTY-STAFF-STUDENT
K	FACULTY-STAFF-STUDENT
K	PARKING METERS
L	K.W. CONFEREE PARKING
M	STUDENT
N	FACULTY-STAFF-STUDENT

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

3801 West Temple Ave. Pomona, California 91768

Freeways and Major Highway Routes leading to California State Polytechnic University, Pomona



Continuing Education

Institutions of higher education have, in recent years, recognized a growing demand for providing educational opportunities for those seeking education other than the full-time student. Since 1961, Cal Poly, Pomona recognized that obligation, and through its facilities and resources has provided opportunities to help the teacher upgrade and keep current on the knowledge in his or her field; to provide school workers with additional training so that they may perform their duties more efficiently; to allow the homemaker to continue her education, which otherwise might be stopped because of her daytime obligations; to offer the scientist or engineer the opportunity to sharpen his talents by working on current subjects in his field; to assist businesses and oganizations in training and upgrading their members; and to help other interested people obtain specialized knowledge in areas of their interest.

Cal Poly has one of the most comprehensive continuing education programs of any of the California State University and Colleges.

In August, 1972 the Educational Services office within which the extension and summer sessions programs operate relocated to Kellogg West, the multi-million dollar Center for Continuing Education. With this consolidation under one roof, Cal Poly services which provide surrounding communities with continuing education opportunities began operating together.

Continuing education opportunities at Cal Poly can generally be organized into two main areas: conferences and institutes, which serve businesses and organizations, and extension and summer session, which serve the individual.

Through a staff of professional conference coordinators, Kellogg West provides businesses and organizations with modern facilities, assistance in program planning, professional evaluation, securing effective resources and teacher personnel for conferences and institutes. Its location on a university campus enables Kellogg West to make use of the resources and teaching staff on campus.

Kellogg West's modern facilities have provided lodging for conferees from all over the United States and the world. Adjacent to the conference center, with the view of the Pomona valley and surrounding communities is an air-conditioned lodge, with 51 double-occupancy rooms. Meeting rooms, a large auditorium accommodating 250 individuals, dining facilities and a public coffee shop are located in the conference center.

Since its opening in April, 1971, more than 750 banks, retail businesses, government organizations, associations, churches, corporations, clubs and educational institutions have used the facilities at Kellogg West. The complex was made possible by a $3 million grant from the W. K. Kellogg Foundation in Battle Creek, Michigan, and is the 10th continuing education facility funded by the Foundation. It is the first established within a statewide system of higher education, the California State University and Colleges.

For the individual adult learner, Cal Poly has provided extension and summer session classes since 1969. Extension classes are offered in the Fall, Winter and Spring Quarters, at various locations throughout the Pomona and San Gabriel valleys. Subjects range from agriculture to zoology, and from scuba diving to teacher preparation.

Extension courses offer adults who cannot attend daytime classes, a chance to earn upper division university credit during evenings without being formally admitted to the university.

Summer sessions are offered for students who do not want to go through the university's formal matriculation process, or who wish to complete their course of study in a short time. Courses vary in length, from a few days to several weeks. Especially featured during the summer session are

a number of equitation workshops, horseshoeing workshops, mission trails which visit Southern California missions, camping trips and teacher prep courses.

For further information on extension or summer session, or to regularly receive a catalogue, contact the extension offices at Kellogg West, California State Polytechnic University, Pomona, California 91768, or call (714) 595-7511.

If your business, organization or club is interested in having developed or holding a conference, institute or seminar at Kellogg West, contact the bookings and reservations office, at the same address and telephone number.

Cal Poly Foundation

The Cal Poly Foundation, Inc. was organized and is operated to provide essential services and facilities which are an integral part of the educational programs of the university but which would be difficult to conduct directly through state operation.

The foundation is a self-supporting organization whose resources are used exclusively to complement the university's programs.

Foundation activities include the operation of all food service facilities, including vending, the bookstore, and the fiscal administration for student instructional projects, supplementary health services, instructional research programs, international programs, workshops, conferences, institutes, and the Arabian horse show. Contracts and grants from public and private agencies that are awarded to the university are administered by the foundation.

The foundation was created on February 28, 1966 as a non-profit educational organization within the scope of the provisions of the *California Revenue and Taxation Code,* Section 23701 (d) and the *United States Internal Revenue Code,* Section 501 (c) (3), and operates in conformity with regulations established by the Trustees of the California State University and Colleges and approved by the California State Director of Finance as required by the *California Education Code,* Section 24054. It is administered and supervised by the university administrative organization as required by Title 5, *California Administrative Code,* Section 42601 (c).

Alumni Association

The California State Polytechnic University Alumni Association Incorporated is an association of graduates, former students and friends of the university. The operations of the organization are carried out by a Board of Directors consisting of a president; six vice presidents representing the instructional schools of the university; a vice president in charge of special interest groups; a secretary; a treasurer; fourteen directors; a student representative from the Associated Students, Inc.; and a university representative appointed by the President of the university.

In addition to regional and local meetings of alumni, the Association welcomes members to receptions during Poly Vue, maintains an alumni directory, is responsible for all alumni publications, to include the *Challenge,* and annually honors an Outstanding Alumnus of the Year.

Information about the Association may be obtained by contacting the university's Alumni Office.

Arabian Horse Program

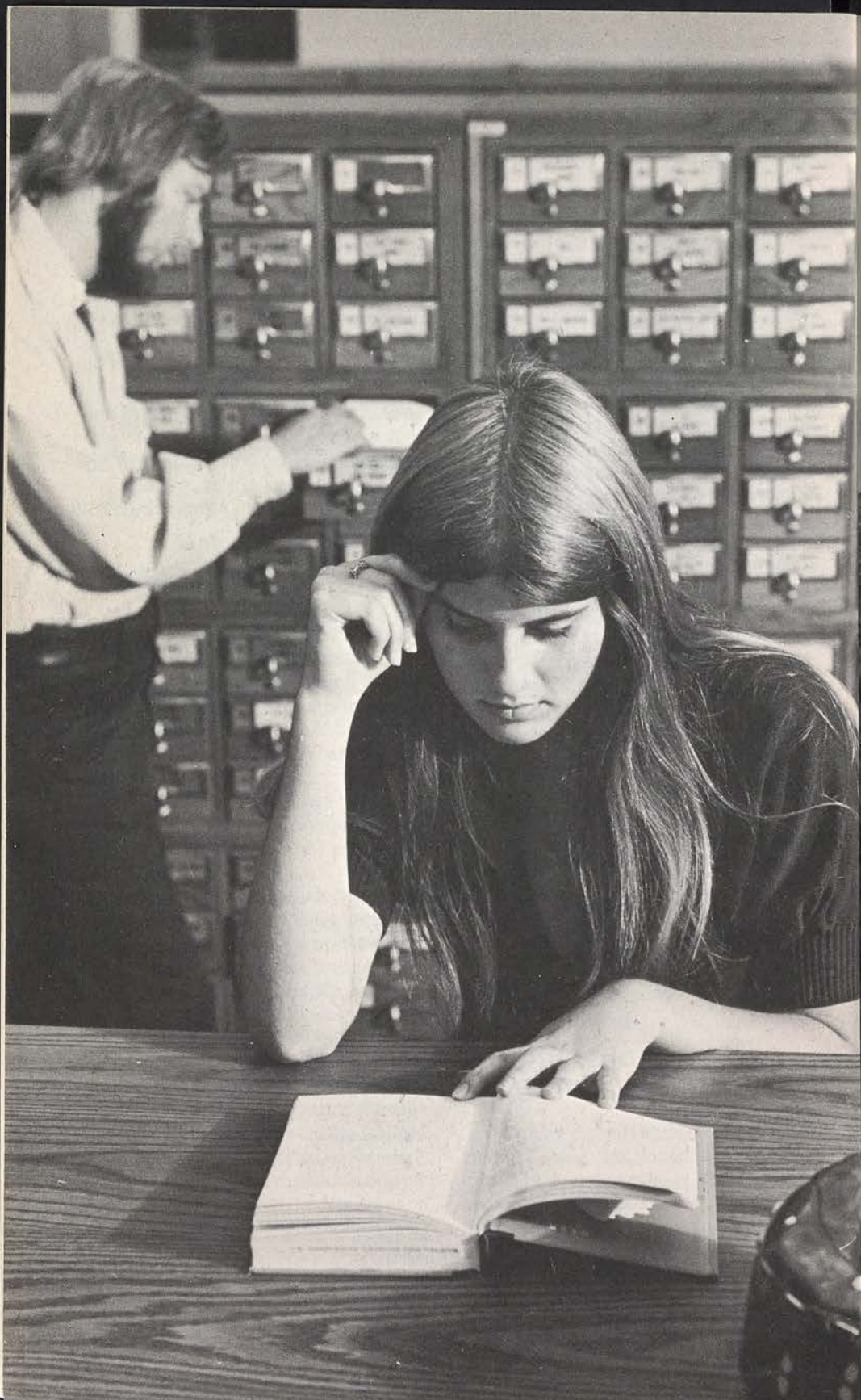
The oldest campus tradition is the Arabian horse show, first started by W. K. Kellogg in 1926, and continued after his ranch became a university campus. Public performances are given every Sunday during October and November, and January through May at 2 and 3:30 p.m. The program, featuring the Arabian as an English,

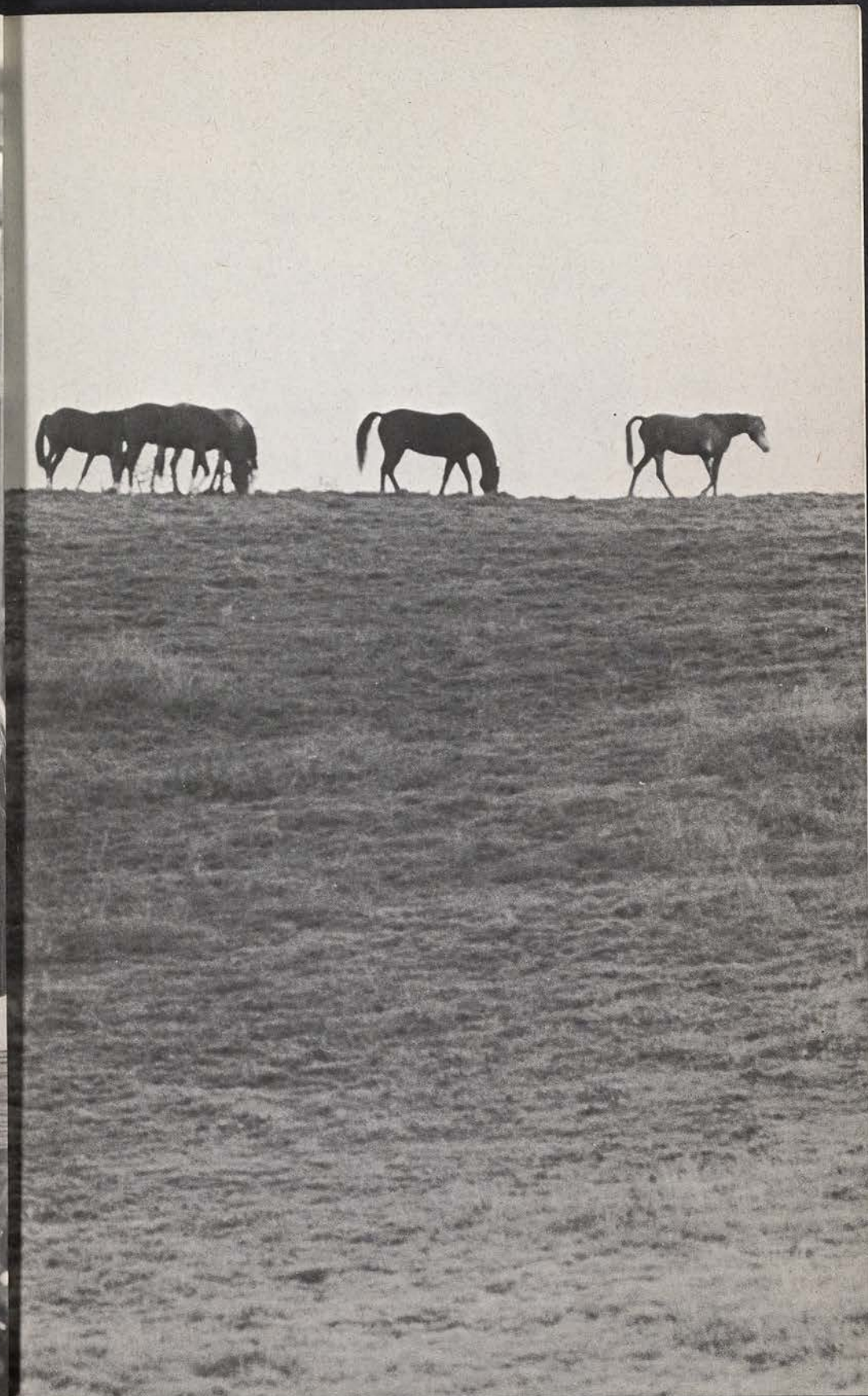
western, stock, trick and jumping horse, is planned and produced by students working with horses they have trained.

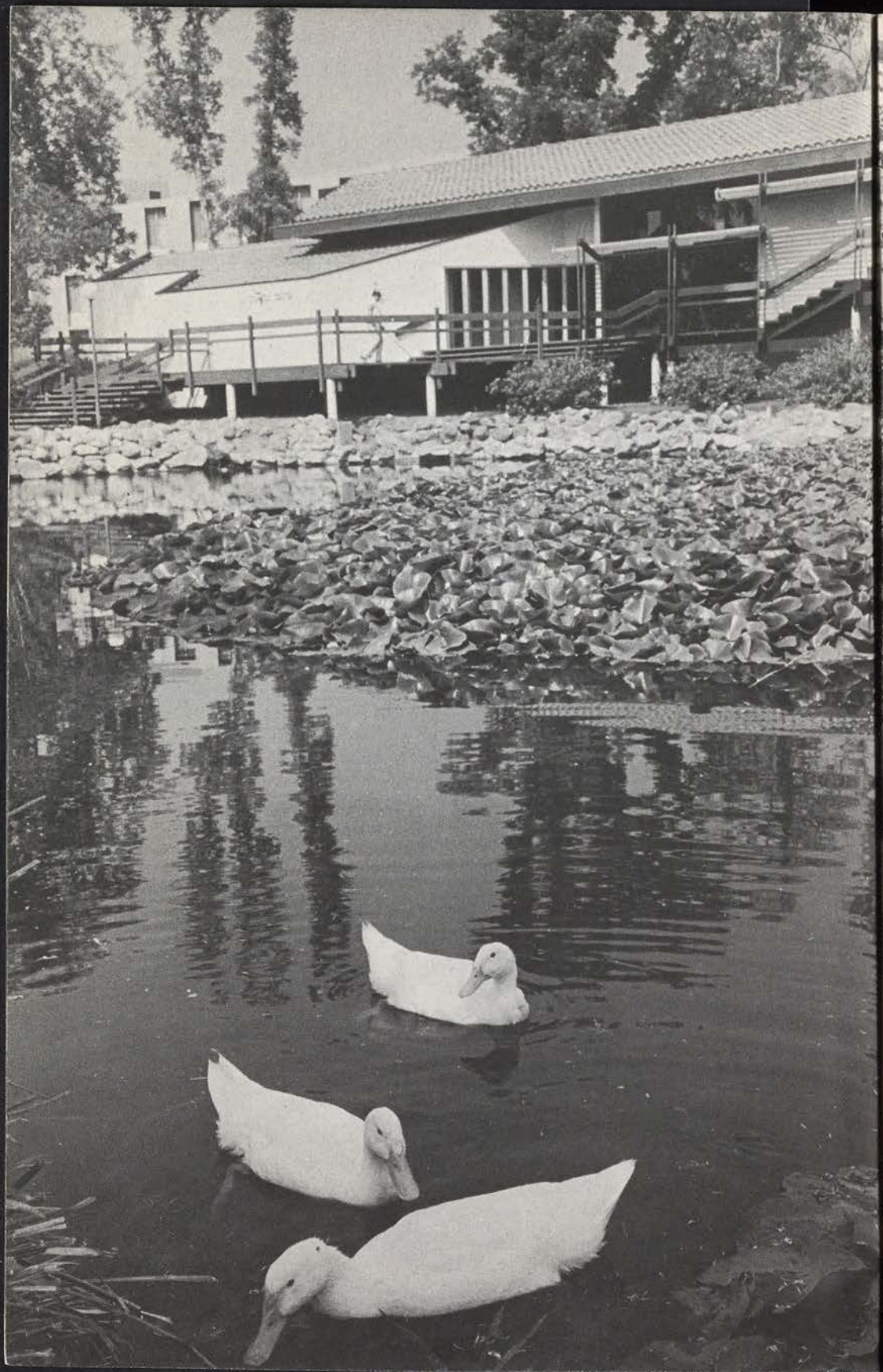
The shows are designed to promote interest in the Arabian breed and point up the horse's versatility, beauty, and intelligence, as well as to offer valuable experience for students in handling horses. The Arabians are utilized in the animal science courses related to the ever expanding field of light horse production and training. The Kellogg Ranch has been one of the world's outstanding Arabian horse breeding farms, and the university continues the breeding program today, perpetuating the Arabian and making valuable blood lines available to the public. The Kellogg Arabians are a noted attraction for thousands of Southern Californians and tourists who view the show each year.

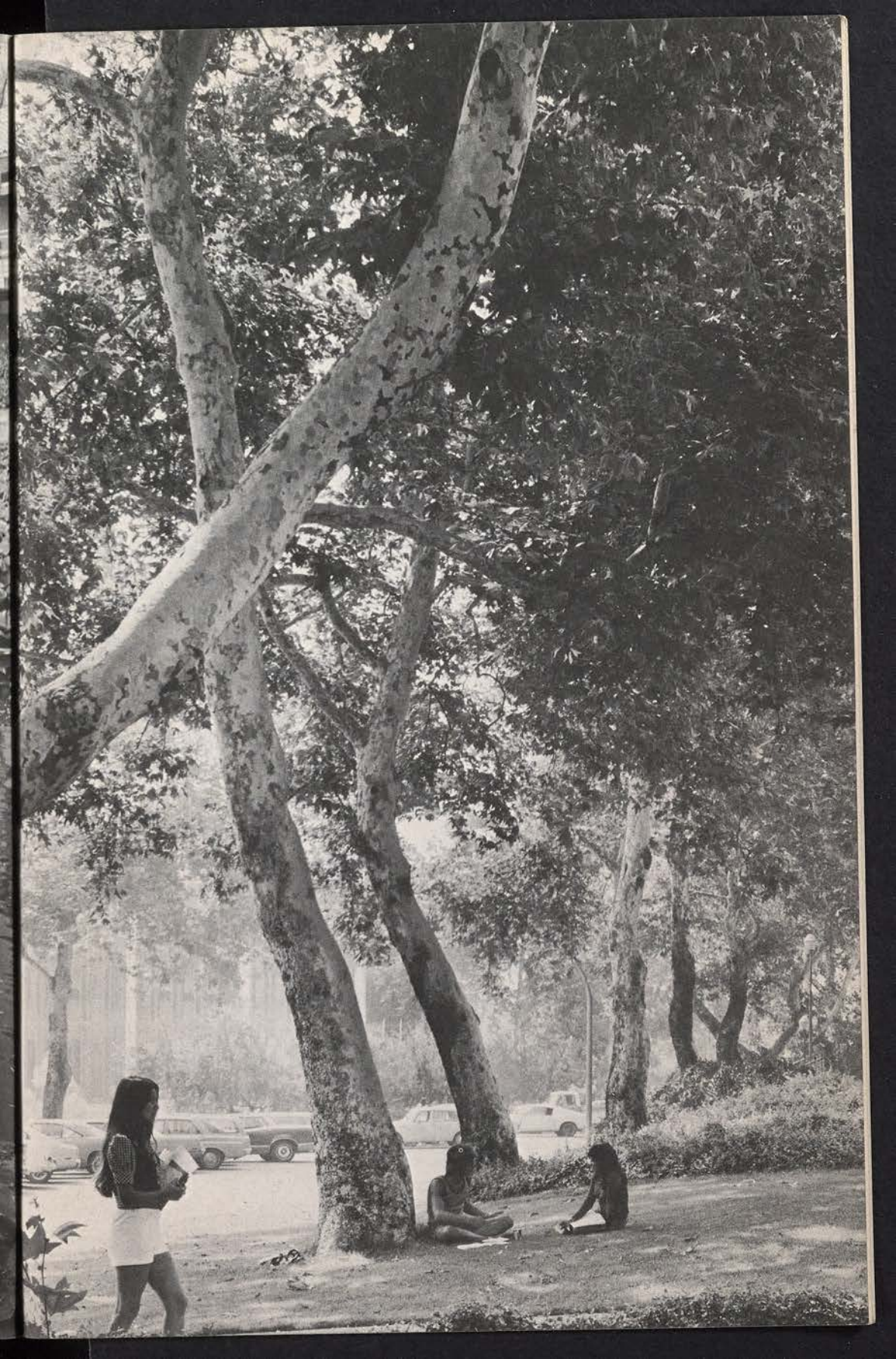
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ADMISSIONS

APPLICATION PROCEDURES

Admission to the Campus

Requirements for admission to The California State University and Colleges are in accordance with Title 5, Chapter 5, Subchapter 2, of the California Administrative Code, as amended by the Board of Trustees of The California State University and Colleges on November 24, 1970. A prospective applicant who is unsure of his status under the requirements is encouraged to consult his school or college counselor or a Campus Admissions Officer.

Undergraduate Application Procedures —1974–75

All prospective undergraduate students must file a complete application for admission within the appropriate filing period. A complete application includes an application, a residence questionnaire, a data coding form, and the $20.00 non-refundable application fee. Each undergraduate applicant may file only one application for any one term with The California State University and Colleges System. Applications may be obtained from any campus of the system or high school and community college counselors, and should be filed with the campus of first choice. Alternate choice campuses may be listed on the application. Applicants seeking financial aid should also complete and submit with the application a Preliminary Financial Aid Application.

Graduate Application Procedures— 1974–75

All applicants for any type of post-baccalaureate status (e.g., Master's degree aspirants, those seeking credentials, and those interested in taking courses for professional growth, etc.) must file a complete application packet for admission to post-baccalaureate status within the appropriate filing period. A complete application packet for admission to post-baccalaureate status includes an "Application for Admission/Readmission" (for post-baccalaureate students), a "Residence Questionnaire", a "Supplemental Graduate Admissions Application", a "Data Coding Form", and the $20.00 non-refundable application fee. Post-baccalaureate applicants who were enrolled as undergraduate students at the campus in the term immediately preceding the term for which they now wish to apply are also required to complete and submit an application packet and remit the $20.00 non-refundable application fee. Applicants seeking financial aid should also complete and submit with the application material specified above, a "Preliminary Financial Aid" application.

Since applicants for post-baccalaureate programs will be limited to the choice of a single campus on each application, redirection to alternative campuses will be minimal. In the event that a post-baccalaureate applicant wishes to be considered by more than one campus, it will be necessary to submit a separate application (and fee) to each.

Application materials may be obtained from the Office of Admissions or the Graduate Studies Office of any campus within the system and should be filed with the campus of first choice.

Application Filing Periods—1974–75

Term	*Initial Filing Period*	*Extended Filing Period (begins on date given and continues until quotas are reached)*
Summer, 1974	Jan. 1–31, 1974	Feb. 1, 1974
Fall Q, 1974	Nov. 1–30, 1973	Dec. 1, 1973
Fall S, 1974	Nov. 1–30, 1973	Dec. 1, 1973
Winter Q, 1975	June 1–30, 1974	July 1, 1974
Spring S, 1975	Aug. 1–31, 1974	Sept. 1, 1974
Spring Q, 1975	Aug. 1–31, 1974	Sept. 1, 1974

Calendars

Semester Calendar		Quarter Calendar	
Chico	Northridge	Bakersfield	Los Angeles
Fresno	San Francisco	Dominguez Hills	Cal Poly, Pomona
Fullerton	San Jose	Hayward	San Bernardino
Long Beach	Sonoma	Humboldt	Cal Poly, SLO
Sacramento	Stanislaus*		
San Diego			

* The Stanislaus campus is on a modified semester plan, with an "early" fall semester, concluding before the December holidays, an interim term of one month, and a regular spring semester.

Initial Filing Period

All applications filed during the initial filing period will receive equal consideration within established enrollment categories and quotas, irrespective of the time and date filed.

Space Reservations

Applicants who can be accommodated within category quotas will receive confirmation of space reservation. Although the space reservation is not a statement of admission, it is a commitment on the part of the campus to admit a student once eligibility has been determined. When the student receives notice of the space reservation, he should initiate action to have transcripts of all college and high school work sent to the campus where space has been reserved. The campus will inform him of the number of copies of transcripts required, dates for submittal, and where they should be sent. THE STUDENT SHOULD NOT REQUEST THAT TRANSCRIPTS BE SENT UNTIL REQUESTED TO DO SO BY THE CAMPUS WHERE SPACE HAS BEEN RESERVED.

Redirection

Applications of students who cannot be accommodated at their first choice campus will automatically be redirected to their second choice, and, if they cannot be accommodated there, to their third choice, etc.

Hardship Petitions

Each campus has established procedures to consider qualified applicants who would be faced with an extreme hardship if not admitted. Prospective hardship petitioners should contact the campus regarding specific policies governing hardship admission.

Extended Filing Period

Campuses not filling category quotas during the intital filing period will continue to accept applications during the extended filing period until quotas are filled. Application priority within the extended period will be granted in chronological order of application receipt by the campuses.

UNDERGRADUATE ADMISSIONS REQUIREMENTS

First-Time Freshmen

Applicants who have completed no college work * after high school graduation will be considered for admission as first-time freshmen under one of the following provisions. Results of either the CEEB Scholastic Aptitude Test (SAT) or the American College Testing program examination (ACT) are acceptable in establishing eligibility.

* Exceptions: College credit earned concurrent with high school enrollment; college credit earned in summer session after high school and prior to regular matriculation in college; college credit granted for the CLEP or ADVANCED PLACEMENT programs, or military or USAFI courses; or college credit granted for some non-traditional learning experience, will *not* affect the applicant's status as a first-time freshman for application quota purposes as well as admission. Further, the accelerated student, who completes his high school program mid-year, who has applied to The California State University and Colleges for the following Fall term, but chooses to attend a local community college in the spring term will be considered a first-time freshman for application quota purposes as well as admission. All such college or advanced standing credit, if fully acceptable as transfer credit, will be granted the student after admission.

California High School Graduates and Legal Residents for Tuition Purposes must have a grade point average and total score on the SAT, or composite score on the ACT, which together provide an eligibility index placing them in the upper one-third of California high

school graduates. The grade point average is based upon all high school course work completed in grades 10–12, excluding physical education and military science courses.

High school graduates from other states or possessions who are nonresidents for tuition purposes must present an eligibility index which places them in the upper one-sixth of California high school graduates. The following table gives grade point averages and test scores which together combine to establish eligibility.

SAT

CEEB
Box 1025
Berkeley, California 94770

Dates Test Given:
October 13, 1973
(California & Texas only)
November 3, 1973
February 2, 1974
April 6, 1974
June 22, 1974

ACT

Registration Unit
P.O. Box 168
Iowa City, Iowa 52240

Dates Test Given:
October 20, 1973
December 8, 1973
February 23, 1974
April 27, 1974
June 15, 1974
(not at Cal Poly, Pomona)

Graduates of Foreign High Schools

Applicants who are graduates of foreign high schools must have preparation equivalent to that required of eligible California high school graduates. The campus will carefully review the previous record of all such applicants and only those with promise of academic success equivalent to that of eligible California high school graduates will be admitted. Such applicants are not required to take the (SAT) (ACT) (either) except when specifically requested to do so.

Non-High School Graduates

Applicants who are over 18 years of age, but have not graduated from high school will be considered for admission only when preparation in all other ways is such that the campus believes promise of academic success is equivalent to that of eligible California high school graduates.

High School Students

Students still enrolled in high school will be considered for enrollment in certain special programs if recommended by the principal and if preparation is equivalent to that required of eligible California high school graduates. Such admission is only for a given program and does not constitute the right to continued enrollment.

Admission as Undergraduate Transfers

Applicants for admission to the California State University and Colleges as undergraduate transfers will be considered for admission under one of the following provisions:

Applicants who have successfully completed 60 or more transferable semester units, or the equivalent, are eligible for admission if they have achieved a grade point average of 2.0 (C) and were in good standing at the last college attended. Nonresident applicants must have earned a grade point average of at least 2.4 (C+).

Applicants who have successfully completed fewer than 60 transferable semester units, or the equivalent, are eligible for admission if they meet the above requirements *and* the current first-time freshman requirements. Applicants for admission as transfer students who have been continuously enrolled at a college since graduation from high school are eligible if they meet the first-time freshmen requirements in effect at the time of their high school graduation. Either SAT

or ACT test results are required of transfer applicants with fewer than 50 transferable semester units.

ELIGIBILITY INDEX

The following chart is used in determining the eligibility of graduates of California high schools (or California legal residents) for freshman admission to a CSUC campus. Grade point averages are based on work completed in the last three years of high school, exclusive of physical education and military science. Scores shown are the SAT Total and the ACT Composite. Students with a given G.P.A. must present the corresponding test score. Conversely, students with a given ACT or SAT score must present the corresponding G.P.A. in order to be eligible.

The minimum eligibility index is: SAT = 3072 and ACT—741. The index is computed either by multiplying the grade point average by 800 and adding it to the total SAT score, or multiplying the grade point average by 200 and adding it to 10 times the composite ACT score.

G.P.A.	A.C.T. Score	S.A.T. Score	G.P.A.	A.C.T. Score	S.A.T. Score	G.P.A.	A.C.T. Score	S.A.T. Score	G.P.A.	A.C.T. Score	S.A.T. Score	G.P.A.	A.C.T. Score	S.A.T. Score
(-)[1]			2.96	15	704	2.71	20	904	2.47	25	1096	2.22	30	1296
3.20	11	512	2.95	16	712	2.70	21	912	2.46	25	1104	2.21	30	1304
3.19	11	520	2.94	16	720	2.69	21	920	2.45	26	1112	2.20	31	1312
3.18	11	528	2.93	16	728	2.68	21	928	2.44	26	1120	2.19	31	1320
3.17	11	536	2.92	16	736	2.67	21	936	2.43	26	1128	2.18	31	1328
3.16	11	544	2.91	16	744	2.66	21	944	2.42	26	1136	2.17	31	1336
3.15	12	552	2.90	17	752	2.65	22	952	2.41	26	1144	2.16	31	1344
3.14	12	560	2.89	17	760	2.64	22	960	2.40	27	1152	2.15	32	1352
3.13	12	568	2.88	17	768	2.63	22	968	2.39	27	1160	2.14	32	1360
3.12	12	576	2.87	17	776	2.62	22	976	2.38	27	1168	2.13	32	1368
3.11	12	584	2.86	17	784	2.61	22	984	2.37	27	1176	2.12	32	1376
3.10	13	592	2.85	18	792	2.60	23	992	2.36	27	1184	2.11	32	1384
3.09	13	600	2.84	18	800	2.59	23	1000	2.35	28	1192	2.10	33	1392
3.08	13	608	2.83	18	808	2.58	23	1008	2.34	28	1200	2.09	33	1400
3.07	13	616	2.82	18	816	2.57	23	1016	2.33	28	1208	2.08	33	1408
3.06	13	624	2.81	18	824	2.56	23	1024	2.32	28	1216	2.07	33	1416
3.05	14	632	2.80	19	832	2.55	24	1032	2.31	28	1224	2.06	33	1424
3.04	14	640	2.79	19	840	2.54	24	1040	2.30	29	1232	2.05	34	1432
3.03	14	648	2.78	19	848	2.53	24	1048	2.29	29	1240	2.04	34	1440
3.02	14	656	2.77	19	856	2.52	24	1056	2.28	29	1248	2.03	34	1448
3.01	14	664	2.76	19	864	2.51	24	1064	2.27	29	1256	2.02	34	1456
3.00	15	672	2.75	20	872	2.50	25	1072	2.26	29	1264	2.01	34	1464
2.99	15	680	2.74	20	880	2.49	25	1080	2.25	30	1272	2.00	35	1472
2.98	15	688	2.73	20	888	2.48	25	1088	2.24	30	1280	(-)[2]		
2.97	15	696	2.72	20	896				2.23	30	1288			

[1]Students earning grade point averages above 3.20 are eligible for admission.
[2]Students earning grade point averages below 2.0 are not eligible for admission.

OTHER APPLICANTS

An applicant not admissible under one of the above provisions should enroll in a junior college or other appropriate institution. Only under the most unusual circumstances will such applicants be permitted to enroll in the university. Permission is granted only by special university action.

ENTRANCE PREPARATION

Overall excellence of performance in high school subjects and evidence of academic potential provide the basis for success in college. While no specific high school course pattern is required, the applicant, to prepare himself to undertake a full program of studies and to pursue the required program in general education, is encouraged to include in his high school program subjects which provide a background for college work.

The following courses are recommended:

1. College preparatory English.
2. Foreign language.
3. College preparatory mathematics.
4. College preparatory laboratory science.
5. College preparatory history and/or social science.
6. Study in speech, music, art, and other subjects contributing to general academic background.

Admission as a Transfer

Any individual who has attempted college work will be considered for admission under one of the following provisions.

APPLICANTS WITH 60 OR MORE SEMESTER UNITS

An applicant who has completed 60 or more semester units (90 quarter units) or the equivalent at an accredited college or university is eligible for admission if he has achieved a grade point average of 2.0 (C) on all acceptable college work attempted and was in good standing at the last college he attended.

Non-resident applicants must have attained a grade point average of at least 2.4 (C+).

APPLICANTS WITH FEWER THAN 60 SEMESTER UNITS

An applicant who has completed fewer than 60 semester units (90 quarter units) or the equivalent at an accredited college or university may be admitted if he meets the above scholarship and good standing requirements and if he meets requirements currently in effect for first-time freshmen; or, if he has been in full-time continuous enrollment at a college since his graduation from high school, and he meets the requirements that were in effect for first-time freshmen at the time of his high school graduation.

Either ACT or SAT test results are required of transfer applicants with fewer than 60 semester units (90 quarter units).

APPLICANTS WITH PARTICULAR MAJORS

An applicant who does not meet either of the above provisions may be admitted to the college if his desired major is such that 60 semester (90 quarter units) units of work appropriate to that major are not offered by the institution from which he seeks to transfer, and if he meets all of the following:

1. He has completed all appropriate course work offered at the college from which he will transfer.
2. He has attained a grade point average of 2.0 (C) in all college work attempted.
3. He was in good standing at the last college attended.
4. He can, in the judgment of the university, succeed in his degree objective.

OTHER APPLICANTS

Applicants not admissible under one of the above provisions should enroll in a junior college or other appropriate institution. Only under the most unusual circumstances will such applicants be permitted to enroll in the university. Permission is granted only by special action.

PROVISIONAL ADMISSION

A student transferring from a non-accredited institution may be granted provisional admission if he meets the above requirements.

A student who was on probation at the time of leaving the most recent college or university attended may be granted only provisional admission.

Admission from Schools and Colleges in Foreign Countries

The admission of international (foreign) students is governed by separate requirements.

The official transcript of record and other credentials of an applicant for admission from a foreign country should be submitted in official English language translation. They will be evaluated under the regulations governing foreign student admissions. All papers required for completion of the application for admission should be submitted to the admissions office at least three months before the opening of the quarter for which the applicant hopes to gain admittance. This early application allows sufficient time for the necessary correspondence relative to entrance and, if the applicant is admitted, will aid him in obtaining the necessary travel documents.

An applicant from a foreign country may be admitted only after demonstrating that his command of the language will permit him to profit from instruction in this university. An applicant will be asked to take an English language test in his own country or one administered by the university.

Those students who, in the judgment of the English Department, do not have a sufficient level of fluency in English, will be required to take English 102 and 103: English as a Second Language. All others must fulfill the basic English requirement.

An applicant who is a graduate of a foreign high school must have preparation deemed by the university to show promise of academic success. Such applicants are not required to take the ACT, except when specifically requested to do so.

Graduates of High Schools in a Foreign Country

Applicants who are graduates of foreign high schools must have preparation equivalent to that required of eligible California high school graduates. The university will carefully review the previous record of all such applicants and only those with promise of academic success equivalent to that of eligible California high school graduates will be admitted. Such applicants are not required to take the (SAT) (ACT) (either) except when specifically requested to do so.

Admission as a Graduate

Details on the requirements for admission as a graduate student are included in the *Graduate Bulletin,* obtainable from the office of the Dean of Graduate Studies.

Redirection

It is not always possible for the university to accommodate all qualified applicants. If an application is accepted and it later becomes evident that space will not be available, it and any supporting documents

will, at the request of the applicant, be forwarded to any state college or university where space is available. No additional application fee is required.

DETERMINATION OF RESIDENCE FOR NONRESIDENT TUITION PURPOSES

The following statement of the rules regarding residency determination for nonresident tuition purposes is not a complete discussion of the law, but a summary of the principal rules and their exceptions. The statutes governing residence determination for tuition purposes by The California State University and Colleges are found in *Education Code* Sections 22800–23754.4, 23758.2, 23762, and in *Title 5* of the *California Administrative Code,* Article 4 (commencing with Section 41901) of Subchapter 5 of Chapter 1, Part V. As this is written, those regulations are in the process of amendment to implement the uniform residence determination law enacted in Statutes 1972, Chapter 1100 (AB 666), so they are not reproduced here. A copy of the revised regulations is available for inspection upon request being made to the Office of Admissions and Records. The determination of whether a student qualifies as a "resident" for tuition purposes is made by the university or college after review of a residence questionnaire completed by each student upon entering the university or college. The residence questionnaire is designed to provide to the university or college information necessary for residency determination, including the applicability of any exceptions.

The general rule is that a student must have been a California resident for at least one year immediately preceding the residence determination date in order to qualify as a "resident student" for tuition purposes. A residence determination date is set for each academic term and is the date from which residence is determined for that term.

Whether a student has acquired California residence usually depends on whether the student has attained majority; i.e., has became an adult. Majority is attained at 18 years of age. If the student is a minor, residence is derived from (and therefore is the same as) that of the student's father. If the father is not living, the student's residence is that of the mother while she remains unmarried. The residence of a minor cannot be changed by act of the minor or that of the minor's guardian, so long as the minor's parents are living.

Upon attaining majority, the student may acquire a residence apart from that of the parents. The acquisition of California residence by an adult requires both physical presence in the state, and at the same time, an intent to remain in California indefinitely, that is, an intent to regard California as one's permanent home. Although physical presence is easily proven, subjective intent is more difficult, requiring the student to present evidence of various objective manifestations of such intent.

A woman may establish her own residence even though she be married.

An alien is not eligible to acquire residence until admitted into the United States for permanent residence under an immigrant visa.

There are several exceptions from nonresident tuition. These rules are limited in scope, and are quite detailed. If it appears that any of them may be applicable, the student may wish to discuss the matter with the residence clerk of the campus. Some of the exceptions provide for:

1. Minors whose parents were residents of California but who have left the state. When the minor reaches age 18, the exception continues for the year to enable the minor to qualify as a resident student.
2. Minors who have been present in California for more than a year before the residence determination date, and entirely self-supporting for that period of time, are treated as adults for purposes of determining residence.
3. Dependent children and spouses of per-

sons in active military service stationed in California on the residence determination date. This exception applies only for the minimum time required for the student to obtain California residence and maintain that residence for a year. The exception is not affected by transfer of the military person directly to a post outside the 50 states and District of Columbia.

4. Military personnel in active service stationed in California on the residence determination date for purposes other than education at state-supported institutions of higher education. This exception applies only for the minimum time required for the student to obtain California residence and maintain that residence for a year.
5. Certain credentialed, full-time employees of community college districts.
6. Full-time State University and Colleges employees and their children and spouses. This exception applies only for the minimum time required for the student to obtain California residence and maintain that residence for a year.
7. Certain exchange students.
8. Children of deceased public law enforcement or fire suppression employees, who were California residents, and who were killed in the course of law enforcement or fire suppression duties.
9. A person in continuous full-time attendance at an institution who has resident classification on the effective date of Statutes 1972, Chapter 1100 (AB 666) shall not lose such classification as a result of adoption of the uniform student residency law on which this catalog statement is based, until the attainment of the degree for which currently enrolled. (*Education Code* Section 22862).

   It is anticipated at the time this is written that the new residence law will become effective in early March, 1973.

Students classified incorrectly as residents or incorrectly granted an exception from nonresident tuition are subject to reclassification as nonresidents and payment of nonresident tuition in arrears. Resident students who become nonresidents, and nonresident students qualifying for exceptions whose basis for so qualifying changes, must immediately notify the Office of Admissions and Records. Applications for a change in classification with respect to a previous term are not accepted.

The student is cautioned that this summation of rules regarding residence determination is by no means a complete explanation of their meaning. The student should also note that changes may have been made in the rate of nonresident tuition, in the statutes, and in the regulations between the time this catalog is published and the relevant residence determination date.

REGISTRATION

General Procedures

A new student will receive a registration fee statement with his notice of admission. Registration fees must be received in the accounting office not later than the deadline date indicated on the fee statement. Classes will not be scheduled or an evaluation of transfer credit prepared until these fees are paid. A person applying or admitted late is not assured of classes or that an evaluation of transfer credit will be prepared before classes begin.

Instruction for registration of a continuing student are included in the "Class Schedule" issued prior to the opening of each quarter.

Credit for a course is given only when a student is properly registered in the university and successfully completes the course. An individual is not properly registered until all registration forms required by the Registrar have been filed and fees paid. A student may not be admitted to a course unless he is properly registered in the university.

CONCURRENT ENROLLMENT

A student who wishes to register at another accredited institution while in attendance at this university must file a petition for concurrent enrollment. No credit will be granted for work taken at a college concurrent with work at this university unless this petition has been approved in advance. Petitions are available at the records office.

HOLDING OF RECORDS

Student records may be placed on a hold status because of financial or other obligations to the university. While the student's records are on hold he will not be allowed to register, nor will transcripts of credits be released. Records will be held until the obligation is cleared to the satisfaction of the office or department instituting the hold. Legal authority for these actions is cited in Sections 42380 and 42381 of *Title 5* of the *California Administrative Code.*

HONORABLE DISMISSAL

Honorable dismissal automatically will be noted on the transcript of each student who graduates or withdraws from the university, unless he has been disqualified because of misconduct.

MAXIMUM UNIT LOAD

The maximum number of units a student may take in any one quarter is 20, including audited courses and approved concurrent work at other colleges or universities. Exceptions may be made upon the advance approval of a "Petition to Carry an Excess Load" by the dean of the school in which the student is registered. Maximum program limits will be waived only upon presentation of evidence of the student's ability to successfully complete such a group of courses.

CHANGE IN PROGRAM

Each student is responsible for *every* course listed on his official program card. Any change, which is an addition or deletion of a course or change in section, must be made on the proper form and filed with the registrar's office on or before the dates published in the academic calendar. Forms for changes in program may be obtained from the student's adviser.

Courses may be added or sections changed through the 8th day of classes. Courses may be dropped without penalty (no grade assigned) through the 5th . After

this date and through the seventh week of classes, a student may withdraw from a course in which he is enrolled only for serious and compelling reasons. Permission to withdraw during this time period will be granted only with the approval of the professor, the department chairman, and the school dean. All requests for permission to withdraw under these circumstances and all approvals shall be made in writing on a withdrawal petition which states the reasons for the withdrawal. For course withdrawals during this period the instructor will assign a grade of W.

Withdrawals shall not be permitted during the final three weeks of instruction except in cases where the cause of withdrawal is due to circumstances *clearly* beyond the student's control. The appropriate grade will be assigned at the discretion of the instructor. Ordinarily, withdrawals in this category will involve total withdrawal from the university.

WITHDRAWAL FROM UNIVERSITY

Students who desire to withdraw from university because of personal, academic or other problems should consult with, and obtain forms from, the Counseling Center. After official clearances are received by the student, the withdrawal application is submitted to the records office. Students leaving the university who do not officially withdraw are subject to failing grades in their classes. The grading policy for students who withdraw from the university after the 5th day of classes is the same as for students who drop courses after this date (see Change in Program).

LEAVE OF ABSENCE

When a student finds it necessary to interrupt his progress toward a degree for a reason acceptable to the appropriate university authorities, he may be granted a leave of absence. Attendance at another educational institution is not considered an interruption of progress toward a degree for leave purposes. A student on leave of absence may, upon return from the leave, continue in the same program he had prior to the leave and he retains the right to select requirements in effect at the time he entered or reentered the curriculum.

A leave of absence may be granted by filing a petition for leave with the registrar. A student granted leave of absence has a commitment from the university to be readmitted because of the educational hardship inherent in the interruption of his degree program. This commitment must be validated by a written notice to the Registrar of return from leave for the quarter of return designated in the leave petition no later than 90 days after the opening date of the application filing period for that quarter.

The only routinely approved reasons for leave of absence are illness and military service. Leaves may be granted for a maximum of one year or four consecutive quarters. A request for leave of absence must be filed prior to the period of absence. Retroactive leave requests will not be approved.

Failure to return from leave as specified in the approved petition will be considered withdrawal from the university. Under such circumstances, re-enrollment will require a full application for admission under the same circumstances as any new or returning student.

REFUNDS

Any student who withdraws from university before the end of the second week is entitled to a refund of a portion of registration fees paid. A nonresident or foreign student who withdraws from the university or who drops units during the first four weeks of a quarter is entitled to a refund of a portion of tuition paid. A student must file an application for a refund with the records office at the time of withdrawal or dropping of units to be eligible for a refund. Applications for refund cannot be accepted at a later date.

AUDITING COURSES

Auditing a course is attending classes for no credit. A student must be registered and must have paid fees in order to audit a course. Audited courses must be included on the student's official program card, and they are designated by AU beside the course unit listing.

Enrollment in any course as an auditor shall be permitted only after students otherwise eligible to enroll in the course on a credit basis have had an opportunity to do so. Auditors are subject to the same fee structure as credit students and regular class attendance is expected. Once enrolled as an auditor, a student may not change to credit status unless such a change is requested on or before the last day to add classes. The deadline for changing from credit to audit is the same as for dropping a course. The materials and services fee is determined on the basis of the total units of both credit and audit courses in which the student is enrolled.

TRANSFER TO OTHER INSTITUTIONS

A student who plans to transfer from this university to another college or university, should, at the earliest possible date, request that his transcript of record be forwarded by the registrar's office (see Fees and Expenses Schedule for charges) to the new institution. Evaluation of transcripts will be made by the new institution.

Changes in Curriculum

CHANGE OF MAJOR

A student has the opportunity, upon determining that he is pursuing a course of study for which he has no aptitude or in which he is not interested, to change to another major. In such cases, a student should consult his adviser and the Counseling Center for assistance in making the change. Students enrolled under certain laws must obtain approval by the Veterans Administration before a change can be made.

Transfer from one major to another does not in any way change the student's scholastic standing.

CURRICULUM DEVIATION

Although the university has specified a program of courses for each major, under certain conditions a student may be permitted to deviate from the established curriculum. Information regarding requests to deviate from the curriculum may be obtained from the student's adviser and the registrar's office.

REVISION OF REQUIREMENTS

A student in continuous attendance and continuing in the same curriculum may elect to meet the graduation requirements in effect either at the time of entering the curriculum or at any subsequent time prior to his graduation. Substitutions for discontinued courses not taken by the student may be authorized or required by the student's major department.

In the case of those transferring from a community college in California, the student may elect to continue in the curriculum in effect at the time of his first enrollment in the community college if he has been in continuous full-time enrollment.



EXPENSES AND HOUSING

FEE SCHEDULE, 1973-74

Tuition is not charged to legal residents of California. The following reflects the fees and expense for both the quarter and semester systems.

All Students

	Semester	Quarter
Application fee (non-refundable) payable by check or money order at time of applying		$20
Materials and Service fee		
(1-3.9 units)	$39	$26.50
(4-7.9 units)	44	30.00
(8-11.9 units)	49	33.00
(12 and more units)	59	39.00
Medical Facilities fee	3	2.00

Nonresidents (Foreign and Domestic)

Nonresident tuition		
(15 or more units) maximum	$650	$433
(less than 15 units) per unit or fraction	43	29
Per academic year *	1,300	1,299

* The fee for the fourth quarter is $453; thus the potential annual fee is $1,732 for nonresidents in attendance all four quarters.

Summer Session

Per summer semester unit	$27
Per summer quarter unit	18

NOTE: Fees subject to change without advance notice.

No fees of any kind shall be required of or collected from those individuals who qualify for such exemption under the provisions of the Alan Pattee Scholarship Act.

MISCELLANEOUS FEES

Application to the university (charged of all applicants—payable by check or money order at time of applying—*nonrefundable*)	$20.00
Check returned for any cause	5.00
Conference, Short Course or Institute, per person	Estimated Cost
Course credit by special examination (per unit)	1.00
Failure to meet administratively required appointment or time limit	2.00
Graduation (not a state fee)	10.00
Health facility fee	2.00
Late registration	5.00
Library	See schedule in library
Parking fee (per quarter)	10.00
Transcript of record	1.00
Associated Students, Inc.	
* Membership fee (not a state fee)	
Fall quarter	10.00
Winter, Spring, Summer quarter, each	5.00
** University Union fee (not a state fee)	
Fall quarter	8.00
Winter, Spring quarter, each	6.00
Summer quarter	3.00

* Education Code, Section 23801
** Education Code, Section 23805

Dependent on the time of withdrawal from university, a student may be entitled to a partial refund of fees if applied for at the time of withdrawal. (See section on Withdrawal from the University.)

Refund of Fees

Materials and Service Fee:

There will be no refund of Materials and Service Fee for a decrease in units at any time.

Students who withdraw from all classes before the last day to withdraw without penalty are entitled to a refund of all but $10 of the M & S Fee. Other fees:

ASI Fee—before classes begin, 100%;

Fall Qtr., during 1st week	$7.50
during 2nd week	$5.00

Winter, Spring and Summer Qtrs.,
during 1st week $3.00
during 2nd week $2.00
University Union Fee—
before classes begin, 100%.
after classes begin, no refund.
Medical Facilities Fee—
before classes begin, 100%.
after classes begin, no refund.

Non-Resident Tuition Fees:

Students who pay a non-resident fee are entitled to a refund on non-resident fees paid when units are dropped. No refund will be made after the fourth week of classes. No refund will be made unless a written application for refund is filed at the time of the drop.

Refund scale for non-resident tuition fee

Drop during 1st week of classes
100% of non-resident fees
Drop during 2nd week of classes
75% of non-resident fees
Drop during 3rd week of classes
50% of non-resident fees
Drop during 4th week of classes
25% of non-resident fees
Drop after 4th week of classes -0-

In order to be eligible for a refund of any fees paid, a student must file an Application for Refund at the Records Office at the time of withdrawal. The application for refund form may be obtained from the records office.

Expenses

Estimated expenses for a legal California resident student living in a campus residence hall are $569 per quarter exclusive of personal expenses.

A student enrolling under the auspices of an agency supplying educational assistance should check in advance with the agency representative regarding payment of fees and/or costs.

The total cost for students living away from home will vary. However, typical costs will amount to approximately $1,700 for a three-quarter school year, *excluding* personal expenses.

Total expenses for nonresident and foreign students will be higher, as they will include tuition fees not required of legal California resident students.

Typical One Quarter Expenses

Associated Students, Inc. membership and college union fees
Fall Quarter $18.00
(Winter & Spring—$11
Summer—$18)
Materials and service fee 39.00
Room and board
(19 meals per week) 425.00
Books and supplies
(estimated) 80.00
Parking 10.00
Health facility fee 2.00

Estimated total expenses $569.00

Provision should be made for personal expenses which average $250 per quarter.

The student majoring in one of the environmental design disciplines should be prepared for expenditures that are somewhat greater than average. Experience has indicated that students spend from $150 to $250 per quarter for materials, equipment, and supplies during their initial year as environmental design students.

Debts Owed to the Institution

From time to time the student may become indebted to the institution. This could occur, for example, when the student fails to repay money borrowed from the institution. Similarly, debts occur when the student fails to pay institution dormitory or library fees, or when the student fails to pay for other services provided by the institution at the request of the student. Should this occur, Sections 42380 and 42381 of *Title 5* of the *California Administrative Code* authorize the institution to withhold "permission to register, to use

facilities for which a fee is authorized to be charged, to receive services, materials, food or merchandise or any combination of the above from any person owing a debt" until the debt is paid. For example, under these provisions the institution may withhold permission to register, and may withhold other services, such as grades and transcripts. If a student feels that he or she does not owe all or part of a particular fee or charge, the student should contact the campus business office. The business office, or another office on campus to which the student will be referred by the business office, will review the pertinent information, including information the student may wish to present, and will advise the student of its conclusions with respect to the debt.

Housing

The university on-campus residence program includes significant emphasis upon educational activity as part of the total living experience. Concern for the student's personal, social, and intellectual development has resulted in a vigorous residence hall program based on student interests. Wing and hall governments, social events, cultural and recreational efforts and community living complement the academic schedule to create a living-and-learning environment.

Each of the six air-conditioned halls on the campus accommodates about 200 students in comfortable double rooms. Recreation and lounge facilities are provided for each hall, as are convenient laundry facilities, refreshment vending machines, kitchenettes, and ironing and study rooms. Student rooms are furnished with beds, dressers, wardrobes, bookcases, desks and chairs. Students supply their own pillows, blankets, towels, sheets, study lamps and room decorations. Dining facilities located in nearby Sycamore Canyon provide for outdoor or indoor dining. Breakfast, lunch, and dinner are offered weekdays, with brunch and dinner on Saturday and Sunday.

New students interested in on-campus housing should request a housing application at the time of application for admission to the university. Contracts issued for the academic year provide for both room and board. Residence hall fees were $1,176 for the 72–73 academic year and are expected to be increased to $1,225 for 73–74. Payments may be made in periodic installments in accordance with the schedule available from the housing office.

Off-Campus Housing

Privately-owned and operated off-campus housing is available for both men and women students. The university does not inspect or supervise these facilities. Inquiries about off-campus housing should be made in person at the housing office.

SERVICES

Health and Medical

Medical services, paid for by the state and the student, are designed to provide, on an outpatient basis, the services usually rendered by the family physician. Any specialist care or hospitalization is at the student's expense unless student insurance is purchased at the time of enrollment (or the student is covered by another private insurance plan or under his parents' policy). All enrollees may utilize the health services daily, Monday through Friday, between 8:00 A.M. and 5:00 P.M., except holidays. In addition, a first aid room is maintained in Room 121-A of the Science Building from 5:00 P.M. to 10:00 P.M., Monday through Thursday, and from 5:00 P.M. to 9:00 P.M. Friday. Submission of the health form is mandatory.

Counseling

Professional counselors are available in the Counseling Center and other locations on campus for the purpose of providing students with the opportunity for confidential discussion about personal, social, vocational or academic problems. Both individual and group counseling are utilized. Counseling emphasizes the importance of developing self-confidence, self-esteem, and the ability to achieve meaningful interaction with others as a basis for solving problems.

The center conducts special programs including a study and reading center, and a test center where personality and vocational tests are available. A counselor is available for emergencies when the center is closed.

Academic and occupational guidance is provided by a faculty advisor in the student's major department. Personal and social concerns identified by this advisor and other members of the faculty are referred to the professional staff in the Counseling Center.

Orientation

Orientation programs for beginning and transfer students are conducted prior to the start of each quarter. In addition, a live-in program for new freshmen is held during the summer. These programs offer students an introduction to the campus, to student services, and to the academic program related to their major. Every effort is made to provide new students with information and advice which will facilitate a smooth and effective beginning at Cal Poly. The orientation programs are directed and coordinated by the Counseling Center.

Academic Advising

Each student is assigned a faculty advisor in the student's major department. A student should look especially to his advisor for help in program planning and vocational concerns, although any member of the faculty may be consulted when this seems desirable. It is important in planning a program to be sure that opportunities are not overlooked or lost by default. Taking courses in sequence, substituting courses when necessary, completing major requirements, dropping or adding courses, petitions for waivers or exceptions and other similar decisions should involve discussion between the student and his academic advisor.

Once assigned to a regular academic advisor a student remains with him unless there is some reason for a change. A change of advisor may be made if the student changes his major or the advisor is assigned to other duties. But an advisor

only advises. The student, not the advisor, is responsible for meeting requirements and for remaining in good academic standing. It is the responsibility of each student to initiate and continue periodic meetings with his advisor. It is the responsibility of the advisor to be available. How often these meetings occur will depend primarily upon the student's needs.

Veterans Affairs

The university is approved for the training of veterans of the military services and their dependents under educational assistance programs established by the state and federal governments. The records office provides assistance to those desiring to initiate or continue their university education under these programs.

Authorization for training under all federal laws must be obtained from the Veterans Administration through its regional office at 11000 Wilshire Boulevard, Los Angeles, California 90024. Veterans with no prior training under the G.I. bills are urged to request their letters of eligibility at least two months before enrolling. Those who are transferring from another school should submit their transfer requests at least one month before enrolling.

Vocational Rehabilitation

Students who have a physical, emotional, or other disability which handicaps them vocationally may be eligible for the services of the State Department of Rehabilitation. These services include vocational counseling and guidance, training (with payment of costs such as books, fees, tuition, etc.) and job placement. Under certain circumstances students may also qualify for help with medical needs, living expenses and transportation.

Appointments may be made with the rehabilitation clerk in the records office or by contacting the State Department of Rehabilitation, 1006 West Fourth Street, Ontario, California, 91761, telephone 714 983-9527.

Career Placement

A centralized career-planning and placement service is available to all students of the university. A sincere effort is made to help each student find employment, but no guarantee of placement is made. Career counseling is provided for those students who are undecided about their career goals.

Many industrial, agricultural and business representatives visit the university to interview graduating students. Career placements are effected through this extensive on-campus interview program, which is supplemented by a career referral service.

For those who have already graduated, the placement center provides a current job referral service. Follow-up studies are conducted, which include contacting both the graduate and employer to appraise the effectiveness of the center's programs, as well as, to determine the satisfaction of both employer and employee.

Educational Placement

Every candidate for a teaching credential registers with the placement center before or during the quarter prior to completion of the credential requirements. Registration includes the preparation of personal data and assembling references for the educational placement file.

Cooperation of the candidate in keeping information in the file up-to-date is necessary for the most effective service whenever the teacher wishes to seek a new position.

Employment

PART-TIME EMPLOYMENT

The university provides work experience for a maximum number of students by employing them to assist in the operations of the entire campus. The number of student jobs is greater than in universities where regular full-time employees do much more of the work.

A number of positions in the local community for both skilled and unskilled employees are listed with the placement office. Information about these jobs and referrals for interviews are arranged by the placement center.

Career-oriented part-time employment, including internships which provide students with an opportunity for them to apply their education in an actual on-the-job experience is emphasized.

SUMMER EMPLOYMENT

Students are encouraged to take career-oriented summer employment in fields related to their majors. On-the-job application of course material stimulates an interest in and shows a need for subsequent courses.

The placement center receives many summer job listings. In addition, many business and industry recruiters visit the campus to interview undergraduates for summer employment, which often leads to permanent employment.

Financial Aid

The university offers a variety of financial aid programs, including scholarships, grants, loans, and employment to assist qualified students in meeting educational expenses. Detailed information, applications, and financial counseling are available in the financial aid office.

Alan Pattee Scholarship

(Children of Deceased Peace Officers or Firemen)

Surviving children, natural or adopted, of California peace officers or firemen killed in the line of duty are not charged fees or tuition of any kind while enrolled at any California State University or College, according to the Alan Pattee Scholarship Act and the Education Code, Section 23762. Students qualifying for these benefits are known as Alan Pattee scholars.

STUDENT ACTIVITIES AND CONDUCT

The quality of student life at Cal Poly is reflected in the breadth of out-of-class programs and informal activities developed by students. Co-curricular activities are an integral part of the educational program, and each student is urged to participate in the life of the academic community.

Student Government and Organizations

All students are members of the Associated Students of California State Polytechnic University, Pomona, and pay a membership fee which entitles the student to full participation in the activities of the association. Membership also makes the daily campus newspaper, *Poly Post,* available to all students. The association develops student-sponsored activities of maximum value and interest to the university community.

The government of student affairs and responsibility for property of the Associated Students are vested in the student senate and executive cabinet, the members of which are elected or appointed annually. In addition, boards and committees supervise publications, athletics, activities, finances, the university union, and *Poly Vue.* Councils of representatives of the various departmental student organizations participate in student government on behalf of each of the academic schools.

Chartered clubs and organizations involve all departments and activities, and the opportunity exists for every student to take an active part in club life.

Offices of the ASI, the ASI business office, and the staff of the activities department are housed in the activities center duplex.

The University Union is under construction and should open for occupancy Spring Quarter 1974. It will provide game rooms, reading rooms, food services, exhibit rooms and many other areas for special interest groups to use.

PUBLICATIONS

Poly Post, the official campus newspaper, is published throughout the school year. *Madre Tierra* is the yearbook record of student activities carried on during the year. A general magazine, *Opus,* features art, photography, articles and examples of student literary effort.

POLY VUE

Poly Vue is the annual university open house held in the Spring. The event shows parents and friends the yearly activities and progress of the university, and provides a time for social activities. The entire program is organized and carried out by the students, and includes academic department exhibits, a carnival, horse shows, and intercollegiate athletic events. A series of activities for high school and junior college students includes a communications day, agricultural events, and business skills and forensic competitions.

MUSIC, DRAMA, FORENSICS

Opportunities are provided for students to participate in theatrical productions, and in music organizations which include band, orchestra, vocal choirs, and smaller vocal and instrumental ensembles. Drama productions include quarterly one-act and three-act plays; musical events include Christmas and Easter programs and a road show tour of California communities. Intercollegiate competition as well as local events are featured in a strong forensics program.

Athletics

Inter-collegiate competition is held under the policies and procedures of the athletic board. A program of inter-collegiate competition for men and women is offered in variety of sports. Those sports available to women are: badminton, softball, volleyball, tennis and basketball. Competition is available to men in: baseball, basketball, football, cross-country, track and field, swimming, water polo, wrestling and gymnastics.

An extensive intramural program is an integral part of the university and includes team sports, individual sports and recreational activities.

Eligibility for Activities

University policy requires that students who undertake the responsibilities of major offices in student government or student organizations be in good standing, and making reasonable progress toward an educational goal. The following specific eligibility requirements for officers of the Associated Students, either elected or appointed, and for officers of organizations, either elected or appointed, implement that policy:

(1) Candidates and incumbents may not be on disciplinary probation.

(2) Undergraduate candidates and incumbents must have an all-college and Cal Poly grade point average of at least 2.00. Graduate candidates and incumbents must have a graduate grade point average of at least 2.70.

(3) In order to perform the duties of a student body officer, the student must be enrolled in this university during each quarter in which he performs the duties of that office. This requirement does not apply during summer quarter.

(4) Incumbents classified as undergraduates must successfully complete 36 units of academic credit per year (4 consecutive quarters). The minimum number of units to be successfully completed in any quarter shall be 12 units, with the exception that the minimum unit load requirement may be decreased to 8 units for a student upon successful petition to the chairman of his major department and his school dean.

(5) Incumbents classified as graduate students must successfully complete 24 units of academic credit per year (4 consecutive quarters). The minimum number of units to be successfully completed in any quarter shall be 6 units.

(6) The student's four quarter sequence will start with the quarter in which the student takes office.

(7) These requirements are independent of any additional student government or student organization requirements.

Eligibility for Intercollegiate Athletics

Eligibility for competition in intercollegiate athletics is regulated in general by the rules of the National Collegiate Athletic Association, the California Collegiate Athletic Association, and the University Policies and Procedures Statement for the Conduct of Intercollegiate Athletics.

Student Conduct

It is expected that all students are enrolled for serious educational pursuits and that their conduct will preserve an atmosphere of learning. All students are expected to assume the responsibilities of citizenship in the campus community. Association in such a community is purely voluntary, and any student may withdraw from it at any time that he considers the obligations of membership disproportionate to the benefits. While enrolled, students are subject to university authority, which includes the prerogative of dismissing students whose

conduct is inimical to the aims of an institution of higher education.

Rules of student conduct are included in the California Administrative Code, Title 5, beginning at Section 41301.

A student who violates university policies or regulations is subject to disciplinary action which can result in a warning, reprimand, probation, suspension, or expulsion. Procedures under which the university may take disciplinary action against a student are specified by the Chancellor of the California State University and Colleges. These procedures are on file in the office of the Coordinator of Student Discipline and the office of the Dean of Students.

Plagiarism

Students are hereby informed that the university considers plagiarism a serious academic offense which subjects those engaging in the practice to severe disciplinary measures. Moreover, one form of plagiarism, the use of purchased term papers, has been considered so serious that the state legislature has enacted a law providing criminal penalties for sale or other distribution of such materials. Students are, therefore, cautioned against this and all other forms of plagiarism.

SPECIAL PROGRAMS

Early Admission

The early admission program allows a limited number of talented high school seniors to enroll for up to six units of university work per quarter while simultaneously completing requirements for graduation at their respective high schools. The university work thus completed is applicable only as university credit and may not be used to meet high school graduation requirements. Consideration for admission to this program is granted a student recommended by his high school principal.

Applications to the program must be submitted by April 30 preceding the fall quarter to which admission is requested. An application consists of the following:

1. A completed "Application for Admission—Early Admission Program."
2. A $20.00 non-refundable application fee.
3. A nomination letter from the high school principal.
4. Two copies of the high school transcript showing work completed through the first term of the junior year. (No college aptitude test score is required.)

A successful applicant will be notified of his admission to the program by June 1.

Reserve Officers Training

Air Force and Army ROTC programs are available to Cal Poly students by special arrangements with units at nearby schools. The interested student usually applies for this program at the school offering the program during the sophomore year. Further information is available in the records office. Units earned in one of these programs are counted only as elective credit towards requirements for graduation.

International Programs

A study abroad program is offered by The California State University and Colleges International Programs, under which students may enroll for a full academic year simultaneously at their home campus, where they earn academic credit and maintain campus residency, and at a distinguished foreign university or a special program center.

Cooperating universities abroad include the University of Provence, France; the University of Heidelberg, Germany; the University of Florence, Italy; the Universidad Ibero-Americana, Mexico; the University of Uppsala, Sweden; the University of Madrid and the University of Granada, Spain; Tel Aviv University and the Hebrew University of Jerusalem, Israel; and Waseda University, Japan. In the United Kingdom, cooperating universities, which may vary from year to year, include Dundee, Leicester, London, Oxford, and Sheffield. In addition, California State University and Colleges students may attend a special program in Taiwan, Republic of China, or an architectural program in Copenhagen, Denmark.

Eligibility is limited to students who will have upper division or graduate standing during their year of participation, who have a B (3.0) average or better in at least 30 semester or 45 quarter units in any two previous consecutive years; show ability to adapt to a new environment; and, in the cases of France, Germany, Mexico and Spain, are proficient in the language of instruction at the foreign university. Selection is made by a faculty committee on the students' home campus and by a statewide faculty committee.

The International Programs are supported by state funds to the extent that such funds would have been expended had the student concerned continued to study in

California. Students assume costs for pre-departure orientation, insurance, transportation, housing and meals. Home campus registration fees, tuition on the home campus for out-of-state students (if the student is not a California resident) and personal incidental expenses or vacation travel costs while abroad are also paid for by the student. The Office of International Programs collects and administers funds for those items which the program must arrange or can negotiate more effectively: typically, home campus fees, orientation costs, insurance, outbound transportation, and housing in some centers. Students accepted in the International Programs may apply for any financial aid available at their home campus.

Application for the 1974–75 academic year must be submitted before February 4, 1974 (except for United Kingdom applicants who must submit applications by January 7, 1974). Detailed information may be obtained from Admissions Office, California State Polytechnic University, Pomona, Cal. 91768. or by writing to The California State University and Colleges International Programs, 5670 Wilshire Boulevard, Los Angeles, California 90036.

EXTENSION

The extension program provides the university and the surrounding area with courses which are not readily available from any other source at a time and place convenient to the using public. These university courses help the teacher to upgrade and keep current the knowledge in his or her field; they allow the housewife to continue her education which might otherwise be stopped because of the daytime requirements placed on her; they offer the scientist or engineer the opportunity to sharpen his talents by working on current subjects in his field; they provide skilled workers with additional training so that they may perform their duties more capably; and they help other interested people to obtain specialized knowledge in an area of their interest.

Extension courses are offered in local high schools in an area bounded by the Angeles Crest Highway and the Orange County line between the 605 Freeway and Etiwanda Avenue. Subjects range from agriculture to zoology and from SCUBA diving training to teacher preparation courses. The extension program is self-supporting.

SUMMER SESSION

The summer session, recently initiated at Cal Poly, provides in-residence course work of special types to those students who do not want to go through the matriculation process and/or who wish to complete their summer work in a short period of time.

Summer session courses vary in length from a few days to several weeks depending on the topic. Subjects covered include many of those that are encountered in the regular quarters or such things as equitation, horseshoeing, trips to visit California missions, camping trips through the Grand Canyon and workshops on the teaching of typewriting.

The summer session is also a completely self-supporting program which does not utilize state funds.

Educational Opportunity Program

The Educational Opportunity Program provides academic assistance and financial aid to students from low-income families who have been unable to realize their potential because of economic, cultural, or educational circumstances. Currently, Black, Chicano, American-Indian, and Caucasian students are attending Cal Poly under the Educational Opportunity Program. Special assistance is available from faculty members and junior and senior student counselor-tutors. The academic program will stress individual adjustment,

study activities, integration of course material, and a special seminar. At the option of the university, additional students may be involved in program activities. Sufficient documentation of their potential will be required and references from high schools, educational agencies, and interested parties will be considered in the E.O.P. selection process. Assistance in making these determinations will be provided by a university committee.

Financial aid funds available to students in the program are administered by the financial aid office in cooperation with the Educational Opportunity Program. Sources include federally insured loans, employment opportunities, state and federal grants, and the privately supported Cal Poly Opportunity Grant Fund (C.P.O.G.). CPOG is a new and growing university and community effort.

Urban Affairs Center

Cal Poly's Urban Affairs Center is organized to help stimulate and facilitate a variety of programs within an urban context. It serves in a liaison capacity between organizations, individuals, and groups of faculty members interested in urban problems and projects. It is engaged in curricular programs in urban studies, research projects and community service activities.

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DEGREES AND CREDENTIALS OFFERED

The university offers undergraduate curricula leading to the degrees of Bachelor of Arts and Bachelor of Science, and graduate curricula for the masters degree. In addition, programs are offered leading to teaching credentials authorizing service in California public schools. Degrees and teaching credential programs offered by the college are: (Numbers in parentheses indicate the page on which requirements are listed.)

SCHOOL OF AGRICULTURE

BACHELOR OF SCIENCE in:

Agricultural Biology 71
Agricultural Business Management 72
Agricultural Engineering 74
Agronomy 76
Animal Science 77
Foods and Nutrition 79
Fruit Industries 80
Home Economics 81
International Agriculture 82
Ornamental Horticulture 84
Park Administration 85
Soil Science 86

SCHOOL OF ARTS

BACHELOR OF ARTS in:

Behavioral Science 91
Drama 94
English 96
History 98
Humanities 99
Music 100
Philosophy 102
Political Science 104

BACHELOR OF SCIENCE in:

Communication Arts 92
Economics 95
Physical Education 103
Recreation Administration 105
Social Sciences 106
Social Services 107

MASTER OF ARTS in:

English 272

MASTER OF SCIENCE in:

Economics 268
Physical Education 274

SCHOOL OF BUSINESS ADMINISTRATION

BACHELOR OF SCIENCE in:

Accounting 109
Business Management 110
Data Processing 112
Finance, Insurance, and Real Estate 114
Hotel and Restaurant Management 000
Marketing Management 115

MASTER OF BUSINESS ADMINISTRATION

..... 264

MASTER OF SCIENCE in:

Business Administration 264

SCHOOL OF ENGINEERING

BACHELOR OF SCIENCE in:

Aerospace Engineering 118
Chemical Engineering 120
Civil Engineering 122
Electrical and Electronics Engineering 124
Engineering Technology 127
Industrial Engineering 128
Mechanical Engineering 129

MASTER OF ENGINEERING 000

SCHOOL OF ENVIRONMENTAL DESIGN

BACHELOR OF SCIENCE in:

Architecture 132
Landscape Architecture 134
Urban Planning 136

MASTER OF ARCHITECTURE 262

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MASTER OF LANDSCAPE ARCHITECTURE 273

MASTER OF URBAN PLANNING 277

SCHOOL OF SCIENCE

BACHELOR OF SCIENCE in:

Biology 138
Botany 139
Chemistry 140
Earth Sciences 141
Mathematics 142
Microbiology 144
Physics 145
Zoology 146

MASTER OF SCIENCE in:

Biological Sciences 263
Chemistry 267
Mathematics 274

TEACHER PREPARATION CENTER

STANDARD TEACHING CREDENTIAL:

Elementary Specialization 155
Secondary Specialization 155

MASTER OF ARTS in:
Education 269–276

UNIVERSITY PROGRAMS

Ethnic Studies 304
Institute for Multidisciplinary Programs 306
Liberal Studies 308
Library Program 309

COURSE NUMBERING SYSTEM

Courses are grouped into number series indicating the college level at which they are normally taught.

1–9 Courses carrying no credit toward degree requirements.

100–299 Courses taught primarily in the freshman and sophomore years and generally introductory in nature.

300–399 Courses primarily for advanced undergraduate students, usually having prerequisites, but bearing no graduate degree credit.

400–499 Courses for advanced undergraduates, and graduate, and post-baccalaureate students.

500–599 Courses open only to graduate students or seniors with prior approval.

600–699 Courses open only to classified graduate students.

900–999 Courses including specalized workshops, seminars, and institutes designed to provide professional and occupational improvement.

Courses numbered 300–499 may be used for post-baccalaureate credential credit.

REQUIREMENTS FOR BACHELOR'S DEGREE

General Requirements

A candidate for the bachelor's degree shall have

1) completed the courses in one of the listed four-year curricula with a minimum "C" grade average for all units in the major;

2) completed the required general education courses;

3) spent not less than three quarters in residence, two of these quarters immediately preceding graduation;

4) earned not less than 50 quarter units in residence;

5) earned a total number of grade points at least equal to twice the number of units attempted (achieve a "C" grade average);

6) completed for a Bachelor of Arts degree a minimum of 186 quarter units with a minimum of 60 of those units being of 300 or 400-level courses; completed for a Bachelor of Science degree a minimum of 198 quarter units with at least 27 of these units being in 300 or 400-level courses listed for the major. No major will contain less than 54 quarter units of courses required in the core for the major. Within these 54 units must be at least 15 units of 100 and 200-level courses. The courses in the major must be exclusive of those courses to satisfy the general education requirements. In addition to the above requirements, every student must complete the sequence of Senior Project and Undergraduate Seminar in his major.

7) a graduation check. An appointment for this records check shall be made in the evaluations office approximately three quarters before expected date of graduation.

8) filed an application for graduation in the registrar's office prior to the deadline listed in the academic calendar.

It is possible for a student to have three examinations scheduled for the same day. If that happens, the student has the liberty of asking the professor of the middle exam to pick a mutually convenient time for the exam.

General Education Requirements

Every student must take a substantial proportion of course work for the bachelor's degree designed to develop his professional competence. In addition, he must develop the knowledge, skills, and understanding which will enable him to function as an intelligent and creative participant in his community. To achieve these goals, the university provides an integrated program of curricular and co-curricular activities which are organized to provide an educational experience appropriate to the needs of the individual student.

Under the provisions of Title 5 of the *California Administrative Code,* the university offers a variety of courses in general education. The pattern of courses included in the program is designed primarily to insure that:

1. the student develop the ability to express himself effectively in both written and oral communication;

2. he understands nature and is able to relate himself to his biological and physical environment;

3. he is acquainted with man's cultural heritage and has developed the capacity to appreciate the creativity of others and to be creative himself;

4. he understands the economic, technological and social problems of contemporary society and appreciates the responsibilities and procedures of modern citizenship;

5. he has a basic understanding of the requirements of good health and is able to

maintain his own physical well-being;

6. he has developed an understanding of himself and his relationships to others.

To be eligible for graduation with a bachelor's degree from California State Polytechnic University, Pomona, a student must complete a minimum of 60 quarter units of general education. A minimum of 48 quarter units must be taken from courses listed under the areas of natural sciences, social sciences, humanities and basic subjects. In addition, each student must complete other breadth requirements indicated below. No more than six units in the major academic discipline of the student may be counted toward meeting general education requirements.

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* Students transferring from another collegiate institution must earn a number of grade points at least equal to twice the number of units attempted at this university.

The courses indicated below may fulfill the university's general education requirements. Each curriculum requires specific courses to be taken in fulfilling general education requirements. These courses are listed under the department offering the degree program.

Courses to fulfill the general education requirement shall be distributed as follows:

NATURAL SCIENCES—(minimum 2 courses)

BIO, 100, 110, 115, 201, 213, 228, 229, 300, 303; BOT 116, 120, 124, 125, 307; MIC 100; ZOO 137, 138, 234, 235; ESC 101, 111, 112, 215, 250, 321, 335; PHY 102, 121, 122, 123, 131, 132, 133; CHM 103, 104, 105, 111, 112, 113, 201, 211.

SOCIAL SCIENCES—(minimum 2 courses)

AMC 201, 202 or equivalent (required of all students)

Other Social Sciences

EC 201, 202, 213; GEO 101, 312; HST 101, 102, 103, 201, 202, 342; ANT 101, 102; SOC 201, 202, 206; PLS 201; PSY 201, 202, 205; COM 413

HUMANITIES—(minimum 2 courses)

ENG 110, 111, 112, 201, 202, 203, 206, 306, 308, 403, 406; PHL 201, 202, 204, 211, 212, 304; DR 203, 411, 412; ART 110, 212, 213, 312; MU 100, 104, 310

BASIC SUBJECTS—(minimum 2 courses)

ENG 104, or equivalent (required of all students)

Other courses

MAT 101, 102, 104, 105, 107, 108, 109, 114, 115, 116, 117, 140, 141, 142, 204, 236; ENG 105, COM 216, 218, 219; SP 100, 203; FR 101, 102, 103, 201, 202, 203; SPN 101, 102, 103, 201, 202, 203; GER 101, 102, 103

OTHER BREADTH REQUIREMENTS

PE 141 or equivalent (3 units required of all students)

A total of *four courses* selected from *a minimum of two schools* other than the school in which the student is majoring (required in all curricula).

Scholastic Requirements

Each student is expected to meet the academic standards required by the state, the university and by his instructors. He is expected to attend classes regularly.

The instructor of a class may excuse student absences from his class.

An instructor, with the President's approval, may at any time exclude from his course any student guilty of unbecoming or disorderly conduct. A student thus excluded will fail the course unless the university determines otherwise.

Students may not remove an incomplete simply by re-enrolling in the course. In cases where repetition of the course is deemed appropriate, the student will be assigned a withdrawal or failing grade rather than an E grade.

If a student subsequently completes a course which is recorded as incomplete on a transcript from another institution, it is his responsibility to submit a corrected official transcript and advise the registrar that he wishes to receive credit.

MINIMUM SCHOLARSHIP REQUIREMENTS

Uniform minimum standards for academic probation or disqualification are in effect at all California State Universities and Colleges. Students will be placed on academic probation or disqualified under the following conditions:

1. A student will be placed on academic probation if his cumulative grade point average falls below 2.0 (C) either for all college-level work attempted or for all work attempted at this university. The student will be advised of probation status as promptly as possible.

2. A student will be removed from probation and restored to good standing when he earns a cumulative grade point average of 2.0 (C) for all university level work attempted and for all such work attempted at this university.

3. A student on probation *may* be disqualified from the university when his cumulative grade point average for all college level work attempted or for all such work attempted at this university is 7 or more grade points below 2.0 (C average) at the end of any quarter. Such a student *will* be disqualified at the end of the spring quarter if:

   a. a freshman or sophomore (less than 90 quarter units of university work completed) is 22‡ or more grade points below a 2.0 (C average).
   b. a junior (90 to 134 quarter units of university work completed) is 13‡ or more grade points below a 2.0 (C average).
   c. a senior (135 or more quarter units of university work completed) is 9 or more grade points below a 2.0 (C average).

4. Scholastic disqualification notices are sent as soon as possible following the end of the quarter.

5. The dean of the school in which the student is enrolled as a major may make exceptions to these conditions when such action seems justified in individual cases.

6. A student who is disqualified for scholastic reasons will not be readmitted until at least one regular quarter has elapsed and then only after presentation to the university of satisfactory evidence that he has improved his chances of scholastic success. The request for readmission will be referred to the dean of the school in which the student wishes to enroll.

Academic Policies

DOUBLE MAJORS

Normally a student meets graduation requirements for a degree in one of the major departments. However, it is permissible for a student to be granted a degree with two majors if all requirements of both major curricula are met.

A student who desires to submit only one senior project for the two majors must file a petition for special consideration prior to the date of commencing the senior project.

Any major completed by the student leading to the single degree being awarded will be listed on the diploma so long as only a single degree is considered. If the student has completed the requirements for both a BA and BS, he will be required to distinguish only one as the degree in order to determine the appropriate degree to be awarded, and the notation on the diploma.

No more than one diploma or degree will be granted to the same student at the same commencement. This is distinguished from the two majors leading to a single degree. However, all majors completed by a student will be listed on the official transcript of record.

TRANSFER CREDIT

A student who has attended accredited two-year or four-year colleges will be given full credit for college level courses

successfully completed. Credit for courses taken at other institutions counts toward fulfillment of major curriculum requirements when applicable, other courses count as elective credit.

Not more than 70 semester units (105 quarter units) may be allowed for credit taken in a junior college. No credit may be allowed for professional courses in education taken in a junior college.

A maximum of 36 quarter units of extension course credit may be applied toward the bachelor's degree.

No limit is placed upon the number of transferable credits from a four-year college or university, except that no student will be granted a bachelor of science degree in any curriculum without having met the general unit, grade, and residence requirements.

No credit will be given for work taken at an unaccredited institution until the student has successfully completed 30 quarter units of work at this university. At that time, and upon recommendation of the student's major department, credit will be given for the unaccredited work.

Once a student has commenced work at this university, he must secure the approval of his adviser prior to taking courses at another institution for credit toward major requirements at this university. (See also concurrent enrollment section.)

GRADING SYSTEM

The following grading system is in effect:
A—Superior
B—Above average
C—Average
D—Below average
I—Incomplete
SP—Satisfactory progress
F—Fail
W—Withdrew passing
AU—Audit (no credit)

Grade points are assigned as follows:
A—4 points
B—3 points
C—2 points
D—1 point
I—0 point
F—0 point
SP—0 point
Passing grades are A, B, C, or D.

An incomplete signifies that a portion of required course work has not been completed and evaluated in the prescribed time period due to unforeseen, but fully justified, reasons and that there is still a possibility of earning credit. It is the responsibility of the student to bring pertinent information to the instructor and to reach agreement on the means by which the remaining course requirements will be satisfied. A final grade is assigned when the work agreed upon has been completed and evaluated.

An "incomplete" must be made up within one calendar year immediately following the end of the term on which it was assigned. This limitation prevails whether or not the student maintains continuous enrollment. Failure to complete the assigned work will result in an "incomplete" being counted as equivalent to an "F" (or an "NC") for grade point average and progress point computation.

The "SP" symbol is used in connection with courses that extend beyond one academic term. The symbol indicates that work in progress has been evaluated as satisfactory to date but that the assignment of a precise grade must await the completion of additional course work. Cumulative enrollment in units attempted may not exceed the total number applicable to the student's educational objective. All work is to be completed within one calendar year of the date of first enrollment and a final grade will be assigned to all segments of the course on the basis of overall quality. any extension of this time period must receive prior authorization by the school dean.

The "W" symbol indicates that the student was permitted to drop the course after the 14th calendar day following the day on which classes begin with the approval of the instructor, the department chairman,

and the school dean. It carries no connotation of quality of student performance and is not used in calculating grade-point average or progress points.

Students may not remove an incomplete by re-enrolling in the course. In cases where repetition of the course is appropriate, the student will be assigned a withdrawal or failing grade rather than an "I" grade.

If a student subsequently completes a course which is recorded as incomplete on a transcript from another institution, it is his responsibility to submit a corrected official transcript and advise the registrar that he wishes to receive credit.

Grades will be mailed from the records office as soon as possible after the close of a quarter.

REPETITION OF COURSES

A student may repeat a course in which he has received a grade lower than C, but each time the course is taken the student will be charged with units attempted and will receive the grade points earned. Unit credit is given only *once* for a repeated course and is recorded the first time the course is passed.

Except where noted in the specific course description, a student may not take again (except as an auditor) or receive credit by examination for any course in which he has received a grade of C or higher.

Grades will be mailed to the last address filed with the records office.

GRADUATE COURSES TAKEN BY UNDERGRADUATES

Seniors who are within 12 quarter units of qualifying for graduation with baccalaureate degrees may petition through their major departments to use as many as nine quarter units of their senior-year load as graduate credit, provided the following conditions are met:

1. the student has completed his graduation check;
2. the adviser endorses the request;
3. the student agrees to enroll for no more than the maximum load of 16 units for the quarter in which this work is taken;
4. neither the courses involved nor the credit for them is needed to complete requirements for the baccalaureate degree.

If approved, these credits will apply to graduate objectives, as appropriate, and will be recorded on the students' permanent records as graduate credit.

ADVANCED PLACEMENT

While in high school, ambitious and well-qualified students are encouraged to take college level courses which will prepare them for the Advanced Placement Examination given each spring by the College Entrance Examination Board. Any student who has scored a 3, 4, or 5 on such a course examination will automatically be given units of university credit at the time of admission. A maximum of 30 units, with no more than 12 units in any one field, is allowed for advanced placement. The use of such credits to satisfy university and departmental requirements is determined by the appropriate departments.

CREDIT BY EXAMINATION

A student may be permitted, at the discretion of his school dean, to obtain credit by examination for courses in subject matter fields in which he is especially qualified through previous education or experience and for which credit has not otherwise been given. A fee of $1 per unit is charged for such an examination. It may include written, oral, or skills tests, or a combination of all three types, and will be sufficiently comprehensive to determine that the student has essentially the same knowledge and skills as those students who successfully complete the course. A student is not permitted to obtain credit by examination in a course unless all prerequisites for the course as specified in this catalog have been satisfied. The grade received is en-

tered on the student's permanent record. The length of the examination will be consistent with the unit value of the course.

A six-week period must elapse before a second petition for credit by examination in the same course will be considered.

Units of credit received through this procedure may not apply toward the residence requirements for any of the degrees or credentials offered by the university.

Detailed instructions for applying for credit by examination may be obtained from the registrar's office.

CREDIT FOR MILITARY SERVICE

Nine units of elective credit will be allowed toward graduation for a student with an honorable discharge from the military services of the United States who submits evidence of satisfactory completion of one year of military training.

An additional 13½ quarter units of elective credit will be allowed toward graduation to any student submitting evidence that he has received a commission in the Army, Navy, Air Force, Coast Guard, or Marine Corps. Maximum total credit possible toward graduation for military service is 22½ quarter units. Credit is not given for completion of the six-month reserve training programs or for college level general educational development tests.

Credit for specific courses may be allowed if the student has satisfactorily completed equivalent study in a military service school. The guidelines of the American Council on Education are followed in determining eligibility and approval must be granted by the department teaching the specific course for which credit is sought.

HONORS

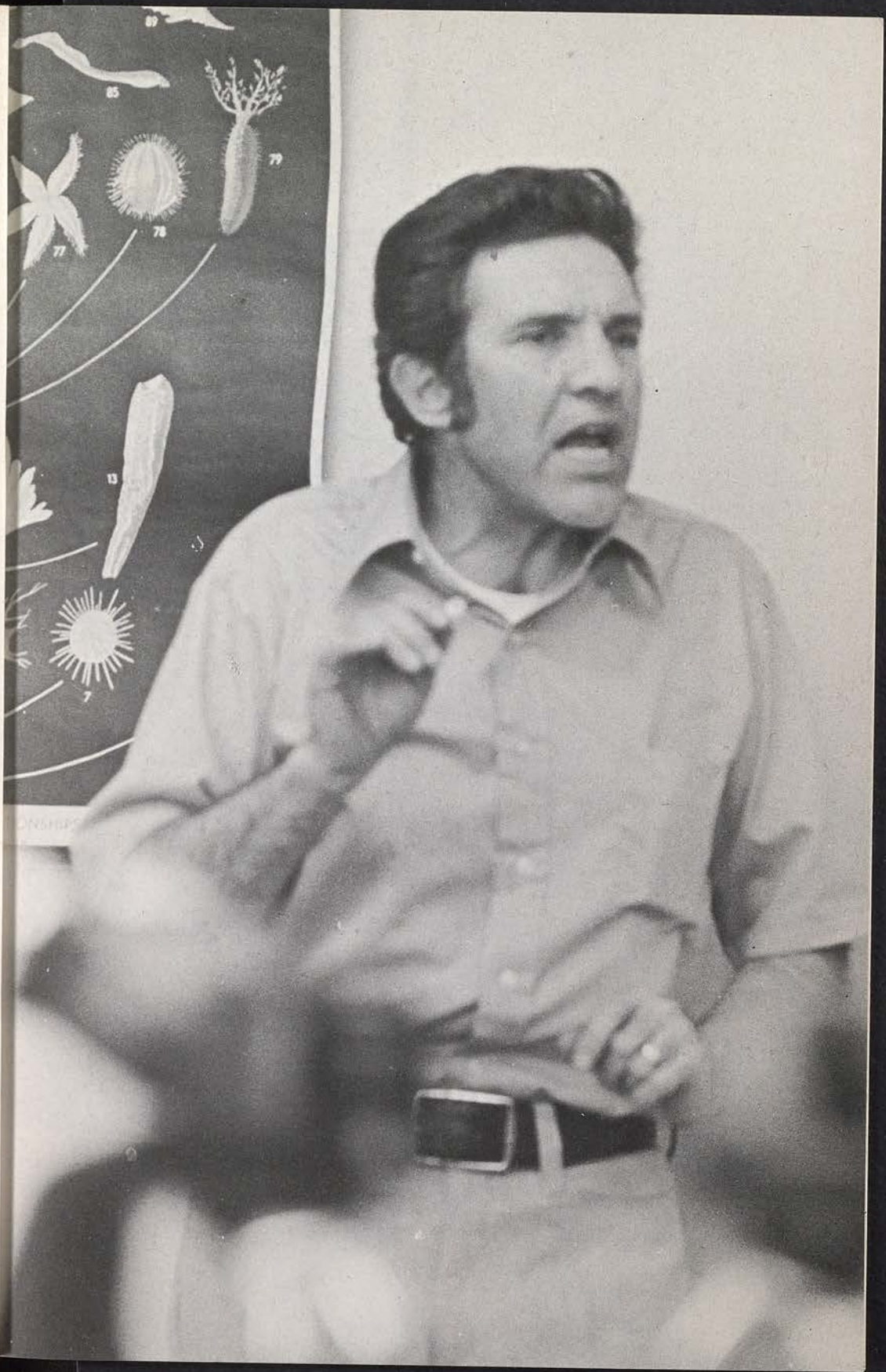
First-time freshmen may be awarded "Honors at Entrance" if during their tenth, eleventh, and twelfth grades they earned a grade point average of at least 3.5 in all subjects excluding physical education and military science, and have received a commendation from their high school principals for having contributed in the areas of citizenship and leadership.

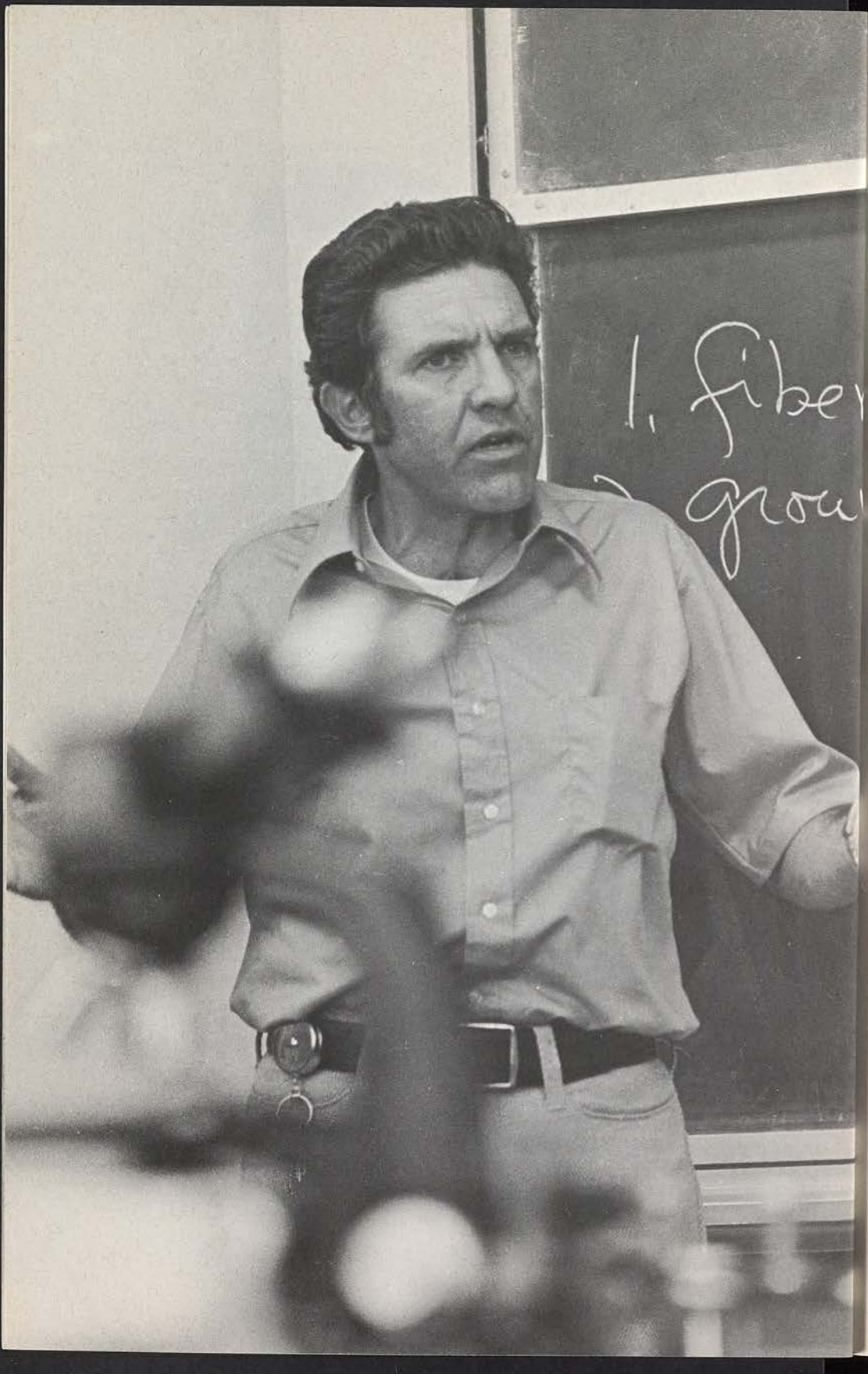
The "Academic Honors List," announced at the end of each quarter, honors undergraduate students who have completed 12 or more units during the quarter with a 3.0 or better grade point average.

The "President's Honor List," announced at the end of the spring quarter, honors undergraduate students who have a grade point average of 3.0 or better for completion at the university of 12 or more units during any three of the four quarters of a university year.

A candidate for a bachelor's degree is eligible for "Graduation with Honors" if at the end of the quarter preceding commencement he has earned a 3.1 or better cumulative grade point average, including all college-level work attempted at this university and accepted from other institutions.

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SCHOOL OF AGRICULTURE

Frederick E. Beckett, *Dean*

Dynamic technological changes have increased management efficiency to the point where less than five per cent of California's population lives and works on farms, yet agriculture is this state's leading industry. California is, in turn, the nation's agricultural leader. Although fewer people are needed on farms, positions in the nonfarming segments of agriculture have increased spectacularly. A School of Agriculture graduate can look forward to an ex citing future in agriculturally-related occupations in business, industry, specialized services, education, conservation, and recreation, as well as production. These expanding careers provide challenging opportunities for men and women over a broad spectrum of interests and abilities. Hundreds of careers, many relatively unknown only a few years ago, are attracting men and women, from both urban and rural communities.

Instruction in the School of Agriculture is offered in 12 majors leading to the bachelor of science degree. Students interested in agricultural education may choose a program leading to a standard teaching credential-secondary specialization with a major in agriculture.

Animal production flocks and herds are maintained for undergraduate instruction and graduate experimental programs.

Facilities on or near the campus make possible practical laboratories for the various majors. The college farm consists of fertile soils typical of the Southern California area with enough variation in soil type and climate to give students a broad background of experience. Over 600 acres of university-owned land is available for pastures, crops, groves, and ornamental plantings.

To assure each student of occupational competence, the college provides an opportunity for him to learn the fundamental skills involved in the care, maintenance, and operation of agricultural equipment and facilities. Financing is available through the Kellogg Unit Foundation for individual student projects in most areas. A supervised work program is an important part of instruction, and all departments offer employment for student assistants.

Departments and Majors

AGRICULTURAL BUSINESS MANAGEMENT

_____, Chairman

Agricultural Business Management major (BS); options in Agricultural Economics, Food Distribution, Management

International Agriculture (BS)

AGRICULTURAL ENGINEERING

Floyd V. Matthews, Jr., Chairman

Agricultural Engineering major (BS)

ANIMAL SCIENCE

Eugene K. Keating, Chairman

Animal Science major (BS); options in Pre-Veterinary Science, Animal Production, Animal Agribusiness

Secondary credential program, major in Agricultural Sciences and Vocational Agriculture

FOODS AND NUTRITION AND HOME ECONOMICS

Ramiro C. Dutra, Chairman

Foods and Nutrition major (BS); Home Economics major (BS)

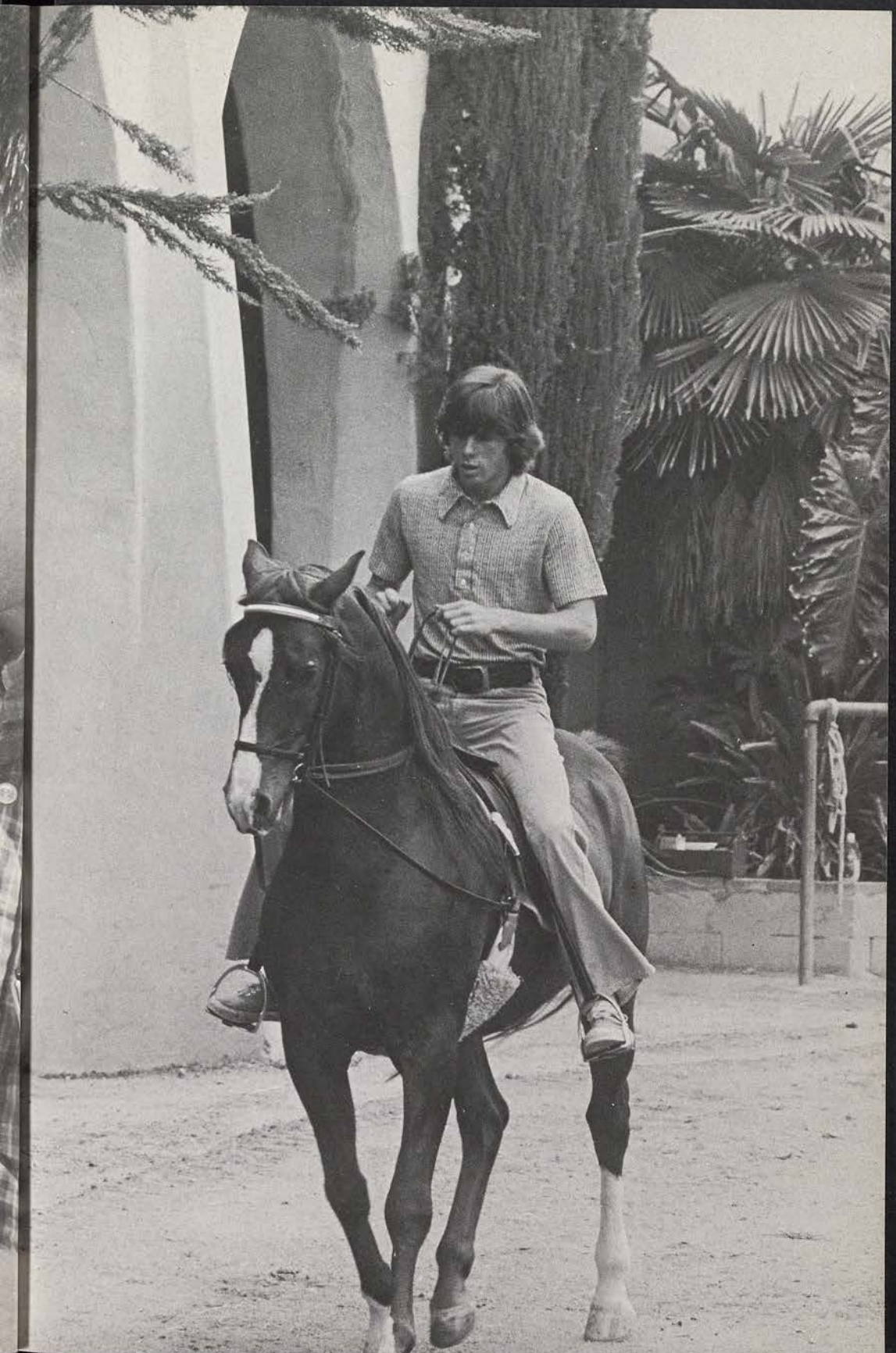
Secondary credential programs, major in Home Economics

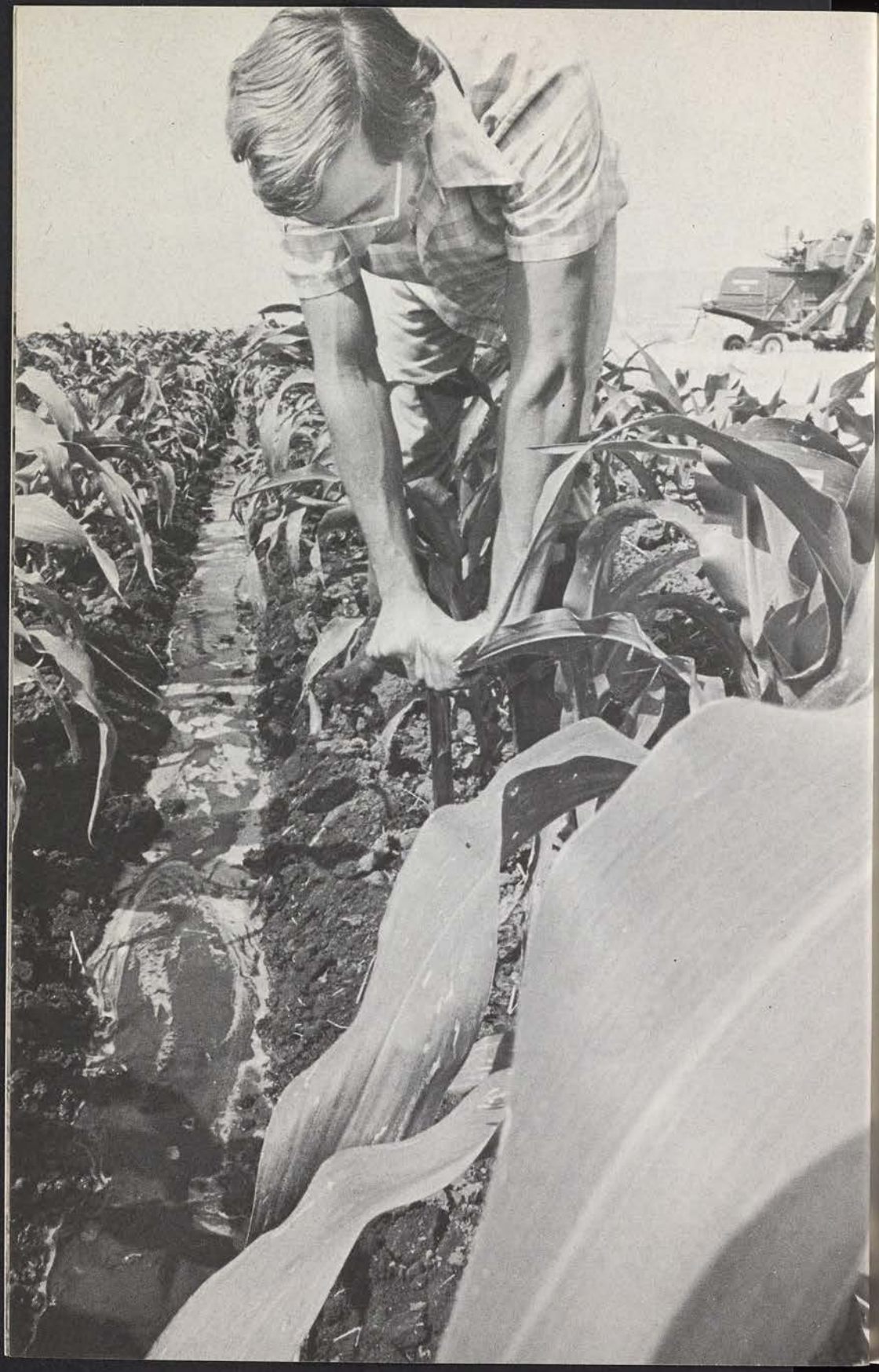
ORNAMENTAL HORTICULTURE
Joel Carter, Chairman
Ornamental Horticulture major (BS); Park Administration major (BS)
Secondary credential program, major in Ornamental Horticulture

PLANT AND SOIL SCIENCE
Robert L. Procsal, Chairman
Agricultural Biology major (BS); options in Agricultural Biology, Economic Entomology; Agronomy major (BS); Fruit Industries major (BS); Soil Science major (BS)

VOCATIONAL AGRICULTURE
Paul Peterson, Coordinator
Teaching credential in Vocational Agriculture.







AGRICULTURAL BIOLOGY

One of the four majors offered in the Plant and Soil Science Department is agricultural biology. For other programs in the department see agronomy, soil science and fruit industries.

Edward C. Appel, Jr. Kenneth R. Hobbs Richard S. Kaae

Agricultural biology combines the agricultural and biological sciences. Protection of food, plants, animals, man and his buildings is emphasized through the management of the environment and its organisms. Agricultural biologists are involved with programs of protection that are environmentally compatible and socially responsible. These programs include the management of populations of insects, mites, nematodes, plant diseases, weeds and vertebrate pests.

Professional careers with county, state and federal departments of agriculture and allied governmental agencies are satisfying. Challenging positions in sales, advisory services and as consultants with the various pest management and related commercial organizations and agricultural production enterprises, both domestic and international, are available. Research, teaching and graduate studies are other interesting pursuits.

The marketing of agricultural products presents many opportunities for individuals with a knowledge of quality standards, and the environmental factors and organisms affecting fruits and vegetables.

Summer employment is encouraged and frequently arranged because it provides both valuable experiences and income for students.

Opportunities are expanding and are abundant for each of our graduates because they are capable of using their knowledge for the benefit of society. In addition to the development of knowledge necessary for occupational proficiencies, sources of information are emphasized. This enables the graduate to increase professional competence and to cope with the constantly growing volume of new information. Thus, graduates are prepared for immediate employment in a wide range of positions and are prepared to enhance their careers after graduation.

Certification by the California Department of Agriculture for employment with the county departments of agriculture and as an entomologist by the Entomological Society of America is available.

Two programs are offered—agricultural biology and economic entomology. The choice of program will depend upon the student's professional career objective.

CURRICULAR OPTIONS

Agricultural Biology. This broadly based option is especially suitable for the individual who desires a variety of activities, enjoys the outdoors and likes to work with plants or animals. The professions serving agriculture and related industries by advisory and enforcement activities are emphasized. Employment is with private business and governmental organizations.

Economic Entomology. This option develops a high degree of specialization for individuals oriented toward private and industrial consultancies, crop and livestock insect biology and as entomologists with governmental agencies through emphasis of total environmental problems and pest management practices.

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CORE COURSES FOR MAJOR

(Required of all students)

Pest Control Equipment	AE	233	(3)
Agricultural Law	AGB	101	(3)
Introduction to Arthropods	AGB	165	(4)
Plant Identification	AGB	224	(4)
Insect Biology I	AGB	228	(3)
Insect Biology II	AGB	229	(4)
Principles of Pest Management	AGB	231	(4)
Vertebrate Pest Management	AGB	323	(4)
Produce Market Quality	AGB	325	(3)
Career Planning in Ag Biology	AGB	372	(1)
Pest Control Practices	AGB	424	(3)
ID of Immature Arthropods	AGB	455	(3)
Senior Project	AGB	461	(2)
Senior Project	AGB	462	(2)
Undergraduate Seminar	AGB	463	(2)
Courses to complete Major			(33-43)

OPTION COURSES FOR MAJOR

(Required for specific option)

Economic Entomology

**Household Pests	AGB	332	(3)
**Medical Entomology	AGB	333	(3)
Insects Affecting Timber Products	AGB	334	(3)
Bee Science	AGB	336	(3)
Insect Population Behavior	AGB	377	(3)
Biological Control	AGB	403	(3)
Advanced Pest Management	AGB	448	(3)
General Plant Pathology	BOT	223	(4)
Descriptive Statistics	MAT	107	(3)
General Bacteriology	MIC	200	(5)
Insect Classification	ZOO	327	(4)

Agricultural Biology

Management Accounting	ABM	324	(4)
Regulatory Pest Management	AGB	322	(4)
Fruit and Vegetable Standards	AGB	326	(4)
Weeds and Weed Control	AGR	233	(4)
Principles of Ecology	BIO	325	(4)
General Plant Pathology	BOT	223	(4)
Management Principles and Theory	BUS	307	(4)
or Personnel Management	ABM	402	
Basic Soil Science	SS	231	(4)
Soil Fertility and Fertilizers	SS	233	(4)
Plant Pathology Electives			(7)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Basic Biology	BIO	115	*(5)
General Botany	BOT	124	*(5)
General Botany	BOT	125	*(5)
College Chemistry	CHM	104	*(3)
College Chemistry	CHM	105	*(3)
College Chemistry Lab	CHM	141	*(1)
College Chemistry Lab	CHM	142	*(1)
Elements of Organic Chemistry	CHM	201	(3)
Organic Chemistry Lab	CHM	251	(1)
Elements of Biochemistry	CHM	321	(4)
Report Writing	COM	216	(3)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Basic Mathematics and	MAT	101	*(3)
Basic Mathematics	MAT	102	*(3)
or Intro Math Analysis	MAT	108	*
and Intro to Math Analysis	MAT	109	*
Physical Education	PE	141	*(3)
General Psychology	PSY	201	*(4)
Human Relations	PSY	314	(4)
Public Speaking	SP	100	*(4)
Invertebrate Zoology	ZOO	137	*(5)
Humanities			(6)
Plant or Animal Production Electives			(7)
Support and Electives			(21-31)

** AGB 322 may be substituted

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Agriculture.

Course Descriptions

AGB 101 Agricultural Law (3)

Agricultural Code and other laws affecting those agencies and individuals who promote and protect the agricultural industry of California; functions of state and county departments of agriculture and allied organizations. Sources of information. 3 lectures.

AGB 165 Introduction to Arthropods (4)

Arthropods and certain relatives affecting food, plants, animals, man and his buildings. Emphasizing insects, mites, ticks, spiders, snails, and slugs; their morphological and phylogenetic relationships; habits and habitats; important characteristics affecting the well-being of mankind. 3 lectures, 1 three-hour laboratory.

AGB 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

AGB 224 Plant Identification (4)

Identification of ornamental, orchard, and crop plants by contrast of odors, leaf shapes, and arrangements; fruit and flower types, growth habits; coloration of plant parts, and environmental variations. Consideration of scientific, common, and family name; general propagation and most serious pests. 3 lectures, 1 three-hour laboratory. Prerequisite: BOT 124.

AGB 228 Insect Biology I (3)

Recognition and distribution of the important insects and mites attacking the major field, cereal, and truck crops. Host preference and identification of damage to plant parts. Seasonal history, habits, and problems relating to pest management programs. 2 lectures, 1 three-hour laboratory. Prerequisite: AGB 165 or equivalent.

AGB 229 Insect Biology II (4)

Recognition and distribution of the important insects and mites attacking citrus, avocados, deciduous fruit, small fruit, berries, grapes, and nut trees. Host preference and identification of damage to plant parts. Seasonal history, habits, and problems relating to pest management programs. 3 lectures, 1 three-hour laboratory. Prerequisite: AGB 165 or equivalent.

AGB 231 Principles of Pest Management (4)

Concepts of pest management which include selective use and placement of pesticides, plant resistance, cultural and mechanical control, chemical and radiation sterilization, and the use of antimetabolites, hormones, pheromones, attractants, and repellants; selected combinations of these approaches; related laws. 3 lectures, 1 three-hour laboratory. Prerequisite: AGB 165, CHM 103 or the equivalents.

AGB 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

AGB 303 Horticultural Products (3)

Selection and use of fruits and vegetables. Includes post-harvest physiology, quality factors; varieties, availability, ripening, handling and storage considerations. Governmental agencies concerned with quality and wholesomeness of foods. For students other than Agricultural Biology majors. 3 demonstration—discussion meetings.

AGB 322 Regulatory Pest Management (4)

Programs of pest management, especially detection, survey, eradication, and quarantine. Purpose and application of United States and California plant quarantine laws and regulations, including biological, economic, and administrative aspects. Identification, habits, seasonal history and hosts of potential pests and diseases. 3 lectures, 1 three-hour laboratory. Prerequisite: AGB 165, PTH 223.

AGB 323 Vertebrate Pest Management (4)

Vertebrates in conflict with man; including those that interfere with the production and storage of food and fiber, transmit diseases, and damage buildings and other structures. Identification, biology and economic importance. Management techniques. Related laws and regulations. 3 lectures, 1 three-hour laboratory.

AGB 325 Produce Market Quality (3)

The marketing of quality fruits and vegetables from grower to consumer. Identification, cause and detection methods of quality factors resulting from insects, mites, nematodes, birds, mammals, plant diseases, and non-parasitic disorders important when marketing major fruits and vegetables. 2 lectures, 1 three-hour laboratory. Prerequisite: PTH 223, AGB 228, 229.

AGB 326 Fruit and Vegetable Standards (4)

Quality provisions of the Agricultural Code relating to fruits, nuts, vegetables, eggs, and honey. Minimum standards for marketing, including maturity, container, marking, and size requirements. Parasitic and physiological market defects, their identification, cause, and legal tolerances. 3 lectures, 1 three-hour laboratory. Prerequisite: AGB 325.

AGB 332 Household Pests (3)

Pests attacking plant and animal products in dwellings, food serving, and processing establishments, warehouses, and other enclosures; recognition of pests, damage, habitats; means of control and exclusion; pesticides registered for use in controlling these pests; related laws and regulations. 2 lectures, 1 three-hour laboratory. Prerequisite: AGB 165 or equivalent.

AGB 333 Medical Entomology (3)

Arthropod pests existing as nuisances in dwellings and other structures; dooryard pests, and pests attacking man and domestic animals. Emphasis on biology, recognition, habitat, ecology, distribution and disease transmission; techniques and materials used for control. 2 lectures, 1 three-hour laboratory. Prerequisite: AGB 165 or equivalent.

AGB 334 Insects Affecting Timber Products (3)

The major and minor insect pests and other arthropods of economic significance in the destruction of wood products; recognition of stages and damage; habits, seasonal history, and control of such pests. Laws and regulations affecting the structural pest control operator. 2 lectures, 1 three-hour laboratory. Prerequisite: AGB 165 or equivalent.

AGB 336 Bee Science (3)

Care, management, and manipulation of bees. Practical application of principles for effective establishment and maintenance of apiaries. Pollination and value of bees to agriculture. Recognition and control of bee diseases. Laws and regulations pertaining to beekeeping. 2 lectures, 1 three-hour laboratory.

AGB 372 Career Planning In Agricultural Biology (1)

Critical employer-employee evaluation. Employment techniques including preparation of application forms, data sheet, and portfolio; the interview and application follow-up. 1 lecture. Prerequisite: Junior standing.

AGB 377 Insect Population Behavior (3)

The study of pest populations in crop ecosystems in relation to chemical, biological, cultural, physical, and integrated control practices. Relationships among host, pest population, related biotic agents, soil, climate and management practices. 2 lectures, 1 three-hour laboratory.

AGB 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

AGB 401 Field Entomology (1–4)

Collection and classification of insects and other arthropods from selected ecological zones, animals, crop plants, or other habitat situations. Individual or group participation for advanced students. Approval before enrolling required.

AGB 403 Biological Control (3)

Natural and induced control of insect, mite, and weed pests using agents other than toxicants; collection, production and liberation of control agents; habits and identification of major groups of parasites and predators; recent developments in pest inhibition. 3 lectures. Prerequisite: Consent of instructor.

AGB 424 Pest Control Practices (3)

Summation of entomology courses through field observations of pest levels, development of integrated control programs, and evaluations of pest management results; discussions of experimental plot designs and statistical analysis of pest distribution. 2 lectures, 1 three-hour laboratory. Prerequisite: Senior standing.

AGB 441, 442 Internship in Agricultural Biology (1–3) (1–3)

On the job experience with public and private agencies for advanced students. Professional type experience new to the student so that a valuable contribution toward career development results. Written report based on an approved outline. Approval before enrolling required.

AGB 448 Advanced Pest Management (3)

The glandular systems of economically important arthropods which are now and may become sites for the interruption, distortion, or termination of natural functions in pest management activities. A consideration of mechanisms of growth, protection, and reproduction as a means of blocking life processes. 2 lectures, 1 three-hour laboratory.

AGB 455 Identification of Immature Arthropods (3)

The identification of immature arthropods that are economically important. Consideration of arthropods related to insects. Emphasis on those orders of insects with complete metamorphosis, including Coleoptera, Diptera, Lepidoptera, and Hymenoptera. 1 lecture, 2 three-hour laboratories.

AGB 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

AGB 463 Undergraduate Seminar (2)

New methods and developments, practices, and procedures in the field. 2 meetings.

AGB 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

AGRICULTURAL BUSINESS MANAGEMENT

----------, *Chairman*
Elton O. Brooks
David E. Cole
John D. Hanson
William C. Hughes
Charles H. Jameson
Milo G. Lacy
M. Robert White

The agricultural business management major is primarily a curriculum of business courses applied to the agricultural industry. Options in agricultural economics, food distribution, and management are offered within the major. Because of the wide selection of course offerings, a broad range of occupational choices is available to the graduate. These include the banking and finance area, food and fiber processing, sales, and marketing positions and federal, state and county government units.

The economics option includes an additional emphasis on economic analysis, statistics and mathematics. This option is recommended for the students planning advanced degree work in agricultural economics and resource development. It also prepares students to enter management positions in the agri-business arena requiring more specialized decision-making skills.

The food distribution option is designed for all aspects of food distribution, including transportation, packaging, product sales, advertising, public relations, food brokerage, buying, wholesaling, and retailing. Opportunities for on-the-job seasonal employment are developed to assist students in obtaining practical experience and familiarity with the current practices in California agriculture.

The management option emphasizes employment preparation and is particularly valuable to the student who has not specifically selected a vocational field but desires a broad approach in the study and skills needed in the management areas of agricultural business.

As a supplement to classroom and laboratory meetings, field trips are taken to distribution centers, production areas, and other related industries within agriculture. Frequent visits by guest speakers from leading agricultural firms further ensure that the student gains practical, current knowledge. In addition to business management, sales, and sales-promotional training, students may elect studies in specified production fields to gain valuable production techniques and experience necessary for job competency.

As a senior, the student is encouraged to take part-time employment in a related agricultural industry of his interest and to work closely with management people in the development of his senior project.

CORE COURSES FOR MAJOR

(Required of all students)

Intro to Agricultural Business	ABM	101	(4)
Advertising & Promotion of Agricultural Products	ABM	225	(3)
Contemporary Economic Problems of Agriculture	ABM	300	(3)
Agricultural Marketing	ABM	304	(3)
Agricultural Labor Management	ABM	308	(4)
Agricultural Economics	ABM	311	(4)
Agricultural Policy	ABM	313	(4)
Management Accounting	ABM	324	(4)
Agricultural Enterprise Management	ABM	328	(4)

Intro to Agricultural Data Management	ABM	375	(3)
Personnel Management	ABM	402	(3)
Agricultural Prices	ABM	403	(4)
Economics of Food & Fiber Consumption	ABM	410	(3)
Transportation of Agricultural Commodities	ABM	416	(4)
Senior Project	ABM	461	(2)
Senior Project	ABM	462	(2)
Undergraduate Seminar	ABM	463	(2)
Introduction to Data Processing	DP	211	(4)
World Agricultural Resources	IA	101	(4)
Courses to Complete Major			(33–42)

OPTION COURSES FOR MAJOR

(Required in specific options)

Agricultural Economics

Agricultural Market Structure	ABM	412	(4)
Statistical Analysis for Agriculture	ABM	476	(4)
Price and Income Analysis	EC	311	(4)
Price and Income Analysis	EC	312	(4)
Economic Statistics	EC	321	(4)
Economic Statistics	EC	322	(4)
Introduction to Mathematical Analysis	MAT	108	(3)
Introduction to Mathematical Analysis	MAT	109	(3)
Logic and Semantics	PHL	202	(4)
Agricultural Production (Select from AS 111, AGR 111, FI 230, OH 131, AS 327)			(8)

Food Distribution

Wholesaling of Agricultural Products	ABM	106	(3)
Agricultural Sales and Service Management	ABM	202	(3)
Job Instruction Training	ABM	203	(2)
Retailing	ABM	306	(4)
Economics of Food distribution	ABM	360	(3)
Harvesting and Marketing	AGR	224	(4)
Meat Utilization	AS	327	(3)
General Fruit Production	FI	230	(3)
Fundamentals of Risk and Insurance	FIR	307	(4)
Introduction to Foods	FN	121	(3)
Salesmanship	MKT	208	(4)
Basic Horticultural Skills	OH	131	(4)

Management

Wholesaling of Agricultural Products	ABM	106	(3)
Agricultural Sales and Service Management	ABM	202	(3)
Job Instruction Training	ABM	203	(2)
Retailing of Agricultural Products	ABM	306	(4)
Enterprise Accounting	ABM	325	(3)
Land Appraisal	ABM	406	(4)
Introduction to Plant Science	AGR	111	(3)
Harvesting and Marketing	AGR	224	(4)
Feeds and Feeding	AS	101	(4)
Meat Utilization	AS	327	(3)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization or American Political System	AMC PLS	201 201	*(4)
American Civilization or United States History	AMC HST	202 202	*(4)
Business Law	BUS	301	*(4)
Report Writing	COM	216	*(3)
Principles of Economics	EC	201	*(4)
Principles of Economics	EC	202	*(4)
Freshman Composition	ENG	104	*(4)
Basic Mathematics	MAT	101	*(3)
Physical Education	PE	141	*(3)
Public Speaking	SP	100	*(4)
Courses to complete general education requirements and electives			**(55–64)

* May be used for the general education requirement. Select unspecified courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Agriculture for fulfillment of the breadth requirement.

Course Descriptions

ABM 101 Introduction to Agricultural Business (4)

Agricultural business structure and scope of operations. principles of operations and financing. Seminar discussions. 4 lectures.

ABM 106 Wholesaling of Agricultural Products (3)

Principles, methods, and techniques of buying, receiving, storing and handling agricultural products between the producer and the retail outlets. Functions of brokers, wholesaler—voluntary and cooperative types, case studies, field trips and guest speakers in seminar discussions. 3 lectures.

ABM 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ABM 202 Agricultural Sales and Service Management (3)

Case studies and seminar discussions concerning principles of sales, personnel selection, training, and supervision. Sales control, credit collection, theory and method of evaluation of sales and service techniques. 3 lectures.

ABM 203 Job Instruction Training (2)

The principles and techniques of mechanical and technical job instruction; introductory research methods presented; job breakdown and job description as applied to agricultural business enterprises; student seminar-type discussions, demonstrations, and case study critiques. 2 lectures.

ABM 225 Advertising and Promotion of Agricultural Products (3)

Industry-sponsored agricultural advertising programs; tools of publicity, merchandising and public relations. Detailed examination of local types of advertising media, rates for short, seasonal promotions. Advertising provisions of marketing orders. Seminar-type discussions and guest speakers. 2 lectures and 1 three-hour laboratory.

ABM 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

ABM 300 Contemporary Economic Problems of Agriculture (3)

Seminar discussions of current social, economic and ecological problems. Overview of food supplies, population, agricultural pollution, food costs, consumerism, poverty, world food dilemma and societies' responsibility. 3 lectures. Prerequisite: EC 201 or consent of the instructor.

ABM 304 Agricultural Marketing (3)

Economic aspects of marketing agricultural products. Problems and alternative solutions of various marketing institutions. Current trends and developments in California product marketing. 3 lectures. Prerequisite: EC 201 or permission of the instructor.

ABM 306 Retailing of Agricultural Products (4)

Functions of buying, receiving, storing, and handling products and merchandise for profitable store operations. Site selection, costs, facilities, techniques, store operations and methods; application of computers to decision making; case studies, seminar discussions, and field trips. 3 lectures and 1 three-hour laboratory.

ABM 308 Agricultural Labor-Management Relations (4)

Analysis of union contracts used in agricultural industry. Responsibilities of management and labor. Evolution of western agriculture labor and unionization. Trends and alternative effects of future bargaining in agriculture. 3 lectures, 1 three-hour laboratory, field trips.

ABM 311 Agricultural Production Economics (4)

Introduction to fundamental production economic principles applies to problems in agriculture. 4 lectures. Prerequisite: EC 202.

ABM 313 Agricultural Policy (4)

Comtemporary development and economic analysis of public programs and policies affecting agriculture. Current policies and programs. Alternative policies evaluated. Seminar discussions. Policy case studies analyzed. 4 lectures. Prerequisite: EC 201 or consent.

ABM 320 Accounting for Landscape Architects (4)

General accounting principles with special emphasis on problems unique to the Landscape architectural practioner. 3 lectures, 1 three-hour laboratory.

ABM 324 Management Accounting (4)

Fundamental processes of double entry accounting. Emphasis on practical application in agricultural management. 3 lectures, 1 three-hour laboratory.

ABM 325 Enterprise Accounting (3)

Techniques of financial analysis and accounting for income, costs and profits. Case studies employed using agricultural firms. Management of financial and credit resources. 3 lectures.

ABM 328 Agricultural Enterprise Management (4)

Criteria for decision making involving agricultural enterprises. Case studies used. Budgeting processes, credit use, and feasibility analysis. Source of economic information. Introduction to simulation of management process. Seminar discussions. 3 lectures, 1 three-hour laboratory.

ABM 360 Economics of Food Distribution (3)

Introductions to food distribution practices. Pricing and price determination principles. Mergers and acquisition; state and federal regulations. Trade restraints. 3 lectures. Prerequisite: ABM 306 or consent.

ABM 361 Case Studies in Food Distribution (2)

Seminar discussions of actual case problems. Financing organization, management, store location, operation, personnel, mergers and growth. 2 lectures. Prerequisite: ABM 306.

ABM 375 Introduction to Agricultural Data Management (3)

Principles and procedures involved in analysis, presentation of agricultural data for upper management. Application for agricultural business, decision making, sampling, calculation and interpretation of introductory parametric and non-parametric tests applied to market tests. Computer applications. 2 lectures, 1 three-hour laboratory. Prerequisite: Math 107 or DP 211 or equivalent.

ABM 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ABM 402 Personnel Management (3)

Worker-supervisor relationships and theory; employee motivation; union and management relations; recruitment and selection; performance appraisal; communications; individual and group incentive systems; employee counseling. Case studies analyzed. Seminar discussions held, role playing emphasized, guest speakers. 3 lectures.

ABM 403 Agricultural Prices (4)

Principles and methods of price analysis, forces affecting agricultural prices, price variations, cycles and trends, price reports and forecasting, governmental agricultural price control programs and price characteristics of specific agricultural commodities. 4 lectures. Prerequisite: EC 202.

ABM 406 Land Appraisal (4)

Principles, methods and techniques of appraising agricultural real property for loans, purchase and sale, tax assessments, condemnations, and other purposes. 3 lectures, 1 three-hour laboratory.

ABM 410 Economics of Food and Fiber Consumption (3)

Multidisciplinary approach. Studies and delineates agricultural food and fiber consumption variables. Investigates marketing from consumer point of view. Surveys disciplines relevant to consumer behavior and consumption trends. Case studies and seminar discussion used to facilitate comprehension of concepts involved. 3 lectures. Prerequisites: EC 201, 202.

ABM 412 Agricultural Market Structure (4)

Market structure analysis and public policy. Micro economic principles applied to the firm and industry. Case studies of structure, conduct and performance applied to industries. Seminar discussions. 4 lectures. Prerequisite: EC 202 or consent of the instructor.

ABM 416 Transportation of Agricultural Commodities (3)

Principles of transportation of perishable agricultural products, emphasizing current trends of rail, truck and air carriers. Types of equipment available, trends and regulations including agricultural exemptions and incentives. 3 lectures.

ABM 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

ABM 463 Undergraduate Seminar (2)

New methods and developments, practices, and procedures in the field. 2 meetings. Prerequisite: Senior project completed.

ABM 441–442 Internship in Agricultural Business Management (1-3) (1-3)

On-the-job training in agricultural business management providing collegiate level experience in food distribution, agricultural management. One unit credit for each 120 hours of experience and training. No more than 6 units of credit can be earned. Useful for preparation of senior project. Permission of coordinator required.

ABM 476 Statistical Analysis for Agriculture (4)

Application of statistical tools and techniques employed in agricultural economic analysis. Application of computer to selected parametric and non-parametric statistical techniques. 3 lectures. 1 three-hour laboratory. Prerequisites: ABM 375 and MATH 107 or equivalent.

ABM 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

AGRICULTURAL ENGINEERING

Floyd V. Matthews, Jr., *Chairman*
John W. Branch, Jr. You-tsai Hung Charles M. Stark
Haven Q. Conard

Agricultural engineering is becoming increasingly important with the growth of agriculture to highly automated methods of operation. Because agriculture includes all operations and facilities utilized from the planting of seed to the packaged processed foods, many challenges await the agricultural engineer.

A student pursuing a major in agricultural engineering combines engineering sciences with basic biology to accomplish his educational objective. He may select areas of special interest such as food engineering, soil and water, electric power and processing, or power and machinery.

Because of the rapid expansion in the processing of convenience foods, a student in food engineering will be concerned with the design of equipment and facilities for food processing plants.

Opportunities are abundant for the student interested in soil and water. Irrigation, drainage, flood and erosion control, and water supply require study of soil mechanics, movement of water through the soil, and design criteria for canals, ditches and dams.

The trend to large dairy, beef, swine and poultry enterprises has necessitated the automation of feed handling and processing equipment. A knowledge of electric power and electronic controls is necessary to engineer these complex systems.

If the student selects the power and machinery area, he will learn how to design machines for automatic harvesting of fruits and vegetables. He will study the power testing of tractors and the effects of noise and vibrations on the equipment operator.

Students contemplating entrance into agricultural engineering should take a maximum of physics, mathematics and science in high school.

The Agricultural Engineering Department maintains and manages a fleet of agricultural and construction equipment for instructional and farm use.

CORE COURSES FOR MAJOR

(Required of all students)

Agricultural Engineering Problems	AE	101	(4)
Engineering Analysis of Agricultural Machines	AE	210	(3)
Instruments and Controls	AE	250	(3)
Engines and Energy Conversion	AE	310	(3)
Agricultural Environments and Structures	AE	320	(5)
Strength of Biological Materials	AE	330	(3)
Agricultural Use of Radiations	AE	331	(3)
Man-Machine Systems	AE	410	(5)
Irrigation Engineering	AE	440	(4)
Erosion Control & Drainage Engineering	AE	441	(4)
Senior Project	AE	461	(2)
Senior Project	AE	462	(2)
Undergraduate Seminar	AE	463	(2)
Introduction to Engineering Graphics	ESG	120	(3)
or Engineering Graphics	ESG	121	
Strength of Materials	ME	219	(3)
Thermodynamics	ME	301	(4)
Fluid Mechanics	ME	311	(4)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Basic Biology	BIO	115	*(5)
General Chemistry	CHM	111	*(3)
General Chemistry	CHM	112	(3)
General Chemistry Laboratory	CHM	151	*(1)
General Chemistry Laboratory	CHM	152	(1)
Report Writing	COM	216	(3)
Principles of Economics	EC	201	*(4)
Principles of Economics	EC	202	*(4)

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Elements of Electrical Engineering	EEE	331	(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Analytic Geometry and Calculus	MAT	114	*(3)
Analytic Geometry and Calculus	MAT	115	*(3)
Analytic Geometry and Calculus	MAT	116	*(3)
Calculus and Differential Equations	MAT	214	(4)
Calculus and Differential Equations	MAT	215	(4)
Calculus and Differential Equations	MAT	216	(4)
Engineering Statics	ME	211	*(3)
Engineering Dynamics	ME	212	(4)
Strength of Materials	ME	218	*(3)
Physical Education	PE	141	*(3)
General Physics	PHY	131	*(4)
General Physics	PHY	132	*(4)
General Physics	PHY	133	(4)
Basic Soil Science	SS	231	(4)
Humanities			*(6)
Mathematics (Restricted)			(6)
Agricultural Science Electives (Restricted)			(8)
Natural Science Electives (Restricted)			(6)
Directed Electives (Restricted)			(7)
Electives			(14)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education requirements select four courses from a minimum of two schools other than the School of Agriculture.

Course Descriptions

AE 101 Agricultural Engineering Problems (4)

An introduction to the field of agricultural engineering and the type of problems encountered. Machining and welding techniques, surveying land for agricultural enterprises, experimentation and report writing. 3 lectures, 1 three-hour laboratory.

AE 102 Fundamentals of Household Equipment and Materials (4)

Scientific principles applied to household equipment and its use. Electic wiring, motors, switches, timers, and heat sensors used in appliances. Principles of infrared, ultrasonic, and microwave energy, refrigeration, and flow of heat through utensils and materials. 3 lectures, 1 three-hour laboratory.

AE 121 Construction Fundamentals (2)

Construction techniques, materials strength tests, structural engineering and planning. Carpentry and masonry tools, hardward and materials as applied to construction of various structures. Hand and power equipment, 1 lecture, 1 three-hour laboratory.

AE 122 Utility Systems (2)

Electrical power and lighting systems. Electrical principles, codes, construction techniques and wiring practices. Design of water pressure systems. Methods of installation. 1 lecture, 1 three-hour laboratory.

AE 123 Welding (2)

Fundamentals of arc and acetylene welding. Flat, horizontal, vertical, and overhead positions. Cutting, brazing, hard-facing. Practical arts and skills of metal fabrication. 1 lecture, 1 three-hour laboratory.

AE 124 Landscape Construction (4)

Fabrication techniques with wood, material strength tests. Fundamentals of structural engineering as applied to landscape and nursery construction. Safe and efficient use of hand and and power tool equipment. 2 lectures, 2 three-hour laboratories.

AE 131 Surveying Fundamentals (2)

Measurement of distances, elevations, angles, and directions. Care and use of surveying equipment. Contours, maps, field notes, calculation methods. 1 lecture, 1 three-hour laboratory. Prerequisite: MAT 101 or 102.

AE 132 Surveying Applications (2)

Plane table mapping, earth yardage for land forming, cuts and fills by planimeter, curve surveys, topographic maps by transit-stadia. Desk calculator methods. 1 lecture, 1 three-hour laboratory. Prerequisite: AE 131.

AE 200 Special Problems For Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

AE 210 Engineering Analysis of Agricultural Machines (3)

A functional and force analysis of soil working tools, planting equipment, pest control equipment, and harvesting equipment. The application of statics and dynamics to machine units. 2 lectures, 1 three-hour laboratory. Prerequisite: ME 212.

AE 215 Tractor Power and Machinery (4)

A study of the operating principles of internal combustion engines including detailed studies of valves, ignition, carburetion, and power measurement. Operating principles and adjustments of field machinery such as plows, harrows, planters, grain harvesters, and hay harvesting equipment. 3 lectures, 1 three-hour laboratory. Prerequisite: AE 241 or equivalent.

AE 231 Materials and Creative Construction (3)

Construction material characteristics; aesthetic qualities, functional application, strengths, durability, economics. Creative use of construction materials, tools, and equipment. 1 lecture, 2 three-hour laboratories. Prerequisite: Ability to safely operate power tools.

AE 233 Pest Control Equipment (3)

Principles of machines and power units as applied to various types of spraying, dusting, and fumigation equipment used in structural and agricultural industries. Structural pest control equipment. Structural repair techniques. 2 lectures, 1 three-hour laboratory. Prerequisite: AE 122, MAT 101 or 102.

AE 240 Irrigation (4)

Principles and practices of irrigation. Irrigation design engineering. Pumps, wells, water conveyance and measurement. Surface, sub-surface and sprinkler irrigation. Science of plant-soil-water relationships. Water requirements of crops. Leaching and drainage problems. 3 lectures, 1 three-hour laboratory. Prerequisite: AE 131, SS 231, MAT 101 or 102.

AE 241 Tractors (2)

Basic principles of engines and power transmission. Field and shop practice in operation, service, adjustment, and minor repair of wheeled and tracklayer tractors. Gasoline, LPG, and diesel engines. Includes bulldozer, backhoes, skiploaders, etc. 1 lecture, 1 three-hour laboratory.

AE 244 Special Projects (1–4)

Individual or group projects tailored to the student need for further development of knowledge and skill. Construction or modification of agricultural or shop equipment. 1 laboratory per unit. Limited to 4 units total, with maximum of 2 units per quarter.

AE 250 Instruments and Controls (3)

Fundamentals of instruments and their operational characteristics with respect to damping, range and accuracy. Electric, electronic, pneumatic, and hydraulic controls for sensing and actuating devices. 3 lectures. Prerequisite: MAT 116.

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AE 299 Special Topics For Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

AE 310 Engines and Energy Conversion (3)

Energy conversion and thermodynamics of engines. Power testing of tractors and agricultural power units. 2 lectures and 1 three-hour laboratory. Prerequisite: ME 301.

AE 320 Agricultural Environments & Structures (5)

Air-humidity relationships and engineering applications to atmospheres for fruits, vegetables and animals. Design of building walls, floors, and members to withstand forces of wind, snow, and product storage. 4 lectures, 1 three-hour laboratory. Prerequisite: ME 219.

AE 321 Automatic Irrigation Systems (4)

Engineering design, sprinkler equipment, clock control mechanisms, soil moisture sensing devices, pressure loss, trouble-shooting, electro-hydraulic systems. Application to turf installations. 3 lectures, 1 three-hour laboratory. Prerequisite: AE 122, SS 231, MAT 101 or 102.

AE 330 Strength of Biological Materials (3)

Resistance to mashing and resulting damage to such products as fruits, vegetables, grain, and eggs. Absorption of loads applied to these biological materials and how the loads are transmitted to container walls and floors. 3 lectures. Prerequisite: ME 219.

AE 331 Agricultural Use of Radiations (3)

Applications and sources of such energies as infrared, ultraviolet, electrostatic, microwave and sonic. Radio-frequency treatment of seed, and the influence of electricity on the movement of water in soil are included. 2 lectures and 1 three-hour laboratory. Prerequisite: PHY 133.

AE 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

AE 401 Instruction in Advanced Shop Skills (3)

Management of the facility including maintenance of equipment, inventories, supplies, and planning including instructor's responsibilities and liabilities. 2 lectures and 1 three-hour laboratory. Prerequisite: Junior standing or consent of instructor.

AE 410 Man-Machine Systems (5)

Effects of noise, vibrations, temperature, humidity, etc. on man and his ability to operate equipment. Also dimensions of body movements with respect to design of machines. Coordination of man and machines into a compatible system. 4 lectures and 1 three-hour laboratory. Prerequisite: MAT 216.

AE 411 Principles of Mechanical Harvesting (4)

Forces required to remove fruit from trees and vines and to remove vegetables from the soil and plants. Mechanical, electronic, pneumatic, and hydraulic means of distinguishing desirable from undesirable products. 3 lectures, 1 three-hour laboratory. Prerequisite: MAT 216.

AE 421 Park Equipment Management (4)

Principles of management and operation of park and horticultural equipment fleets. Economic considerations of leases, ownership, and rental. Principles of power determination and mechanism design evaluation. Mechanical, electrical, pneumatic, and hydraulic equipment investigations. 3 lectures, 1 three-hour laboratory. Prerequisite: Senior standing.

AE 430 Aerodynamics in Agriculture (4)

Engineering the density and velocity of air streams for drying, seeding, spraying, loading and unloading. Cleaning and separating agricultural products by air streams. Influence of wind direction and velocity on buildings and growing crops. 4 lectures. Prerequisite: ME 311.

AE 431 Drying of Biological Materials (4)

Principles of moisture movement and removal from fruits, vegetables, hay, and grain. Also freeze drying, vacuum drying, and dehydrofrigidation. 4 lectures. Prerequisite: MAT 216.

AE 440 Irrigation Engineering (4)

Operating characteristics of different systems of irrigation; sprinkler, border, flooding, etc. Calculation of water requirements for crops and soils. Engineering design of water application rates, soil absorption rates and automatic equipment. 3 lectures, 1 three-hour laboratory. Prerequisite: ME 311.

AE 441 Erosion Control and Drainage Engineering (4)

Engineering the methods of reducing the erosive velocity of water flow over land surfaces. Determining the optimum size of pipes and ditches to remove and convey water from the soil. 3 lectures, 1 three-hour laboratory. Prerequisite: ME 311.

AE 461, 462 Senior Project (2) (2)

Student will select an engineering problem in his area of interest. Project will be completed under appropriate faculty supervision and will culminate in a written report.

AE 463 Undergraduate Seminar (2)

Student presentation and discussion of recent research and development in Agricultural Engineering. 2 lectures.

AE 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

AGRONOMY

One of the four majors offered in the Plant and Soil Science Department is agronomy. For other programs in this department see agricultural biology, soil science and fruit industries.

Robert L. Procsal, *Chairman*
Gerald L. Croissant Theodore L. Lieb

Agronomy is for the qualified student who is challenged by the thought of feeding the world. To prepare students the agronomy curriculum is designed to give a broad background in the art and science of crop production. Major and support courses emphasize current practices employed by commercial agriculture in California and other similar agricultural areas. With the realization that scientific and technological developments are changing constantly students are also taught agronomic fundamentals that will enable them to adapt and improve practices as changes occur. These fundamentals include principles of environmental management necessary to insure a continuous supply of agricultural products. Students are sufficiently prepared in the sciences to successfully pursue graduate work.

Agronomy students at Cal Poly have a unique opportunity to obtain actual experience in growing crop plants. The university farm regularly hires students to help maintain over 400 acres of vegetable crops, field crops, forages, cereals and pastures. Enterprising students are allowed to conduct individual or group crop projects involving small plots or several acres of land. These projects provide valuable training in all phases of crop farm operations and at the same time allow the students to share in the profits.

Employment possibilities are numerous. In addition to commercial crop production, students are prepared to work in the agricultural chemical industry, the seed industry, crop processing and marketing, and county, state and federal agencies. Traditionally a man's field, women are now finding agronomy to be not only a fascinating study but a promising vocation.

CORE COURSES FOR MAJOR

(Required of all students)

Cereal Crops	AGR	122	(4)
Field Crops	AGR	221	(4)
Harvesting & Marketing of Vegetables	AGR	224	(4)
Vegetable Crop Production	AGR	226	(4)
Weeds and Weed Control	AGR	233	(4)
Crop Technology	AGR	322	(4)
Seed Production	AGR	331	(4)
Irrigated Pastures	AGR	333	(4)
Plant Breeding	AGR	404	(4)
Crop Diseases	AGR	421	(4)
Crop Farm Operations	AGR	437	(3)
Senior Project	AGR	461	(2)
Senior Project	AGR	462	(2)
Undergraduate Seminar	AGR	463	(2)
Basic Soil Science	SS	231	(4)
Soil Management	SS	232	(4)
Soil Fertility and Fertilizers	SS	233	(4)
Soil Analysis	SS	337	(2)
Plant Tissue Analysis	SS	338	(2)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Management Accounting	ABM	324	(4)
Surveying Fundamentals	AE	131	(2)
Tractor Power and Machinery	AE	215	(4)
Tractors	AE	241	(2)
Introduction to Arthropods	AGB	165	(4)
Insect Biology	AGB	228	(3)
Principles of Pest Management	AGB	231	(4)
Introduction to Plant Science	AGR	111	(3)
American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Basic Biology	BIO	115	*(5)
Genetics	BIO	303	*(4)
Agricultural Botany	BOT	120	(4)
General Plant Pathology	BOT	223	(4)

Fundamentals of Chemistry	CHM	103	*(4)
College Chemistry	CHM	104	*(3)
College Chemistry	CHM	105	*(3)
College Chemistry Laboratory	CHM	141	*(1)
College Chemistry Laboratory	CHM	142	*(1)
Elements of Organic Chemistry	CHM	201	*(3)
Organic Chemistry Laboratory	CHM	250	*(1)
Principles of Economics	EC	201	*(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Basic Mathematics	MAT	101	*(3)
Basic Mathematics	MAT	102	*(3)
Physical Education	PE	141	*(3)
Public Speaking	SP	100	*(4)
Humanities			*(6)
†Agricultural Engineering			(4)
‡Agricultural Business Management			(3)
Electives			*(28)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements select four courses from a minimum of two schools other than the School of Agriculture.

† Select from AE 121, 122, 123.

‡ Select from ABM 304, 308, 311.

Course Descriptions

AGR 111 Introduction to Plant Science (3)

Diversification and importance of economic crop plants. Environmental factors as they affect plant growth. Physical characteristics of soil, soil-water relationships, terminology. 3 lectures.

AGR 122 Cereal Crops (4)

Production and management of the major California cereal crop varieties. Characteristics of these varieties in relation to applicable cultural practices, harvesting, cost of production, grain grading and processing, marketing, disease and pest control. 3 lectures, 1 three-hour laboratory.

AGR 123 Forage Crops (4)

Production, harvesting, and utilization of principal California forage crops. Identification and utilization of range plants studied in the field. 3 lectures, 1 three-hour laboratory.

AGR 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

AGR 221 Field Crops (4)

Growing of California field crops other than cereals, such as row-planned cotton, flax, field beans, sugar beets, and miscellaneous fiber and oil crops. Characteristics of the major varieties in relation to the best cultural harvesting, marketing, disease and pest control practices. 3 lectures, 1 three-hour laboratory.

AGR 224 Harvesting and Marketing of Vegetables (4)

Harvesting methods and procedures; current handling and packaging techniques; grades and grading, minimum standards, containers, storage; requirements of crops for processing. 3 lectures, 1 three-hour laboratory.

AGR 226 Vegetable Crop Production (4)

Cultural practices, varieties, economics of production of major warm and cool season vegetables. Application of production techniques on college-operated acreage. 3 lectures, 1 three-hour laboratory.

AGR 233 Weeds and Weed Control (4)

Recognition and control of weeds injurious to California crop and range lands. Classification of weeds and their seed. Dissemination; cultural, chemical, and biological control practices; laws regarding weeds. 3 lectures, 1 three-hour laboratory.

AGR 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

AGR 322 Crop Technology (4)

Grades and qualities of California crops as they affect market values. Determination of factors affecting optimum harvesting and storage. Technological processes as they affect processing. 3 lectures, 1 three-hour laboratory. Prerequisite: AGR 122, 221, 224.

AGR 331 Seed Production (4)

California field, vegetable and flower seed production. Location, methods of growing, harvesting, storing. Economic outlook for principal kinds. Certified seed production. Seed laws. 3 lectures, 1 three-hour laboratory. Prerequisite: AGR 122, 221, 226, 233.

AGR 333 Irrigated Pastures (4)

Culture, management, fertilization, composition, and costs of California irrigated pastures. Identification, adaptation, and utilization of major irrigated pasture varieties. 3 lectures, 1 three-hour laboratory.

AGR 336 Range Management (4)

Soil and plant characteristics of rangelands. Management practices used to maintain range resources and increase production of forage and livestock. Identification of important range plants. 3 lectures, 1 three-hour laboratory. Prerequisite: SS 221 or 231.

AGR 341 Farm Cultural Practices (3)

Practical application of primary and secondary crop production cultural practices with a relationship to field conditions. Sequence and necessity of operations from soil preparation through harvesting. Analysis of equipment efficiency to crop culture. 1 one-hour lecture, 2 three-hour laboratories. Prerequisite: AE 215 or AE 241 and any crop production course, or by permission of the instructor.

AGR 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

AGR 404 Plant Breeding (4)

Principles and techniques of improving crop plants. Field plot design and statistics applied to experimentation in crop improvement. 3 lectures, 1 three-hour laboratory. Prerequisite: BIO 303.

AGR 421 Crop Diseases (4)

Methods of recognizing and controlling diseases of commercial vegetable and field crops. Chemical and cultural control methods that are presently being utilized in California. 3 lectures, 1 three-hour laboratory. Prerequisite: BOT 120, PTH 223.

AGR 437 Crop Farm Operations (3)

Operation of commercial vegetable and field crop acreages. Basic management problems in relation to cost determination, leasing, labor relations, government programs, credit, water rights, and machinery management. 2 lectures, 1 three-hour laboratory. Prerequisites: AGR 122, 221; AGR 224 or 226.

AGR 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

AGR 463 Undergraduate Seminar (2)

New methods and developments. Practices and procedures in the field. 2 lectures.

AGR 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

ANIMAL SCIENCE

Eugene K. Keating, *Chairman*

Allen C. Christensen
Norman K. Dunn
Homer D. Fausch
Jack T. Gesler
David C. P. Hayes
Mack H. Kennington
Arlin D. Knight
Sandi Lieb
Cedric Y. Matsushima
Edward A. Nelson
Robert H. Packard
Robert J. Schechter
Tom W. Westing

A four-year curriculum leading to a Bachelor of Science degree in Animal Science with options in pre-veterinary science, animal production, and animal agri-business is offered by the department.

Courses offered by the department are designed to fulfill career needs for men and women in the science and business phases of the animal industry.

Specialized laboratories are provided for meat, wool, poultry, eggs, feed processing and animal production. The department maintains 330 acres of range land and 100 acres of irrigated pasture. Livestock includes a purebred breeding herd of Aberdeen-Angus and polled Herefords, and commercial feeder cattle; the Kellogg Arabian horses; flocks of purebred Rambouillet, Suffolk, and Hampshire sheep; a herd representing commercial breeds of swine; and flocks of laying hens, fryers and turkeys.

Location of the college provides rich opportunities for students to obtain specialized and practical educational experience in production, management, feeding, marketing and processing. Cooperation of prominent local breeders, feeders, producers, marketing organizations and related animal industry offers additional opportunity for field study.

Facilities for student-owned and operated livestock projects are made available by the Cal Poly Foundation.

The pre-veterinary science option meets requirements for admission to schools of veterinary medicine, related medical technical fields, and for graduate study in animal nutrition, meat science, animal breeding, and animal physiology.

The animal production option stresses preparation for management of livestock, horse and poultry enterprises. The option is of particular value to the student planning to teach agriculture at the secondary level or to serve in underdeveloped nations.

The animal agri-business option stresses preparation for management and marketing in animal agri-businesses of non-ranch type. Particular emphasis is given to agri-businesses needing animal specialists as a part of their management or marketing team. This option has been found to be of particular value to women as well as men majors.

For the student interested in meat science and processing, specialized courses are available. A student may develop a program emphasizing meat science by consulting with the appropriate departmental advisor.

CORE COURSES FOR MAJOR

(Required of all students)

Feeds & Feeding	AS	101	(4)
Introduction to Swine Production	AS	122	(4)
Introduction to Sheep Production	AS	123	(4)
Introduction to Beef Production	AS	131	(4)
Meat Science	AS	227	(3)
or Meat Utilization	AS	327	
Advanced Livestock Feeding	AS	303	(3)
Animal Nutrition'	AS	402	(4)
Animal Breeding	AS	404	(4)

Senior Project	AS	461	(2)
Senior Project	AS	462	(2)
Undergraduate Seminar	AS	463	(2)
Poultry Principles	PS	131	(4)
Physiology of Domestic Animals	VS	205	(4)
Animal Diseases	VS	301	(3)
Courses to complete major			(61)

OPTION COURSES FOR MAJOR

(Required in specific options)

Pre-Veterinary Science

Select a minimum of 30 units:

Mammalian Endocrinology	AS	412	(4)
Chemical Principles	CHM	113	(4)
Organic Chemistry	CHM	212	(3)
Organic Chemistry	CHM	213	(3)
Quantitative Analysis	CHM	221	(4)
Organic Chemistry Lab	CHM	252	(1)
Organic Chemistry Lab	CHM	253	(1)
College Physics	PHY	121	(4)
College Physics	PHY	122	(4)
College Physics	PHY	123	(4)
Vertebrate Zoology	ZOO	138	(5)
Embryology	ZOO	323	(4)
Electives			(31)

Animal Production

Tractors	AE	241	(2)
Forage Crops	AGR	123	(4)
or Cereal Crops	AGR	122	
Irrigated Pastures	AGR	333	(4)
or Range Management	AGR	336	
Approved Animal Science			(30)
Electives			(21)

Animal Agri-Business

Select 30 units from			(30)
ABM 202, 225, 304, 308, 311, 325, 402, 403, 406, BUS 144, 145, 244, 245, 301, 302, DP 211			
Approved Animal Science Selections			(14)
Electives			(17)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Management Accounting	ABM	324	(4)
Agricultural Enterprise Management	ABM	328	(4)
American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Basic Biology	BIO	115	*(5)
Genetics	BIO	303	*(4)
College Chemistry	CHM	104	*(3)
College Chemistry	CHM	105	*(3)
College Chemistry Laboratory	CHM	141	*(1)
College Chemistry Laboratory	CHM	142	*(1)
Elements of Organic Chemistry	CHM	201	*(3)
Organic Chemistry Laboratory	CHM	251	*(1)
Biochemistry	CHM	327	*(4)
Principles of Economics	EC	201	(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Basic Mathematics	MAT	101	*(3)
Basic Mathematics	MAT	102	(3)
or Trigonometry	MAT	104	
or Introduction to Math Analysis	MAT	108	
General Bacteriology	MIC	201	(5)
Physical Education	PE	141	*(3)
General Psychology	PSY	201	*(4)
Public Speaking	SP	100	*(4)
General Soils	SS	221	(4)
or Basic Soil Science	SS	231	
Invertebrate Zoology	ZOO	137	*(5)
Humanities			*(6)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education requirements select four courses from a minimum of two schools other than the School of Agriculture.

Course Descriptions

AS 101 Feeds and Feeding (4)

An introductory course treating the fundamentals of animal nutrition, the composition of feeds, feeding standards and their application to livestock production. 3 lectures, 1 three-hour laboratory.

AS 111 Animal Agricultural Science (4)

Designed for non-animal science majors as an orientation course pertaining to basic physiological and economical considerations in the production and marketing of animals. 4 lectures.

AS 122 Introductory Swine Production (4)

History and development of swine industry. Types and breeds of swine. Hog production under California and Midwestern conditions. Common feeds used to supply nutrition requirements. Practice in handling, feeding, and selection. 3 lectures, 1 three-hour laboratory.

AS 123 Introductory Sheep Production (4)

Management of farm flocks of sheep with emphasis on common breeds, their identification and adaptation to California conditions. Principles of feeding, selecting, and evaluating sheep and their products. 3 lectures, 1 three-hour laboratory.

AS 124 Basic Equitation (2)

The fundamentals of the art of equitation. The anatomy of the horse as it pertains to riding. Equipment utilized in training and riding, care of the horse and safety precautions are emphasized. 2 three-hour laboratories.

AS 125 Introductory Horse Production (3)

History, evolution, breeds and functions of horses. Basic principles of equine nutrition, reproduction, inheritance, disease and parasite prevention and control, skeletal and muscular form and function. 2 lectures, 1 three-hour laboratory.

AS 131 Introductory Beef Production (4)

Survey of market beef production in the United States. Breed characteristics, grades and classes of market cattle and carcasses. Importance of by-products. 3 lectures, 1 three-hour laboratory.

AS 141 Canine Care and Management (3)

Fundamentals of breeding, feeding, training, management and care of dogs. 2 lectures, 1 three-hour laboratory.

AS 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

AS 227 Meat Science (3)

The practice of slaughtering and cutting of cattle, sheep and swine. Consideration of chemical composition, yields, grades, federal and state inspection and the fundamentals of curing and smoking meats. 2 lectures, 1 three-hour laboratory.

AS 230 Dairy Science (4)

Selection, breeding, feeding, and management of dairy cattle, composition and food value of dairy products. Dairy industry statistics and opportunities. 3 lectures, 1 three-hour laboratory.

AS 234 Farrier Science (4)

Fundamentals of horseshoeing, anatomy and physiology of the horse's foot, pastern and legs. Trimming feet, fitting, nailing shoes, and introduction to corrective shoeing. 2 lectures, 2 three-hour laboratories.

AS 241 Introductory Livestock Evaluation (2)

Instruction in selection of beef cattle, sheep, swine, and horses according to utility, type and breed. 2 three-hour laboratories. Prerequisite: Sophomore standing.

AS 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

AS 303 Advanced Livestock Feeding (3)

Nutritional requirements for maintenance, growth, fattening, reproduction, and lactation. Calculation of efficient and economical rations. Biological and replacement value of feeds. Recent developments in feeding. 3 lectures. Prerequisite: AS 101.

AS 305 Artificial Insemination of Domestic Animals (3)

Fundamentals and techniques used in the artificial breeding of cattle, sheep, swine and horses; physiological aspects of reproduction; evaluation of artificial insemination in the livestock industry. 2 lectures, 1 three-hour laboratory. Prerequisite: VS 206.

AS 306 Experimental Animal Methodology (4)

Fundamentals and techniques used in the breeding, feeding, care, management and experimentation with laboratory animals. Comparative studies of large versus small animals and the implications of recent findings derived from such studies. 3 lectures, 1 three-hour laboratory. Prerequisite: VS 205 or BAC 200.

AS 322 Commercial Swine Production (4)

Management of swine herd. Selection of breeding stock. Feeding and nutritional needs of swine. Market channels, cycles and production costs. Disease control and common diseases of swine. 3 lectures, 1 three-hour laboratory. Prerequisite: AS 101, 122.

AS 323 Sheep and Wool Technology (5)

Management of commercial feedlot and range sheep operations. Shearing, packing, grading, and marketing wool. Critical analysis of the economic characteristics of wool. 4 lectures, 1 three-hour laboratory. Prerequisite: AS 101, 123.

AS 325 Horse Industry (3)

A comprehensive consideration of equine reproduction and breeding-farm management, including breeding complications, mating hygiene, disease and parasite detection, mare and stallion selection, records and office procedures of stallion stations. 2 lectures, 1 three-hour laboratory.

AS 327 Meat Utilization (3)

Introduction to the technology of meat processing and utilization including cutting, curing, smoking, wrapping, freezing and storage problems. Economic aspects of procurement, portion control and preparation, inspection and grading. For women and interested non-majors. 2 lectures, 1 three-hour laboratory.

AS 331 Beef Cattle Science (5)

The management of commercial and purebred cattle. Cost of production as affected by geographical location. Improvement of performance and breeding efficiency with emphasis on cattle fertility and performance testing. 4 lectures, 1 three-hour laboratory. Prerequisite: AS 131.

AS 335 Horsemanship (2)

Theory and practice of basic training principles and methods. Handling, training, grooming of the young foal and yearling. Instruction in long line training and ground driving. 2 three-hour laboratories. Prerequisite: AS 325.

AS 337 Meat Evaluation (2)

Factors related to carcass quality, conformation, and finish, including meat classification, grading, and evaluation of carcass and wholesale cuts of beef, pork, and lamb. Field trips to nearby packing plants required. 1 lecture, 1 three-hour laboratory. Prerequisite: AS 227.

AS 341 Livestock and Wool Evaluation (3)

Intensive evaluation of livestock and wool by use of carcass evaluation, records of performance, fleece measurements, and standard breed type in preparation for intercollegiate competition. 3 three-hour laboratories. Prerequisite: AS 241

AS 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

AS 402 Animal Nutrition (4)

Metabolism of proteins, carbohydrates, fats, minerals, and vitamins. Relationship of proper nutrition to livestock production. 3 lectures, 1 three-hour laboratory. Prerequisite: CHM 327.

AS 403 Ruminant Nutrition (3)

Implications of recent findings in ruminant nutrition. The physiochemical processes of digestion and absorption. Metabolism and the importance of rumen microflora. Normal metabolism and abnormal metabolic disorders. Modes of action of feed additives. 3 lectures. Prerequisite: AS 402.

AS 404 Animal Breeding (4) or (3)

Application of genetics to animal breeding. Systems of mating, use of in-breeding, cross-breeding and selection in improving farm animals. 3 lectures, 1 three-hour laboratory. Prerequisite: BIO 303—Genetics.

AS 412 Mammalian Endocrinology (4)

A general course surveying the glands of internal secretion and their role in development, growth, metabolic regulation, lactation, and reproduction of animals. 4 lectures. Prerequisite: VS 205 or equivalent.

AS 413 Physiology of Lactation (3)

Physiology of milk secretions. Factors affecting production. Mechanical and natural removal of mammary gland secretions. 3 one-hour lectures. Prerequisite: VS 205 or equivalent.

AS 422 Feedlot Operations (3)

Management problems of commercial feedlots. Factors affecting efficiency and economy of gain. Procurement of livestock and feedstuffs. Disease control, record keeping, financing and physical plant. 2 lectures, 1 three-hour laboratory. Prerequisite: AS 303 and a minimum of one advanced production course.

AS 423 Livestock Marketing (3)

Livestock marketing practices and procedures. Study of factors affecting livestock and meat prices. Functions of livestock marketing agencies. 2 lectures, 1 three-hour laboratory. Prerequisite: AS 122, 123, 131.

AS 424 Nutritive Analysis (2)

Laboratory course involving the principles and practices in quantitative analysis of feedstuffs. 2 three-hour laboratories. Prerequisite: CHM 327.

AS 427 Meat Processing and Technology (5)

Manufacturing of processed meats, and meat products as related to processing operations, sanitation, product formulation, quality control, and smokehouse operations. 3 lectures, 2 three-hour laboratories. Prerequisite: AS 227, CHM 201.

AS 432 Animal Improvement Plans (4)

The design and evaluation of animal breeding systems. 3 lectures, 1 three-hour laboratory. Prerequisite: AS 404.

AS 434 Farrier Problems (3)

Corrective and specialized horseshoeing. Instruction in constructing normal and corrective horseshoes and techniques in applying them. 1 lecture, 2 three-hour laboratories.

AS 461, 462 Senior Project (2) (2)

Selection and completion of a project under a minimum of supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

AS 463 Undergraduate Seminar (2)

New methods and developments, practices, and procedures in the field. 2 lectures. Prerequisite: Senior standing.

AS 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

Poultry Science

PS 131 Poultry Principles (4)

Detailed consideration of avian anatomy and physiology as it affects production. Strain evaluation and selection, incubation, feeds and nutrition, sanitation and disease prevention and control. 3 lectures, 1 three-hour laboratory.

PS 231 Poultry Production (4)

The fundamentals of poultry production. Management, ration formulation, production facilities and marketing systems as they relate to various classes of poultry. 3 lectures, 1 three-hour laboratory. Prerequisite: PS 131

PS 331 Poultry Marketing (4)

The fundamentals of poultry meat and egg marketing. Market channels, processing, and quality maintenance. Management and merchandising problems peculiar to the poultry industry. 3 lectures, 1 three-hour laboratory. Prerequisite: PS 231.

Veterinary Science

VS 205 Physiology of Domestic Animals (4)

Physiological processes of the more important organs of the animal body. 4 lectures. Prerequisite: Sophomore standing.

VS 206 Anatomy of Domestic Animals (3)

Laboratory demonstrations and discussions involving the comparative anatomy of the skeleton, musculature and digestive systems of the horse, cow, sheep, and pig. 2 lectures, 1 three-hour laboratory. Prerequisite: BIO 115.

VS 301 Animal Diseases (3)

Study of factors contributing to animal diseases and their control. 3 lectures. Prerequisite: ZOO 137, MIC 200.

VS 302 Animal Parasitology (4)

The study of animal parasites and their relationship to diseases and infestations of horses, cattle, sheep, swine, and poultry. 3 lectures, 1 three-hour laboratory. Prerequisite: VS 301.

FOODS AND NUTRITION

Ramiro C. Dutra, *Chairman*
Nenita Cabacungan
Anahid T. Crecelius
Ruthanna Davis
Cheryl L. Loggins

The department provides programs of study which enable students to meet the needs of family and community living and lead to challenging and rewarding professional opportunities in a broad field of activities.

The department offers two curricula, one in foods and nutrition and the other in home economics.

The primary objective of the foods and nutrition curriculu is to prepare graduates for careers as die tians, nutritionists and food administrators in hospitals, educational and social institutions, food research laboratories, businesses, and government agencies. This curriculum meets the academic standards of the American Dietetic Association and qualifies the graduate for admission to A.D.A. approved internships. High school students planning to major in foods and nutrition are advised to build a background in foods, chemistry and biology. Junior college students should concentrate on chemistry (including organic), biology (including bacteriology) and communication skills.

CORE COURSES FOR MAJOR

(Required of all students)

Introduction to Foods	FN	121	(4)
Meals	FN	221	(4)
Food Procurement	FN	224	(3)
Cultural Aspects of Food	FN	228	(3)
Nutrition	FN	235	(4)
Nutrition of the Life Cycle	FN	236	(3)
Food Technology	FN	302	(4)
Quantity Food Preparation	FN	331	(4)
Experimental Foods	FN	333	(3)
Community Nutrition	FN	336	(3)
Advanced Nutrition	FN	421	(4)
Advanced Nutrition	FN	422	(3)
Diet Therapy	FN	423	(4)
Food Equipment and Layout	FN	427	(4)
Food Chem & Toxicology	FN	432	(4)
Institutional Management	FN	436	(3)
Senior Project	FN	461	(2)
Senior Project	FN	462	(2)
Undergraduate Seminar	FN	463	(2)

SUPPORT & ELECTIVE COURSES

(Required of all students)

Management Accounting	ABM	324	(4)
Personnel Management	ABM	402	(3)
Fundamentals of Household Equipment and Materials	AE	102	(4)
Horticultural Products	AGB	303	(3)
American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Meats Utilization	AS	327	(3)
Basic Biology	BIO	115	*(5)
College Chemistry	CHM	104	*(3)
College Chemistry	CHM	105	*(3)
College Chemistry Laboratory	CHM	141	*(1)
College Chemistry Laboratory	CHM	142	*(1)
Elements of Organic Chemistry	CHM	201	*(3)
Organic Chemistry Laboratory	CHM	250	*(1)
Biochemistry	CHM	321	(4)
Report Writing	COM	216	(3)
Introduction to Data Processing	DP	211	(4)
Principles of Economics	EC	201	*(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Basic Mathematics	MAT	101	*(3)
Basic Mathematics	MAT	102	*(3)
Descriptive Statistics	MAT	107	*(3)
General Bacteriology	MIC	201	(5)
Food Microbiology	MIC	320	(4)
Health Education	PE	107	(3)
Physical Education	PE	141	*(3)
General Psychology	PSY	201	*(4)
Educational Psychology	PSY	340	*(4)
Public Speaking	SP	100	*(4)
Human Physiology	ZOO	235	*(4)
Humanities			(6)
Electives			(24)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements select four courses from a minimum of two schools other than the School of Agriculture.

Course Descriptions

FN 121 Introduction to Foods (4)

Principles and techniques of basic food preparation. Elements of food sanitation, legislation, and consumer choices. 2 lectures, 2 three-hour laboratories.

FN 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

FN 205 Nutrition and Physical Activity (3)

The modern concept of nutrition as related to diet and body function emphasizing the requirements during adolescence and adulthood. Energy metabolism. Dietary basis of physical efficiency. Nutrition of athletes. Problems in the selection of the pre-game meal. 3 lectures. Prerequisite: CHM 103 and BIO 115 or equivalent. For students not majoring in Foods and Nutrition.

FN 221 Meals (4)

Design and preparation of economical, palatable and nutritionally-balanced meals for family groups and community groups. Etiquette of proper table setting and service. 2 lectures, 2 three-hour laboratories.

FN 224 Food Procurement (3)

Principles of purchasing for the foodservice industry. Study of regulatory agencies, grading and distribution channels. Preparation of specifications, receiving and storage procedures. Two (2) lectures, 1 three-hour laboratory. Prerequisite: FN 121.

FN 228 Cultural Aspects of Food (3)

Contemporary aspects of dietary habits and cookery as related to national, ethnic, and religious influence. 2 lectures, 1 three-hour laboratory.

FN 235 Nutrition (4)

Role of the carbohydrates, lipids, proteins, minerals and vitamins in human nutrition. Dietary standards and recommended allowances. 3 lectures, 1 three-hour laboratory. Prerequisite: CHM 201, 250 or equivalent.

FN 236 Nutrition of the Life Cycle (3)

Nutritional needs of pregnancy, lactation, childhood, adolescence, adulthood and geriatrics. Planning and computation of normal diets for all phases of the life cycle. Three (3) lectures. Prerequisite: FN 205 or FN 235.

FN 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

FN 302 Food Technology (4)

Technical principles of food processing including pasteurization, sterilization, homogenization, dehydration, conventional freezing, freeze-drying and fermentation as they relate to the preservation of various types of foods and beverages. Field trips. 3 lectures, 1 three-hour laboratory. Prerequisite: MIC 200 or equivalent.

FN 331 Quantity Food Preparation (4)

Principles and practices in planning, preparing and serving food in large quantity. Experience institutional food service. 2 lectures, 2 three-hour laboratories. Prerequisite: FN 121.

FN 333 Experimental Foods (3)

Application of the experimental approach to food preparation. Semi-independent studies. 1 lecture, 2 three-hour laboratories. Prerequisite: FN 121.

FN 336 Community Nutrition (3)

Types of nutritional surveys. Economics and nutrition. Role of public and private agencies in community nutrition programs. Role of the nutritionist in domestic assistance programs. Two (2) lectures, 1 three-hour laboratory. Prerequisite: FN 205 or FN 235.

FN 337 Food Service in Institutions (4)

Principles involved in the organization and administration of food service units. Planning, purchasing, storage, and production of quality foods for quantity service. Specification, planning, use and care of equipment. Work flow. Microbiology and food sanitation. Safety and legislation for food service in institutions. 3 lectures, 1 three-hour laboratory. For students not majoring in Foods & Nutrition.

FN 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

FN 421 Advanced Nutrition (4)

Qualitative, quantitative and intermediary metabolic studies of diets. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 327, FN 235.

FN 422 Advanced Nutrition (3)

Hormonal effects upon nutrient absorption, transport and utilization. Diseases of hormonal origin and their dietary management. 3 lectures. Prerequisite: FN 421.

FN 423 Diet Therapy (4)

Relationship between diet and health with particular emphasis on specific dietary requirements associated with certain diseases and conditions. 3 lectures, 1 three-hour laboratory. Prerequisite: FN 421.

FN 427 Food Equipment and Layout (4)

Selection, maintenance and arrangement of equipment and furnishings for food service departments with emphasis on materials, construction and specifications. 2 lectures, 2 three-hour laboratories. Prerequisite: FN 331.

FN 432 Food Chemistry and Toxicology (4)

Chemical composition of foods. Chemical changes occurring during processing and storage. Detection of deterioration, adulteration and contamination with toxic materials. Laboratory analysis of various types of food. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 211, 251.

FN 436 Institutional Management (3)

Principles of good organization and management and their application to the effective operation of food service. Production of quality food for group service within a predetermined budget. Responsibilities of the food service manager. 2 lectures, 1 three-hour laboratory. Prerequisite: FN 331.

FN 437 School Nutrition Management (4)

Organization and administration of school foodservice and school nutrition education. Study of school food systems. Experience in school kitchens. Three (3) lectures, 1 three-hour laboratory. Prerequisites: FN 11 and FN 235.

FN 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

FN 463 Undergraduate Seminar (2)

Student study and presentation of new methods and developments, practices, and procedures in the fields of specialization in foods and nutrition. 2 meetings. Prerequisites: Senior standing.

FN 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

FRUIT INDUSTRIES

One of the four majors offered in the Plant and Soil Sciences Department is fruit industries. For other programs in this department see agricultural biology, agronomy, and soil science.

Albert E. Canham Lloyd A. Newell

Fruit industries majors become qualified in the scientific as well as practical study of production management, processing and marketing of citrus, avocados, other subtropicals and deciduous fruit tree crops.

The curriculum presents a balanced course study of natural sciences, plant sciences, economics, business management and humanities. The graduate is prepared for professional and occupational advancement in orchard management, packinghouse management, marketing, fruit tree nurseries, chemical and equipment sales, education, reseach and other related areas.

CORE COURSES FOR MAJOR

(Required of all students)

Management Accounting	ABM	324	(4)
Irrigation	AE	240	(4)
Citrus Production	FI	121	(4)
Citrus Production	FI	122	(4)
Avocado Production	FI	123	(4)
Subtropical Fruit Pests	FI	221	(4)
Citrus Diseases	FI	226	(4)
Fruit Propagation	FI	245	(1)
Fruit Propagation	FI	246	(1)
Citrus and Avocado Market	FI	321	(3)
Fruit Processing and Handling	FI	322	(3)
Packinghouse Management	FI	323	(3)
Orchard Management	FI	422	(4)
Fruit Storage	FI	425	(2)
Senior Project	FI	461	(2)
Senior Project	FI	462	(2)
Undergraduate Seminar	FI	463	(2)
Soil Management	SS	232	(4)
Soil Fertility and Fertilizers	SS	233	(4)
Plant Tissue Analysis	SS	338	(2)
Fruit Production (From Department List)			(4)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Enterprise Accounting	ABM	325	(3)
Personnel Management	ABM	402	(3)
Surveying Fundamentals	AE	131	(2)
Tractor Power and Machinery	AE	215	(4)
Introduction to Arthropods	AGB	165	(4)
Weeds and Weed Control	AGR	233	(4)
American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Basic Biology	BIO	115	*(5)
Agricultural Botany	BOT	120	*(4)
General Plant Pathology	BOT	223	(4)
Plant Physiology	BOT	322	(5)
Fundamentals of Chemistry	CHM	103	*(4)
College Chemistry	CHM	104	*(3)
College Chemistry	CHM	105	*(3)
College Chemistry Laboratory	CHM	141	*(1)
College Chemistry Laboratory	CHM	142	*(1)
Elements of Organic Chemistry	CHM	201	(3)
Organic Chemistry Laboratory	CHM	250	(1)
Data Processing	DP	211	(4)
Principles of Economics	EC	201	*(4)
Principles of Economics	EC	202	(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Basic Mathematics	MAT	101	*(3)
Basic Mathematics	MAT	102	*(3)
Physical Education	PE	141	*(3)
General Psychology	PSY	201	*(4)
Public Speaking	SP	100	*(4)
Basic Soil Sciences	SS	231	(4)
Agricultural Engineering (See Advisor)			(4)
Humanities			*(6)
Electives			(20)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education requirements select four courses from a minimum of two schools other than the School of Agriculture.

Course Descriptions

FI 121 Citrus Production (4)

Economic importance of the industry, orchard care and soil management including: pest control, cultivation, irrigation, weed control, fertilization and frost protection. 3 lectures, 1 three-hour laboratory.

FI 122 Citrus Production (4)

Citrus botany, commercial varieties and rootstocks, propagation and nursery methods, orchard planning and development, pruning, disease control and fruit handling procedures. 3 lectures, 1 three-hour laboratory.

FI 123 Avocado Production (4)

Industry development, environmental requirements, variety adaptation, propagation, tree training, cultural requirements, soil management practices and production economies. 3 lectures, 1 three-hour laboratory.

FI 131 Subtropical Fruits (4)

Subtropical fruits including the date, olive, fig, macadamia nut and other selected fruits for commercial planting in California. Climatic and cultural requirements, fruiting and growth habits, varietal characteristics, and propagation. 3 lectures, 1 three-hour laboratory.

FI 132 Pomology (4)

Commercial deciduous fruits and nuts. Varieties, production areas, seasonal cultural practices and requirements. 3 lectures, 1 three-hour laboratory.

FI 136 Small Fruit Production (4)

Specialized berry culture, varieties, production areas, propagation, pest and disease control, cultural practices and harvesting. 3 lectures, 1 three-hour laboratory.

FI 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

FI 221 Subtropical Fruit Pests (4)

Recognition of pests, their seasonal habits and damage to selected major subtropical fruits. Procedures used in reducing damage including equipment operation, soil fumigation and cultural methods. 3 lectures, 1 three-hour laboratory. Prerequisite: AGB 165.

FI 226 Citrus Diseases (4)

Diseases of citrus under California conditions, their symptoms and methods of control. 3 lectures, 1 three-hour laboratory. Prerequisite: PTH 223, FI 122.

FI 230 General Fruit Production (3)

Characteristics of the fruit industry of California. Varieties and cultural practices used in selected commercial fruit crops including fruiting and growth habits and propagation. For students other than Fruit Industries majors. 3 lectures.

FI 231 Grape Production (4)

Production, processing, and marketing of raisins, table and wine grapes. 3 lectures, 1 three-hour laboratory.

FI 245 Fruit Propagation (1)

Nursery propagation of fruit plants. Budding, tipgrafting, cuttings, seedbed preparation, care and management of the nursery. 1 three-hour laboratory.

FI 246 Fruit Propagation (1)

Topworking and grafting fruit plants. Types of grafts used, selection of propagating material. 1 three-hour laboratory.

FI 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

FI 321 Citrus and Avocado Marketing (3)

Procedures in marketing citrus and avocados. Organization, importance, and function of cooperative and private marketing corporations in the assembling, processing and distribution of these fruit crops. 3 lectures. Prerequisite: FI 123.

FI 322 Fruit Processing and Handling (3)

Physical operations of citrus and avocado packinghouses in relation to harvesting, processing, and packing; fruit storage and diseases; precooling, refrigeration and transportation. 2 lectures, 1 three-hour laboratory. Prerequisite: FI 226.

FI 323 Packinghouse Management (3)

Management relations in citrus and avocado packinghouse procedures. Regulatory aspects of fruit quality, grades and standards. Use and manufacture of products from citrus and avocados. 2 lectures, 1 three-hour laboratory. Prerequisite: FI 322.

FI 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

FI 422 Orchard Management (4)

Factors of management relating to the efficient operation of citrus and avocado orchards. Effect of cultural practices on production and quality of fruit. 3 lectures, 1 three-hour laboratory. Prerequisite: Senior standing.

FI 425 Fruit Storage (2)

Behavior of citrus and avocados under storage conditions. Respiration and internal change determinations of fruit in storage. 1 lecture, 1 three-hour laboratory. Prerequisite: Senior standing.

FI 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Prerequisite: Senior standing.

FI 463 Undergraduate Seminar (2)

Intensive study of the technical and management problems and new developments in the operation and management of fruit orchards. 2 lectures. Prerequisite: Senior standing.

FI 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

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HOME ECONOMICS

Ruby Beilby Audrey Scollard Ruby L. Trow

The field of home economics offers a variety of opportunities to its graduates. The scope of training in the field is broad. The major is organized in several areas: clothing and textiles; equipment, housing, and interiors; foods and nutrition, home management, family economics and consumer education; child development and family relations.

One of the areas of home economics which offers many opportunities is that of teaching. For graduates completing credential requirements, teaching positions are to be found at the levels of nursery school, junior high school, and senior high school. Other areas which employ home economists are business, industry, and social welfare.

In addition to providing major and minor programs, home economics courses are taken by students from other disciplines who have an interest in the home, family living, and consumer protection.

CORE COURSES FOR MAJOR

(Required of all students)

Introduction to Foods	FN	121	(4)
Meals	FN	221	(4)
Nutrition	FN	235	(4)
Apparel Selection	HE	107	(3)
Textiles	HE	108	(3)
Clothing Construction	HE	230	(3)
Clothing Construction	HE	231	(3)
Nursery School Practicum	HE	315	(3)
Home Management	HE	322	(4)
Interior Design and Furnishings	HE	323	(4)
Apparel Construction and Design	HE	330	(4)
Household Equipment	HE	410	(4)
Family Housing and Environment	HE	420	(4)
Home Management with Limited Resources	HE	422	(3)
Family Finance	HE	440	(4)
Senior Project	HE	461	(2)
Senior Project	HE	462	(2)
Undergraduate Seminar	HE	463	(2)
Child Psychology: Early Childhood	PSY	310	(4)
Family Relations	SOC	206	(3)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Fundamentals of Household Equipment and Materials	AE	102	(4)
American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Visual Arts	ART	110	*(4)
Basic Biology	BIO	115	*(5)
College Chemistry	CHM	104	*(3)
College Chemistry	CHM	105	*(3)
College Chemistry Laboratory	CHM	141	*(1)
College Chemistry Laboratory	CHM	142	*(1)
Elements of Organic Chemistry	CHM	201	*(3)
Organic Chemistry Laboratory	CHM	251	*(1)
Principles of Economics	EC	201	*(4)
Principles of Economics	EC	202	*(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Advanced Academic Composition	ENG	301	(4)
Basic Mathematics	MAT	101	*(3)
Health Education	PE	107	(3)
Physical Education	PE	141	*(3)
General Psychology	PSY	201	(4)
Principles of Sociology	SOC	201	*(4)
Principles of Sociology	SOC	202	*(4)
Public Speaking	SP	100	*(4)
Human Physiology	ZOO	235	*(4)
Humanities (Literature)			*(3)
Electives			(46)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education requirements select four courses from a minimum of two schools other than the School of Agriculture.

Course Descriptions

HE 107 Apparel Selection (3)

Factors involved in apparel selection; historical, economic, aesthetic, psychological, and sociological aspects of individual and family clothing selection. 2 lectures, 1 three-hour laboratory.

HE 108 Textiles (3)

Introductory study of textiles; natural and synthetic fibers, yarn and fabric construction, dyes and finishes as they influence fabric selection, performance, and care. 2 lectures, 1 three-hour laboratory.

HE 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

HE 230 Clothing Construction (3)

Techniques and equipment used in garment construction. Students with comparable clothing construction experience may be excused by satisfactory performance on placement exam. 6 hours activity.

HE 231 Clothing Construction (3)

Current problems in clothing construction. Comparison and evaluation of various construction processes in relation to fabric, design, and intended use. 6 hours activity. Prerequisite: HE 200 or satisfactory performance on placement exam.

HE 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

HE 315 Nursery School Practicum (3)

Observation and participation in group care of pre-school children; analysis of nursery school curriculum and objectives; application of principles and concepts of child growth and development in the care of young children. 2 lectures, 1 three-hour laboratory. Prerequisite: PSY 310.

HE 322 Home Management (4)

Introductory study of the economic, social and institutional forces that influence management of home and family. Management principles in relation to use of family resources, the consumer's role, family values and goals, problem solving, and decision making. 4 lectures.

HE 323 Interior Design and Furnishings (4)

The study of design principles as applied to interiors. Consideration of individual and family needs in the use of furnishings, textiles, accessories, and architectural materials related to interior design. 3 lectures, 1 three-hour laboratory.

HE 330 Apparel Construction and Design (4)

Apparel design and pattern structure. Application of principles of clothing construction and textile selection in creative pattern design. 2 lectures, 2 three-hour laboratories. Prerequisite: HE 201.

HE 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

HE 408 Textile Technology (4)

Structure and synthesis of textile fibers, physical testing of fibers and fabrics, fiber identification, new developments in textile production, special dyes and finishes. 3 lectures, 1 three-hour laboratory. Prerquisite: HE 108 or equivalent.

HE 410 Household Equipment (4)

Application of scientific principles and experimental procedures in selection, use, and care of equipment used in the home. 3 lectures, 1 three-hour laboratory. Prerequisite: Senior standing.

HE 420 Family Housing and Environment (4)

Planning housing to meet family and individual needs as related to design and to current social and economic factors. Consideration of construction methods and materials. Relationship between family housing and total environment. 4 lectures. Prerequisite: HE 323.

HE 422 Home Management with Limited Resources (3)

Special management problems of low-income families, urban families, employed homemakers, physically handicapped homemakers. Application of management principles and concepts developed through field work with families. 2 lectures, 1 three-hour laboratory. Prerequisite: HE 322, or consent of instructor.

HE 423 Advanced Interiors and Furnishings (4)

Advanced study of design and furnishings with emphasis on functional planning for residences. Historical style development of furniture and textiles. Changing cultural patterns, materials and methods, designers and philosophies. 3 lectures, 1 three-hour laboratory. Prerequisite: HE 323 or equivalent.

HE 430 Advanced Clothing Construction (3)

Principles and techniques used in tailoring of coats and suits. Style, fabric, findings, construction methods. 6 hours activity. Prerequisite: HE 201 or equivalent.

HE 433 Home Economics Gainful Employment Programs (4)

Program development. Criteria for student work experiences. Vocational education legislation. Collaboration of advisory committees from community and industry. Job placement. Three (3) lectures, 1 three-hour laboratory. Prerequisite: a methods course in home economics or equivalent.

HE 440 Family Finance (4)

Economic factors which influence family life. Planning, controlling and evaluating family resources. Factors which affect consumer choice. Consumer role of the family. 4 lectures. Prerequisites: EC 201, 202.

HE 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results presented in formal report. Minimum 120 hours total time.

HE 463 Undergraduate Seminar (2)

Trends, current concepts, and developments in Home Economics and Home Economics Education. 2 lectures. Prerequisite: Senior Standing.

HE 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

INTERNATIONAL AGRICULTURE

Recent studies of world resources indicate a growing need that known agricultural production and marketing technologies be integrated into each country's own situation. The need for capable and well trained people to effect these changes is expanding. Opportunities exist for both the domestic student as well as the foreign national trained in this major. This university is uniquely suited to offer the program in international agriculture because of its agricultural facilities, faculty, and programs and its easy accessibility to the large number of U.S. firms with international agriculture interests located in or near Los Angeles County.

The international agriculture major is designed to train students for employment with firms that do or plan to operate internationally at the beginning management level in either the production or marketing (sales) phase of the business. The flexibility in the course of study that is available is developed by the student in consultation with his departmental counselor. The production phase can include livestock and/or plants with the respective ancillary support courses of farm mechanization, pest control, irrigation, soils, fertilization, etc. The marketing (sales) phase includes an additional emphasis on the business aspects applied to different economic and political entities.

The specific studies in agriculture selected are intensive and designed to develop in each student, regardless of his background in agriculture, the knowledge and skills necessary for proficiency in the field. The program includes activities designed to equate the highly-developed agricultural technology of this country to the less highly-developed technologies in foreign countries. In addition the international agriculture student's curriculum deals with an international core of world studies and a specialization in one agricultural area. The student will become fluent in at least one foreign language and will be familiar with the cultures of the world region in which he intends to work to make him an effective force in the international agriculture field.

Added practical experience working in a foreign country also is a part of the program. Each student may spend from three to six months working for a firm or educational institution. Typically the cooperating firms or educational institutions have been in Central and South America. Graduates of this major also are qualified for employment in the Peace Corps and other similar volunteer programs.

CORE COURSES FOR MAJOR

(Required of all students)

Agricultural Marketing	ABM	304	(3)
Introduction to Agricultural Data Mgmt	ABM	375	(3)
Irrigation	AE	240	(4)
Introduction to Plant Science	AGR	111	(3)
Irrigated Pastures	AGR	333	(4)
Range Management	AGR	336	(4)
Feeds and Feeding	AS	101	(4)
World Agricultural Resources	IA	101	(4)
Agricultural Market Development	IA	302	(4)
Animal Production in the Tropics	IA	303	(4)
Seminar in Tropical Agriculture	IA	371	(1)
Farm Management in Low Income Agriculture	IA	380	(3)
Summer Field Experience	IA	401	(3)
Senior Project	IA	461	(2)
Senior Project	IA	462	(2)
Undergraduate Seminar	IA	463	(2)
Introduction to Plant Science	SS	221	(4)
International Agriculture Electives			(6)
Courses to complete major			(19)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Job Instruction Training	ABM	203	(2)
Contemporary Economic Problems of Agriculture	ABM	300	(3)
Agriculture Production Economics	ABM	311	(4)
Management Accounting	ABM	324	(4)
Agricultural Enterprise Management	ABM	328	(4)
Introduction to Arthropods	AGB	165	(4)
Principles of Pest Management	AGB	231	(4)
American Civilization	AMC	201*	(4)
or The American Political System	PLS	201	
American Civilization	AMC	202*	(4)
or United States History	HST	202	
Life Science	BIO	110*	(3)
Heredity and Man	BIO	300*	(3)
Fundamentals of Chemistry	CHM	103*	(4)
Report Writing	COM	216*	(3)
Principles of Economics	EC	201*	(4)
Principles of Economics	EC	202*	(4)
Freshman Composition	ENG	104*	(4)
Basic Mathematics	MAT	101*	(3)
Fundamentals of Physics	PHY	102*	(4)
Public Speaking	SP	100*	(4)
Foreign Language Proficiency or Equivalent Proficiency in English (equivalent to three quarters of study)			(12)
Humanities Electives			* (6)
Electives			** (32)

* May be used for the general education requirement. Select unspecified courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Agriculture for fulfillment of the breadth requirement.

Course Descriptions

IA 101 World Agricultural Resources (4)

Resource base for agricultural production on various continents. Potential for increasing food supplies. Role of agriculture in economic development. 4 lectures.

IA 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

IA 201 Agricultural Ecology (4)

Ecological factors affecting agricultural production in the tropics with emphasis in Latin America including the influence and interaction of environmental factors such as climate, soil, and man on crop and animal adaptation and distribution in the tropics. 4 lectures.

IA 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

IA 301 Tropical Field Crops Production (4)

Agricultural production systems of economically important field crops in the tropical and subtropical Americas; characteristics, culture, pest control, harvesting, utilization, and storage of cereal, fiber, sugar, oil, and leguminous crops. 4 lectures. Prerequisite: AGR 111 or AGR 130.

IA 302 Agricultural Market Development (4)

Marketing systems for agriculture in marketing less developed economies. Analysis of marketing policies used to expand and improve food production. 4 lectures. Prerequisite: IA 101, EC 201.

IA 303 Animal Production in the Tropics (4)

Principles of animal production in the tropics and subtropics. Management of cattle, pigs, poultry, and other important ruminant animals, including discussion on economically important animal products. 3 lectures, 1 three-hour laboratory.

IA 330 Tropical Pastures (3)

Principles and techniques in pasture production in tropical and subtropical regions including identification of valuable grass and legume species, nutritive value assessment, and management with emphasis in Latin America. 3 lectures. Prerequisite: IA 301.

IA 350 Farm Mechanization in the Tropics (3)

Farm mechanization in tropical agriculture. Problems related to farm unit size, soil compaction, spare parts, etc. Mechanics of the tractor and implement. Farm machinery types. Soil/Vehicle/Implement mechanics. Bullock and oxen drawn farm equipment. 2 lectures, 1 three-hour laboratory.

IA 360 Tropical Soil Management (3)

Management of tropical and subtropical soils. Effects of origin, development and characteristics of tropical and subtropical soils on agricultural production and conservation of natural resources in developing countries with emphasis on Latin America. 3 lectures. Prerequisite: SS 221 or 231.

IA 362 Tuber Crop and Vegetable Production in the Tropics (3)

Agricultural production of economically important tubers and vegetables in the tropical Americas. Characteristics, cultural practices, varieties adapted to the tropics, harvesting, storage, utilization and nutritive value of tropical root crops and vegetables in Latin America. 3 lectures. Prerequisite: IA 301.

IA 371 Seminar in Tropical Agriculture (1–2)

Seminar on special problems encountered in tropical agriculture. Content will vary from one offering to another. Course may be repeated up to three units of credit. Taught in Spanish language. 1 lecture-discussion. Prerequisite: Senior standing, SPN 203 or demonstrated proficiency in Spanish language.

IA 380 Farm Management in Low Income Tropical Agriculture (3)

The traditional farm family. Nature of farmer's resources and his control. Farm records. Cost relationships. Budgeting. Types of farm management decisions and guiding principles applicable. Handling of risk and uncertainty, credit, labor, machinery. Impact of public policies on farm management. 3 lectures. Prerequisite: EC 201.

IA 382 Agricultural Extension Methods (3)

Attitudes of traditional farm family; characteristics of effective farmer education programs; farm leader identification, extension training methods, and training of agricultural extension workers. 3 lectures. Prerequisite: advanced standing.

IA 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

IA 401 Field Experience in Latin America (3–8)

Individualized field research experience in Latin America. Class hours variable depending on credit. Prerequisite: Advanced standing; consent of advisor and instructor, one course in International Agriculture; competence in Spanish language recommended.

IA 461, 462 Senior Project (2) (2)

The student selects and completes a research project under faculty supervision typical of those he will be required to handle in his field of employment. Research findings and conclusions are presented in a formal report. Minimum of 120 hours required. Prerequisite: Senior standing.

IA 463 Undergraduate Seminar (2)

Oral presentation of senior project. Discussion of trends in foreign agricultural production and marketing. 2 lectures. Prerequisite: Senior project completed.

IA 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

ORNAMENTAL HORTICULTURE

Joel W. Carter, *Chairman*
Oliver A. Batcheller David Lannom Tom T. Yoshikawa
James L. Degen

Ornamental horticulture is among the largest of California's agricultural industries. The state's great population growth and resulting urbanization has increased the need for landscape plantings, parks, golf courses and beautification of the environment. The department provides degrees in two majors, ornamental horticulture and park administration.

The ornamental horticulture major prepares men and women for positions in the production and marketing of horticultural products, principally nursery and floricultural crops. It provides an excellent background for students desiring to teach or do research in horticultural science.

The university's facilities offer outstanding opportunities for practical application of methods and principals used in the industry. The beautifully landscaped campus serves as an arboretum and botanical garden for applied laboratory course work. The department has 12,000 square feet of greenhouse space, 5,000 square feet of lath and saran shade houses, five acres of growing grounds and other nursery facilities. Students may grow and market their own nursery stock, cut flowers or potted plants for their profit and experience.

CORE COURSES FOR MAJOR
(Required of all students)

Management Accounting	ABM	324	(4)
Gen. Plant. Pathology	BOT	223	(4)
Plant Physiology	BOT	322	(5)
Basic Horticulture Skills	OH	131	(4)
Plant Propagation	OH	222	(4)
Plant Materials	OH	231	(4)
Plant Materials	OH	232	(4)
Plant Materials	OH	233	(4)
Greenhouse Management	OH	323	(4)
Diseases of Ornamental Plants	OH	327	(4)
Native Plant Materials	OH	336	(3)
Senior Project	OH	461	(2)
Senior Project	OH	462	(2)
Undergraduate Seminar	OH	463	(2)
Turf Management	PA	333	(4)
Basic Soils	SS	231	(4)
Soil Fertility & Fert.	SS	233	(4)

SUPPORT AND ELECTIVE COURSES
(Required of all students)

Surveying Fundamentals	AE	131	(2)
Pest Control Equipment	AE	233	(3)
Intro. to Arthropods	AGB	165	(4)
American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Basic Biology	BIO	115	*(5)
Elements of Botany	BOT	120	*(4)
Principles of Ecology	BOT	325	*(4)
Business Law	BUS	301	(4)
College Chemistry	CHM	104	*(3)
College Chemistry	CHM	105	*(3)
College Chemistry Laboratory	CHM	141	(1)
College Chemistry Laboratory	CHM	142	(1)
Organic Chemistry	CHM	201	*(3)
Organic Chemistry Laboratory	CHM	250	(1)
Report Writing	COM	216	*(3)
Principles of Economics	EC	201	*(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Basic Mathematics	MAT	101	*(3)
Basic Mathematics	MAT	102	*(3)
Salesmanship	MKT	208	(4)
Physical Education	PE	141	*(3)
Ethics	PHL	204	*(4)
General Psychology	PSY	201	*(4)
Public Speaking	SP	100	*(4)
Soil Analysis	SS	337	(2)
Plant Tissue Analysis	SS	338	(2)
Humanities			*(4)
Directed Electives			*(30)
Electives			**(12)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Agriculture.

Course Descriptions

OH 121 Nursery Operations (4)

The nursery industry in California; the wholesale grower, the jobbers, the retail nursery, the garden center, and other nursery outlets. A study of nursery location, arrangement, organization, and operation. 3 lectures, 1 three-hour laboratory.

OH 131 Basic Horticultural Skills (4)

The basic skills of horticulture. Techniques and plans for their use in the gardening and nursery trade. 3 lectures, 1 three-hour laboratory.

OH 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

OH 222 Plant Propagation (4)

Commercial propagation—grafting, budding, layering, separation, divisions, cuttings, tissue culture and orchid flasking. Field trips to commercial operations. 2 lectures, 2 three-hour laboratories. Prerequisites: OH 131, 231, BOT 120 or 124.

OH 223 Basic Floral Design (3)

Introduction to basic floral design, covering preparation of flowers, color harmony, and design principles. 1 lecture, 2 three-hour laboratories.

OH 231, 232, 233 Plant Materials (4) (4) (4)

The study of trees, shrubs, vines and herbaceous plants used in California; shown during their best growing season. This includes: identification, habit of growth, cultural requirements and landscape use. 3 lectures, 1 three-hour laboratory. Prerequisite: BIO 115.

OH 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

OH 323 Greenhouse Management (4)

Designed and management of different types of greenhouses and plant shelters. Maintenance, heating, cooling, humidification systems and their controls. Mechanization, automatic and semi-automatic fertilization and watering systems. 3 lectures, 1 three-hour laboratory. Prerequisite: OH 131.

OH 327 Diseases of Ornamental Plants (4)

Effect of diseases on ornamental plants found in nurseries, greenhouses, flowers, and identification, control, and prevention. Field trips to production areas to study field conditions. 3 lectures, 1 three-hour laboratory. Prerequisite: BOT 223.

OH 335 Sub-tropical Plant Materials (3)

Sub-tropical plant materials, including ferns, bamboos, palms, house plants. Identification, growth habits, cultural requirements and landscape use. 2 lectures, 1 three-hour laboratory.

OH 336 Native Plant Materials (3)

Native California plants suitable for landscape purposes. Their identification, habits of growth, cultural requirements, and landscape use. 2 lectures, 1 three-hour laboratory.

OH 343 Landscape Management (4)

The selection and techniques necessary for the proper management of ornamental plants. 3 lectures, 1 three-hour laboratory. Prerequisite: OH 131, 231, 232, 233, or consent of instructor.

OH 353 Horticultural Management (4)

Selection, planting and cultural care of ground covers, shrubs, trees, and turf. 3 lectures, 1 three-hour laboratory.

OH 365 Commercial Flower Production (4)

Controlling production of potted and cut flowers by using photoperiod, temperature adjustment, vernalization and chemicals to schedule maturity of a crop. Automated watering, shading and fertilization systems. Disease and pest control. 3 lectures, 1 three-hour laboratory. Prerequisites: OH 131, 323, SS 231, 233

OH 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

OH 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

OH 463 Undergraduate Seminar (2)

An open forum of senior students in which the latest developments, practices, and procedures are discussed. Each student is responsible for the development and presentation of a topic in his chosen field. 2 lectures.

OH 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

PARK ADMINISTRATION

Joel W. Carter, *Chairman*
Wilhelm Beckert Kent Kurtz George Price

The park administration major in the Ornamental Horticulture Department provides opportunities to obtain the skills and knowledge needed for top management positions in park systems. A thorough foundation in ornamental horticulture is supplemented with courses which relate to such subjects as recreation, public administration, business management, public relations, design, and conservation to application in a parks system. Although graduates may begin their careers as park rangers, supervisors, or assistants, the curriculum gives them the background for advancement to higher positions such as superintendent, general manager or director of parks and recreation. Emphasis is placed on the operation of city parks with consideration of regional, state, national and commercial parks. Preparation for careers in golf course management, landscape contracting, and grounds maintenance is provided.

Field trips are taken to many types of parks and recreation facilities in Southern California. Students are encouraged and assisted to obtain part-time and summer employment with parks agencies, golf courses, landscape contractors and the university grounds department.

CORE COURSES FOR MAJOR

(Required of all students)

Management Accounting	ABM	324	(4)
Automatic Irrigation Systems	AE	321	(4)
Basic Horticulture	OH	131	(4)
Plant Materials	OH	231	(4)
Plant Materials	OH	232	(4)
Plant Materials	OH	233	(4)
Diseases of Ornamental Plants	OH	327	(4)
Native Plant Materials	OH	336	(3)
Orientation and History of Parks	PA	214	(3)
Recreation Concepts	PA	219	(3)
Aquatic Facility Management	PA	325	(4)
Arboriculture	PA	328	(3)
Turf Management	PA	333	(4)
Contracts, Specifications, Estimating	PA	415	(3)
Park Facility Management	PA	425	(4)
Park Policies and Practices	PA	426	(4)
Park Budgets and Finance	PA	427	(3)
Contracts, Specifications, Estimating	PA	431	(4)
Golf Course Management	PA	436	(4)
Senior Project	PA	461	(2)
Senior Project	PA	462	(2)
Undergraduate Seminar	PA	463	(2)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Personnel Management	ABM	402	(3)
or Industrial Supervision	BUS	313	
Construction Fundamentals	AE	121	(2)
Utility Systems	AE	122	(2)
Surveying Fundamentals	AE	131	(2)
Surveying Applications	AE	132	(2)
Park Equipment Management	AE	421	(4)
American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Basic Biology	BIO	115	*(5)
Elements of Botany	BOT	120	*(4)
Business Law	BUS	301	(4)
Fundamentals of Chemistry	CHM	103	*(4)
Report Writing	COM	216	(3)
Principles of Economics	EC	201	*(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Physical Geology	ESC	221	(4)
Landscape Drawing and Design	LA	211	(4)
Landscape Materials	LA	212	(4)
The Park and Recreation System	LA	213	(3)
Basic Mathematics	MAT	101	*(3)
Basic Mathematics	MAT	102	*(3)
Physical Education	PE	141	*(3)
Ethics	PHL	204	*(4)
General Psychology	PSY	201	*(4)
Public Speaking	SP	100	*(4)
Basic Soil Science	SS	231	(4)
Soil Fertility and Fertilizers	SS	233	(3)
General Entomology	ZOO	226	(4)
or Introduction to Arthropods	AGB	165	
Humanities—Introduction to Modern Fiction	ENG	201	*(3)
Electives			(17)

* May be used for the general education requirements. Select unspecified courses from the general education list.

Course Descriptions

PA 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

PA 214 Orientation and History of Parks (3)

A history of the development of national, state, and municipal park systems. A consideration of changing philosophies affecting their development. 3 lectures.

PA 219 Recreation Concepts (3)

Past and present concepts of recreation. Their effect on the park administrator in dealing with such problems as land acquisition, park design, and use of parks and park facilities. 3 lectures.

PA 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

PA 325 Aquatic Facility Management (4)

Management of all types of water-related recreation facilities including fountains, reflecting pools, wading pools, swimming pools, lakes and ponds, beaches and marinas. The supervision and organization of aquatic recreation activities such as wading, swimming, boating, surfing and fishing. 3 lectures, 1 three-hour laboratory.

PA 328 Arboriculture (3)

Care and management of specimen ornamental trees. Cavity repair, bracing and cabling, pruning. Practice in the use of lines and in climbing. Safety practices. 2 lectures, 1 three-hour laboratory. Prerequisite: OH 131, 231.

PA 332 Athletic Turfgrass Management (3) (For Non Majors)

The grasses, materials and techniques involved in the maintenance and management of all types of athletic and recreational fields. 3 lectures. Prerequisites: Junior standing or consent of instructor.

PA 333 Turf Management (4)

Considerations in the management of turf, including such specialized areas as golf courses, bowling greens, athletic fields and park lawns. 3 lectures, 1 three-hour laboratory. Prerequisite: Junior standing or consent of instructor and SS 221 or 231.

PA 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

PA 415 Contracts, Specifications, Estimating (3)

Cost finding and estimating, contracts and specifications, legal aspects pertaining to the landscape industry. 3 lectures. Prerequisite: Senior standing.

PA 425 Park Facilities Management (4)

Management of facilities normally within the jurisdiction of the park department, including, but not limited to, the management of park structures, play equipment, surfaced areas, and city street trees. 3 lectures, 1 three-hour laboratory.

PA 426 Park Policies and Procedures (4)

Policies and procedures governing park departments, including, but not limited to, public relations, relationship to other governmental agencies. Analysis of park problems, planning, and scheduling. Emphasis on the municipal level. 3 lectures, 1 three-hour laboratory.

PA 427 Budgeting and Finance of Parks (3)

The administration of public funds by park departments for acquisition, development, and operation of park areas. A study of tax structures, bonds, purchasing, and budgeting techniques. 3 lectures. Prerequisite: PA 426.

PA 431 Contracts, Specifications, Estimating (4)

Cost finding and estimating, contracts and specifications relative to construction in the landscape industry. Laboratory experience in estimating and writing specifications. 3 lectures, 1 three-hour laboratory. Prerequisite: Senior standing.

PA 436 Golf Course Management (4)

The management, supervision, maintenance and operation of golf courses. A study of the equipment, scheduling, promotion and personnel required and related facilities of public and private courses. 3 lectures, 1 three-hour laboratory. Prerequisites: PA 333 and 334.

PA 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

PA 463 Undergraduate Seminar (2)

An open forum of senior students in which the latest developments, practices and procedures are discussed. Selected field trips. 2 lectures.

PA 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

SOIL SCIENCE

One of the four majors offered in the Plant and Soil Science Department is soil science. For other programs in this department see agricultural biology, agronomy, and fruit industries.

Gaylord Patten James A. Pomerening George W. Schmitz

The curriculum in soil science prepares students for careers related to the use, management, and conservation of soils. The soil scientist is concerned with the chemical, physical, mineralogical and biological properties of soils in order to evaluate its capabilities and limitations for purposes of developing sound management decisions. Employment opportunities exist with federal, state and international agencies, research and consulting laboratories and agricultural chemical companies. Soil scientists are engaged in a variety of professional careers. They are employed by the federal government in mapping soils and the dissemination of technical soil information to farmers, ranchers, foresters, engineers, wildlife biologists, urban planners and all other users of soil information. States and municipalities employ the soil scientist in environmental and land use appraisal and planning. Soil scientists serve on the staffs of commercial chemical companies as technical specialists. With stricter laws on environmental pollution in effect, the need for trained, qualified scientists to advise on the application of plant nutrients and farm chemicals is now essential. Graduates in social science find emloyment as soil specialists on management teams of commercial farming operations. The teaching of agricultural sciences in high schools is available to the graduate who pursues the teacher preparation program in college along with his major in soil science. A portion of soil science graduates continue their education for higher degrees after completion of the bachelor of science degree. The advanced degree leads to teaching and research positions with universities, government agencies and private industry. The current awareness of the importance of our soil as a vital and life sustaining part of our ecology, points up the future need for soil scientists in the preservation and management of our environment.

CORE COURSES FOR MAJOR

(Required of all students)

Surveying Fundamentals	AE	131	(2)
Surveying Applications	AE	132	(2)
Irrigation	AE	240	(4)
Introduction to Plant Science	AGR	111	(3)
Range Management	AGR	336	(4)
Basic Soil Science	SS	231	(4)
Soil Management	SS	232	(4)
Soil Fertility and Fertilizers	SS	233	(4)
Soil and Water Conservation	SS	333	(4)
Soil Analysis	SS	337	(2)
Plant Tissue Analysis	SS	338	(2)
Soil Chemistry	SS	431	(4)
Soil Physics	SS	432	(4)
Soil Classification and Survey	SS	433	(4)
Senior Project	SS	461	(2)
Senior Project	SS	462	(2)
Undergraduate Seminar	SS	463	(2)
† Crop Production Courses			(8)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Agricultural Business Management Course			‡(4)
Introduction to Arthropods	AGB	165	(4)
Weeds and Weed Control	AGR	233	(4)
American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Animal Science Course			†(4)
Basic Biology	BIO	115	(5)
Elements of Botany	BOT	120	(4)
General Plant Pathology	BOT	223	(4)
College Chemistry	CHM	104	*(3)
College Chemistry	CHM	105	*(3)
College Chemistry Laboratory	CHM	141	*(1)
College Chemistry Laboratory	CHM	142	*(1)

Elements of Organic Chemistry	CHM	201	(3)
Quantitative Analysis	CHM	221	(4)
Organic Chemistry Laboratory	CHM	250	(1)
Principles of Economics	EC	201	*(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Physical Geology	ESC	111	*(3)
Physical Geology Laboratory	ESC	151	*(2)
Earth Science Course			†(4)
Trigonometry	MAT	104	*(4)
College Algebra	MAT	105	*(4)
General Bacteriology	MIC	201	(5)
Physical Education	PE	141	*(3)
College Physics	PHY	121	*(4)
College Physics	PHY	122	(4)
Public Speaking	SP	100	*(4)
Humanities			*(7)
Electives			(28)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Agriculture.

† Consult with advisor.

Course Descriptions

SS 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

SS 221 General Soils (5)

Fundamentals of soils, including their physical and chemical properties and the relation of these properties to the origin, classification, use and management of the soils. Primarily for non-technical majors. 3 lectures, 1 three-hour laboratory. Prerequisite: CHM 103.

SS 231 Basic Soil Science (4)

Introduction to soils, including physical, chemical and biological properties of soils, soil-plant interrelations, soil formation and classification, and soil moisture. 3 lectures, 1 three-hour laboratory. Prerequisite: CHM 103 or equivalent.

SS 232 Soil Management (4)

Examination and application of the principles of soil management as they relate to plant growth and environmental quality; Emphasizing an integration of soil-water-plant relationships. 3 lectures, 1 three-hour laboratory. Prerequisite: SS 221 or SS 231.

SS 233 Soil Fertility and Fertilizers (4)

Soil fertility and its relation to plant nutrition. Fertilizer materials, production, application and usage. 3 lectures, 1 three-hour laboratory. Prerequisite: SS 221 or 231.

SS 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

SS 333 Soil and Water Conservation (4)

Climate, topography, soils and land use in relation to soil and water losses. Principles, methods, and programs of soil and water conservation. 3 lectures, 1 three-hour laboratory. Prerequisite: SS 221 or 231.

SS 337 Soil Analysis (2)

Chemical analysis of soils as a means of diagnosing problems related to western soils. 1 lecture, 1 three-hour laboratory. Prerequisite: SS 221 or 231, CHM 105.

SS 338 Plant Tissue Analysis (2)

Chemical analysis of plant tissue as a guide to fertilization and crop production. 1 lecture, 1 three-hour laboratory. Prerequisite: CHM 105, or 112.

SS 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

SS 431 Soil Chemistry (4)

Chemical composition of soils, cation and anion exchange, soil colloids and their significance, nutrient release and fixation reactions. 3 lectures, 1 three-hour laboratory. Prerequisite: SS 231, CHM 221, or consent of instructor.

SS 432 Soil Physics (4)

Physical properties and their significance to soil behavior. Mechanical composition, density and porosity, water movement and retention, aeration. 2 lectures, 2 three-hour laboratories. Prerequisite: SS 231, PHY 121.

SS 433 Soil Classification and Survey (4)

Principles and methods of soil classification. Soil survey techniques and soil survey interpretations. Soil morphology and its relation to soil genesis, classification, survey and interpretations. 3 lectures, 1 three-hour laboratory. Prerequisite: SS 221 or 231.

SS 439 Soil Materials (3)

Soil properties and practices for the establishment and maintenance of ornamental plantings. Use of soil analysis, amendments fertilization, irrigation, drainage and slope stabilization for ornamental plants. 2 lectures, 1 three hour laboratory. Prerequisite: SS 221 or SS 231.

SS 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

SS 463 Undergraduate Seminar (2)

A study of current developments in soil science and a discussion of periodical literature. 2 lectures.

SS 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

VOCATIONAL AGRICULTURE EDUCATION

Paul Peterson, *Coordinator*

The primary function of the vocational agricultural education program is the preparation of teachers of vocational agriculture for the public secondary schools of California. Specialized pre-professional and professional courses are offered for undergraduate and graduate (fifth year) students. Technological, scientific, and broad general education course work for agriculture teaching candidates is offered throughout the School of Agriculture and other schools including the college-wide Teacher Preparation Center.

Students with an interest in becoming agriculture teachers enroll in an agriculture major and obtain a B.S. degree. Students are required to have course work in four areas of agriculture. These are (1) agricultural business management or farm management, 7-8 units, (2) agricultural engineering or agricultural mechanics, 8-10 units, (3) animal science, 10 units, and (4) plant/soil science and ornamental horticulture, 10 units.

Students who plan to obtain a credential must have two years of practical experience in agriculture, and should consult with the Coordinator of Vocational Agriculture early in their college career. Vocational agriculture teacher candidates are advised to wisely use the electives available in the major to complete courses required for the teaching credential which are not normally specified in the undergraduate major. A single subject academic minor must be selected from those offered at Cal Poly. Work toward the minor should be started no later than the sophomore year to enable incorporation of minor requirements in the student's total curriculum. Information on the minor requirements may be obtained from the Teacher Preparation Center.

CORE COURSES FOR MAJOR

(Required of all majors in vocational agricultural education. See Teacher Preparation Section for additional secondary education requirements.)

Introduction to Vocational Agriculture Programs	AG	300	(2)
Young and Adult Programs and Youth Leadership	AG	410	(3)
Agricultural Mechanics	AG	420	(3)
Seminar (concurrent with student teaching)	AG	550	(3)
Program Planning and Development	TEP	550	(3)

In addition 7-8 units, 8-10 units, etc. will be taken in four required areas. The exact nature of this work will be determined in consultation with the agriculture advisor.

Courses In Related Agriculture

AG 300 Introduction to Vocational Agriculture Programs (2)

Overview of vocational agriculture programs including goals and purposes. Qualifications essential to success in vocational agriculture. Programs of studies to meet requirements for instruction in vocational agriculture. 2 lecture discussions.

AG 311 Fundamentals of Agricultural Science (3)

Overview of the plant and animal industries. Principles and practices in producing, processing, and distributing food and fiber. Concepts designed particularly for the discriminating consumer. 3 lectures.

AG 410 Young and Adult Programs and Youth Leadership (3)

Organization, history, philosophy, administration and procedures in advising Future Farmer Chapters and conducting classes for out-of-school youth and adults. Surveys and plans for development of rural and urban adult programs. F.F.A. and Young Farmer programs, techniques and methods. 2 lectures, 1 activity.

AG 420 Agricultural Mechanics (3)

Agricultural mechanics in vocational agriculture programs and facilities. Organizing a course of study and implementing a program. Demonstrations and analysis of techniques. 2 lectures and 1 activity period combined, 4 hours.

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SCHOOL OF ARTS

Albert J. Aschenbrenner, *Dean*
George P. Hart, *Associate Dean*

The School of Arts offers eight Bachelor of Arts degrees, six Bachelor of Science degrees, one Master of Arts degree and two Master of Science degrees. Information concerning the masters curricula may be found in the *Graduate Bulletin.*

Bachelor's degree programs are offered in a wide range of humanities, behavioral and social sciences and physical education through the ten departments of the school. In addition there are numerous majors and minors offered to meet the Standard Teaching Credential Program for both elementary and secondary specializations.

An important university-wide function of this school is to provide instruction in certain basic offerings in general education. Thus, a major emphasis falls on preparing graduates for their roles as active, participating citizens of the several communities to which they will ultimately belong.

A majority of the co-curricular activities of the university are closely related to the academic programs within the School of Arts. These activities are open to students throughout the entire university. Dramatic productions, musical programs, and art exhibits are produced and sponsored by the respective department. Communications media, including publications, radio and television, speech and forensics programs, are advised by faculty in the Communication Arts Department and offer a wide variety of experience for students. Intercollegiate and intramural athletics for both men and women are offered by the Physical Education Department.

Departments and Majors

BEHAVIORAL SCIENCES
- William Larson, Chairman
- Behavioral Science major (BA)

COMMUNICATION ARTS
- _____, Chairman
- Communication Arts major (BS); Options in Broadcast Journalism, Newspaper and Magazine Journalism, Public Relations, Specialized Communications, Speech
- Secondary Credential Programs, major in Newspaper and Magazine Journalism, Speech

ECONOMICS
- Gertrude Boland, Chairman
- Economics major (BS)
- Master of Science in Economics

ENGLISH AND MODERN LANGUAGES
- James M. Ware, Chairman
- English major (BA)
- Humanities major (BA)
- Secondary Credential Program, major in English
- Master of Arts in English

HISTORY
- Werner H. Marti, Chairman
- History major (BA)
- Secondary Credential Program, major in History

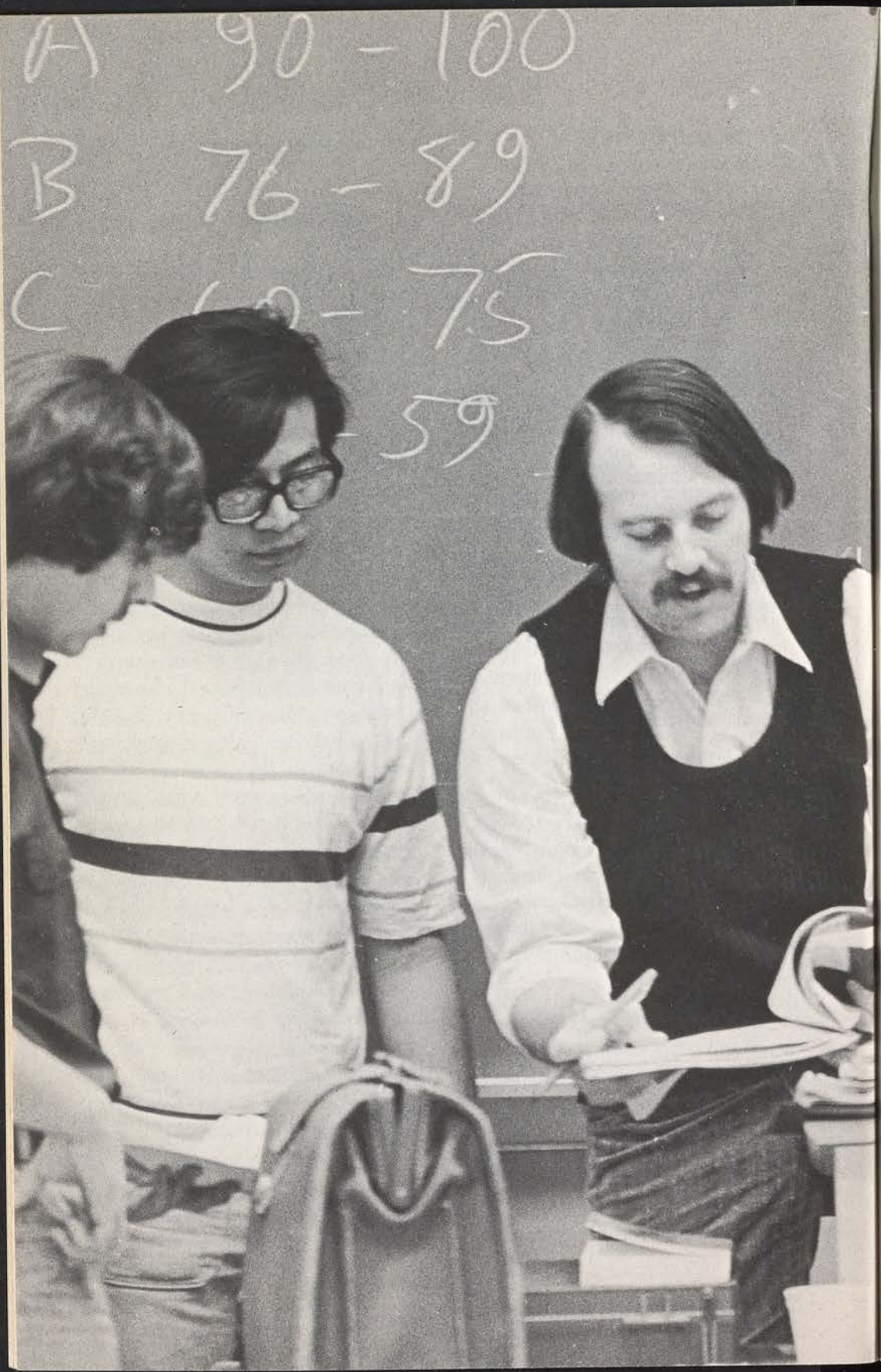
MUSIC, DRAMA AND ART
- Philip R. Browne, Chairman
- Music major (BA)
- Drama Major (BA)
- Secondary Credential Program, major in Drama

PHYSICAL EDUCATION
- Donald E. Warhurst, Chairman
- Physical Education major (BS)
- Recreation, Administration major (BS)
- Secondary Credential Program, major in Physical Education
- Master of Science in Physical Education

POLITICAL SCIENCE
- John Esterline, Chairman
- Political Science major (BA)
- Secondary Credential Program, major in Political Science

SOCIAL SCIENCES
- Floyd H. Ross, Acting Chairman
- Social Sciences major (BS); Options in Social Sciences, and Economics
- Philosophy Major (BA)
- Secondary Credential Program, major in Social Sciences
- Elementary Credential Program, major in Social Sciences

SOCIAL SERVICES
- Signe Starnes, Chairman
- Social Services major (BS)


A 90 - 100
B 76 - 89
C 60 - 75
59

ART

Diane Divelbess, *Coordinator*
Walter W. Glaser Karl E. Winchell

The art program emphasizes the development of individual inventiveness from a base of sound, comprehensive, fundamental concepts, methods and technical skills, with exploration and experimentation encouraged at all levels.

A wide variety of art courses is offered to fulfill the general education requirements of other major programs in the college, and a minor in art is available for students preparing to teach in elementary and secondary schools.

Sequences of courses from the introductory to the advanced may be pursued in art history, drawing, painting, design, ceramics and sculpture.

Course Descriptions

ART 110 The Visual Arts (4)

Introduction to the visual arts. A comprehensive survey/analysis to foster appreciation and understanding of traditional and experimental art forms as they relate to human needs. 4 lectures.

ART 130 Introduction to Painting (3)

Image as painting. Varied projects at the creative impulse level, designed to foster development of visual equivalents for ideas and emotions. Media: acrylics, transparent, opaque, collage, etc. Emphasis on individual solutions to creative situations. 3 two-hour activities.

ART 134 Art Materials and Skills (3)

Development of appreciative and creative skills. Variety of materials used, with an emphasis on two dimensional design concepts. 3 two-hour activities.

ART 135 Craft Materials and Skills (3)

Basic projects with various craft materials. Ceramics, metal, textiles, wood, and leather. Development of three-dimensional skills and concepts through the materials and their properties. Criteria applied to craft materials. 3 two-hour activities.

ART 136 Introduction to Clay (3)

Exploration of fundamentals of ceramic materials utilizing slab, coil and mold making. Emphasis on developing creative activity. 3 two-hour activities.

ART 137 Raku (3)

Introduction to asymmetrical forms with an emphasis on low-fire glaze calculations. Explore aspects of primitive kiln construction with concentration on reduction firings. 3 two-hour activities.

ART 143 Introduction Drawing (3)

Analysis and practice of drawing. Problems involving development of perceptual gestalt, descriptively and expressively. Emphasis on concepts, methods, techniques. 3 two-hour activities.

ART 151 Graphic Layout (3)

Design principles of visual communication. Graphic design projects in packaging, book design, corporate image program, advertising, and mass media communications. 1 lecture, 2 two-hour activities.

ART 161 Relief Printmaking (3)

Exploration of basic materials and processes of the relief print, including wax, plaster, cardboard, linoleum and wood. 1 lecture, 2 two-hour activities.

ART 212 History of Western Art (4)

Comprehensive survey and analysis of the development of art in Western Civilizations from prehistoric times to the Renaissance. 4 lectures.

ART 213 History of Western Art (4)

Comprehensive survey and analysis of the development of art in Western Civilizations from the Renaissance to the 20th century. 4 lectures.

ART 220 Fundamentals of Sculpture (3)

Fundamentals of sculpture involving modeling or carving clay, plaster, wood, stone and metal. 3 two-hour activities.

ART 236 Crafts Design (3)

Development of concepts, methods, and skills in basic craft media such as ceramics, wood, and metal construction plus optional individually-elected projects. 3 two-hour activities.

ART 237 Ceramics (3)

An introduction to ceramic design. Basic methods of forming, decorating, glazing and firing pottery forms with an emphasis on the use of the potter's wheel. 3 two-hour activities.

ART 240 Lettering and Layout (3)

Development of appreciative and skillful usages of alphabets and layout, forming, spacing letters in popular media. Emphasis on development of selective skills in visual communications. 3 two-hour activities.

ART 241 Printmaking (3)

Methods and techniques of printmaking. Relief, intaglio, photographic and silk screen processes. 2 three-hour laboratories. Prerequisite: ART 134.

ART 245 Life Drawing (3)

Skills and techniques in drawing the human figure from studio models. 2 three-hour laboratories. Prerequisite: ART 143 or permission of instructor.

ART 247 Acrylic Painting (3)

Methods and techniques with acrylics. Emphasis on form and composition. 3 two-hour activities. Prerequisite: ART 134 or permission of instructor.

ART 249 Transparent Watercolor Painting (3)

Methods and techniques with transparent watercolor. Outdoor sketching and studio projects. 3 two-hour activities. Prerequisite: ART 134 or permission of instructor.

ART 262 Silk Screen Painting (3)

Silk screen as an art form, including basic silk screen techniques with paper, glue and lacquer stencils. 1 lecture, 2 two-hour activities. Prerequisite: Art 161.

ART 263 Intaglio Printmaking (3)

Techniques and skills in intaglio methods of printmaking, including drypoint, etching, aquatint, mezzotint and engraving. 1 lecture, 2 two-hour activities. Prerequisite: Art 161.

ART 311 Art Movements of the Nineteenth Century (4)

Analysis of revolutionary and reactionary movements in the art of Europe and America during the XIX Century. Neo-classicism, Romanticism, Realism, the Barbizons, Impressionism, etc. 4 lectures. Recommended: ART 110, 212, 213.

ART 312 Foundations of Modern Art (4)

Comprehensive survey and analysis of the founding movements and evolutionary development process of the visual arts in the West from the early XIX Century to the present time. 4 lectures.

ART 313 Art Movements of the 20th Century (4)

Analysis of the visual arts of the twentieth century in Europe and the United States. From post-World War II to the present time. 4 lectures. Prerequisite: ART 110, and/or ART 311, 312.

ART 314 History of Art of the United States (4)

Survey of the art of the United States from colonial times to the present. European tradition and the Academy, Frontier art forms, Regionalism, Social Realism to merging with the International Art Style. 4 lectures. Recommended: ART 110, 212, 213 or permission of instructor.

ART 315 Art of the Ancient Civilization (4)

Survey of the arts of ancient civilizations from Mohenjendaro through Egypt, Sumeria, Assyria, Persia, the art of the steppes and Pre-Columbian art forms, showing the interrelations and cultural exchanges of the ancient world, the development of their societies and the reflection of their religion and world view on the art forms. 4 lectures. Prerequisite: ART 212 or permission of instructor.

ART 316 Art of the Classical World (4)

Survey of the arts of the classical world starting with the island civilization of Crete, the development of the Greek art through the art of the Etruscans and Romans. Art forms as a reflection of culture. 4 lectures. Prerequisite: ART 212 or permission of instructor.

ART 319 Art of Mexico and the Southwest (4)

The pre-classic and classical arts of pre-Columbian Mexico, the Spanish Conquest and the Colonial Period of Mexico to present; the American Southwestern Indian arts.

ART 321 Sculpture (4)

Investigation of contemporary three dimensional forms and their relationships to man and his environment. 4 two-hour activities. Prerequisite: ART 220.

ART 331 Ceramics (4)

Intensified study of ceramic and sculptural forms produced on the potter's wheel with an in-depth study of glaze calculation, kiln oxidation and reduction atmospheres, firing processes. 4 two-hour activities. Prerequisite: ART 237.

ART 337 Three-Dimensional Design (3)

Theory and application of aesthetic elements and principles of three-dimensional forms and their relationship to human need, involving the rise of sculpture and ceramics. 3 two-hour activities.

ART 339 Two-Dimensional Design (3)

Elements and principles of two-dimensional design related to projects for specific functions. 3 two-hour activities. Prerequisites: ART 134 or ENV 143 or permission of instructor.

ART 343 Schematic Drawing (3)

Developing graphic images through schematic analysis methods. Approach to creative problems through objective means, e.g. perspective simplification, etc. Emphasis on developing perceptual and conceptual abilities with a minimum of mechanical devices. 3 two-hour activities. Prerequisite: ART 143.

ART 344 Life Drawing (3)

Drawing for creative expression from live, costumed studio models in silver-point, charcoal, pencil and paints. 3 two-hour activities.

ART 345 Drawing for Graphic Expression (3)

Advanced problems in draftsmanship with special emphasis on linear and textural expression. Prerequisite: ART 143 and 243. 2 three-hour laboratories.

ART 348 Oil Painting (4)

Studio course in oil painting techniques. 4 two-hour activities. Prerequisites: foundations in painting or ART 247 or permission of instructor.

ART 405 Art in the Elementary School (3)

Art education theory and curriculum design. Evaluation techniques, art materials and skills. 3 lectures.

ART 410 History of Tribal Arts (4)

Art of tribal cultures—African, Oceanic, Eskimo, and American Indian—within the context of religious and mythological beliefs; meaning and social functions of the art forms. 4 lectures. Prerequisite: ART 212 or permission of instructor.

ART 416 History of Oriental Art (4)

Survey of Oriental Art. First section of the survey will cover Indian and Islamic art, the art of Tibet and South East Asia. As the art of the Orient is primarily religious, the religious and philosophical concepts will be examined in relation to the major monuments. 4 lectures. Prerequisites: ART 212, 213.

ART 417 History of Oriental Art (4)

Survey of Oriental Art. Second section will cover China, Japan and Korea. As the art of the Orient is primarily religious, religious and philosophical concepts will be examined in relation to major monuments. 2 four-hour activities. Prerequisites: ART 212, 213, 416.

ART 430 Advanced Ceramics (3)

Development of designs in clay with an emphasis on mass production. 1 lecture, 2 two-hour activities. Prerequisite: Art 331.

ART 439 Advanced Painting (4)

Development of advanced concepts, methods, and techniques. Traditional and experimental approaches. Group and individual projects in studio and on location. Individual development. 2 four-hour activities. Prerequisite: ART 247 or 249 or permission of instructor.

BEHAVIORAL SCIENCES

William R. Larson, *Chairman*
John N. Burma
Sidney Carlin
Gary A. Cretser
William F. Hill
Louis J. King
Marcia Lasswell
William K. Lombardo
Frederick B. Meeker
Monica Morris
Joseph L. Philbrick
Robert M. Schwieder
Donald Shupe
Joics B. Stone

The department offers courses leading to the degree of Bachelor of Arts in Behavioral Science. The curriculum for this degree is composed of courses in psychology and sociology, with additional emphasis on anthropology courses from elsewhere in the university.

Instruction in the department is intended to provide a background for understanding human behavior, in both individual and collective aspects. The interdisciplinary orientation and offerings of the department allow the student to select a major curriculum, in concert with faculty advisors, which best supports his aspirations for post-college employment or advanced education. A minimum number of required courses has been established, in order that a high degree of flexibility can be achieved in personal curriculum planning with approved electives selected through consultation with faculty advisor. The introductory courses in psychology and sociology are prerequisites to most of the upper division offerings.

CORE COURSES FOR THE MAJOR

(Required for all students)

Intro Cult Anth	ANT	102	(4)
Meth Beh Sci	BHS	204	(4)
Senior Project	BHS	461	(2)
Senior Project	BHS	462	(2)
Undergrad Seminar	BHS	463	(2)
General Psychology	PSY	201	(4)
General Psychology	PSY	202	(4)
Social Psychology	PSY	401	(4)
Prin of Soc	SOC	201	(4)
Prin of Soc	SOC	202	(4)
Soc Org	SOC	310	(4)
Approved electives in BHS, PSY, SOC, ANT 300–400 level; (courses to be chosen in consultation with advisor)			(22)

SUPPORT AND ELECTIVE COURSES

(Required for all students)

Amer Civil	AMC	201*	(4)
Amer Civil	AMC	202*	(4)
Freshman Composition	ENG	104*	(4)
Physical Education	PE	141*	(3)
Courses to complete General Education Reqmts.			**(45)
Approved Electives (300–400 level) chosen in consultation with advisor			(24)
Free Electives			†(42)

* May be used for the general education requirement. Select appropriate courses from general education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

† The total curriculum must include 60 units of upper division courses.

Course Descriptions

BHS 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

BHS 204 Methods in the Behavioral Sciences (4)

An introduction to the methods and techniques used in carrying out primary investigation in the Behavioral Sciences. 4 lectures. Prerequisite: SOC 201 and PSY 201.

BHS 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

BHS 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

BHS 450 Computer Methods in Behavioral Science (4)

Survey of computer methods currently used in behavioral science research. Examination of simulations, games, analytic models, humanistic applications and special techniques. Practice in FORTRAN programming of applied behavioral science problems. Three lectures, 1 two-hour activity. Prerequisite: Behavioral science major and junior standing or permission of instructor.

BHS 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment or interest. Projects are presented in a formal written report.

BHS 463 Undergraduate Seminar (2)

Study and discussion of recent developments in major field in contrast with senior project. Prerequisite: senior standing.

BHS 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

Psychology

PSY 201 General Psychology (4)

Basic concepts, methods and vocabulary of psychology with emphasis on the scientific study of development, learning, perception, sensation, thinking and physiological foundations. 4 lectures.

PSY 202 General Psychology (4)

Critical consideration of the methods and concepts in the study of mental tests, motivation, personality differences, abnormal behavior, therapy, social psychology and industrial psychology. 4 lectures. Prerequisite: PSY 201.

PSY 205 Personal Adjustment (3)

The development of insight into human behavior; understanding self and others; principles of mental health and their application to personal adjustment. 3 lectures.

PSY 301 Experimental Psychology: Research, Design & Methodology (4)

A heavily laboratory-oriented course; contemporary experimental design, particularly the use of appropriate control procedures. Students will design experiments using a wide variety of "good" designs and will criticize and improve "poor" sample designs. Recent experiments in the literature will be evaluated, and to some degree, replicated in the laboratory. 3 lectures, 1 two-hour activity. Prerequisite: BHS 204, PSY 202.

PSY 302 Experimental Psychology: Learning and Problem Solving (4)

A heavily laboratory-oriented course; learning by doing experiments on human and animal learning and problem solving. The latest experimental work in the field will be discussed and analyzed for validity and impetus-value to further research. 3 lectures, one two-hour activity. Prerequisite: BHS 204, PSY 202.

PSY 305 Basic Developmental Psychology (4)

A wide range of developmental areas is considered, including genetic factors, the effects of environmental enrichment and deprivation on development and the principles that apply to motor perceptual and social behavior. A cross-species approach provides a solid comparative foundation for subsequent courses covering infancy, childhood and adolescence. 4 lectures. Prerequisite: PSY 201.

PSY 310 Child Psychology: Early Childhood (4)

Developmental aspects of the physical, social, emotional, and intellectual growth of the child from birth through the pre-school years. Emphasis on factors that facilitate and impede development; early learning and the development of language; growing awareness of self in relation to environment. 4 lectures. Prerequisite: PSY 201.

PSY 311 Child Psychology: The Middle Years (4)

Development aspects of the physical, social, emotional growth of the child from kindergarten years through pre-adolescence. Emphasis on development of social abilities, and social awareness; thought processes; awareness of self in relation to environment. 4 lectures. Prerequisite: PSY 310 or consent of instructor.

PSY 312 Adolescent Psychology (4)

Physical, social, emotional, and intellectual growth of the adolescent. Emphasis upon personality formation, social adjustment, and the problem of self-identity. 4 lectures. Prerequisite: PSY 201.

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PSY 314 Human Relations (4)

The problems of human relations, specifically in group situations as observed on the job. Development of skills in dealing with others especially as a committee member and chairman of groups. Development of skills through class lecture and discussion plus small-group involvement with actual business-personnel problems. 3 lectures, 1 two-hour activity. Prerequisite: PSY 201.

PSY 315 Human Relations (4)

Introduction to human motivation in the one-to-one relationship. Effect upon individual behavior of the changing contemporary American culture; techniques of successful two-way communications; structure for professional interviewing. 3 lectures, 1 two-hour activity. Prerequisite: PSY 314.

PSY 316 Psychological Testing (4)

The use and misuses of psychological tests; construction, standardization, and statistics involved in testing, including objective and projective tests in all areas of measurement, i.e., achievement, motivation, aptitude, personality, and vocational preference. 3 Lectures 1 two-hour lab. Prerequisite: PSY 201 and 202 or consent of instructor.

PSY 321 The Psychology of Identity (4)

Psychological aspects of conflict, isolation, assimilation and assignation; the psychology of prejudices and discrimination; the psychological factors in minority group leadership, group membership identity and group membership consciousness. 4 lectures. Prerequisite: upper division standing or consent of instructor.

PSY 332 Industrial and Personnel Psychology (4)

A survey of applications of psychology to selection and motivation of employees; to work and efficiency; morale, fatigue and job safety. Application of psychological principles to man as part of the man-machine system including multiple sensory input (sound-sight, etc.) for learning and motivation. 3 lectures, 1 two-hour activity.

PSY 334 Cognitive Processes (4)

Processes by which humans acquire and maintain knowledge. Focus on the relationships of perception, language and thinking, and concept attainment. Major theories of cognitive development. 4 lectures. Prerequisite: PSY 202 or equivalent course.

PSY 340 Educational Psychology (4)

Psychological principles of the learning process and mental hygiene at the elementary and secondary levels. Emphasis upon learning and the motivation of the learner. 4 lectures. Prerequisite: PSY 201.

PSY 401 Social Psychology (4)

Advanced study of human behavior as a product of interaction and social process: nature of group life in relation to social groupings, social conflict, public opinion, group morale, social control, leadership. Small groups, team composition and nature of prejudice. 4 lectures. Prerequisite: PSY 201 or permission of instructor.

PSY 403 Psychology of Personality (4)

Advanced study of the major contemporary approaches to personality. Emphasis is upon development and structure of personality: biological, psychological, and socio-cultural determinants of personality; dynamics and changes of personality and the conditions which facilitate such changes. 4 lectures. Prerequisite: PSY 201.

PSY 415 Abnormal Psychology (4)

The causes, description, and treatment of the extremes of human behavior. Emphasis on an integrated analysis from a psycho-social viewpoint. 4 lectures. Prerequisite: PSY 201.

PSY 450 Principles of Behavior Modification (4)

Principles of behavior modification as applicable to home, school and institutional settings. Currently used approaches to behavioral change studied through analysis of experimental situations and published reports. 4 lectures. Prerequisite: PSY 201 or equivalent.

PSY 451 Practicum in Behavioral Modification (4)

Practical experience in the shaping of behavior. Participants will work with patients and staff at Pacific State Hospital, students and other class members. Use will be made of audio tapes, films and other data recording devices to monitor participant progress in behavioral shaping. Two lecture and discussion hours per week. 2 three-hour labs. Prerequisite: PSY 450 or permission of instructor.

Sociology

SOC 201, 202 Principles of Sociology (4) (4)

Sources of materials and methods of sociological study; concepts and principles; structure and process of group life; social institutions. Applications of techniques in field study. 4 lectures.

SOC 206 Family Relations (3)

Analysis of dating, courtship, engagement, religious, social, marital and legal factors relating to marriage and early adjustment. Preparation for marriage. 3 lectures.

SOC 301 Contemporary Social Problems (4)

Analysis of leading social problems facing American society today. 4 lectures. Prerequisite: junior standing.

SOC 302 Criminology (4)

Causal theories, nature, extent, control and prevention. Approximately 50 percent of course devoted to prevention and rehabilitation, both inside and outside penal institutions. 4 lecture-discussions. Prerequisite: SOC 201, 202 and junior standing.

SOC 308 Sociology of the Barrio (4)

Analysis of social institutions and Mexican-American community with emphasis on the urban and rural communities. Survey of educational, political, religious, economic and social systems. Field work will be required in order to provide relative experiences. 4 lectures. Prerequisite: SOC 201, 202 and junior standing.

SOC 310 Social Organization (4)

An analysis of the structure and function of selected social organizations, with particular emphasis upon social processes, social evolution and social planning. 4 lectures. Prerequisite: SOC 201, 202.

SOC 320 Ethnic Relations in America (4)

Overview and interpretation of social and social-psychological theory in relation to prejudice and discrimination. Emphasis on current ethnic contacts and conflicts in the United States. 4 lecture-discussions. Prerequisite: SOC 201, 202 and junior standing.

SOC 321 Family as a Social Institution (4)

Social and cultural aspects of the development of the family as an institution, focusing upon its structures, its functions, its forms of disorganization, and suggestions for adjustments to current trends. 4 lecture-discussions. Prerequisite: SOC 201, 202.

SOC 322 Sociology of Poverty (4)

Sociological and social psychological aspects of poverty: Involvement of primary relationship with the poverty family. 4 lectures. Prerequisite: SOC 201.

SOC 323 Sociology of Minority Communities (4)

Sources of materials and methods of sociological study of minority communities; concepts and principles; differential structure and process of minority group life; social institutions in the context of value system conflict; indigenous efforts to alleviate community problems. 4 lectures. Prerequisite: junior standing.

SOC 330 Population and Society (4)

Analysis of population trends and problems in modern society. Focus on demographic characteristics of world population, with special reference to urban concentrations and underdeveloped nations. 4 hours lecture-discussion. Prerequisite: SOC 201, 202.

SOC 333 Research Methods in Sociology (4)

A survey of methods for conducting or evaluating sociological research. Survey methods and field techniques; unobtrusive methods; questionnaire and scale design; interviewing schedules and coding; data organization and file structure for computer use in social research. Laboratory experience in development and usage of evaluation procedures in large-scale social systems. 3 lectures, 1 two-hour activity. Prerequisites: SOC 201–202, or PSY 201–202, BHS 204.

SOC 350 Social Movements (4)

Social movements, past and present. Emphasis on the relationship between the social structure and the emergence of social movements. 4 lectures. Prerequisite: SOC 202.

SOC 401 Urban Sociology (4)

A comparison of the organization of the modern city with special emphasis on the social problems of the modern industrial urban center; analysis of trends in urban and suburban communities; and ecological patterns and change. 3 lectures, 1 two-hour activity. Prerequisite: junior standing or permission of the instructor.

SOC 405 Development of Social Thought (4)

A study of sociological thought. Emphasis placed upon whole theoretical systems and the writings of the early sociological theoreticians. Required background and experiences: 4 lectures. Prerequisites: Soc 201 and 202.

SOC 410 Social Stratification (4)

Theories and research concerning social stratification with emphasis on contemporary American society, to include the measurement and analysis of social status and stratification models; the meaning of social class for individuals and society, and correlates of social class. 4 lectures. Prerequisites: SOC 201–202.

COMMUNICATION ARTS

_____, *Chairman*

Thomas A. Burdick
David A. Church
Robert Clark
Ross F. Figgins
Gary D. Keele
Kenneth Kitch
Russell V. Lapp
Linda Malm
Dan L. Miller
Glen D. Phillips
Alfred E. Sheldon
Stanley Taylor
Frank A. Tennant
Ben F. Thompson
Martin L. Wang

An increasingly complex society needs individuals to inform, interpret, and explain to the public the problems of that society. The communication arts major is designed to prepare students to fill communication positions in the mass media, business, industry, and education.

Five options are offered to students taking the communication arts major—newspaper/magazine, journalism, public relations, broadcast journalism, specialized communication, and speech.

The newspaper/magazine option is designed for students planning careers in editorial and supervisory assignments with newspapers, magazines and industrial publications, or for students wishing to obtain a standard teaching credential—secondary specialization, with a journalism major or minor.

The public relations option should be chosen by students planning careers in public relations, advertising, and communications positions which require skills and knowledge in these areas.

The broadcast journalism option is designed for students planning careers in gathering and preparing news, features, and documentary materials for radio and television broadcasting.

The specialized communication option should be chosen, by students who wish to use communicaton skills in a specific area of interest such as economics, government, social services, education, and theater.

The speech option prepares students for obtaining a secondary school teaching minor in speech and related subjects at the secondary level. It includes preparation in the methods and techniques of public address, oral interpretation, and forensics.

Students completing the major are qualified to take advantage of a variety of occupational opportunities and to pursue advanced study in professionally oriented graduate schools.

CORE COURSES FOR MAJOR

(Required of all students)

Intro to Mass Comm	COM	101	(4)
Hst of Mass Comm	COM	203	(4)
or Pub. Add & Amer. Trad.	SP	312	
Pub Opin, Prop & Media	COM	413	(4)
or Speech Tech in Soc	SP	403	
Senior Project	COM	461	(2)
Senior Project	COM	462	(2)
Undergraduate Seminar	COM	463	(2)
Courses to Complete Major			(37-40)

OPTION COURSES FOR MAJOR

(Required in specific options)

Newspaper and Magazine Journalism

Reporting	COM	102	(4)
Photography	COM	131	(3)
Prin of Printing	COM	206	(4)
Photojournalism	COM	231	(2)
Communication Law	COM	304	(4)
Editing Laboratory	COM	305	(2)
Specialized Reporting	COM	307	(4)
Public Affairs Report	COM	309	(4)
Editorial Writing	COM	310	(2)
Communication Ethics	COM	401	(4)
Newspaper Operations	COM	403	(4)
Adv. Exp. Writing	ENG	303	(4)

Public Relations

Reporting	COM	102	(4)
Photography	COM	131	(3)
Prin of Printing	COM	206	(4)
Photojournalism	COM	231	(2)
Communications Law	COM	304	(4)
Editing Laboratory	COM	305	(2)

Public Affairs Report	COM	309	(4)
Bus & Ind Journalism	COM	311	(4)
Public Relations	COM	313	(4)
Communication Ethics	COM	401	(4)
Adv. Expos. Writing	ENG	303	(3)

Specialized Communications

Reporting	COM	102	(4)
Photography	COM	131	(3)
Adv Copy, Layout & Pro	COM	302	(4)
Communications Law	COM	304	(4)
Specialized Reporting	COM	307	(4)
Communications Ethics	COM	401	(4)
Upper Div Courses— Advisor Approval			(17)

Broadcast Journalism

Reporting	COM	102	(4)
Photography	COM	131	(3)
Photojournalism	COM	231	(2)
Intro to the Film	COM	241	(4)
Basic News Broadcasting	COM	301	(4)
Communications Law	COM	304	(4)
TV & Radio News Anal	COM	411	(4)
The Documentary Film	COM	431	(4)
Educ TV Prod Workshop	COM	440	(4)
Oral Interpretation	SP	203	(4)

Speech

Voice and Diction	SP	102	(4)
Adv Public Speaking	SP	200	(4)
Oral Interpretation	SP	203	(4)
Forensics Workshop	SP	230	(2)
Argumentation	SP	304	(4)
Conf Tech & Group Dis	SP	307	(4)
Speech Criticism	SP	308	(4)
Speech Composition	SP	311	(4)
Rhetorical Theory	SP	416	(4)
Adv Proj in Oral Interp	SP	443	(2)
Adv Proj in Forensics	SP	444	(2)

SUPPORT & ELECTIVE COURSES

(Required of all students)

Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Lang & Human Behavior	ENG	313	(4)
United States History	HST	201*	(4)
United States History	HST	202*	(4)
Library Research & Bib	LIB	103	(3)
Physical Education	PE	141*	(3)
American Political Sys	PLS	201*	(4)
Gen Psychology	PSY	201*	(4)
Public Speaking	SP	100*	(4)
Courses to complete general education requirements			**(29)
Electives			(70–76)

* May be used for general education requirements. Select unspecified courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

Course Descriptions

COM 101 Introduction to Mass Communications (4)

Survey of contemporary mass media; communications theory, structure and interrelationships of newspapers, magazines, radio and television. Analyses of major media content. 4 lectures.

COM 102 Reporting (4)

News gathering and writing principles; use of news sources and documents; indepth reporting, including investigative, interpretive, personality and series stories; speeches and meetings. 2 lectures, 2 two-hour activity periods. Prerequisite: COM 101.

COM 131 Photography (3)

Basic photography techniques, including taking, processing, and selecting good photos. For those who have had no or very limited experience in photography. 1 lecture, 2 three-hour laboratories.

COM 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

COM 203 History of Mass Communications (4)

History, background, and responsibilities of the mass media in the progress of man. Special emphasis on development of mass communication in the United States. 4 lectures.

COM 204 History of Broadcasting (3)

History and progress of the broadcast media and comparative world systems with special attention to the American system as developed from the 1890's. 3 lectures.

COM 205 Introduction to Broadcasting Techniques (4)

An introduction to broadcast studio techniques; broadcast equipment; types of programming, and the various forms of performance techniques employed in broadcasting. 3 lectures, 1 three-hour laboratory.

COM 206 Principles of Printing (4)

Printing processes and the adaptability and possibilities of each; preparation of material for printing. 4 lectures.

COM 216 Report Writing (3)

Reporting-writing techniques. Research, organization, and preparation of specialized and technical information. Regular written reports. 3 lectures. Prerequisite: ENG 105.

COM 218 Business Communication (3)

Writing effective business letters and memoranda with emphasis on clarity and on reaction-evoking techniques. Letters of application and resumes. 3 lectures. Prerequisite: ENG 105.

COM 219 Technical Writing (4)

The principles of technical writing with extensive practice in the preparation of technical materials in the various forms common to the engineering fields. 4 lectures. Prerequisite: ENG 104.

COM 231 Photojournalism (2)

Photography for publication and public relations. Photo editing, picture stories and illustrations, photo marketing. 1 lecture, 1 three-hour laboratory. Prerequisite: COM 131, or permission of instructor.

COM 241 Introduction to the Film (4)

The development of the motion picture as an art form and medium of mass communication. Critical appreciation and analysis of the film. 2 lectures, 2 two-hour activities.

COM 251 Communications Practice (2)

Production course for beginning staff members of college communications media. Minimum of 8 hours production activity a week. Prerequisite: COM 102 (may be taken concurrently) and permission of instructor. Total credit limited to 6 units.

COM 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

COM 301 Basic News Broadcasting (4)

Gathering, writing, editing, and programming news for the broadcast media, including audio and visual treatment for radio, television, and film. 4 lectures. Prerequisite: COM 102 or permission of the instructor.

COM 302 Advertising Copywriting, Layout and Production (4)

Examination of advertising appeals and application of product and market research to specific creative problems. Preparation of copy, planning of layout and production of advertising. 2 lectures, 2 two-hour activities.

COM 304 Communications Law (4)

The fundamentals and applications of libel and right-of-privacy laws as they affect mass communication. 4 lectures. Prerequisite: COM 203 or permission of instructor.

COM 305 Editing Lab (2)

Copy editing, headline writing, layout, and makeup. 2 three-hour laboratories. Prerequisite: COM 102.

COM 307 Specialized Reporting (4)

Writing in such fields as education, travel, agriculture, science, arts, sports, religion, politics. 2 lectures, 2 two-hour activities. Prerequisite: COM 102.

COM 309 Reporting Public Affairs (4)

Gathering material and writing stories pertaining to business, labor, industry, government, and courts; special emphasis on organization and procedure of government and courts. 2 lectures, 2 three-hour activity periods. Prerequisite: COM 102.

COM 310 Editorial Writing (2)

Writing editorials; emphasis on the use of editorial comment. 2 lectures. Prerequisite: COM 102.

COM 311 Business and Industrial Journalism (4)

The use of printed material in business and industry, including house organs, brochures, and pamphlets; operation of the news bureau and writing of publicity releases. 4 lectures. Prerequisite: COM 102.

COM 313 Public Relations Theory (4)

The effects of organized information on public thinking; dissemination of ideas by commericial, industrial, social, and governmental organizations; the use of various publicity tools. 4 lectures. Prerequisite: ENG 105.

COM 319 Advanced Technical Writing and Editing (4)

Principles and practices of technical writing and editing as employed by the technical writer in industry; preparation and editing of technical communications. Prerequisite: Permission of the instructor. 4 lectures.

COM 322 The Constitution and the Media (4)

Problems and practice of the media in such areas as freedom of the press, censorship, free press versus fair trial, contempt, media access to government information, newsman's freedom to travel, private access to the media. 4 lectures. Prerequisite: COM 304.

COM 351 Advanced Communications Practice (2)

Production course for experienced staff members of college communications media. Minimum of 8 production activities a week. Prerequisite: 6 units of COM 251, permission of instructor and department chairman. Total credit limited to 6 units.

COM 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

COM 401 Communications Ethics (4)

Responsibility of the mass media and the journalist in today's society. 4 lectures. Prerequisite: COM 304.

COM 403 Newspaper Operations (4)

The organization of the newspaper, including study of advertising and circulation problems and relations with the community. 4 lectures. Prerequisite: COM 101, 302, or permission of instructor.

COM 405 School Publications (3)

Operations of secondary school publications —newspaper, yearbook, magazine—including staffing, financing, production, relationship of advisor. 3 lectures. Prerequisite: experience in student publications.

COM 411 TV and Radio News Analysis (4)

Survey of principles and practices of interpretive reporting and commentary in electronic media; organization, writing, delivery of new analyses; production of commentary programs on local, national and international news, leading to their use on radio and television stations. 2 lectures, 2 two-hour laboratories. Prerequisites: COM 102, COM 205, and COM 301.

COM 413 Public Opinion, Propaganda, and the Mass Media (4)

Critical study and evaluation of the techniques of psychopolitical persuasion; mass media and public opinion in America; developments in international propaganda. 4 lectures. Prerequisite: permission of the instructor.

COM 431 The Documentary Film (4)

Principles and techniques of the documentary film in mass communications. 2 lectures, 2 two-hour activities.

COM 440 Educational Television Production Workshop (4)

Theory and practice of educational television with emphasis on practical experience in the various aspects of production; planning, writing, graphics, directing, and studio operations. 2 lectures, 2 three-hour laboratories. May be repeated for a total of 12 units.

COM 441 Automated Instructional Procedures (3)

Automated instructional materials. Theory of programmed learning, current applications, and the state of the art. Laboratory experiences include evaluation and testing of existing programs and machines, construction of sample materials by the student. 1 lecture. 2 two-hour activities.

COM 451 Editorial Practice (2)

Production course for students in editorial and management positions on college communications media or news bureau. Minimum of 6 hours production activity a week. Prerequisite: 6 units of COM 351 and permission of Communication Arts faculty. Total credit limited to 6 units.

COM 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems the graduate will meet in his chosen field of employment. Results presented in a formal written report. Minimum of 120 hours total time.

COM 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the student's major fields. 2 lectures. Prerequisite: senior standing or permission of instructor.

COM 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

Speech

SP 100 Public Speaking (4)

Theory and practice in speech organization, composition, and delivery. Use of research materials. 4 lectures.

SP 102 Voice and Diction (4)

Theory and principles of voice production. Physiology, mechanics, and function of the vocal mechanism; phonetics and enunciation; exercises and drills to improve the quality, flexibility, and effectiveness of the voice, leading to good usage of standard American speech. 4 lectures.

SP 200 Advanced Public Speaking (4)

An understanding of the variables operating in oral communication through their application in various oral communication settings. 4 lectures. Prerequisite: SP 100.

SP 203 Oral Interpretation (4)

Theory, methods, and practice in oral communication of literature, technical reports, criticism, and other written materials. Analysis of literary style as applied to oral communication. Exercises in microphone technique and public performance. 4 lectures.

SP 230 Forensics Workshop (2)

Intercollegiate and intramural competition in debate, oratory, oral interpretation, extemporaneous speaking, and impromptu speaking. Independent projects in specialized fields. 2 three-hour laboratories. May be repeated for not more than 6 units.

SP 304 Argumentation (4)

Philosophies and principles of argumentation; methods of logical proof. Obtaining and organization of evidence, construction of the written brief, analysis of fallacies, and rebuttal technique. Application of principles of argumentation to professional speaking. 4 lectures. Prerequisite: SP 100 or permission of instructor.

SP 307 Conference Techniques and Group Discussion (4)

Variables of communication within problem-solving groups; development of conference and discussion skills. Secondary emphasis on group psychology as it relates to problem-solving discussions. 4 lectures.

SP 308 Speech Criticism (4)

Critical approaches to the analysis and evaluation of public address. Development of evaluative standards and methods for classroom application. 4 lectures. Prerequisite: permission of instructor.

SP 311 Speech Composition (4)

Compositional aspects of public address: Elements of structure and style. Analysis of current standards of public address and compositional speeches. 4 lectures. Prerequisite: SP 100 or permission of instructor.

SP 312 Public Address and the American Tradition (4)

Techniques and strategies of major speeches affecting significant political, economic, social and religious issues in the United States. Important trends in American public address. 4 lectures. Prerequisite: junior standing or permission of instructor.

SP 403 Speech Techniques in Society (4)

Analysis of persuasive discourse; study of persuasion theory and research findings that operate in modern society. 4 lectures. Prerequisite: SP 100 or permission of instructor.

SP 416 Rhetorical Theory (4)

Major theories of rhetoric from the classical to the modern; application to contemporary communication techniques. 4 lectures. Prerequisite: SP 100

SP 443 Advanced Projects in Oral Interpretation (2)

Planning, directing and producing programs, play and choral readings, and other special projects. 2 three-hour laboratories. May be repeated for not more than 6 units. Prerequisite: SP 203 or permission of instructor.

SP 444 Advanced Projects in Forensics (2)

Participation and competition in upper division intercollegiate forensics, special projects for professional organizations, directing the high school forensics program and other independent projects in public address. 2 three-hour laboratories. Prerequisite: SP 230 or permission of instructor. May be repeated for not more than 6 units.

DRAMA

Robert L. Gilbert, *Coordinator*
Ralph C. McCormic James Martin Beala Neal

The basis of the program leading to the bachelor of arts degree is the understanding of drama as a creative art through two media—active student participation in theatre productions aimed at a mastery of skills in all aspects of theatre, and a comprehensive study of drama.

To provide for the active participation of students, a wide range of student productions is presented. Students have intensive training in the theory and skills of acting, directing, stagecraft, make-up, stage lighting, costume and scene design, and stage management.

Experimental workshops explore new trends in drama and its production. These workshops and the major productions involve students from a variety of academic disciplines, and contribute greatly to the cultural climate of the college and of the local communities.

Course work includes theatre history and criticism, playwriting, dramatic structure and dramatic literature. The curriculum develops the academic background essential to intelligent and relevent integration of production skills of contemporary society with its antecedents in the great classic dramatic periods of the past.

After completing the drama program at Cal Poly, students are prepared to go into teaching in secondary schools; into graduate schools; or into specialized training for professional theatre, television or motion pictures.

CORE COURSES FOR MAJOR

(Required of all students)

Technical Production I	DR	131	(4)
Technical Production II	DR	132	(4)
Make-up	DR	143	(1)
Acting	DR	151	(4)
Vocal Techniques for Theatre	DR	252	(3)
Scene Analysis for Acting	DR	253	(4)
History of the Theatre I	DR	311	(4)
History of the Theatre II	DR	312	(4)
History of the Theatre III	DR	313	(4)
Stage Lighting	DR	332	(3)
Directing	DR	356	(4)
Seminar in Theatre History	DR	414	(2)
Senior Project	DR	461	(2)
Senior Project	DR	462	(2)
Undergraduate Seminar	DR	463	(2)
16 units chosen from the following courses with the approval of advisor			
Scene Design	DR	337	(4)
Improvisation for the Theatre	DR	355	(2)
Reader's Theatre	DR	358	(4)
Theatre Management	DR	361	(4)
Stage Costume Design and Construction	DR	381	(4)
Special Problems	DR	400	(4)
Play Writing	DR	401	(4)
Advanced Acting	DR	458	(4)
Creative Dramatics	DR	471	(4)
Advanced Creative Dramatics	DR	472	(4)
History of Costume	DR	481	(4)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Introduction to the Theatre	DR	203	(4)
Play Production Activity	DR	244	(6)
Advanced Projects in Theatre	DR	441	(6)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Western Literary Heritage	ENG	111*	(4)
or			
Western Literary Heritage	ENG	112	
Shakespeare	ENG	403	(4)
or Shakespeare	ENG	404	
History of Civilization	HST	101*	(4)
or History of Civilization	HST	102	
or History of Civilization	HST	103	
Physical Education	PE	141*	(3)

Music Course	*	(4)
Art Course	*	(4)
Philosophy	*	(4)
Courses to complete General Education Requirements	**	(21)
Electives	†	(55)

* May be used for General Education requirement. Select appropriate courses from General Education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

† The total curriculum must include 60 units of upper division courses.

Course Descriptions

DR 131 Technical Production I (4)

Principles of backstage organization, scenery construction, and property construction. Crew work on current productions. 2 lectures, 2 three-hour laboratories.

DR 132 Technical Production II (4)

Principles and technique of stage lighting, elementary scene design, scenery painting, and sound. Crew work on current productions. 2 lectures, 2 three-hour laboratories.

DR 143 Makeup (1)

Theory and practice in theatrical makeup, including materials, base and lining techniques, chiaroscuro, old age and character makeup, construction of life masks, construction and application of appliances. 1 three-hour laboratory.

DR 151 Acting (4)

Theory and practice of acting with special attention to basic approaches, including improvisation, motivation, concentration, and character development. 2 lectures, 2 three-hour laboratories.

DR 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

DR 203 Introduction to the Theatre (4)

Theatre as a performing art. Representative plays employed to present the elements of theatre production, dramatic structure, interpretation, and theatre management. Students will attend live theatre productions. 4 lecture-discussions. Prerequisite: ENG 104 or permission of instructor.

DR 244 Play Production Activity (1)

Practical experience by participation in theatrical production. Technical crews, theatre management, and acting. 1 three-hour laboratory. May be repeated for not more than 6 units.

DR 252 Vocal Techniques for the Theatre (3)

Principles of the actor's vocal techniques for theatre performance; analysis of dialogue, its phonetic elements, rhythms, and regional variations; application of phonetic principles to articulation and pronunciation of stage dialogue; exercises for public performance; invitational public performance. 2 lecture-discussions, 1 two-hour activity.

DR 253 Scene Analysis for Acting (4)

Techniques of play and scene analysis through class exercises in improvization, formal analytical methods and rehearsal techniques. Students will create several roles for class and/or public performance. 2 lecture-discussions, 2 three-hour laboratories. Prerequisite: DR 151.

DR 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

DR 311 History of the Theatre I (4)

Survey of dramatic art and production from the Greeks to 1640. Application of historic principles and styles to contemporary play production and criticism. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

DR 312 History of the Theatre II (4)

Dramatic art and theater production from 1640 to 1870. Application of theories, principles and styles to contemporary play production and criticism. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

DR 313 History of the Theatre III (4)

Survey of dramatic art and production from 1870 to the present. Application of historic principles and styles to contemporary play production and criticism. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

DR 332 Stage Lighting (3)

Theory and practice in stage lighting. Composition, design, switchboard design, instrument selection and purchasing, production planning. Students will serve as crew members and supervisors for departmental productions. 2 lectures, 1 three-hour laboratory. Prerequisite: DR 132 or permission of instructor.

DR 337 Scene Design (4)

Theory and technique of scene design, including working drawings, perspectives, painter's elevations and ground plans. Techniques of scenery construction and painting. 2 lectures, 2 two-hour activities. Prerequisite: Dr 131, 132, or permission of instructor.

DR 355 Improvisation for the Theatre (2)

An approach to acting utilizing improvizational techniques to explore temporal, spatial and sonoric relationships as well as scene building methods. 2 three-hour laboratories. Prerequisite: DR 151. To be offered in alternate years.

DR 356 Directing (4)

Theory and practice in play selection, analysis and direction, composition, movement, coaching, and ground plans. 2 lectures, 2 three-hour laboratories. Prerequisite: DR 151, 253.

DR 358 Reader's Theatre (4)

Theory and directed practice in group presentation of dramatic and choral readings for public performance. Adaptation for group presentation of selected genres of literature including prose, verse and drama; one public performance. 2 lectures and 2 three-hour laboratories.

DR 361 Theatre Management (4)

Principles of organization and management of the performing arts production program, including choice of season, audience analysis, promotion and publicity, box-office procedures, budgeting and finance, crew organization and supervision. 3 one-hour lecture-discussions. 1 three-hour laboratory. Prerequisite: DR 131, 132.

DR 381 Stage Costume Design and Construction (4)

Design and construction of stage costumes including sketches, material selection, pattern drafting, cutting, fitting, sewing. 2 lectures, 2 two-hour activities.

DR 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

DR 401 Playwriting and Dramatic Structure (4)

Intensive study of dramatic structure as applied to theatre practice. Theory and practice in playwriting and criticism. 4 lecture-discussions.

DR 414 Seminar in Theatre History (2)

Studies in a limited aspect of theatre history. Significant periods, modes, and contributors to the mainstream of theatrical arts. Subject matter to be announced each quarter that the course is offered. May be repeated for a total of six units. 2 lecture-discussions. Prerequisite: junior standing.

DR 441 Advanced Projects in Theater (1)

Advanced problems and independent projects in acting, directing, stage design, stage lighting, costuming and staging, including participation in major productions and independent production of experimental student plays. 1 three-hour laboratory. May be repeated for not more than 6 units.

DR 458 Advanced Acting (4)

Intensive study in styles and forms of acting, with special attention to mastery of technique and comparative study of theories of acting. 2 lectures, 2 three-hour laboratories. Prerequisites: Dr 151, 253.

DR 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems the graduate will meet in his chosen field of employment. Results presented in a formal written report. Minimum of 120 hours total time.

DR 463 Undergraduate Seminar (2)

Reports of senior projects, discussions of professional articles of an appropriate level. 2 lecture-discussions.

DR 471 Creative Dramatics (4)

Theory and practice of improvizational drama, dramatization of children's stories, and techniques of story telling, with emphasis on participation, leadership, and development of original materials for classroom and recreational use. 2 lectures, 2 two-hour activities.

DR 472 Advanced Creative Dramatics (4)

Classroom demonstration, instruction, theory, and practice in advanced creative dramatic techniques and special projects in local schools. Instruction in building drama sessions, preparing complex scenes, flexibility and alternative modes of presentation; exploration of many media as core material for sessions. 2 lectures, 2 two-hour activities.

DR 481 History of Costume (4)

The dress of civilized man as applied to theatre costuming from early recorded history to the present, as seen through the contemporary art and written description, with emphasis on art history and social institutions. 4 lectures.

DR 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

ECONOMICS

Gertrude C. Boland, *Chairman*
Taha Al-Sabea
Sidney M. Blumner
Robert T. Bray
George T. Galbreath
Arthur Geller
Franklin Y. H. Ho
Ralph B. Hutchinson
David G. Jaques
David J. Park
Milton M. Shapiro
John T. Shieh
Dale G. Stallings
James E. Sutton

The department serves all schools of the university by providing courses that contribute to the general education of all students and develops vocational proficiencies to meet the needs of the undergraduate economics majors. A curriculum leading to the Master of Science degree in Economics is also offered in the department. Requirements for this degree may be found in the *Graduate Bulletin.*

The curriculum in economics, while maintaining a broad background of general education and traditional undergraduate courses, possesses flexibility and adaptability. Students may opt for development of skills and competencies in either quantitative or non-quantitative economic analysis while planning a unique program relevant to personal goals.

The undergraduate major in economics has three objectives: first, to prepare economic analysts for positions in business, industry, agriculture, and government; second, to prepare students for research or management trainee positions in fields such as public administration, labor unions, industry, finance, and insurance; third, to furnish undergrduate preparation for students who may wish to pursue graduate work in the field of economics.

The department also offers an economics option for the social sciences major. For a further description of this option refer to the social sciences major.

The department offers minors for students seeking elementary and secondary teaching credentials.

CORE COURSES FOR MAJOR

(Required of all students)

Principles of Economics	EC	201	(4)
Principles of Economics	EC	202	(4)
Money & Banking	EC	308	(4)
Price & Income Analysis	EC	311	(4)
Price & Income Analysis	EC	312	(4)
Economic Statistics	EC	321	(4)
Economic Statistics	EC	322	(4)
Senior Project	EC	461-	(2)
Senior Project	EC	462	(2)
Undergraduate Seminar	EC	463	(2)
Adv Econ and/or Math Electives			(34)

SUPPORT & ELECTIVE COURSES

(Required of all students)

Principles of Accounting	ACC	124*	(4)
Principles of Accounting	ACC	125*	(4)
American Civilization	AMC	201 *	(4)
American Civilization	AMC	202*	(4)
Report Writing	COM	216*	(3)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Physical Education	PE	141*	(3)
Public Speaking	SP	100*	(4)
Courses to complete General Education Requirements		**	(34)
Free Electives			(62)

* May be used for general education requirements. Select unspecified courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

Course Descriptions

EC 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

EC 201, 202 Principles of Economics (4) (4)

How the economic system works. The forces which determine the efficiency of the allocation, utilization, and distribution of resources. The determinants of national income, output, prices, and employment. Applications of economic analysis. International economic problems. Courses to be taken in sequence. 4 lecture-discussions.

EC 205 Consumer Economics (4)

Principles of personal finance. The basic economics of personal money management, including budgeting, borrowing, spending, saving, investing, and insuring. 4 lecture-discussions. Prerequisite: EC 202.

EC 213 Economic Problems (4)

Specific current economic problems selected with reference to the needs of the students. Seminar, and discussions. 4 lectures. Prerequisite: EC 202.

EC 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

EC 301 Public Finance (4)

Principles of government financing and its various economic and social effects; collecting, spending and administration of public funds. 4 lecture-discussions. Prerequisite: EC 202.

EC 308 Money and Banking (4)

Relation of money and banking to the general economy; interrelationships between money and banking and production and distribution. 4 lecture-discussions. Prerequisite: EC 202.

EC 311, 312 Price and Income Analysis (4) (4)

Role of prices in organizing economic activities. Forces determining the general level of employment and income. Analysis of the behavior of households, firms, and market prices under various competitive conditions. Distribution of national income. Utilization and growth of the economy. 4 lectures. Problem-solving sessions. Courses to be taken in sequence.

EC 321, 322 Economic Statistics (4) (4)

Statistical methods and techniques in economic analysis. Analysis of time series, index number construction, regression and correlation analysis, probability and other statistical distributions; related economic topics. 4 lectures. Problem-solving sessions.

EC 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. total credit limited to 4 units, with a maximum of 2 units per quarter.

EC 402 Economic Development (4)

Pre-conditions and processes of economic growth and development of nations. Analysis in terms of economic theory. History and experience of societies relevant to problems of today's developing nations. 4 lecture-discussions. Prerequisite: EC 202.

EC 403 Comparative Economic Systems (4)

Examination of alternative economic organizations, ranging from free enterprise to fully planned economies. 4 lecture-duscussions. Prerequisite: EC 202.

EC 404 International Trade Theory and Policy (4)

Topics in the theory of international trade and values. Theory of tariffs and quotas. 4 lecture-discussions. Prerequisite: EC 202.

EC 405 International Finance (4)

Topics in international liquidity and finance theory. Problems of the international monetary system. 4 lecture-discussions. Prerequisite: EC 404.

EC 407 Development of Economic Doctrine (4)

The development of economic ideas or doctrines from the early Greek writers through the Classical and Neo-Classical schools to the present. 4 lecture-discussions. Prerequisite: EC 202.

EC 408 Economic History of Europe (4)

Economic development of Europe from the fall of the Roman Empire to the formation of the Common Market; growth of economic institutions antecedent to those of modern Europe. Bearing of European economic development upon that of the United States. 4 lecture-discussions. Prerequisite: EC 202.

EC 409 Economic History of the U.S. (4)

Analysis of growth and economic well-being of the U.S. economy in historical perspective. Interplay of economic forces and historical conditions. 4 lecture-discussions. Prerequisite: EC 202.

EC 413 Managerial Economics (4)

Use of quantitative economic analysis in formulating business policies; analysis of the social impact of management's role in the economy; integrated application of economic analysis and operations analysis to practical managerial problems. 4 lecture-discussions. Prerequisite: EC 202.

EC 414 Labor Economics (4)

Macroeconomic analysis of industrial relations. Theories and facts in wage and employment determination. Philosophies and functions of organized labor and their changing aspects. The aggregate effects of collective bargaining on economic efficiency and social welfare. Governmental policy in labor-management relations. Problems of insecurities. 4 lecture-discussions. Prerequisite: EC 202.

EC 415 Labor Problems and Practices (4)

Nature, instrumentalities and structure of collective bargaining emphasizing three critical areas: labor management laws, grievance and arbitration procedures, and trends in collective bargaining. 4 seminar-discussions. Prerequisite: EC 414.

EC 419 Land Economics (4)

Economic principles underlying utilization and conservation of land resources. Economics of urban land uses, forces of demand for urban land and factors affecting economic supply of urban land, factors affecting the locations of industries and other enterprises; patterns of urban and regional growth. Problems of rural and urban land use and development. More efficient uses of land and land-use planning. 4 lecture-discussions. Prerequisite: EC 202.

EC 421 Econometrics (4)

Introduction to quantitative model building, estimation, verification, and prediction of economic variables. 4 lectures. Problem-solving sessions. Prerequisite: EC 312 and EC 322 or equivalent.

EC 422 Economic Programming (4)

Optimization analysis and programming techniques, including various methods of linear programming, integer programming, quadratic programming, and dynamic programming. 4 lectures. Problem-solving sessions. Prerequisite: EC 202, MAT 204 or equivalent, or permission of instructor.

EC 423 Economic Conditions Analysis (4)

Techniques and procedures of statistical analysis of macroeconomic and microeconomic conditions. 4 lectures, problem-solving sessions. Prerequisite: EC 421.

EC 426 Economic Planning (4)

Theory and practice of economic planning ranging from national and regional economics to individual sectors, projects or enterprises. The extent of planning ranges from a complement to the economies of market systems to comprehensive, all encompassing plans. 4 lecture-discussions.

EC 430 State and Local Government Finance (4)

Theory and practice of state and local government finance. Examination of impacts of state and local government finance upon various sectors of state and local economy. Relation and conflicts between federal, state, and local government finance and their impact upon aggregate and regional economy. 4 lecture-discussions. Prerequisite: EC 301.

EC 431 Regional Economic Analysis (4)

Theories and techniques of regional analysis: population estimation, income and social accounting, location theories, economic-base theory, input-output analysis, industrial complex analysis, inter-regional linear programming. 4 lecture-discussions. Prerequisite: EC 202.

EC 432 Urban Economics (4)

Analysis of the level, distribution and stability of local income; analysis of local economic development problems of Southern California cities with physical distribution and urban transportation problems; central business districts and urban renewal. 4 lecture-discussions. Prerequisite: EC 202.

EC 433 Economics of Transportation (4)

The economic characteristics of transport; the functions of the differing transportation agencies; transportation pricing; problems of state and federal regulation; coordination of facilities; and current transport problems. 4 lecture-discussions. Prerequisite: EC 202.

EC 434 Economics of Public Utilities (4)

Economics of public service corporations. Problems of rate determination and other regulations. State and national problems arising from the development of public utilities. 4 lecture-discussions. Prerequisite: EC 202.

EC 435 Environmental and Resource Economics (4)

Price system and efficiency in the use and conservation of natural resources; private and social costs, the concept of waste, cost allocation among uses, analysis of policies for petroleum, coal, timber, fisheries, natural gas, and minerals. 4 lecture-discussions. Prerequisite: EC 202.

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EC 436 Economics of Population (4)

An analysis of the dynamics of population change and trends in population growth, its composition and distribution. Interaction of population change with levels of business activity and rates of economic development. 4 lecture-discussions. Prerequisite: EC 202.

EC 437 Economics of Social Welfare (4)

Economic security and social welfare. Sources, changes in, and attempts at alleviation of economic insecurity. Economics of social security, public assistance, and poverty programs. 4 lecture-discussions. Prerequisite: EC 202.

EC 440 Business and Government (4)

Economic significance of controls placed by government upon business; divergent issues arising from present relations of government to business. 4 lecture-discussions. Prerequisite: EC 202.

EC 441 American Industry (4)

Examination of number and size distribution of sellers in selected American industries. Conduct and performance of firms in the context of the industry structure. Examination of actual and optimal government policy in each industry. 4 lecture-discussions. Prerequisite: EC 202.

EC 450 Economics of Capital Markets (4)

Analysis of the economic foundations upon which money and capital market transactions are based. Institutional and economic factors influencing the prices, uses, and sources of the flow of funds in equity and debt markets. 4 lecture-discussions. Prerequisite: EC 202, 308.

EC 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum of 120 hours total time. Prerequisite: senior standing.

EC 463 Undergraduate Seminar (2)

Intensive study of selected economic problems with the application of various techniques of analysis. 2 lectures. Prerequisite: Completion of senior project or permission of instructor.

EC 478 Planning-Programming-Budgeting System (4)

Economic analysis for decision in resource allocation without market mechanism. Theory, tools and practice of cost benefit analysis and system analysis. 4 lecture-discussions. Prerequisite: EC 312.

EC 497 Economics of Minority Groups (4)

Economic analysis of the problems of minorities in urban communities. Distribution and stability of minority income. Economic effects of discrimination. Federal, state and local programs. Alternative solutions to present problems. 4 lecture-discussions. Prerequisite: EC 202.

EC 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

ENGLISH

James M. Ware, *Chairman*
Virginia H. Adair
Samuel I. Bellman
Leo W. Berg
S. Ralph Bobb
John R. Butterworth
Alexander H. Chorney
Stanley J. Cook
Thomas J. Elliott
Joseph R. Farrell
Milton L. French
John F. Fulbeck
Ruth M. Harmer
C. Edwin Harwood
Theodore C. Humphrey
Carola M. Kaplan
Harold P. Levitt
William L. McAdams
Caryl McNees
Ahmed M. Metwalli
Robert E. Morsberger
Victor N. Okada
Larry K. Robinson
Sidney Shrager
Ben Siegel
George Stavros
Joseph H. Stodder
Richard W. Suter
Halsey P. Taylor
Theodore N. Weissbuch
Stephen V. Whaley
Walter R. Whitney
Lillian Wilds
Rudolf Zrimc

The major in English, leading to a Bachelor of Arts degree, serves two purposes. It equips the student for graduate study and, when conjoined with the program for the secondary teaching credential, for a career in teaching on the secondary level.

A teaching credential minor in English is also offered.

The curriculum for the English major is patterned as follows: in the freshman year courses in the methods of reading literature and in the literature of Western antiquity; in the sophomore year a broad survey of English and American literature; in the junior year a narrower consideration of the principal genres; and in the senior year relatively intensive work in individual authors and pairs or small groups of authors.

In addition the department lists elementary and intermediate sequences in French, German, and Spanish, plus courses in French, German and Hispanic civilizations which may be studied in the French, German or Spanish languages.

Work is also offered in English as a second language and in the literature-language aspects of Black, Chicano and American Indian Studies.

CORE COURSES FOR MAJOR

(Required of all students)

Meth of Literary Study	ENG	108	(4)
Western Literary Heritage	ENG	111	(4)
Survey of British Literature	ENG	207	(4)
Survey of British Literature	ENG	208	(4)
Survey of American Literature	ENG	211	(4)
Survey of American Literature	ENG	212	(4)
Adv Expository Writing	ENG	303	(4)
Novel in England to 1880	ENG	305	(4)
English Drama to 1890	ENG	307	(4)
The English Poem	ENG	309	(4)
Language and Human Behavior	ENG	313	(3)
Structure of Language	ENG	320	(4)
Grammars of English	ENG	321	(4)
Chaucer	ENG	401	(4)
Milton	ENG	402	(4)
Shakespeare	ENG	403	(4)
Shakespeare	ENG	404	(4)
Literary Criticism	ENG	405	(4)
Senior Project	ENG	461	(2)
Senior Project	ENG	462	(2)
Undergraduate Seminar	ENG	463	(2)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
The Visual Arts	ART	110*	(4)
or Found of Mod Art	ART	312*	
†Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
French	FR	202*	(4)
or Spanish	SPN	202*	
or German	GER	202*	
History of Civilization	HST	101*	(4)
or Hist of Civ	HST	102	
or Hist of Civ	HST	103	
History of Great Britain to 1640	HST	330	(4)
or History of Great Britain after 1640	HST	331	
Survey of Music Lit	MU	104*	(4)
Physical Education	PE	141*	(3)
General Psychology	PSY	201*	(4)
Public Speaking	SP	100*	(4)
Courses to complete General Education requirements			**(21)
Electives			†(41)

* May be used for the general education requirement. Select appropriate courses from the general education list.

† Students with appropriate scores in entrance tests will be placed in ENG 105 instead of ENG 104 and will later take an English course in lieu of ENG 104.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement. The total curriculum must include 60 units of upper division courses.

Course Descriptions

ENG 102 English as a Second Language (4)

English composition for foreign students. Frequent exercises in reading and composition. Drill in selected problems in structure. 4 lectures. May be substituted for ENG 104. Prerequisite: Satisfactory score on placement examination.

ENG 103 English as a Second Language (4)

English composition for foreign students. Introduction to forms of exposition and logic. Technique of the term paper. Readings and compositions. Drill in selected problems in structure. 4 lectures. May be substituted for ENG 105. Prerequisite: ENG 102.

ENG 104 Freshman Composition (4)

The fundamentals of English usage. Frequent papers, chiefly expository. Readings. 4 lectures. ENG 102 or ENG 106–107 may be substituted for this course.

ENG 105 Freshman Composition (4)

Frequent expository writing with stress on organization. Technique of the term paper. Readings. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 106 Basic Communication Skills (1–4)

A communication skills program for the student who needs audio-visual and programmed clinic experiences not offered in ENG 104. Analysis of students' reading and writing, lectures, arrangement of self-tutorial programs. Variable credit. Course to be repeated, if necessary, for full credit. ENG 106 (4) and ENG 107 (4) may be substituted for ENG 104. 5 hours discussion, 5 hours activity.

ENG 107 Basic Communication Skills (1–4)

Continuation of ENG 106 work in communication skills. Variable credit. Course to be repeated, if necessary, for full credit. ENG 106 (4) and ENG 107 (4) may be substituted for ENG 104. 5 hours discussion, 5 hours activity. Prerequisite: 4 units of ENG 106.

ENG 108 Methods of Literary Study (4)

For English majors and other recommended students. Readings in fiction, drama, and poetry. Types of criticism. Frequent papers. 4 lectures. Prerequisite: ENG 105.

ENG 110 The Bible as Literature (4)

Old and New Testament narrative, poetry, and wisdom literature in the King James Version. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 111 Western Literary Heritage (4)

Readings in literature of the ancient world from the beginning to the 6th century after Christ, with emphasis on the history of ideas. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 112 Western Literary Heritage (4)

Readings in medieval and Renaissance literature from the 6th through the 16th century, with emphasis on the history of ideas. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ENG 201 Introduction to Modern Fiction (4)

Readings chiefly in the 20th century short story and novel, with emphasis on man's search for knowledge, self-understanding, and values. May not be elected by English majors. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 202 Introduction to Poetry and Modern Drama (4)

Readings chiefly in 20th century drama, with emphasis on man's search for knowledge, self-understanding, and values. May not be elected by English majors. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 203 Introduction to Shakespeare (4)

Selected plays from the works of Shakespeare. May not be elected by English majors. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 205 The Black Writer in America (4)

Analysis and evaluation of the works of major Black writers in America—from Phillis Wheatley to the present—in the light of cultural, political and social history. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 206 Contemporary Literature (4)

Writings that reflect significant social, religious, and political issues of our time. Such authors as John Cheever, J. D. Salinger, James Baldwin, John Osborne, Rolf Hochhuth. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 207, 208 Survey of British Literature (4) (4)

British literature, as exemplifying the history of ideas, from its beginning to the present, with emphasis on the major works. 4 lectures. Prerequisite: 3 units of literature.

ENG 211, 212 Survey of American Literature (4) (4)

Philosophical, religious, political, and literary ideas in American writing from Colonial times to the present. 4 lectures. Prerequisite: 3 units of literature.

ENG 215 Ethnic Minorities in American Literature (4)

Attitudes toward, and stereotyped images of, the American Indian, Mexican-American, and Black American in works of authors outside the ethnic group. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

ENG 301 Advanced Professional Writing (4)

Short, formal communications: the memo, abstract, review, explication; brief professional report and recommendation; the committee paper. 4 lectures. Prerequisite: ENG 104 or equivalent.

ENG 302 Advanced Composition—Fiction (3)

The fundamentals of short story writing. Exercises in plotting, characterization, dialog, description, narration, and point of view. Readings. Discussion and analysis of stories and exercises. 3 lectures. Prerequisite: Permission of instructor; 3 units of 200-level literature.

ENG 303 Advanced Expository Writing (4)

Current practices in such forms as the essay, commentary, magazine article. 4 lectures. Prerequisite: ENG 105 or equivalent.

ENG 304 The Development of the Short Story (3)

Critical analysis; history and evaluation of form. 3 lectures. Prerequisite: 3 units of 200-level literature.

ENG 305 The Novel in English to 1880 (4)

Development of the novel in England and America to the rise of Naturalism. Richardson to Conrad. 4 lectures. Prerequisite: 4 units of 200-level literature.

ENG 306 The Modern Novel (4)

Realism and its variants in the 19th and 20th centuries, from French and Russian beginnings. 4 lectures. Prerequisite: 3 units of 200-level literature.

ENG 307 The English Drama to 1890 (4)

From tropes to Shaw. 4 lectures. Prerequisite: 3 units of 200-level literature.

ENG 308 The Modern Drama (4)

Continental, British, and American dramatic trends from the rise of Naturalism. 4 lectures. Prerequisite: 3 units of 200-level literature.

ENG 309 The English Poem (4)

Critical analysis and evaluation of genres and single works, other than dramatic. 4 lectures. Prerequisite: 3 units of 200-level literature.

ENG 310 Modern British and American Poetry (3)

Advanced analysis of language and forms of poetry, chiefly from the 20th century. 3 lectures. Prerequisite: 3 units of 200-level literature.

ENG 313 Language and Human Behavior (3)

Semantics; the symbolic process of English. Relationship of words and phrasings to their referents. Effects of this relationship upon human thought, interpretation, and behavior. 3 lectures. Prerequisite: 3 units of 200-level literature.

ENG 320 The Structure of Language (4)

Methodology of contemporary linguistic science. Phonology, morphology, syntax as they apply to language in general. 4 lectures. Prerequisite: junior standing.

ENG 321 Grammars of English (4)

Principles and methods of linguistics as they relate to modern English. Examination of systems used to describe the language: traditional, structural, and transformational grammars. 4 lectures. Prerequisite: ENG 320.

ENG 322 Development of Modern English (3)

Principles of change in language as an aid to understanding present-day pronunciation, spelling, word formation, grammar, and usage. Emphasis on word derivation and semantic change. 3 lectures. Prerequisite: ENG 320.

ENG 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ENG 401 Chaucer (4)

Chaucer's principal works, with special emphasis on *The Canterbury Tales* and *Troilus and Criseyde.* Cultural background. 4 lectures. Prerequisite: 3 units of 300-level literature.

ENG 402 Milton and His Contemporaries (4)

Paradise Lost, Samson Agonistes. Prose and minor poems. Selected works by such contemporaries of Milton as Andrew Marvell. Historical background. 4 lectures. Prerequisite: 3 units of 300-level literature.

ENG 403 Shakespeare (4)

Selected plays through *Hamlet.* 4 lectures. Prerequisite: 3 units of 300-level literature.

ENG 404 Shakespeare (4)

Selected plays after *Hamlet.* 4 lectures. Prerequisite: ENG 403.

ENG 405 Literary Criticism (4)

Analysis of the works of selected major critics, with emphasis on the moderns. Application of principles in original critical essays. 4 lectures. Prerequisite: 3 units of 300-level literature.

ENG 406 Major American Writers (3)

Intensive reading in such writers as Melville, Robinson, O'Neill, and Hemingway. 3 lectures. Prerequisite: 3 units of 300-level literature or permission of instructor.

ENG 416 Children's Literature (4)

Readings in myth and folklore and in children's classics from the 18th century to the present. 4 lectures. Prerequisite: 3 units of 200-level literature.

ENG 417 Adolescent Literature (4)

Selected readings in literature for the adolescent. Discussion of the nature and reading stages of the adolescent, criteria and sources for selecting adolescent literature, and effective methods of classroom presentation. 4 lectures. Prerequisite: 3 units of 200-level literature.

ENG 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Formal report. Prerequisite: senior standing. Required minimum of 120 hours.

ENG 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in their major fields. 2 lectures. Prerequisite: senior standing or permission of instructor.

ENG 471 Major English Poets 1500–1660 (3)

Relatively intensive work in two or three poets such as Spenser, Sidney, Greville, Jonson, Donne, Herbert. 3 lectures. Prerequisite: 3 units of 300-level literature.

ENG 472 Major English Poets of the Restoration and 18th Century (3)

Relatively intensive work in two or three poets such as Dryden, Pope, Blake, Burns. 3 lectures. Prerequisite: 3 units of 300-level literature.

ENG 473 Major English and American Poets of the 19th Century (3)

Relatively intensive work in two or three poets such as Wordsworth, Keats, Tennyson, Browning, Whitman, Dickinson. 3 lectures. Prerequisite: 3 units of 300-level literature.

ENG 476 Major Novelists of the 19th Century (3)

Relatively intensive work in two or three writers such as Balzac, Dickens, Melville, Flaubert, Dostoyevski, Tolstoy. 3 lectures. Prerequisite: 3 units of 300-level literature.

ENG 478 Major Prose Writers of the 18th Century (3)

Relatively intensive work in two or three writers such as Swift, Voltaire, Johnson, Rousseau, Burke, Lessing, Gibbon. 3 lectures. Prerequisite: 3 units of 300-level literature.

ENG 479 Major Prose Writers of the 19th Century (3)

Relatively intensive work in two or three writers such as Newman, Emerson, Ruskin, Arnold, Henry Adams. 3 lectures. Prerequisite: 3 units of 300-level literature.

ENG 483 Studies in 20th Century American Literature (3)

Relatively intensive work in two or three writers such as Faulkner, Fitzgerald, Bellow, Styron, Lowell, Stevens, Frost, Pound, O'Neill, Miller. 3 lectures. Prerequisite: 3 units of 300-level literature or permission of instructor.

ENG 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

French

FR 101 Elementary French (4)

Essentials of the spoken and written language for the beginner. Fundamentals of pronunciation, intonation and grammar. 4 lectures.

FR 102 Elementary French (4)

Extension of fundamentals of pronunciation and grammar for the continuing student. 4 lectures. Prerequisite: FR 101 or equivalent.

FR 103 Elementary French (4)

Advanced grammatical patterns and pronunciation for the continuing student. 4 lectures. Prerequisite: FR 102 or equivalent.

FR 201 Intermediate French Grammar (4)

Diagnostic grammar review; emphasis on verbs and pronouns. Auditory understanding. 4 lectures. Prerequisite: FR 103 or equivalent.

FR 202 Intermediate French Reading (4)

Reading of varied short texts; establishing a steadily increasing vocabulary. Introduction to literary texts. Recommended for prospective graduate students. 4 lectures. Prerequisite: FR 103 or equivalent.

FR 203 Intermediate French Composition and Conversation (4)

French composition, both oral and written. Frequent original presentations. 4 lectures. Prerequisite: FR 103 or equivalent.

FR 207 French Civilization from the Middle Ages Through the Enlightenment (4)

Culture of France from the Middle Ages through the Enlightenment. Conducted in French and English. 4 lectures. Prerequisite: FR 103 or equivalent.

FR 208 France Today (4)

Roots of 20th century French culture in 19th century tradition. Broad survey of contemporary France. Conducted in French and English. 4 lectures. Prerequisite: FR 103 or equivalent.

FR 209 Overseas French Cultures (4)

Development of French culture in those countries where French has been the second language and French culture the link with Western Civilization. Conducted in French and English. 4 lectures. Prerequisite: FR 103 or equivalent.

German

GER 101 Elementary German (4)

Essentials of the spoken and written language for the beginner. Fundamentals of pronunciation, intonation and grammar. 4 lectures.

GER 102 Elementary German (4)

Extension of fundamentals of pronunciation and grammar for the continuing student. 4 lectures. Prerequisite: GER 101 or equivalent.

GER 103 Elementary German (4)

Advanced grammatical patterns and pronunciation for the continuing student. 4 lectures. Prerequisite: GER 102 or equivalent.

GER 201 Intermediate German Grammar (4)

Intensive review of grammar; consideration of advanced points of grammar; readings in original German. 4 lectures. Prerequisite: GER 103 or equivalent.

GER 202 Intermediate German Reading (4)

Development of reading proficiency in German; analysis and discussion of texts; some translation. Recommended for prospective graduate students. 4 lectures. Prerequisite: GER 103 or equivalent.

GER 203 Intermediate German Composition and Conversation (4)

Fundamentals of German composition; intensive practice in conversation; idiomatic German; vocabulary building. Frequent oral and written original presentations. 4 lectures. Prerequisite: GER 103 or equivalent.

GER 207 German Civilization (4)

Survey of German culture and social customs. Conducted in German and English. 4 lectures. Prerequisite: GER 103 or equivalent.

Spanish

SPN 101 Elementary Spanish (4)

Essentials of the spoken and written language for the beginner. Fundamentals of pronunciation, intonation and grammar. 4 lectures.

SPN 102 Elementary Spanish (4)

Extension of fundamentals of pronunciation and grammar for the continuing student. 4 lectures. Prerequisite: SPN 101 or equivalent.

SPN 103 Elementary Spanish (4)

Advanced grammatical patterns and pronunciations for the continuing student. 4 lectures. Prerequisite: SPN 102 or equivalent.

SPN 201 Intermediate Spanish Grammar (4)

Intensive review of advanced points of grammar; emphasis on verbs and clauses. 4 lectures. Prerequisite: SPN 103 or equivalent.

SPN 202 Intermediate Spanish Reading (4)

Development of reading proficiency in Spanish; analysis and discussion of texts; some translation. Recommended for prospective graduate students. 4 lectures. Prerequisite: SPN 103 or equivalent.

SPN 203 Intermediate Spanish Composition and Conversation (4)

Fundamentals of Spanish composition; intensive practice in conversation; idiomatic Spanish; vocabulary building. Frequent oral and written original presentations. 4 lectures. Prerequisite: SPN 103 or equivalent.

SPN 204, 205 Spanish for the Spanish Speaking: Beginning and Intermediate (4) (4)

A bilingual presentation of Spanish for those who have some exposure to the vernacular but no formal experience in written and oral Spanish; vocabulary building, reading and writing skills and introduction to literature in Spanish. Prerequisite: some knowledge of vernacular Spanish or by permission of instructor. 4 lectures.

SPN 207 Spanish Civilization (4)

Culture of Spain, including art, music, history, social customs and world outlook. Conducted in English and Spanish. 4 lectures. Prerequisite: SPN 103 or equivalent.

SPN 208 Latin American Civilization (4)

Culture of Latin America; pre-Columbian civilizations, colonial and early national periods. Conducted in Spanish and English. 4 lectures. Prerequisite: SPN 103 or equivalent.

SPN 209 Contemporary Latin American Civilization (4)

Culture of present-day Latin America, including art, music, history and social customs. Relations with the United States. Conducted in Spanish and English. 4 lectures. Prerequisite: SPN 103 or equivalent.

SPN 210 The Language of the Barrio (4)

A bilingual course in Chicano Spanish and English. The literature and folk art of the barrio: poetry, essay, short story, and the *teatro campesino.* The language of the barrio as the language of poverty and frustration, its cultural relevance to America today and its role as symbol of the emergent dignity of the Chicano. 4 lectures.

SPN 211 Contemporary Literature of the Chicano (4)

Survey of contemporary Chicano literature focusing on the development of *vato* Spanish as a literary language through critical evaluation of current novels, essays, short stories and poetry. 4 lectures. Prerequisite: SPN 210 or permission of instructor.

SPN 215 Hispanic and American Indian Folklore of the Southwest (3–4)

An overview of Southwest folklore with an emphasis on tales, legends, *corridos,* and the evolution of modern folkloric genres. Units depend on whether or not student chooses to do fieldwork. 3 lectures, optional fieldwork. Prerequisite: SPN 103 or equivalent.

SPN 304 Literature of Mexico (4)

Survey of literary movements in Mexico with detailed study of literary forms and styles, focus on novel and short story. 4 lectures. Prerequisite: SPN 203 or permission of instructor.

HISTORY

Werner H. Marti, *Chairman*
Anthony L. Brundage
William M. Evans
Frederick B. Heath
Raoul E. Isais
John Kershaw
David L. Levering
Gloria R. Lothrop
Donald H. Pflueger
Robert W. Righter
Ralph E. Shaffer
David R. Smith
William A. Smith
Jerry L. Voorhis
George H. C. Wong

The history curriculum provides broad, basic offerings for general education as well as the opportunity for major specialization leading to the Bachelor of Arts degree. Courses are designed to encourage students to seek out relevant relationships to contemporary social, political, and cultural issues, and to provide historical, perspective on materials studied in other departments of the university.

The major provides a foundation for students seeking a standard secondary teaching credential and qualified graduates for a variety of civil service and other occupational opportunities. It also serves as preprofessional training for law and graduate work leading to college teaching.

History majors may select from two curriculum tracks. The first, printed below, reflects the judgment of the department as to what represents a well-balanced history major. The second provides the opportunity for the student, in conjunction with his adviser, to structure his curriculum in accord with his intellectual interests and vocational objectives. In addition, the department is uniquely equipped to provide a specialization in the history of Southern California.

CORE COURSES FOR MAJOR

(Required of all students)

History of Civilization	HST	101	(4)
History of Civilization	HST	102	(4)
History of Civilization	HST	103	(4)
United States History	HST	201	(4)
History Methods	HST	300	(4)
Senior Project	HST	461	(2)
Senior Project	HST	462	(2)
Undergraduate Seminar	HST	463	(2)
History (300–400 level)			(4)
† Area Studies			(12)
# American History Series			(12)
‡ European History Series			(12)

SUPPORT AND ELECTIVE COURSES *

(Required of all students)

Intro to Phy Anthro	ANT	101*	(4)
and Intro to Cult Anthro	ANT	102*	(4)
or Prin of Sociology	SOC	201*	
and Prin of Sociology	SOC	202*	
Prin of Economics	EC	201*	(4)
Prin of Economics	EC	202*	(4)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
United States History	HST	202*	(4)
Physical Education	PE	141*	(3)
American Political System	PLS	201*	(4)
General Psychology	PSY	201*	(4)
General Psychology	PSY	202*	(4)
Public Speaking	SP	100*	(4)
Courses to complete General Education Requirement			**(21)
Electives			***(52)

† Select 12 units of history area studies with the approval of adviser from HST 301, 302, 303, 304, 305, 307, 312, 313, 421, 422, 423, 432, 433, 434.

Select 12 units of American history series with the approval of adviser from HST 336, 340, 341, 342, 401, 402, 403, 404, 405, 406, 407, 410, 411, 412, 413, 414.

‡ Select 12 units of European history series with the approval of adviser from HST 319, 320, 321, 322, 323, 324, 326, 330, 331, 332, 418, 419, 420, 430.

* May be used for the general education requirement. Select appropriate courses from general education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

*** The total curriculum must include 60 units of upper division courses.

Course Descriptions

HST 101, 102, 103 History of Civilization (4) (4) (4)

Development of civilization from earliest times to the present. Political, economic, social, intellectual, and religious contributions of the various peoples to contemporary life. 4 lecture-discussions.

HST 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

HST 201, 202 United States History (4) (4)

A survey of the history of the United States from earliest exploration to the present with emphasis on the political, social, and economic trends and episodes which have molded the modern American nation. 4 lecture-discussions.

HST 210 The Black Man in America (4)

The diaspora of the Blacks to the New World and their subsequent cultural contributions. The slave trade. Slavery in North and South America and its effect upon Afro-American culture. 4 lecture-discussions.

HST 211 The Black Man in America (4)

Black history from the Civil War to World War I. Impact of the Reconstruction era upon the Black man's quest for self-identity and full participation in American life. 4 lecture-discussions.

HST 212, 213 History of the Chicanos in the United States (4) (4)

Survey of Chicano cultural, economic, social, and political contribution to development of the United States since Spanish conquest. Emphasis on the Southwest and California areas but with demonstration of Chicano influence and settlement in other areas of United States. Case studies of Mexican-American communities in New Mexico, Colorado, Texas, California, New York, Missouri and Illinois. 4 lecture-discussions.

HST 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

HST 300 History Methods (4)

Introduction to the methods of historical research: bibliography, textual analysis, source criticism, writing. 4 lecture-discussions.

HST 301, 302, 303 Far Eastern History (4) (4) (4)

Analysis of the cultural foundations of the Asian tradition. Humanistic achievement in art, religion, literature, and philosophy in an historical context. China, Japan, and Korea from the ancient period to the 20th Century. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 304, 305 History of Latin America (4) (4)

Latin America from the 15th century to the present. Emphasis on the economic, cultural, and historical development of the area. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 307 Latin American Problems of the 20th Century (4)

Current problems of Latin America such as land tenure and use, the origins of the power elites and their role in society; the Latin American university and the role of the student-intellectual in society and politics; the development of foreign interests in Latin America and their effect on economic and political development; the origins of the major twentieth century revolutions and their case studies (Mexico—1910, Bolivia—1952, and Cuba—1959). Future of Latin America—regional integration or disintegration, the role of the United States. 4 lecture-discussions. Prerequisite: junior standing or permission of the instructor.

HST 312 History of South and Southeast Asia (4)

History of South and Southeast Asia to the present; political, social and cultural developments. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 313 History of South West Asia and North Africa (4)

From the rise of the Ottoman Empire to the present. Cultural developments of the region; political, social and economic problems of the 20th century. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 319 History of Greece (4)

From Bronze Age to Hellenistic Period; political institutions, philosophy, fine arts. Greek historians in translation. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 320 History of Rome (4)

From 500 B.C. to A.D. 300. Political institutions, historiography, religion, fine arts. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 321 Medieval History (4)

Cultural, social, intellectual, political, and economic history of Western Europe from A.D. 300 to 1500. 4 lecture-discussions. Prerequisite: HST 101 or permission of instructor.

HST 322 Early Modern Europe from 1450 to 1713 (4)

The political, social, cultural, and economic history of Europe from 1450 to the collapse of the *ancien regime,* including the Italian Renaissance, the Protestant Reformation, the discoveries of the world, the scientific revolution, France under Louis XIV, and the Enlightenment. 4 lecture-discussions. Prerequisite: HST 102 or permission of instructor.

HST 323 Modern Europe from 1815 to 1914 (4)

European political, social, cultural and economic developments from the collapse of the *ancien regime* (1789) to the beginning of World War I, including the French Revolution, Napoleonic Europe, conservatism, liberalism, nationalism, and materialism. 4 lecture-discussions. Prerequisite: HST 103 or permission of instructor.

HST 324 Europe in the 20th Century (4)

The political, economic, and social forces which have influenced the great powers of Europe in the 20th century. The development of 20th century ideologies. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 326 Age of Enlightenment and Revolution (4)

European political, intellectual, social, and cultural developments from the beginning of the 18th century through the French Revolution, including the Encyclopedist movement, Deism, the impact of the American Revolution on Europe, enlightened despotism, and 18th century colonial developments. 4 lecture-discussions. Prerequisite: HST 103 or permission of the instructor.

HST 330 History of Great Britain to 1640 (4)

History of Britain and the British Empire from the Roman occupation to 1640. Social, economic, and constitutional development. Comparisons with the experience of other nations and peoples. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

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HST 331 History of Great Britain After 1640 (4)

Political, social, economic and cultural history of modern Britain (1640 to the present). Emphasis on social and political movements related to British democracy, and the imperial tradition. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 332 Great Britain in the Industrial Revolution (4)

The transformation of the British economy, social structure, political and intellectual life during the period 1783–1914. Emphasis will be placed upon the effects of industrialization and urbanization on institutions and ways of life. The development of democracy and party system, the various social reforms, the growth of centralized bureaucracy, educational changes, and the emergency of socialism and imperialism will be the main topics covered. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 336 The Black Man in America (4)

From World War I to the present. The Pan-African movement and its influence upon American Black nationalist movements, civil rights and other current black movements. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 337 History of the American Indians (4)

Culture of the native Americans; political and social organization; contacts with Europeans; wars of attrition against them; their contribution to American culture; their present conditions. 4 lecture-discussions.

HST 340 Diplomatic History of the United States (4)

Development, policies, methods, traditions, and organizational structure involved in United States foreign relations from independence to the present era. Relationship of foreign policy to American domestic problems. Role of public opinion. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 341 History of the American West (4)

Impact of frontier conditions upon the social, economic, political, and intellectual life of the United States. Place of the West in the arena of international politics. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

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HST 342 History of California (4)

From Spanish beginnings to the present; relationship of major state historical movements to the world and national scenes; cultural and intellectual developments; political, social, and economic trends. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 343 Regional History of Southern California (4)

The history of Southern California as a distinctive geographical, economic, cultural, social and political entity. The interplay of these forces upon the region's institutions which give the region its distinctiveness as well as its broader impact on the state, nation, and world. 4 lecture-discussions. Prerequisite: HST 342 or permission of instructor.

HST 344 Local History of Southern California (4)

Roots of cities, their population, institutions, and relationship to the overall development of the region. Impact of industrialism and urbanism on the growth and character of cities. 4 lecture-discussions. Prerequisite: HST 342 or permission of instructor.

HST 345 Social History of Southern California (4)

Roots and growth of cultism and radicalism in the political, social, and cultural life of Southern California; individuals and movements which reflect these phenomena. 4 lecture-discussions. Prerequisite: HST 342 or permission of instructor.

HST 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

HST 401 American Colonial History (4)

Political, social and economic study of the Anglo-Colonial World. Qualities of colonial life as contributory reasons for revolt. Colonial cultural debt to the Old World. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 402 The Federal Union (4)

The American Revolution and Constitutional Era, the evolution of the nation through the age of Jackson, with attention to political, economic and social problems. 4 lecture-discussions. Prerequisite: HST 202 or permission of instructor.

HST 403 The Age of Jackson (4)

Rise of the common man, development of the political party system, increasing political influence of the West and Manifest Destiny from 1820–1850. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 404 Civil War and Reconstruction (4)

Internal development and expansion of the American people and the rise of sectional conflict, culminating in the Civil War and Reconstruction. 4 lecture-discussions. Prerequisite: HST 202 or permission of instructor.

HST 405 The Gilded Age and the Progressive Era 1865–1914 (4)

Major cultural changes wrought by industrialization in the United States and the resultant changes of American attitudes needed to accommodate the business civilization. 4 lecture-discussions. Prerequisite: U.S. History Survey of American Civilization or permission of instructor.

HST 406 The United States 1914–1945 (4)

Political, social, economic and diplomatic history of the United States from the origin of World War I to the conclusion of World War II; domestic problems of the twenties and thirties, and international developments between the two wars. 4 lecture-discussions. Prerequisite: U.S. History Survey of American Civilization or permission of instructor.

HST 407 United States Since World War II (4)

National developments in the critical years since 1945. Major social, intellectual, and economic forces as they shape the contemporary American scene. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 410 Rise of the City in American Life (4)

Major facets of American life emerging in the city; urban thought from the 17th century to the present. 4 lecture-discussions. Prerequisite: junior standing or permission of the instructor.

HST 411 Social Reform Movements in U.S. 1800–1860 (4)

American social and agrarian reform movements. Penal reform, land reform, women's rights, and peace movements; economic reforms in the 20th century. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 412 History of Minorities in American Life (4)

Ethnic and racial minorities; their role and contributions to the political, economic, social and cultural life. Compares problems of assimilation and critically analyzes the myth of the "melting pot." 4 lecture-discussions. Prerequisite: junior standing, U. S. History or AMC 201, 202.

HST 413 History of the South (4)

Unique forces which have shaped Northern culture; environmental factors which have affected Southern citizens, white and black. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 418 History of Eastern Europe (4)

Eastern Europe exclusive of the Soviet Union with an emphasis on the unique and often crucial role played in European history by states or areas such as Poland, Hungary, Yugoslavia, and Rumania. Junior standing or permission of instructor. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 419 Russia From the Ancient Period to 1917 (4)

The political, social, cultural, and social history of Russia from the pre-Christian era until the Bolshevik revolution, emphasizing the rise of Muscovy and the interplay between the various ethnic groups living within the Russian empire. 4 lecture-discussions. Prerequisite: junior standing or permission of the instructor.

HST 420 The Soviet Union Since 1917 (4)

Bolshevik Revolution, Soviet constitution, development of political institutions, major economic and diplomatic developments since 1917. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 421 Pre-Colonial Africa (4)

Indigenous cultural, political, and economic institutions of African societies. Rise and fall of various ancient African kingdoms; their characteristic cultures, contributions, and problems, from the earliest times to the advent of the colonial episode. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 422 Colonial Africa (4)

From earliest contact between Africans and Europeans to dawn of African nationalism. Atlantic slave trade; diaspora to New World; 1884–1885 Berlin Conference and partition of Africa; European colonial policies and African response. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 423 African Nationalism and Decolonization (4)

Period of trusteeship; emergence of contemporary African nationalist movements; decline of European colonization; African independence; social, political, and economic aspects of contemporary African nations. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 430 History of Spain and Portugal (4)

Survey of Iberian development since the collapse of the Moorish Kingdoms to the present. Emphasis on Spain and Portugal in European evolution. Rise and fall of Iberian overseas empires, dynastic problems, socio-political developments, cultural movements. 4 lecture-discussions. Prerequisite: junior standing or permission of the instructor.

HST 432 History of Brazil (4)

Survey of the development of Brazil, political, social and economic growth. Focus on the demographic and social movements that created modern Brazil. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 433, 434 History of Mexico (4–4)

Origins and development of the modern nation of Mexico, its Indian and Hispanic heritage, Mexican-United States relations and Mexico's impact on the United States.The historical role of the Mexican in the United States and the development of the Mexican-American (Chicano) in the United States as viewed by Mexican and American historians. History 433 covers the period from 1345 to 1910; History 434 covers the period after 1910. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Formal report required. Prerequisite: senior standing. Required minimum of 120 hours.

HST 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the students' major fields. 2 lectures. Prerequisite: senior standing.

HST 470 History and Historians (4)

Great writers of history as well as the varying interpretations of history as a science, an art, a methodology, or philosophy. Critical and analytical treatment of the differing interpretations in an effort to determine their validity and relevance for the present. 4 lecture-discussions. Prerequisite: junior standing or permission of instructor.

HST 472 Special Topics in History (4)

Treats topics, issues, or movements which because of their timeliness or special character are not covered in existing courses. 4 lectures. Prerequisite: junior standing or permission of instructor.

HST 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

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HUMANITIES

The humanities major, which is housed in the Department of English and Modern Languages, is for students whose main interest as undergraduates is the acquisition of a liberal education. Enough elective freedom is provided so that a student can also prepare for a career in law, medicine, business, education, or other fields. Students are expected to choose electives in concert with their advisers, who will help them keep abreast of specific preparation needed for entry into a business training program, graduate school, or professional school.

CORE COURSES FOR MAJOR

(Required of all students)

Indians of North America	ANT	321	(4)
or Peoples & Cultures of Mesoamerica	ANT	322	
or Cultures of South America	ANT	323	
or Peoples and Cultures of Africa	ANT	324	
Western Literary Heritage	ENG	111	(4)
Western Literary Heritage	ENG	112	(4)
or Survey of British Literature	ENG	207	
Introduction to Shakespeare	ENG	203	(4)
Survey of British Literature	ENG	208	(4)
Survey of American Literature	ENG	211	(4)
Advanced Professional Writing	ENG	301	(4)
or Advanced Composition-Fiction	ENG	302	
or Advanced Expository Writing	ENG	303	
The English Poem	ENG	309	(4)
Language and Human Behavior	ENG	313	(3)
Structure of Language	ENG	320	(4)
or one sophomore level foreign language course			
Major American Writers	ENG	406	(3)
Senior Project	ENG	461	(2)
Senior Project	ENG	462	(2)
Undergraduate Seminar	ENG	463	(2)
History of Ancient Philosophy	PHL	211	(4)
or History of Medieval Philosophy	PHL	212	
or History of Modern Philosophy	PHL	213	
World Religions	PHL	304	(4)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Introduction to Cultural Anthropology	ANT	102*	(4)
History of Western Art	ART	212*	(4)
History of Western Art	ART	213*	(4)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Theory of Design	ENV	101	(4)
or Role of Engineering in Society	EGR	201	
History of Civilization	HST	101*	(4)
History of Civilization	HST	102*	(4)
History of Civilization	HST	103*	(4)
Survey of Music Literature	MU	104*	(4)
Physical Education	PE	141*	(3)
Courses to complete general education requirements			**(20)
Electives			†(59)

Note: A minimum of 30 units of unrestricted elective credit must represent work in upper division courses. In addition, the elective courses chosen should be in areas relevant to the student's career goal.

* May be used for general education requirement. Select appropriate courses from general education list.

** Must include four courses from a minimum of two schools other than the School of Arts.

† The total curriculum must include 60 units of upper division courses.

MUSIC

Philip R. Browne, *Chairman*
Charles A. Coulter
John DeFoor
Charles E. Lindsley
James E. Mooney
Kathreen R. Prout
Lowell K. Weeks

The major in music is designed to prepare students for professional careers in music. The program provides the academic foundation and the aesthetic understanding necessary for students planning careers in music instruction at various levels in both public and private educational institutions. It develops the technical skills essential for careers in performance, conducting, composition, and arranging. The program leads to a Bachelor of Arts degree with a major in music.

The program emphasizes practical experience, requiring specified numbers of units of applied music in the student's area of emphasis, and in performance in appropriate ensemble organizations.

The student planning to enter the music major must possess performance skills in either instrumental or vocal areas equivalent to that required for a major performance organization. Also, the student must have piano proficiency equivalent to MU 113 and theory proficiency equivalent to MU 100 or these courses must be passed satisfactorily during the first year in the program.

The music department offers a 30-unit minor for elementary and secondary teaching candidates. Courses are also offered for the general college student in a wide variety of instrumental, vocal and theoretical subjects. Many performance groups are open to the music student and non-music student alike.

CORE COURSES FOR MAJOR

(Required of all students)

Applied Music	MU	170	(6)
Structure of Music	MU	201	(4)
Structure of Music	MU	202	(4)
Structure of Music	MU	203	(4)
String Instrument Fundamentals	MU	231	(1)
Brass Instrument Fundamentals	MU	232	(1)
Woodwind Instrument Fundamentals	MU	233	(1)
Voice Fundamentals	MU	237	(1)
Structure of Music	MU	301	(4)
Structure of Music	MU	302	(4)
Structure of Music	MU	303	(4)
Instrumental Conducting and Literature	MU	307	(4)
or Choral Conducting and Literature	MU	308	(4)
Applied Music	MU	370	(3)
Renaissance and Baroque Music	MU	404	(4)
Classical and Romantic Music	MU	405	(4)
20th Century Music	MU	406	(4)
Senior Project	MU	461	(2)
Senior Project	MU	462	(2)
Undergraduate Seminar	MU	463	(2)
The student will select 11 units from the following, according to his area of interest and proficiency:			(11)
Jazz Band	MU	141/341	
Varsity Band	MU	150	
Marching Band	MU	151/351	
Concert Band	MU	152/352	
Symphony Orchestra	MU	153/353	
Concert Choir	MU	161/361	
Instrumental Ensembles	MU	340	
Vocal Ensembles	MU	360	
Chamber Singers	MU	364	

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
History of Western Art	ART	212*	(4)
Modern Threatre Practice	DR	203*	(4)
History of the Threatre	DR	412*	(4)
Freshman Composition	ENG	104*	(4)

Survey of Music	MU	104*	(4)
Arranging and Scoring	MU	306	(4)
History of Jazz	MU	310*	(3)
Music Literature for Children	MU	401	(4)
Physical Education	PE	141*	(3)
Courses to Complete General Education Requirements			**(26)
Electives			†(60)

* May be used for the general education requirement. Select appropriate courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the Breadth Requirement.

† The total curriculum must include 60 units of upper division courses

Course Descriptions

MU 100 Music Fundamentals (4)

Introduction to music theory for the general college student. Notation, rhythm, melody, scales, keyboard work. No previous experience required. 4 lectures.

MU 104 Survey of Music Literature (4)

Introduction to the great composers in Western civilization and their music. Basic forms, styles and aesthetics of music. Lectures, recordings, films. 4 lectures.

MU 111, 112, 113 Class Piano (1) (1) (1)

Beginning class piano instruction. Development of ability to play simple chords in all keys and to harmonize simple melodies using these chords. Transposition of simple melodies. Technical studies. Prerequisite: MU 100 or equivalent. Two-hours laboratory.

MU 141, 341 Jazz Band (1) (1)

Study of jazz, blues, rock and related styles of music—traditional, contemporary and avant-garde. Leadership and/or solo abilities must be demonstrated for advance credit. 3 hours laboratory. Total credit limited to 12 units. Prerequisite: consent of instructor.

MU 142 Jazz Improvisation (1)

Elements of jazz improvisional styles; traditional, intervening, contemporary and avant-garde techniques of improvisation; chords, key, scales, melodic and rhythmic application, stylistic devices and procedures necessary to the development of spontaneous and creative soloistic invention in the jazz idiom. 2 hours laboratory. Prerequisite: MU 100 and MU 141 or equivalent.

MU 150 Varsity Band (1)

Performance activities designed primarily for rallies, sports events and college activity functions. Previous experience and consent of instructor required. 2 hours activity. Total credit limited to 8 units.

MU 151, 351 Marching Band (1) (1)

Marching and playing for athletic events and parades. Previous experience required. Advanced credit only for those with demonstrated instrumental proficiency and leadership qualities. Three-hours laboratory. Total credit limited to 4 units.

MU 152, 352 Concert Band (1) (1)

Training and experience in wind band repertoire, traditional and contemporary. Previous band experience and consent of instructor required. For advanced credit, student must demonstrate instrumental proficiency and leadership qualities. Three-hours laboratory. Total credit limited to 8 units.

MU 153, 353 Symphony Orchestra (1) (1)

Training and experience in performance of music from all periods. Previous orchestral experience required. Open to all string players; wind players by consent of instructor only. Advanced credit limited to those with demonstrated leadership and solo ability. Three-hours laboratory. Total credit limited to 12 units.

MU 161, 361 Concert Choir (1) (1)

Study, rehearsal and performance of choral literature for mixed voices, from all musical periods. Membership by audition only. Advanced credit limited to students demonstrating vocal proficiency and leadership qualities. 3 hours laboratory. Total credit limited to 12 units.

MU 170, 370 Applied Music (1)

Specialized individual instruction for music majors in their major performing media in the following applied music areas: flute, oboe, clarinet, bassoon, saxophone, French horn, trumpet, trombone, baritone, tuba, percussion, violin, viola, cello, bass, piano, and voice. 10 one-hour lessons per quarter for one unit credit. 1 quarter unit must be repeated by majors for a total of 9 units. Non-majors may take the course for unit credit as instruction is available.

MU 199 Ethnomusicology Performance (2)

Rehearsal and performance of small vocal or instrumental ensembles of music from various world cultures. 4 hours laboratory. Prerequisite: consent of instructor.

MU 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

MU 201 Structure of Music (4)

The properties of tone; rhythm, notation and scales. The study of acoustics and elementary musicianship. Analysis of scores and lectures. 4 lectures. Prerequisite: MU 100 or equivalent and MU 113 or equivalent.

MU 202 Structure of Music (4)

The characteristics of melody: motive and the phrase. Two voice counterpoint. Intermediate musicianship. Analysis of scores and lectures. 4 lectures. Prerequisite: MU 201.

MU 203 Structure of Music (4)

Three voice counterpoint. Basic chord structure and Homophonic textures of four voices. Binary and ternary forms. Advanced musicianship. Analysis of scores and lectures. 4 lectures. Prerequisite: MU 202.

MU 211, 212, 213 Class Piano (1) (1) (1)

Second year of class piano. Continued development of music reading skills, playing by ear and transposing; music for recreational uses in the home, church, and community. Two-hours laboratory. Prerequisite: MU 113.

MU 215 World Music Cultures (4)

Study of music from the major culture areas of the world utilizing the methods and approach of ethnomusicology. An introduction to the music of non-western culture and music of western folk traditions. Lectures and listening laboratory assignments are highlighted by films and live performances. 4 lectures.

MU 231 String Instrument Fundamentals (1)

Fundamentals of playing all string instruments with emphasis on the violin, but including viola, violoncello, bass. No previous experience necessary. For music minors or those interested in learning how to play a string instrument. Two-hours activity. Prerequisite: MU 100 or equivalent.

MU 232 Brass Instrument Fundamentals (1)

Fundamentals of playing all brass instruments with emphasis on the trumpet, trombone, baritone, French horn or tuba. No previous experience necessary. For music minors or those interested in learning how to play a brass instrument. Two-hours activity. Prerequisite: MU 100 or equivalent.

MU 233 Woodwind Instrument Fundamentals (1)

Fundamentals of playing a woodwind instrument. Clarinet, flute, oboe, bassoon, saxophone and related instruments. No previous experience required. For music minors or those who wish to learn how to play a woodwind instrument. Two-hours activity. Prerequisite: MU 100 or equivalent.

MU 237 Voice Fundamentals (1)

Fundamental techniques of singing. Problems of tone production, breathing, diction, repertoire, and song interpretations. 2 hours activity. May be repeated for a total of 3 units. Prerequisite: MU 100 or equivalent.

MU 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

MU 301 Structure of Music (4)

Tonal form in the Baroque. Rondo form, variation form and fugue. Diatonic seventh chords. Analysis of scores, records and lectures. Four hours lecture. Prerequisite: MU 203.

MU 302 Structure of Music (4)

Classical sonata-allegro form. Ninth, eleventh and thirteenth chords. Impressionism. Basic orchestration. Analysis of scores, recordings, lectures. Four hours lecture. Prerequisite: MU 301.

MU 303 Structure of Music (4)

Twentieth Century techniques. Bitonality, polytonality, atonality and serial schemes. Advanced orchestration. Analysis of scores, recordings and lectures. Four hours lecture. Prerequisite: MU 302.

MU 306 Arranging and Scoring (4)

Techniques of arranging for instrumental and vocal groups. Orchestration for instrumental and vocal combinations. 4 lectures. Prerequisites: MU 203, 231, 232, 233, 237.

MU 307 Instrumental Conducting and Literature (4)

Techniques of conducting instrumental ensembles. Analysis and study of instrumental literature of all periods and for all combinations. Lectures, listening, student projects and practical experience. 4 lectures. Prerequisite: MU 203.

MU 308 Choral Conducting and Literature (4)

Techniques of conducting choral ensembles. Analysis and study of choral literature of all periods and for all combinations of voices. Lectures, listening, student projects and practical experience. 4 lectures. Prerequisite: MU 203.

MU 309 Jazz Arranging (3)

Elements of jazz styles; traditional, intervening, contemporary and avant-garde techniques of arranging and composing; chords, key, scales, melodic and rhythmic application, stylistic devices and procedures necessary to the development of creative facility in the jazz idiom. 3 lectures. Prerequisite: MU 141 and MU 303.

MU 310 History of Jazz (3)

A survey of jazz music; the assimilation of music resources and the development and evolution of the jazz idiom in the 20th century. Emphasis is on the creative innovators who rejuvenated the idiom and inspired others in each era. Lectures, recordings, demonstrations and films. 3 lectures.

MU 311 Music and Dance of Mexico (4)

Survey of music and dance of Mexico focusing on folk instruments and music patterns, cultural crossover between Hispanic and Indian musical heritages. 4 lectures. Prerequisites: junior standing or permission of instructor.

MU 312 Music of Black Americans (4)

An ethnomusicological approach to the study of musical forms and techniques used by the Black man in the western hemisphere. An examination of cultural values and their resultant musical manifestations, i.e., Black music in itself and in its cultural setting. A comparative study of Black music in Africa and the Americas provides the format for lectures and listening assignments. 4 lectures.

MU 340 Instrumental Ensembles (1)

Rehearsal and performance of small ensemble groups including woodwinds or brass or strings. Open to qualified players capable of advanced performance. Two-hours activity. May be repeated for a maximum of 8 units.

MU 360 Vocal Ensembles (1)

Study, rehearsal and performance of literature for specialized vocal ensembles from all musical periods. May be organized into men's and women's choruses. Open to all qualified singers. 2 hours activity. May be repeated for a total of 8 units.

MU 364 Chamber Singers (1)

Study, rehearsal and performance of literature for small choral ensembles of mixed voices from all musical periods. For advanced singers with solo ability. Membership by audition only. 3 hours laboratory. Total credit limited to 9 units.

MU 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

MU 401 Music Literature for Children (4)

Music literature especially suited for (but not limited to) children. Recordings are played, studied and evaluated. Songs for children are played and sung by teacher and students. 4 lectures. Prerequisite: MU 100 or equivalent.

MU 403 Composition Seminar (4)

Composing and analysis of all forms in 20th century style. Individual projects in original composition. 4 hours lecture-discussion. Prerequisite: MU 303, 306.

MU 404 Renaissance and Baroque Music (4)

The growth of Western musical cultures from the Middle Ages through 1750. Analysis of scores, research and listening experiences. 4 lectures. Prerequisite: MU 200 or equivalent.

MU 405 Classic and Romantic Music (4)

The growth of Western musical cultures from 1750 to 1900. Analysis of scores, research and listening experiences. 4 lectures. Prerequisite: MU 200 or equivalent.

MU 406 Twentieth Century Music (4)

Form, style and idiom in Western music from 1900 to the present. Impressionism, neo-classicism, atonal, 12-tone music and music of America. Analysis of scores, research and listening experiences. 4 lectures. Prerequisite: MU 405.

MU 412 Ethnomusicology Seminar (4)

A systematic examination of the principles and historical development of ethnomusicology. An in-depth study of objective methods for analyzing and describing music of specified world cultures and American sub-cultures. Students are expected to bring independent and creative research to the forum. 4 lectures. Prerequisite: MU 215.

MU 461, 462, Senior Project (2) (2)

Selection and completion of a project under faculty supervision and culminating in a public recital on the chosen instrument or vocal area. Minimum 120 hours total time. Prerequisite: senior standing and completion of 9 units of MU 170/370.

MU 463 Undergraduate Seminar (2)

An open forum of senior students in which the latest developments in Music education and professional music practices are discussed. 2 lectures.

MU 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

PHILOSOPHY

Cynthia Anderson, *Coordinator*
Charles W. Ackley Richard C. Richards Floyd H. Ross
Margaret Kinzel

The objectives of the degree program are:

(1) To provide the student specific skills in clear and logical thinking as the basis for practical thinking about the problems of contemporary society which will permit any student to exercise his obligations in a democratic society more effectively.

(2) To provide a factual background in the major areas of both western and eastern philosophical and religious traditions, from the remote past to the present, which will permit the student to enter a graduate or professional school and progress rapidly toward a higher degree.

(3) To provide training to meet the necessary demand for teachers both at the junior and senior college levels who can effectively teach philosophy.

(4) To provide the requisite background to facilitate understanding on the part of individuals who will be dealing with people of other cultures in the contemporary world.

Philosophy is a well-recognized field of preparation for those going into other academic disciplines for advanced degrees as well as for those planning a career in law.

CORE COURSES FOR MAJOR

(Required of all students)

History of Ancient Philosophy	PHL	211	(4)
History of Medieval Philosophy	PHL	212	(4)
History of Modern Philosophy	PHL	213	(4)
World Religions: Oriental	PHL	304	(4)
Senior Project	PHL	461	(2)
Senior Project	PHL	462	(2)
Undergraduate Seminar	PHL	463	(2)
Other Philosophy Courses (28 upper division)			(34)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Introduction to Physical Anthro	ANT	101*	(4)
or Principles of Sociology	SOC	201*	
Freshman Composition	ENG	104*	(4)
Physical Education	PE	141*	(3)
Logic and Semantics	PHL	202*	(4)
or Language and Human Behavior	ENG	313*	
The American Political System	PLS	201*	(4)
and United States History	HST	202*	(4)
or American Civilization	AMC	201*	
and American Civilization	AMC	202*	
Courses to complete general education requirements			**(37)
Free Electives			†(70)

* May be used for the general education requirement. Select appropriate courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

† The total curriculum must include 60 units of upper division courses.

Course Descriptions

PHL 100 Survey of Black Thought (4)

A survey of black thought from the earliest times, incuding Ethiopian-Egyptian-Coptic sources, medieval Muslim Africa, and the modern western slave and liberation periods. Representatives of the modern periods such as Frederick Douglas, Sojourner Trugh, Marcus Garvey, Carver, Du Bois, King, Malcolm X, Carmichael, Cleaver, etc. 4 lectures.

PHL 101 Mexican and Contemporary Chicano Philosophy (4)

Survey of philosophical developments in Mexico which influenced contemporary Chicano movements and focus on Indianist and Mestizo ideology and the concepts of reform in Mexico. 4 lecture-discussions.

PHL 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

PHL 201 Introduction to Philosophy (3)

Issues traditional to western philosophy; their relevance to contemporary living. Purposes and meaning of philosophy for intelligent living. 3 lecture-discussions.

PHL 202 Logic and Semantics (4)

Inductive and deductive processes in reasoning and how semantic considerations affect reasoning and communication, with examples drawn from contemporary society. Emphasis on detection and avoidance of logical and semantic errors, both in other individuals and in the student himself. 4 lectures.

PHL 204 Ethics (4)

The implications of ethics and ethical systems. The meaning of right and wrong, good and bad, obligation. Sanctions and sources of morality. Inquiry into the principles of the morality of human actions. The ethical foundations of personal and social relations. 4 lecture-discussions.

PHL 211 History of Ancient Philosophy (4)

Examination of the philosophical ideas of Greek, Roman, and early medieval world, from the Pre-Socratic philosophers to St. Augustine. 4 lectures.

PHL 212 History of Medieval Philosophy (4)

Examination of the philosophical ideas of medieval and renaissance world, from St. Augustine to Descartes. 4 lectures.

PHL 213 History of Modern Philosophy (4)

Great philosophical ideas and men from Descartes to the twentieth century; Continental and British schools. 4 lecture-discussions.

PHL 214 Contemporary Philosophy (4)

Philosophical movements of the twentieth century, including modern idealism, positivism, pragmatism, existentialism, dialectical materialism, phenomenology and ordinary language analysis. 4 lecture-discussions.

PHL 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

PHL 301 Philosophy of the Arts (4)

Investigation of the nature of art, esthetic experience, beauty, and the standards upon which esthetic judgments are based. Concepts common to the various artistic disciplines; problems in specific areas in architecture, the graphic arts, music, and literature. 4 lecture-discussions.

PHL 302 Philosophy of Science (4)

Structures of modern science, the nature of its laws and methods, and the relation of science and the scientific method to values and human and moral progress. 4 lecture-discussions.

PHL 303 Philosophy of Religion (4)

Nature and grounds of religious experience, both Oriental and Occidental; such problems as man's concept of himself, his gods, his anxiety, evil; the relation of religious faith to science and human behavior. 4 lecture-discussions.

PHL 304 World Religions (4)

Living religions of India, China and Japan; man, movements, and ideas and their relevance to modern man, including developments in the twentieth century. 4 lecture-discussions.

PHL 305 World Religions: The Mediterranean World (4)

Living religions of the Mediterranean World: Zoroastrianism, the Hebrew-Jewish religion, Christianity, Islam: men, movements, and ideas, including developments in the 20th Century. 4 lecture-discussions.

PHL 306, 307 American Indian Thought and Religion (4)

Philosophical and religious beliefs and practices of North American Indians with particular concern for their varied and rich contribution to our cultural heritage. Relationship to other religions, the nature and degree of change which their beliefs and practices have sustained under the impact of modern technology, and the enduring values of their thought and faith, especially ecological. 4 lecture-discussions.

PHL 308 Contemporary American Indian Thought (4)

The ideals and beliefs of modern American Indians, with special concern for the relationships between Indians and the dominant culture: cultural identity and accommodation; tradition and modernization; continuity and change. Relationships between the government and tribes; pan-Indian movements; education; religious practices and beliefs; self-determination. 4 lecture-discussions.

PHL 310 Philosophy of Justice (4)

An examination of the meanings of justice, biblical, Greco-Roman, medieval, and modern, with particular attention to the rise of law and its institutions, the role of dissent and the right of revolution in the processes of change, and the justification and limits of violence. 4 lecture-discussions.

PHL 311 The Military and Social Conscience (4)

Nature of the modern military in American society. Its historical roots, the phenomenon of war, the problem of "militarism", the calls for self-examination and redefinition of rolls in the light of the world conscience. Ethical and moral considerations with particular reference to the nuclear age. 4 lecture-discussions.

PHL 320 American Philosophy (4)

The lively and varied growth of American thought, from the Puritans through the Personalists to the Pragmatists: Edwards, Pierce, James, Royce, Bowne, Santayana, Dewey, Whitehead, etc. 4 lecture-discussions.

PHL 359 Epistemology (4)

Nature, kinds, and degrees of certitude, truth, freedom. The validity of consciousness, experience, (both sense and intellectual), reasoning (deductive, inductive, analogical), authority, subjectivity, and objectivity. How knowledge is acquired: nature of opinion; methods of philosophy and science; kinds of evidence. From the viewpoints of skepticism, realism, existentialism, and empiricism. 4 lecture-discussions.

PHL 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

PHL 401 Philosophy and Religion of Japan (4)

Traditional ways of thought in Japan, beginning with Shinto as the indigenous faith, its maturation and modification through the impacts of Buddhism and Confucianism; the revival of Shinto in the 19th century along with the challenge of Western culture; developments after 1868; changes in Shinto since 1945 and the emergence of the "new religions" in the post-war era. 4 lecture-discussions.

PHL 402 Philosophy and Religion of China (4)

Development of religious and philosophical thought in China with special reference to Confucianist, Taoist, Buddhist schools of thought. 4 lecture-discussions.

PHL 403 Philosophy and Religion of India (4)

Some of the diversity of the philosophy and religion of India from early Rig Vedic times down to the twentieth century. Development of the Upanishads, Yoga systems, the great epics (Mahabharata and Ramayana), the bhakti movements. Emergence of Jainism, Buddhism, Sikhism, Indian Islam. 4 lecture-discussions.

PHL 410 Philosophy of Freedom and Order (4)

A survey and evaluation of both traditional and contemporary views of the crucial concepts of freedom and order in the making and preservation of the state, from Plato and the classicists to Marx and the revolutionaries of today. 4 lecture-discussions. Offered in odd-numbered years. Prerequisite: one of the following: PHL 211 or 212 or 213, PLS 431 or 432 or consent of instructor.

PHL 420 Modern Religious Trends (4)

Men and movements of this century, with emphasis upon the contemporary: Barth, Bultman, Heidegger, Bonhoeffer, Niebuhr, Tillich and the Death of God Theologians. Science and the modern mind, ecumenism and the revolution in art, architecture and methodology, as well as doctrine, and the impact of Eastern religions and Marxism. 4 lecture-discussions.

PHL 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their field of employment. Project results are presented in a formal report. Minimum 120 hours total time.

PHL 463 Undergraduate Seminar (2)

An open forum of senior students in which the latest developments, practices, and procedures are discussed. Each student is responsible for the development and presentation of a topic in his chosen field. 2 lectures.

PHL 469 Existentialism (4)

Basic ideas of existentialist philosophers of the 19th and 20th centuries; a comparison of theistic and atheistic existentialism; existentialist ideas of anxiety, freedom, and responsibility. 4 lecture-discussions.

PHL 470 Myth, Symbol and Ritual (4)

Major mythic themes in the life of both Oriental and Occidental cultures and religions. Ritual practices and symbolic transformation as a part of Man's search for meaning and orientation. Traditions and art forms of India, Tibet, China, Japan and Mediterranean regions. Contempo-

rary relevance of mythic and symbolic factors. Offered in odd-numbered years. 4 lecture-discussions.

PHL 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

PHYSICAL EDUCATION

Donald E. Warhurst, *Chairman*
Ron Allice
Roy L. Anderson
V. Barney Anooshian
Dan Ayala
Stanley Bassin
Caldwell Black
Judy Brame
Ken Cochrane
Bruce Coulter
Ray Daugherty
Lynne Emery
Nadine Felix
Barbara Ford
Jack Frost
Diana Gallardo
Otto Gasser
Don Halderman
Robert Hand
Don Hogan
Leon S. Jackson
Jessie Klinger
Gary Knecht
Frank Lansford
Carolyn Lewis
Gary Marks
Robert Nero
Mary Jo Oliver
Daniel Peterson
Arthur Ridgeway
John Scolinos
Robert Stull
Magnus Syverson
Leo Teghtmeyer

The department offers a uniquely balanced program for students majoring in physical education. A strong set of required core courses stressing general professional preparation followed by five optional areas of specialized professional education allow students to select groups of courses that will be most efficient at meeting their individual vocational needs. This approach allows the department to prepare qualified students for secondary teaching experiences in physical education, health, dance, and for specialized fields such as safety and driver education. The department also offers a curriculum leading to a Master of Science degree in Physical Education. Requirements for this program will be found in the Graduate Bulletin.

The department curriculum also provides required and elective courses in physical education and health to meet the general education needs of all students, operates an intramural sports program, and a program of intercollegiate athletics in many sports.

CORE COURSES FOR MAJOR

(Required of all students)

Intro to P.E.	PE	120	(4)
History of P.E.	PE	210	(4)
Basic Sports Theory	PE	212	(3)
or Basic Sports Theory	PE	213	
Basic Sports Theory	PE	214	(3)
Basic Sports Theory	PE	215	(3)
Kinesiology	PE	302	(4)
Physiology of Exercise	PE	303	(4)
Philosphy of P.E.	PE	310	(3)
Motor Learning & Human Performance	PE	322	(4)
Adaptive P.E.	PE	406	(4)
Tests and Measurements	PE	425	(4)
Senior Project	PE	461	(2)
Senior Project	PE	462	(2)
Undergraduate Seminar	PE	463	(2)
Designated PE Area Elec (PE Area List)			(24)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Principles of Anthropology	ANT	101*	(4)
Basic Biology	BIO	115*	(5)
Fundamentals of Chemistry	CHM	103*	(4)
Freshman Composition	ENG	104*	(4)
Nutrition & Physical Act	FN	205	(3)
Dietetics	FN	236*	(3)
or Turf Management	PA	332*	
Health Education	PE	107*	(3)
Physical Education	PE	141*	(3)
Intro to Philosophy	PHL	201*	(3)
Fund. of Physics	PHY	102*	(4)
General Psychology	PSY	201*	(4)
Principles of Sociology	SOC	201*	(4)
Public Speaking	SP	100*	(4)
Human Anatomy	ZOO	234*	(4)
and Human Physiology	ZOO	235*	(4)
or Introduction to Kinesiology	PE	250	
Humanities			(4)
Free Electives			(60)

* May be used for General Education requirement. Select appropriate courses from the General Education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

Course Descriptions

PE 107 Health Education (3)

Personal hygiene and health education; investigation of the principles which promote attitudes and practices for optimum physical and mental health. 3 lectures.

PE 120 Introduction to Physical Education (4)

Introduction and orientation to physical education as a profession. 3 lectures, 1 two-hour activity.

PE 121 First Aid (3)

A Standard, Advanced, and Instructors' American Red Cross First Aid course. Instruction and practice in the immediate and temporary care of injuries and sudden illness. 2 lectures, 1 two-hour laboratory.

PE 124 Introduction to Dance (3)

A course designed to create an understanding of all dance activities through rhythmic participation, field trips, and audio-visual experiences. 1 lecture, 2 two-hour activities.

PE 127 Regional Dances of Mexico (3)

An introduction to the cultural aspects and skills on the regional dances of Mexico, including rhythms analysis with emphasis on the application of motor learning. 2 lectures, 1 two-hour activity.

PE 140 Physical Education (1)

Activities involving areas of physical fitness, aquatics, dance, individual and team sports and recreational approaches to sport with an emphasis on the development of understanding the interaction of physical and social aspects of activity within our culture. 4 hour activity.

PE 141 Physical Education (½)

Activities involving areas of physical fitness, aquatics, dance, individual and team sports and recreational approaches to sport with an emphasis on the development of understanding the interaction of physical and social aspects of activity within our culture. 2 activity periods.

PE 142 Adaptive Activities (½)

Group and individual exercise based upon individual needs in posture, body mechanics, nutrition, post-injury and illness, and cardiac cases. Course taken in lieu of PE 141 upon recommendation of college physician. 2 one-hour activity periods. Total credit limited to 3 units.

PE 151 Competitive Athletics (1)

May be substituted for required physical training by those qualified to compete in intercollegiate sports program. 10 hours activity. Total credit limited to 6 units.

PE 154 Dance Production Techniques (1)

Intermediate and advanced dance technique with an emphasis on composition and production in the area of dance, free exercise, gymnastics, etc. May be substituted for PE 141 by students talented in exhibition activities. 10 hours activity. Total credit limited to 6 units.

PE 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

PE 210 History of Physical Education (4)

Development of physical education from earliest times to the present. Concentration on political, religious and social bases of societies and the effect of these beliefs on the physical activity of each culture. Emphasis on the United States. 4 lectures.

PE 212 Basic Sports Theory Basketball and Field Hockey (3) (W)

Techniques and skills of basketball and field hockey with application to professional needs. 3 two-hour activities. Prerequisite: PE 141 Basketball or Field Hockey with grade of A or B or consent of instructor.

PE 213 Basic Sports Theory Weight Training, Soccer (3) (M)

An examination of techniques and skills of weight training, soccer, and wrestling with application to professional needs. 6 one-hour activity periods. Prerequisite: PE 141 Weight Training, Soccer, with grade A or B or consent of instructor.

PE 214 Basic Sports Theory: Tumbling, Apparatus and Volleyball (3)

Techniques and skills of tumbling, apparatus and volleyball with application of professional needs. 6 one-hour activity periods. Prerequisite: PE 141 Tumbling, Apparatus and Volleyball, with grade A or B or consent of instructor.

PE 215 Basic Sports Theory: Badminton, Golf and Tennis (3) (M)

Techniques of badminton, golf and tennis with application of professional needs. 6 one-hour activity periods. Prerequisite: PE 141, Badminton, Golf and Tennis, with grade A or B or consent of instructor.

PE 221 Wrestling Theory (3)

Analysis of strategy and skill of wrestling with application of principles. 2 lectures, 1 two-hour activity.

PE 231 Skin and SCUBA Diving (3)

Use of SCUBA apparatus and its application in the underwater environment. Completion of this course leads to certification in SCUBA diving. 2 lectures, 1 two-hour activity. Prerequisite: Consent of instructor.

PE 235 Analysis of Water Polo (3) (M)

Analysis and strategy and skill of water polo with application of principles. 2 lectures, 1 two-hour activity.

PE 245 Advanced Swimming and Lifesaving (3)

Theory and analysis of lifesaving techniques and basic swimming skills. Includes American Red Cross Water Safety Instructor qualifications. 1 lecture, 2 two-hour activities. Prerequisite: PE 141 Swimming or demonstration of basic proficiency.

PE 250 Introduction to Kinesiology (4)

Structure of the human body and its relationship to functioning during physical activity. Skeletal, muscular, circulatory, respiratory, digestive, excretory and nervous systems. Animal dissection, comparison with the human body, use of skeletons, charts, and models. 3 lectures, 1 two-hour activity. Prerequisite: BIO 115, 145.

PE 260 Dance Composition (4)

Analysis of preclassic sectional variation, developmental, free, and fugal dance forms, and of rhythmical fundamentals including development of simple dance patterns. 2 lectures, 2 two-hour activities.

PE 275 Gymnastics Theory (3)

Analysis of strategy and skill of gymnastics with application of principles. 2 lectures, 1 two-hour activity. Prerequisite: PE 141 (Gymnastics)

PE 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

PE 300 Safety Education (3)

Principles and practices of safety as applied to home, fire, industrial, school, community, and traffic situations; accident prevention. 3 lectures.

PE 301 Special Services in Recreation (3)

Hospital recreation, employees' recreation, commercial recreation, and industrial recreation. 3 lectures.

PE 302 Kinesiology (4)

Interrelationships of the body segments and the action of the joints and muscles involved in human movement; application of the principles of movements for the analysis and evaluation of selected physical education activities. 3 lectures, 1 two-hour activity. Prerequisite: ZOO 235 and consent of instructor.

PE 303 Physiology of Exercise (4)

Effects of physical activity upon the circulatory, respiratory, and other physiological systems. Relationship of strength, coordination, flexibility, endurance, fatigue, conditioning, and related factors to human movement and athletic performance. 3 lectures, 1 two-hour activity. Prerequisite: PE 302, 200, 235 or PE 250.

PE 310 Philosophy of Physical Education (3)

The nature, significance and development of sport and physical education and its place in human society as related to the major philosophical systems. 3 lectures.

PE 312 Physical and Psychological Development (4)

Theories of development with focus on changing motor abilities and behavior from childhood through adolescence to adulthood. 4 lectures. Prerequisite: SOC 201, PSY 201.

PE 313 Health Science (4)

Advanced scientific background in the essential elements of the physiological functioning of the normal, healthy human body. 3 lectures, 1 two-hour activity. Prerequisite: PE 107.

PE 320 Driver Education (3)

Recommended instructional techniques for classroom teaching of driver education. 3 lectures.

PE 321 Football Theory (3) (M)

Analysis of strategy and skill in football with application of principles. 2 lectures, 1 two-hour activity.

PE 322 Motor Learning and Human Performance (4)

Scientific analysis of the perceptual and sensory systems involved in physical activity. The role of kinesthesis, reaction time, and strength in neuro-motor coordination, motor learning and transfer factors affecting motor performance. 3 lectures, 1 two-hour laboratory. Prerequisite: PE 302, PSY 201.

PE 323 Baseball Theory (3) (M)

Analysis of strategy and skill in baseball with application of principles. 2 lectures, 1 two-hour activity.

PE 324 Archery and Softball Theory (3)

Analysis and strategy of archery and softball with application of principles. Prerequisites: PE 141 Archery and Softball, with an A or B Grade; or consent of instructor. 1 lecture, 2 two-hour laboratories.

PE 326 Soccer, Speedball, Speed-A-Way Theory (3)

Analysis and strategy of soccer, speedball and speed-a-way with the application of principles. Prerequisite: PE 141, Soccer and Speedball; or consent of instructor. 1 lecture, 2 two-hour laboratories.

PE 328 Developmental Movement for Children (4)

Analysis and practice of basic skill movements used in rhythms, sports, and gymnastics. 3 lectures, 1 two-hour activity.

PE 333 Track and Field Theory (3)

Analysis of strategy and skill in track and field with application of principles. 2 lectures, 1 two-hour activity.

PE 337 Officiating (4)

Analysis of principles and techniques of officiating sports offered in the normal school program. 2 lectures, 2 two-hour laboratories.

PE 341, 342, 343 Direction of Physical Education Activity (1) (1) (1)

Required of all majors in physical education. Experience in the supervision of physical education classes under the direction of the faculty. 2 one-hour periods.

PE 347 Social, Folk and Square Dance Theory (3)

Theory and analysis of social, folk, and square dance. Its philosophy and place in our educational system. 2 lectures, 1 two-hour activity. Prerequisite: PE 124, 141, Folk, Social Dance.

PE 348 Modern/Ballet Dance Theory (3)

Theory and analysis of modern dance and ballet. Their philosophy and place in our educational system. 2 lectures, 1 two-hour activity. Prerequisite: PE 124.

PE 350 Intramural Sports (3)

Principles, policies and procedures underlying the program of intramural sports in institutions of elementary, secondary, and higher education. 2 lectures, 1 two-hour activity.

PE 360 Water Sports Theory (3)

Theory and analysis of swimming pool activities including competitive swimming, strokes, turns, starts and relays; beginning and intermediate diving, water polo skills and strategy; orientation to pool equipment and maintenance; introduction to aquatic games and pool safety. 1 lecture, 2 two-hour activities. Prerequisite: PE 141 Swimming or consent of instructor.

PE 379 Advanced Scuba Techniques (3)

Advanced knowledge and skill in SCUBA diving. Prerequisite: PE 231 or the equivalent; consent of the instructor. Two lectures, 1 two-hour laboratory.

PE 384 Readings in the History of Physical Education (4)

An in-depth analysis and discussion of the classic literature within Physical Education; from Homer's *Iliad* through Galen's: "Exercise with a Small Ball" to contemporary writings in physical education and sport. 2 two-hour seminars.

PE 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

PE 406 Adaptive Physical Education (4)

Growth and development patterns; their relationship to special and regular physical education programs; needs and methods for administering a recreation program for the handicapped. Analysis of postural divergencies and procedures for prevention and correction. 4 lectures. Prerequisite: PE 303.

PE 408 Physical Education for the Mentally Retarded (4)

Sport and recreation as a tool to aid the mentally retarded child towards normalcy. Theoretical discussion of current programs and problems. 4 lectures. Prerequisite: PE 406, PSY 201, PE 302.

PE 411 Administration of Driver Instruction (3)

Principles and practices of administering secondary school driver instruction programs. Includes legal aspects of driver education and driver training. 3 lectures. Prerequisite: PE 320.

PE 412 Administration of Co-Curricular Activities (4)

Organization and administration of extracurricular groups, particularly as applied to drill team, G.A.A., and pep groups. Lecture, analysis and evaluation of school and community programs. 2 lectures, 2 two-hour activities.

PE 420 Administration of Physical Education (4)

Underlying philosophy and principles of administrative theory and practice. Legal aspects on national, state and local levels. Policies and procedures for the administration of sound programs of physical education as related to the total educational program in schools, colleges and universities. 4 lectures.

PE 422 Basketball Theory (3) (M)

Strategy and skill in basketball with application of principles. 2 lectures, 1 two-hour activity, and participation.

PE 425 Tests and Measurements in Physical Education (4)

Physical tests of skill, strength, speed, agility and endurance as a basis for grading, evaluating the program, and as a measure of progress in activities. Basic theory of testing procedures. 3 lectures, 1 two-hour activity. Prerequisite: upper division standing.

PE 426 Laboratory Techniques In Physical Education (3)

Demonstration of and student participation in laboratory techniques for assessing human performance. 2 lectures, 1 two-hour laboratory.

PE 427 Advanced Analysis and Theory of Sports (4)

Advanced analysis of strategy and skills in basketball, football, baseball, or track and field. 3 lectures, 1 two-hour activity. Prerequisite: Satisfactory completion of the appropriate basic analysis course; one year of intercollegiate experience, or permission of instructor.

PE 428 Coaching Psychology in Athletics (4)

Analysis and evaluation of literature concerned with the training and motivation of secondary and collegiate-level athletic performers. Prerequisite: senior standing or previous secondary or collegiate coaching experience. 4 lecture-discussions.

PE 432 Athletic Training (4)

Prevention, examination, and care of athletic injuries, methods of taping, bandaging, and therapeutic exercises applied to athletic injuries, diets, training room equipment, protective devices, and supplies. 3 lectures, 1 two-hour activity. Prerequisite: PE 406 and Senior standing or permission of instructor.

PE 446 Dance History (4)

The place of dance in various cultures throughout the world, from paleolithic times through pre-classic forms to the non-literal dance of today. 1 four-hour lecture discussion.

PE 449 Dance in Art and Education (4)

Human movement experiences through dance and its place in education and society; concepts of art exemplified in dance; elements of art criticism applied to dance production; the place of dance in education. 3 lectures, 1 two-hour activity.

PE 450 Role of Sport in Contemporary Society (4)

Contemporary sports and athletics as they affect man's socio-cultural development and value system; interrelationship with other aspects of American culture. 3 lectures, two-hour activity. Prerequisite: SOC 201, PSY 202.

PE 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results presented in a formal report. Minimum of 120 hours total time.

PE 463 Undergraduate Seminar (2)

Presentation, analysis and evaluation of all senior projects, with emphasis on the values of these projects as they relate to current trends, problems, and practices in physical education. 2 lectures.

PE 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

POLITICAL SCIENCE

John H. Esterline, *Chairman*

Mohammed A. Al-Saadi
George P. Hart
Shah Wali Khan
John Korey
Catherine H. Lovell
Ronald M. Peterson
José Vadi
Charlotte M. Weber
Bruce E. Wilson

The department serves all segments of the university community. It provides courses which aim to develop mature and informed citizens; it provides training for those who wish to pursue a career in public service; it provides a foundation for those who plan to continue into graduate study.

The political science major and all courses offered by the department are designed to integrate the latest behavioral science knowledge about government and politics with a broad understanding of public policy and the role of government in society in both the domestic and international areas. The major prepares students for careers in which knowledge of politics and public affairs is required. Such careers include teaching, administrative and management positions in all areas of government, political staff positions, and public affairs staff positions in business and industry.

The importance of government in our society and economy grows with urbanization and industrialization. The unique location of the university in a rapidly growing population offers opportunities for close observation of, and experience with problems of government and politics. The curriculum combines theoretical and methodological procedures with practical concern for vocational preparation and participation in the political system.

CORE COURSES FOR MAJOR

(Required of all students)

Political Systems	PLS	202	(4)
Pol Sci Methodologies	PLS	290	(4)
Senior Project	PLS	461	(2)
Senior Project	PLS	462	(2)
Undergraduate Seminar	PLS	463	(2)
Political Science Courses			(40)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Freshman Composition	ENG	104*	(4)
United States History	HST	201*	(4)
United States History	HST	202*	(4)
Physical Education	PE	141*	(3)
American Political Systems	PLS	201*	(4)
Courses to complete General Education Requirements			**(53)
Free Electives			(72)

* May be used for general education requirements. Select appropriate courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

Course Descriptions

PLS 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

PLS 201 The American Political System (4)

An analysis of the role and function of government in American society. Nature and operation of the political process. American national government and California government. Meets state requirement for U.S. Constitution and California government. 4 lecture-discussions.

PLS 202 Political Systems (4)

An analysis of the forms of government available to man and of man's relationship to his government. Role of government and the political process in society. 4 lecture-discussions.

PLS 207 Race Relations and the Law (4)

An analytical study of important U.S. Supreme Court cases concerning race relations. Political, social, and economic implications of judicially determined policy. 4 lecture-discussions.

PLS 290 Research Methods in Political Science (4)

Introduction to the principal methods and concepts used to analyze governmental institutions and political behavior. To be taken no later than 1st quarter of junior year. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202 and permission of instructor.

PLS 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

PLS 314 Public Administration (4)

Structures and functions, principles and processes of American governmental administration. Attention to importance and growth of government administration and to the principles and processes of establishing, directing, and evaluating governmental programs. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 315 Public Policy Administration (4)

Substantive policies of government in relation to economic, social, and political programs; the examination of public policy in relation to democratic institutions and the general problems of making public policy responsive to democratic control. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 316 Bureaucracy and Administration Behavior (4)

Characteristics of bureaucracies with special attention to the functioning of bureaucracy as a social and political institution. Concepts of administrative behavior in bureaucracies such as decision-making, leadership, and control. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 322, 323 The Mexican in the American Political System (4) (4)

Concept of the man versus the group, system analysis of Hispanio and English administrative development, conflict of values between the Anglo and the Chicano; role of the Mexican-American in local, state and federal government; case studies of Barrio typologies, political movements within the Mexican-American communities: political leadership—Cesar Chavez and Reyes Tejarina. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 324 Political Parties (4)

Nature and function of American political parties: party organization, political campaigns and elections. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 325 Interest Group Politics (4)

The nature and function of organized interest groups and their impact on government activity and programs. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 341 Comparative Politics: Developed Systems (4)

Typical governments of industrial countries. Emphasis on governmental structures and functions, political processes and their relationship to current problems. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202. May be repeated once for credit.

PLS 342 Comparative Politics: Developing Systems (4)

Selected non-industrialized countries committed to policies of industrialization. Governmental structures and functions, political processes and their relationship to current problems. Importance of underdevelopment to mode of government. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202. May be repeated once for credit.

PLS 345 Politics of the Pacific Basin (4)

Comparative analysis of political forms and processes in selected Pacific Basin nation states with emphasis on their inter-relationships and national efforts to meet challenges of modernization, communication and security. 4 lecture-discussions.

PLS 347 Soviet Politics (4)

Various aspects of the Soviet political system. Nature of the system as a model for political development. Alternative to the "Western model" in the minds of the masses and elites in newly-emerging nations. 4 lecture-discussions.

PLS 381 American State Governments and Politics (4)

Comparison of the forms, structures, and functions of American state governments and politics. The importance of state governments in our system of government. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 382 Local and Metropolitan Politics (4)

Forms, structures, and functions of local and metropolitan government and politics. The modern urban problems and the role of local, state and national governments in meeting these problems. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 383 Minority Community Political Dynamics (4)

Focus on community level (local) problems from the perspective of finding solutions to problems instead of merely describing them. Questions to be analyzed are (1) What forces inhibit or advance the organization of people at a local level to meet their needs? (2) How are strong and effective local organizations built? 4 lecture-discussions.

PLS 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

PLS 401 Constitutional Law (4)

Analytical consideration of development of U. S. Constitutional law on the structure, powers, and relationships of American government. Includes Supreme Court interpretation of taxing, commerce, and war powers; federalism; separation of powers; checks and balances; inter-governmental relations. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 402 Constitutional Law (4)

Analytical consideration of development of U.S. Constitutional law on civil liberties, civil rights, and citizenship relationship of constitution to personal liberty; procedural rights; freedom of religion, speech, press, assembly; due process; equal protection. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 414 Government Budget Administration (4)

Development of the concept of government budgeting. The role of the budget in determination of policy and in administrative control of governmental operations. Public revenues, expenditures, debt, and fund accounting. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202 and PLS 314.

PLS 415 Government Personnel Administration (4)

History of American public personnel and civil service administration, including the role of the civil servant in society. Objectives, principles, and processes of administering the personnel function of government; recruiting, training, promotion, and control of government personnel. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202 and PLS 314.

PLS 416 Comparative Public Administration (4)

Comparative study of the administrative process in different institutional settings and in a variety of political cultures. Prerequisites: PLS 202 and PLS 314.

PLS 421 Legislative Process (4)

Legislatures as political subsystems: behavior, processes, functions of legislators and legislative bodies. Special emphasis on U.S. Congress and its multifaceted, evolving relationships within the American political system. 4 lecture-discussions.

PLS 422 Executive Process (4)

Executives as political subsystems: the role and function of the executive in the development and implementation of public policies. The Presidency as institution and process in the American political system. 4 lecture-discussions.

PLS 423 Judicial Process (4)

Courts as political subsystems: jurisprudential considerations in a political context; judicial roles, actors, and behaviors. Comparative judicial systems. 4 lecture-discussions.

PLS 431 Ancient and Medieval Political Thought (4)

Major contributions of Plato and Aristotle to western political theory, compared to alternate theories from the pre-Socratics, Demosthenes, the sophists Isocrates, and Xenophon. General survey of some thinkers among the Stoa, especially Cicero, the Patristics, and early, classical, and late medieval times. Analysis of Machiavelli as the end of the classical tradition. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 432 Modern Political Thought (4)

Analysis of the break with the classical tradition as the mark of the modern period, from the time of Hobbes to the nineteenth century. Examination of modern conceptions of obligation, natural, law and right, and historicist theories, including the revolt against reason. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 433 American Political Thought (4)

Major political ideas and thinkers which have influenced and which reflect American political and social life, both in its origins and development. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 439 Empirical Theory (4)

A systematic introduction to the philosophy of science and the methodology of contemporary political science. Emphasis on theory construction, conceptualization; the use of inference and induction; the process of generalization, confirmation, recent empirical theory in political science, such as game theory, systems analysis, computer simulation, decision making theory. 4 lectures. Prerequisite: PLS 290.

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PLS 452 International Relations (4)

Contemporary international affairs, including analysis of politics among nations. Bases of national foreign policies, sovereignty, nationalism, and diplomacy. Technology, public opinion, and war in international relations. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 453 International Organizations (4)

Description and analysis of administration, functioning, and organization of various transnational organizations, including nongovernmental. Discussion of U.S. participation. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202.

PLS 454 Inter-American Relations (4)

An introduction to the problems and policies of the nations of Latin America with particular reference to their relations with the super-powers and their participation in international organizations. 4 lecture-discussions. Prerequisite: PLS 452 or PLS 455 or consent of instructor.

PLS 455 Foreign Relations of the United States (4)

The making of American foreign policy, stressing formulation and implementation of decisions and forces influencing the decision-making process. Contemporary problems. 4 lecture-discussions. Prerequisite: PLS 201, or AMC 202.

PLS 461, 462 Senior Project (2) (2)

Selection and completion of a thesis under faculty supervision. Theses must be of substantial academic quality on a significant problem in the student's major area of interest within Political Science. Formal report is required. Prerequisite: Senior standing. Required minimum of 120 hours.

PLS 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the student's major field. Course may be repeated for credit. Prerequisite: Senior standing or permission of instructor.

PLS 471, 472 Field Work in Government and Politics (4) (4)

Placement in government agencies or political organizations for practical applications of academic training. Written report and evaluation required. 1 lecture, 12 hours per week in agency assignment. Prerequisite: Permission of instructor.

PLS 480 Issues in California Government and Politics (4)

Analysis of the political system in California with reference to its institutions, leaders, and electoral process. Seeks to develop an understanding to the State's political development and voting behavior in the twentieth century. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 201.

PLS 490 Political Inquiry (4)

Concepts, approaches, and methods of research applicable to political phenomena. Designed to familiarize the student with the tools and potentialities of social research techniques and to assist him in the presentation, interpretation, and application of research studies. 4 lecture-discussions. Prerequisite: PLS 201 or AMC 202, PLS 290 and permission of instructor.

PLS 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

RECREATION ADMINISTRATION

Don Warhurst, *Chairman*
Barbara Ford
Jack Frost
Frank Lansford
Robert Stull

The professional preparation curriculum in recreation administration is offered with the cognizance of the social and economic factors involved in the ever-increasing amount of leisure time and the concomitant need for recreational personnel, facilities and programs. Increased leisure time for all segments of the population presents each community with the challenge and responsibility to provide wholesome leisure time activities. This can only be accomplished by professionally preparing larger numbers of competent recreation specialists.

This professional preparation program requires extensive field experiences for its majors. This requires a degree of interaction between the college and the community that should be beneficial to both.

Students graduating from this program will find one of their major professional tasks to be guiding, directing and counseling a previously work-oriented society to effectively utilize leisure-oriented lives. The extent to which recreation specialists of the future can do this will greatly influence social frustrations, boredom, and changing family patterns.

CORE COURSES FOR MAJOR

(Required of all students)

Safety and First Aid	PE	121	(3)
Advanced Swimming and Lifesaving	PE	245	(3)
Officiating	PE	337	(4)
Intramurals	PE	350	(3)
Care/Magmt of Athletic Equipment	PE	418	(3)
Intro to Recreation	REC	126	(3)
Social Recration	REC	220	(4)
Recreational Games	REC	222	(3)
Special Services in Rec	REC	224	(4)
Admin of Recreation	REC	301	(4)
Organ & Admin of Camping	REC	315	(4)
Dance in Recreation	REC	335	(4)
Special Problems in Rec	REC	400	(4)
Recreation & Leisure Age	REC	420	(4)
Recreation Field Work/Seminar	REC	423	(6)
Recreation Field Work/Seminar	REC	424	(6)
Senior Project	REC	461	(2)
Senior Project	REC	462	(2)
Undergraduate Seminar	REC	463	(2)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Craft Materials & Skills	ART	135	(3)
Basic Equitation	AS	124	(2)
Biology	BIO	115*	(5)
Natural History of Plants	BIO	228	(4)
Natural History of Animals	BIO	229*	(4)
Public Opinion/Propaganda/ Mass Media	COM	413	(4)
Freshman Composition	ENG	104*	(4)
Earth Science	ESC	101*	(4)
Orientation and History of Parks	PA	214	(3)
Park Facility Management	PA	425	(4)
Health Education	PE	107	(3)
Physical Education	PE	141*	(3)
Survey of Black Thought	PHL	100	(4)
General Psychology	PSY	201*	(4)
Contemporary Social Problems	SOC	301	(4)
Sociology of the Barrio	SOC	308	(4)
Elementary Spanish	SPN	101*	(4)
Courses to complete General Education Requirement			**(24)
Free Electives			(35)

* May be used for the general education requirement. Select appropriate courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

Course Descriptions

REC 126 Introduction to Recreation (3)

Games and activities suitable for a community recreation program. 1 lecture, 2 two-hour activities.

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REC 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

REC 220 Social Recreation (4)

Planning and presenting various social phases of recreation for different age groups. Provides experience in leadership techniques in social activities and settings. 2 hours lecture, 2 two-hour activities.

REC 222 Recreational Games (3)

Development of a repertoire of group and individual quiet games for use by people confined to small areas. 1 lecture, 2 two-hour activities. Prerequisite: for majors only, REC 126.

REC 224 Special Services in Recreation (3)

Hospital recreation, employees' recreation, commercial recreation, and industrial recreation. 3 lectures.

REC 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

REC 301 Administration of Recreation (3)

Supervision and administration of recreation with consideration of facilities, budget, equipment maintenance, public relations, and special activities. 2 lectures, 1 two-hour activity. Prerequisite: PE 126. REC 222, REC 224.

REC 315 Organization and Administration of Camping (4)

Objectives and problems dealing with the organization and administration of resident camps, school camps, day camping and day camps. Students will be exposed to actual camp situations whenever possible. 2 lectures, two 2-hour activities. Prerequisite: junior standing.

REC 316 Outdoor Education (4)

Techniques in the development of leadership for recreational activities particularly as applied to outdoor camping. Social development and integration of individuals into group programs. 2 lectures, 2 two-hour activities. Prerequisite: Upper division standing.

REC 335 Dance in Recreation (4)

Emphasis on rhythmics as applied to all community age levels. Includes pre-school rhythms, creative and modern dance, social, folk, and square dance. 2 lectures, two 2-hour activities.

REC 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

REC 420 Recreation and the Leisure Age (4)

A critical examination of leisure and its role in and influence upon the American culture. An analysis of the changing attitudes toward leisure as well as the changes in the forms of leisure behavior. 2 lectures, two 2-hour activities. Prerequisite: REC 126.

REC 423 Recreation Field Work/Seminar (6)

Observation and participation in a community or industrial recreation program, 1 lecture, 3 two-hour activities. 1 lecture, 12 hours field work. Prerequisite: senior standing and departmental approval.

REC 424 Recreation Field Work/Seminar (6)

Supervised leadership experience in public or private agencies selected after consultation with student concerned. 1 lecture, 12 hours field work. Prerequisite: senior standing and departmental approval.

REC 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results presented in a formal report. Minimum of 120 hours total time.

REC 463 Undergraduate Seminar (2)

Discussion of new developments in recreation, health, and physical education. 2 lectures.

REC 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

SOCIAL SCIENCES

Floyd H. Ross, *Acting Chairman*
Cynthia Anderson
Thomas C. Blackburn
Cecil Brown
Walter Coombs
Joan M. Greenway
Richard Hyslop
Richard L. Johnson
Margaret Kinzel
David G. Lord
Forrest L. McElhoe
Crane S. Miller
John Moore
Richard C. Richards
Emilo Stanley
Otis P. Starkey

The department offers a flexible program with opportunities for each student to concentrate in one or more areas of the traditional social science disciplines (anthropology, economics, geography, history, political science, psychology, sociology, social science) plus the discipline of philosophy. Students who choose the option in economics receive their guidance from the faculty in economics.

The department presently includes the disciplines of anthropology, geography and philosophy. The departmental programs, generally multidisciplinary in nature, are especially suitable for students with a broad interest in human problems who believe that a liberal education is the best background for many types of careers.

The courses in American civilization are designed to help majors from all schools of the university understand the ideas and practices which have molded the American character, shaped the American government, including California state and local government, and influenced the role of the United States in world affairs.

CORE COURSES FOR MAJOR

(Required of all students)

Introduction to Physical Anthropology	ANT	101	(4)
Culture and Personality	ANT	355	(4)
or Social Anthropology	ANT	358	
Cultural Geography	GEO	102	(4)
Economic Geography	GEO	312	(4)
or Geography of Anglo-America	GEO	350	
History of Civilization	HST	101	(4)
History of Civilization	HST	102	(4)
Ethics	PHL	204	(4)
World Religions	PHL	304	(4)
or World Religions	PHL	305	
Introduction to Social Science or Social Science Methodology	SSC	101	(4)
	SSC	333	
Senior Project	SSC	461	(2)
Senior Project	SSC	462	(2)
Undergraduate Seminar	SSC	463	(2)

OPTION COURSES FOR MAJOR

(Required in specific option)

Social Sciences

Each student will complete at least 5 upper division courses in 2 or more of the social sciences (anthropology, economics, geography, history, political science, psychology, sociology, social science), and any one upper division course in philosophy. (24)

Economics

Principles of Accounting	ACC	124	(4)
Devel of Econ Doctrine	EC	300	(4)
Money and Banking	EC	308	(4)
Price & Income Analysis	EC	311	(4)
Price & Income Analysis	EC	312	(4)
Comparative Economic Systems	EC	403	(4)
Descriptive Statistics	MAT	107	(4)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Introduction to Cultural Anthropology	ANT	102*	(4)
Principles of Economics	EC	201*	(4)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Physical Geography	GEO	101*	(4)
History of Civilization	HST	103*	(4)
United States History	HST	202*	(4)
and American Political System	PLS	201*	(4)
or American Civilization	AMC	201*	
and American Civilization	AMC	202*	
Physical Education	PE	141*	(3)
Introduction to Philosophy	PHL	201*	(4)
or Logic and Semantics	PHL	202*	
General Psychology	PSY	201*	(4)
Principles of Sociology	SOC	201*	(4)
Courses to complete general education requirements			**(23)
Free Electives			(62)

* May be used for the general education requirement. Select appropriate courses from general education list.

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

American Civilization

AMC 201, 202 American Civilization (4) (4)

An analysis of American civilization with emphasis on the social, political, and economic ideas and practices which have molded the unique American character; American government, including California state and local government, American ideals and values, and the role of the United States in world affairs. 4 lectures.

Anthropology

ANT 101 Introduction to Physical Anthropology (4)

Man as a bio-cultural species; evolution of human behavior as an adaptive biological process; human nature as species-specific behavior; human variability viewed from both a diachronic and synchronic perspective. 4 lecture-discussions.

ANT 102 Introduction to Cultural Anthropology (4)

The nature of culture and cultural phenomena; comparative social organization; religion and value systems of non-literate and folk peoples; cultural and psychological processes in the development of personality. 4 lecture-discussions.

ANT 320 Indians of California (4)

Major ethnic groups of aboriginal California, with emphasis upon their social and linguistic diversity. Designed to provide a broad appreciation of the technological, social, and ideological life of the native peoples of California through the detailed study of representative societies. 4 lecture-discussions. Prerequisite: ANT 102 or permission of instructor.

ANT 321 Indians of North America (4)

Survey of aboriginal peoples of North America. Habitat, economy and society of pre-Columbian Americans; analysis of various band, tribal, chiefdom and confederation units in terms of their component cultural subsystems. Post-contact developments; Amerindian problems and adaptations in the face of European settlement; the status and role of North American Indians in the present and future. 4 lecture-discussions.

ANT 322 Peoples and Cultures of Mesoamerica (4)

Analysis of peoples, societies and cultures in area between the southern United States border and Colombia. Nature and consequences of colonial contact on aboriginal sociocultural systems; contemporary economics, social, political and ideological systems; ethnic and regional similarities and differences. 4 lecture-discussions.

ANT 323 Peoples and Cultures of South America (4)

Survey of socio-cultural systems of South America. Nature and aftermath of colonial contact with indigenous peoples; contemporary economic, social, political, and ideological subsystems; ethnic and regional similarities and differences. 4 lectures.

ANT 324 Peoples and Cultures of Africa (4)

Ethnology of bands, tribes, chiefdoms, and aboriginal states of Africa. Comparison and contrast of varying adaptations to similar and dissimilar environmental situations; nature and consequences of colonial contact; assimilation and/or acculturation. 4 lecture-discussions.

ANT 334 Peoples and Cultures of the Pacific (4)

Survey and familiarization course dealing with peoples and cultures of Australia, New Guinea, Polynesia and Micronesia. Includes appraisal of changing customs in isolated areas as industrialization impacts on traditional patterns of technology, social organization and ideological systems. 4 lectures. Prerequisites: ANT 102 or ANT 358 or instructor's permission. Offered in odd-numbered years.

ANT 350 Environment, Technology and Culture (4)

Interrelationship of subsistence patterns and economic arrangements as they affect levels of socio-cultural development and are themselves constrained by the natural and social environment in which they occur. Tools and techniques whereby a given society exploits its surroundings. 4 lectures.

ANT 353 Economic Anthropology (4)

Economic institutions in a variety of social contexts. Operation of systems of production and distribution within non-Western societies; market and non-market economic systems; types of economic change; non-Western economies in the modern world. 4 lecture-discussions.

Prerequisite: ANT 102. Offered in odd-numbered years.

ANT 354 Political Anthropology (4)

Organization of legal and governmental activities in traditional societies of varying degrees of complexity. Law and the maintenance of order; resolution of conflict; decision making; political bodies and their ideologies. Political institutions in relationship to other social institutions. 4 lecture-discussions. Prerequisite: ANT 102 or permission of instructor.

ANT 355 Culture and Personality (4)

Sociocultural examination of individual behavior and development; cross-cultural perspective related to "national character," "normalcy," and "abnormalcy," child rearing and other personality factors. Prerequisite: ANT 102 or permission of the instructor. 4 lectures.

ANT 358 Social Anthropology (4)

A comparative, functional approach to social organization and social structure in various societies; culture, society, and personality; family, kinship, and marriage; social role and social rank; law and politics; religious systems; social change. 4 lecture-discussions. Prerequisite: ANT 102.

ANT 390 The Anthropological Experience: Methods and Techniques of Field Research (4)

Theory and technique of ethnographic inquiry. Research proposal formulation; participant observation; directive and non-directive interviewing; collection of quantifiable data. Integration and interpretation of data. Two lectures. Two 2-hour activities. Prerequisite: ANT 102 or ANT 358 and permission of instructor. Offered in odd-numbered years.

ANT 405 Woman: An Anthropological View (4)

Intensive cross-cultural examination of woman, from simple hunting/gathering bands through full evolutionary development to post-industrial society. Includes physical anthropology of woman; role and status; culture and personality studies; affective and contractual bonding; future trends in relationships. 4 lectures. Prerequisite: permission of instructor.

Geography

GEO 101 Physical Geography (4)

Basic principles of physical geography. Significance of earth-related distribution patterns with reference to their effect on man's activities. 4 lecture-discussions.

GEO 102 Cultural Geography (4)

Basic principles of cultural geography. Significance of people-related distribution patterns with reference to their effect on man's activities. 4 lecture-discussions.

GEO 311 Cartography (4)

The preparation of maps and charts including a survey of source materials such as maps, aerial photographs and census and other statistical data. The interpretation of maps and aerial photographs as a source of geographic patterns. 3 hours lecture, 1 3-hour laboratory.

GEO 312 Economic Geography (4)

Economic aspects of man's environment. Economic implications of the distribution or location of natural resources throughout the world. Economic significance of physical and cultural landscapes throughout the world. 4 lecture-discussions.

GEO 313 Political Geography (4)

The role of factors such as location, size, shape, surface, climate, natural resources, economic aspects on the rise and fall of states. The advantages and disadvantages of nations in relation to natural and cultural conditions. Current problems in domestic and international affairs. 4 lecture-discussions.

GEO 315 Urban Geography (4)

Origin and evolution of cities; their size, functions, distribution, patterns, supporting and tributary areas, and roles within the whole political, social, and economic structure of a region; suburbs; problems of metropolitan areas. 4 lecture-discussions.

GEO 340 Regional Geography (4)

A general survey of selected regions of the world that are of greatest importance in global affairs, stressing topics from political and economical geography and using one of the regional approaches. Major geographical problems and relationships; significant human activities in relation to the natural environment. 4 lecture-discussions.

GEO 350 Geography of Anglo-America (4)

An analysis of the physical, cultural and regional patterns of the United States and Canada with emphasis placed on the economic geography of the area. 4 lecture-discussions.

GEO 351 Geography of California (4)

Location and description of California's natural resources. The influence of physical features upon the economic activities and sequence of occupation of California, with particular attention given to relationship of current California problems to their geographical causes. 4 lecture-discussions.

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GEO 352 Geography of Latin America (4)

Physical, cultural, regional patterns of Mexico, Central America, South America, and the islands of the Caribbean. 4 lecture-discussions.

GEO 353 Geography of the Soviet Union (4)

An analysis of major current trends in Soviet social, cultural, economic and political developments and the changing international role of the Soviet Union, as related to the natural environment and regional patterns of the USSR. 4 lecture-discussions.

GEO 357 Geography of Monsoon Asia (4)

Physical, cultural, and regional paterns of eastern and southern Asia from Japan to Afghanistan. Emphasis on the economic and political aspects of the area as a whole and of each country as related to its geographic setting and the area as a whole. 4 lecture-discussions.

GEO 358 Geography of Sub-Saharan Africa (4)

Physical, cultural, and regional patterns of the nations south of the Sahara Desert in Africa. Emphasis on development patterns of the new countries in Africa. 4 lecture-discussions.

GEO 359 Geography of Europe (4)

The natural environment and the cultural landscape of Europe. An analysis of major current trends in social, cultural, economic and political developments in Western and Eastern Europe: historical and geographical regional diversity and the quest for new unity. 4 lecture-discussions.

GEO 361 Geography of Middle America (4)

Distribution of human and cultural features in relation to natural conditions in Mexico, Central America and the West Indies. Reasons for the present distribution. Analysis of current geographical problems. 4 lecture-discussions.

GEO 362 Geography of South America (4)

Role of natural factors in human and cultural patterns. Effect of geographic and other factors in the distribution of crops and industries. Correlations between natural and human conditions. Analysis of current geographic problems. 4 lecture-discussions.

GEO 367 Geography of Mexico (4)

An in-depth analysis of the physical and cultural processes in action in Mexican society and in the environment of Mexico. Emphasis on the developmental problems of Mexico in the modern world. 4 lecture-discussions.

Social Science

SSC 101 Introduction to Social Sciences (4)

An analysis of each of the many disciplines comprising the social sciences with particular emphasis on their interrelationships. A study of source materials and library techniques as well as methods employed by social scientists. 4 lecture-discussions.

SSC 110, 111, 122 Contemporary Issues (3) (3) (3)

Designed to help the student increase his ability to analyze systematically the set of assumptions and values which he has developed about himself and his environment in relation to a career choice or future goals; alternative methods for achievement of career choices; discussion and activity in career and self development. 3 lectures.

SSC 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

SSC 251, 252, 253 Laboratory in Group Activities (1) (1) (1)

Skills and techniques of solving problems in large and small groups; conducting and reporting meetings; analyses of leadership dynamics in campus organizations. 1 two-hour activity.

SSC 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

SSC 301 Asian-American Experience in the United States (4)

The experience of the Asian American in the United States. Chinese-Americans and Japanese-Americans on the West Coast from 1849 to the present. Effects of the media on the Asian-American, community and foreign politics, cultural traditions, race relations. 4 lecture-discussions.

SSC 333 Social Science Methodology (4)

A survey of social research methods basic to conducting primary research. 3 lectures, 1 two-hour activity.

SSC 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

SSC 401 Contemporary American Scene (4)

Domestic problems and issues confronting the American people today. Alternative proposals pointing toward solutions of these problems. 4 lecture-discussions.

SSC 410 Introduction to Irenology (4)

Interdisciplinary analysis of peace, examining intergroup conflict at international, national, and local levels, including labor-management relations and university disturbances. Uses concepts and methodologies of several social sciences. 4 lecture-discussions.

SSC 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum of 120 hours total time.

SSC 463 Undergraduate Seminar (2)

Intensive study of selected social problems with application of various techniques for analysis. 2 meetings. Prerequisite: Completion of senior project.

SSC 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

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SOCIAL SERVICES

Signe Starnes, *Chairman*
Victor Coppin
Nancy Humphreys
George B. Jenkins
Wilma G. Wasserman

The department offers courses leading to the Bachelor of Science degree in Social Services.

The educational objectives of the social services major are twofold: specific career-related goals and educational goals of a more general, self-actualizing character. Both sets of objectives carry equal weight.

Our career-related goal is the preparation of students for employment in such agencies as public welfare, probation and parole, youth service centers, and hospital settings, which offer direct services and require a bachelor's degree as the minimum requirement. The program, therefore, provides education of sufficient scope and depth to enable graduates to function effectively as first-line social workers who deal directly with client groups. Students obtain from the program a body of knowledge and a set of skills which can be put to use immediately in on-the-job performance.

A second career-related goal is the provision of the foundation for and the impetus toward graduate social work education. The program is designed to give students exposure to theory and an opportunity to experience in practice substantive material which will form the basis of their graduate education.

For all students in the program, majors who will move into social service careers or who enter other careers, and non-majors taking social service courses, the program is designed to develop an understanding of the historical development of social welfare institutions, an awareness of contemporary social issues and a sensitivity to human feelings, all within the context of a set of professional values emphasizing human dignity and social change.

An interdisciplinary approach is basic to the development of the educational objectives of the program. The curriculum is designed to meet the educational objectives through specific content areas in the social services courses, and an emphasis on general content areas in support courses offered in other departments. The social service courses provide a theoretical foundation for understanding the development and function of social welfare institutions toward which the new graduate will be addressing himself. The course content also emphasizes the dynamics of human behavior, particularly intervention strategies and their implications for behavioral change. The graduate of the program consequently will have an understanding of human behavior and a beginning skill in intervening on behalf of clients in preparation for immediate work roles or advancement into graduate training.

The department holds constituent membership in the Council on Social Work Education, and has been awarded the council's full approval and endorsement of the social services major.

The series, SSV 321, 322, and 323, *Social Welfare Practice* is a prerequisite to SSV 421, 422, and 423, *Advanced Social Welfare Practice,* and must be taken in sequence beginning in the fall quarter. *Admission is by written application and interview only. Application forms are available in the social services office, and must*

be filed in that office by March 1.

CORE COURSES FOR MAJOR
(Required of all students)

General Psychology	PSY	201	(4)
General Psychology	PSY	202	(4)
Psychology of Identity	PSY	321	(4)
Principles of Sociology	SOC	201	(4)
Principles of Sociology	SOC	202	(4)
Introduction to Social Services	SSV	201	(4)
Social Service Methods	SSV	300	(4)
Social Service Methods	SSV	301	(4)
Social Welfare Practice	SSV	321	(4)
Social Welfare Practice	SSV	322	(4)
Social Welfare Practice	SSV	323	(4)
Advanced Social Welfare Practice	SSV	421	(4)
Advanced Social Welfare Practice	SSV	422	(4)
Advanced Social Welfare Practice	SSV	423	(4)
Social Welfare Policy and Issues	SSV	431	(4)
Senior Project	SSV	461	(2)
Senior Project	SSV	462	(2)
Undergraduate Seminar	SSV	463	(2)
Ethnic Studies Electives			(8)

SUPPORT & ELECTIVE COURSES
(Required of all students)

American Civilization	AMC	201*	(4)
and American Civilization	AMC	202*	(4)
or			
American Civilization	AMC	201*	
and United States History	HST	202*	
or			
The American Political System	PLS	201*	
and American Civilization	AMC	202*	
or			
The American Political System	PLS	201*	
and United States History	HST	202*	
Introduction to Cultural Anthropoloty	ANT	102*	(4)
Life Science	BIO	110*	(3)
Principles of Economics	EC	201*	(4)
Principles of Economics	EC	202*	(4)
Consumer Economics	EC	205	(4)
or			
Economics of Social Welfare	EC	437	
or			
Economics Minority Groups	EC	497	
Freshman Composition	ENG	104*	(4)
Contemporary Literature	ENG	206*	(4)
Physical Education	PE	141*	(3)
Introduction to Philosophy	PHL	201*	(4)
or			
Ethics	PHL	204*	
Public Administration	PLS	314*	(4)
Abnormal Psychology	PSY	415*	(4)
Public Speaking	SP	100*	(4)
Principles of Urban Planning	UP	301*	(4)
Psychology or Sociology electives			(12)
(PSY 310, 311, 314, 315, 401; SOC 301, 310, 320, 322, 401)			
Natural Sciences (1 course on general education list)*			(3)
3 courses outside School of Arts*			(12)
Directed Electives (see adviser)			(12)

* May be used for the general education requirement. Select appropriate courses from the general education list.

† e.g. GEO 315, HST 404, PLS 382, SOC 401, UP 323

** Must include four courses from a minimum of two schools other than the School of Arts for fulfillment of the breadth requirement.

Course Descriptions

SSV 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

SSV 201 Introduction to Social Services (4)

A survey of the historical development of social service. Emphasis on a survey of social welfare philosophies and trends. 4 lectures.

SSV 218 Contemporary Treatment of Offenders (4)

Current correctional practices in probation and parole. An overview of the history of the treatment of the offender and characteristics of the offender. 4 lectures.

SSV 220 The Life Cycle (4)

Study of physical, psychological, social and cultural factors of growth and their relationships. Theory and knowledge of growth and development through the life cycle. Examination of normal and deviant patterns. 4 lecture discussions.

SSV 299. Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

SSV 300, 301 Social Service Methods (4) (4)

An analysis of human behavior theories as they relate to methods and techniques employed by social service practitioners. Application of methods and techniques are evaluated in

a simulated practice activity. 3 lectures, 1 two-hour activity. Prerequisite: SSV 200.

SSV 310 Child Welfare Problems and Services (4)

The course would include coverage by traditional child welfare problems and services such as dependent and neglected children, delinquent, physically and mentally handicapped children and services available to and for them. Foster care will be explored and evaluated as well as institutional and hospital care. 4 lecture discussions.

SSV 321, 322, 323 Social Welfare Practice (3) (3) (3)

The first year internship program introducing the student to practical aspects of social service, including a weekly 8-hour involvement in a social service agency and 1 hour seminar. Prerequisite: SSV 200, 300 and consent of instructor. Admission only by prior application (due March 1 each year).

SSV 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

SSV 421, 422, 423 Advanced Social Welfare Practice (3) (3) (3)

Contemporary practice of social case work method and its applications to present social welfare problems; includes second year of internship program consisting of 8 hours weekly practical experience in a social service agency and a two-hour weekly seminar.

SSV 431 Social Welfare Policy and Issues (4)

Examination and analysis of the development of policy proposals and decisions which form the basis for national and local social welfare programs. Discussion and evaluation, in the context of the role expectations of the social service professional, of current policy proposals, issues and priorities concerning alterations in our economic and social values and systems as they relate to social welfare policy development and decision making. 4 lecture discussions.

SSV 432 New Trends in Social and Community Services (4)

This course will offer students in social services an opportunity to develop their own helping philosophy as well as an awareness of new horizons of service. The philosophy, organization and treatment methods of the various new crisis-oriented agencies and facilities will be explored and analyzed. 4 lecture discussions.

SSV 461, 462 Senior Project (2) (2)

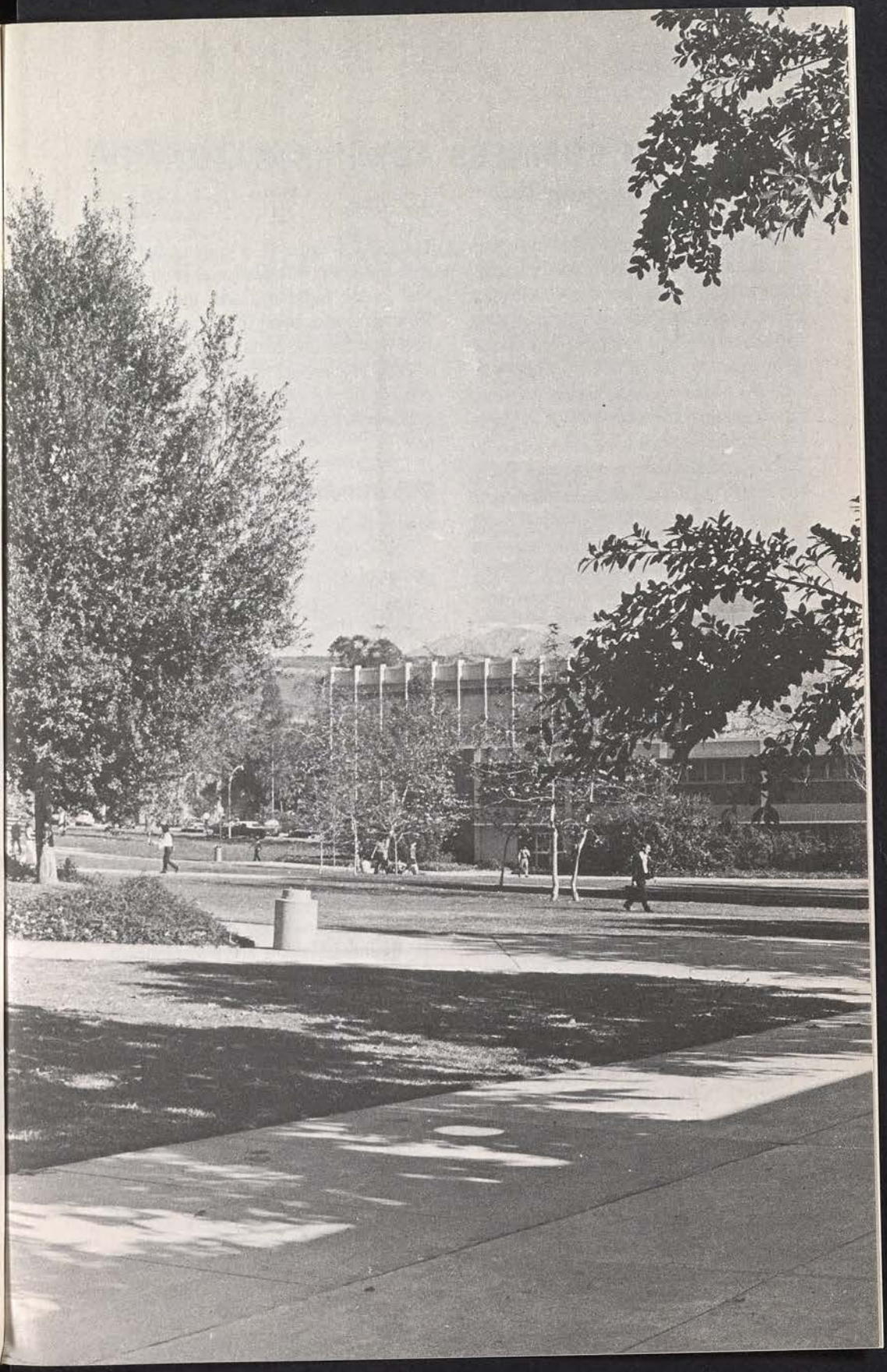
Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Formal report is required. Prerequisite: senior standing. Required minimum of 120 hours.

SSV 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the student's major fields. 2 lectures. Prerequisite: senior standing or permission of instructor.

SSV 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.



SCHOOL OF BUSINESS ADMINISTRATION

James C. Petersen, ***Acting Dean***

The School of Business Administration provides six curricula leading to the bachelor of science degree, and curricula leading to the Master of Business Administration and Master of Science degrees. The Master of Science curriculum offers an option in business education. Information concerning the masters curricula may be found in the *Graduate Bulletin.*

The undergraduate programs of study aim to give the student an understanding of the social and economic environment and knowledge of the structure of business. The curriculum is composed of four parts—general education material; a core of business subjects common to all majors; a major field of study; and free electives for subject experimentation.

The student selects his major on entering and immediately assumes responsibility for establishing his own educational objectives and works to accomplish them. Through early studies in the courses basic to his major, the student has an opportunity to evaluate his career decision and to adjust his goals, if necessary. Undergraduate courses in business fundamentals and skills equip him with salable abilities. The student may augment his on-campus education through job experiences in business work-study and internship programs. General education courses are integrated throughout each four-year program. Each student concludes his program with a senior project. Co-curricular opportunities related to his course of study include the Cal Poly Accountants Club; Pi Sigma Epsilon, a professional sales and marketing fraternity; the Society for the Advancement of Management Club; the Data Processing Club; Delta Sigma Pi, a professional business fraternity; Rho Epsilon, a professional real estate fraternity; and the Business Women's Association (in process of affiliation with Phi Chi Theta).

Programs leading to secondary teaching credentials are offered by the School of Business Administration in business education.

Departments and Majors

Master of Business Administration
(see Graduate Bulletin)

Master of Science in Business Administration (see Graduate Bulletin)

ACCOUNTING

_____, Chairman

Accounting major (BS)

BUSINESS MANAGEMENT

_____, Chairman

Business Management major (BS); Options in Industrial Management, Office Management

Secondary Credential Program, major in Office Management

DATA PROCESSING

Gerald E. Wagner, Chairman

Data Processing major (BS); Options in Business Systems and Programming, Quantitative Business Analysis

FINANCE, INSURANCE AND REAL ESTATE

_____, Chairman

Finance, Insurance and Real Estate major (BS)

Hotel and Restaurant Management major (BS)

MARKETING MANAGEMENT

_____, Chairman

Marketing major (BS)

ACCOUNTING

_____, *Chairman*

Martin K. Barrett
George E. Carlberg
John K. Cheever
Keith B. Ehrenreich
Hugh D. Grove
Vinay Gupta
Clarence H. Jackman
Barry A. Knight
Eugene Pinchuk
Jewel M. Riddle
William B. Theisman

The Accounting Department provides an education for students who wish to enter the field of business with a thorough knowledge of the essential principles of accounting and a strong background for students desiring professional employment in public, private, or government accounting. The student majoring in accounting may select courses which will prepare him specifically for one of these fields.

The accounting courses are taught in the framework of modern business complexity so that the student becomes aware of the many factors in the decision-making process and of the contribution of the accountant and his skills to administrative services.

CORE COURSES FOR MAJOR

(Required of all students)

Principles of Accounting	ACC	124	(4)
Introduction to Managerial Accounting	ACC	125	(4)
Accounting Practice	ACC	145	(1)
Cost Accounting	ACC	211	(5)
Intermediate Accounting	ACC	301	(5)
Intermediate Accounting	ACC	302	(5)
Auditing Principles, Practices and Procedures	ACC	419	(5)
Federal Tax	ACC	431	(5)
Senior Project	ACC	461	(2)
Senior Project	ACC	462	(2)
Undergraduate Seminar	ACC	463	(2)
Business Law	BUS	301	(4)
Business Law	BUS	302	(4)
Introduction to Data Processing	DP	211	(4)
Computer Programming Principles	DP	221	(4)
†Directed Electives			(12)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Auditing Principles, Practices and Procedures	ACC	420	(3)
or Internship in Auditing	ACC	443	
American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Business Computations	BUS	152	(2)
Management Principles and Theory	BUS	307	(4)
Business Statistics	BUS	314	(4)
Quantitative Analysis in Business	BUS	315	(4)
Management Policies and Systems	BUS	410	(4)
Systems Analysis	DP	222	(4)
Principles of Economics	EC	201*	(4)
Principles of Economics	EC	202*	(4)
Money and Banking	EC	308	(4)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Business and Corporation Finance	FIR	304	(4)
Advanced Financial Management	FIR	305	(4)
Introduction to Statistics	MAT	107*	(3)
Introduction to Math Analysis	MAT	108*	(3)
Introduction to Math Analysis	MAT	109*	(3)
Principles of Marketing Management	MKT	305	(4)
Principles of Marketing Management	MKT	306	(4)
Physical Education	PE	141*	(3)
General Psychology	PSY	201*	(4)
Public Speaking	SP	100*	(4)
Humanities			*(6)
Natural Sciences			*(6)
Electives			(29)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Business Administration.

† Select from ACC 400, 401, 402, 403, 413, 414, 424, 432, 441, 442, DP 231, ETI 276, IE 111, 224, 225, PLS 314.

Course Descriptions

ACC 124 Principles of Accounting (4)

Principles and practices of fundamental financial accounting. Introductory survey of uses of accounting, with primary emphasis on the responsibility of the modern corporation to do an adequate job of financial reporting to investors and others outside the corporate entity. 3 lectures, 2 one-hour activity periods.

ACC 125 Introduction to Managerial Accounting (4)

Introductory survey of uses of modern accounting such as costs, budgeting, statement analysis. Special attention is given to the needs of managenent for information in terms of control of the enterprise and formulating business policy decisions. 3 lectures, 2 one-hour activity periods.

ACC 145 Accounting Practice (1)

Practice, manual and EDP, in application of accounting principles to typical business situations. Concurrent: ACC 125.

ACC 200 Special problems for Lower Division Students (1-2)

Individual or group investigation research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ACC 211 Cost Accounting (5)

Cost accounting cycle; cost elements of a product; job order, process and standard cost systems; overhead allocation cost considerations; joint products and by-products; cost behavior, cost-volume profit relationships; analysis of overhead variances. 5 lectures. Prerequisite: ACC 125.

ACC 232 Income Taxes (3)

Federal income tax structure as related to individuals, including problems intended to provide an understanding of the principles. 3 lectures. (Not open to accounting majors.)

ACC 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

ACC 300 Accounting Concepts and Applications (5)

Accounting as an information system for reporting enterprise. Activities: interpretation and uses of financial statements; taxes and decision variables. Prerequisites: ACC 125 and consent of instructor. (Enrollment limited to non-accounting majors.)

ACC 301, 302 Intermediate Accounting (5) (5)

Analytical study and application of current accounting theories and techniques including literature of the American Institute of Certified Public Accountants and other authoritative accounting organizations. 5 lectures. Prerequisite: ACC 125 and consent of instructor.

ACC 308 Institutional and Governmental Accounting (3)

Accounting for nonprofit institutions and governmental organizations. 3 lectures. Prerequisite: ACC 124 or consent of instructor. Not open to accounting majors.

ACC 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ACC 401 Advanced Accounting (4)

Partnerships, joint ventures, installment sales, consignments and actuarial science as related to accounting. 4 lectures. Prerequisite: ACC 302 or consent of instructor.

ACC 402 Advanced Accounting (4)

Governmental and institutional accounting and accounting for fiduciaries. 4 lectures. Prerequisite: ACC 302 or consent of instructor.

ACC 403 Advanced Accounting (4)

Consolidations and home office and branch accounting. 4 lectures. Prerequisite: ACC 302 or consent of instructor.

ACC 413 Case Studies in Controllership (4)

Analysis of accounting problems and business situations from the broad viewpoint of the controller. Studies of actual and simulated business cases. 4 lecture-discussions. Prerequisite: Senior standing.

ACC 414 Cost Accounting and Budgeting (5)

Advanced problems in cost finding and cost control; analysis of variances; budgets and budgetary control; cost-volume relationships; break-even point analysis. Current literature discussed. 5 lecture-discussions. Prerequisite: ACC 211, 302.

ACC 419 Auditing Principles, Practices, and Procedures (5)

Theory of auditing and its objectives; procedures and techniques to carry out the objectives; principles of working paper development and preparation; types of opinions rendered by auditors and their responsibilities; ethics of the C.P.A. 5 lectures. Prerequisite: ACC 211 and ACC 300 or ACC 302 and senior standing (waive ACC 211 for Data Processing majors only).

ACC 420 Auditing Principles, Practices, and Procedures (3)

Extensive procedures and techniques in carrying out the audit objectives: working paper development and preparation; preparation of opinion and report rendered by auditors. 2 lecture. 1 two-hour activity. Prerequisite: ACC 302, 419.

ACC 424 Internal Operational Auditing, and Systems (4)

Objectives, principles and methods of internal and operational auditing with special emphasis on examination and apraisal of internal controls in the various reporting systems. Problems of communiation, delegation of authority, or organization. 4 lecture-discussions. Prerequisite: ACC 300 or 302.

ACC 431 Federal Tax (5)

Income, expense, exclusion, deductions and credits for individual, partnership and corporation tax returns. 5 lectures. Prerequisite: ACC 300 or ACC 301.

ACC 432 Federal Tax (3)

Federal taxes on estates, trusts, reorganizations and tax planning. 2 lectures, 1 two-hour activity period. Prerequisite: ACC 431.

ACC 441, 442 Internship in Accounting (1–8) (1–8)

On-the-job training with a business in some phase of accounting. The experience must be new to the student so that learning takes place. One unit of credit is granted for each 150 hours of training. Internships must be approved in advance by departmental internship coordinator.

ACC 443 Internship in Auditing CPA (3)

On-the-job training with a CPA firm in phases of auditing. The experience must be new to the student. Analytical reports of work accomplished by each student are made periodically to the faculty coordinator. One unit of credit is granted for each 150 hours of training. Units of college credit granted are dependent on departmental approval. Prerequisite: ACC 419 and permission of the instructor.

ACC 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Project typical of problems which graduates must solve in their fields of employment. Formal report is required. Required minimum of 120 hours. Prerequisite: ACC 211 and 302. ACC 461 is prerequisite for 462.

ACC 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the students' major fields. 2 meetings. Prerequisite: ACC 462.

ACC 475 C.P.A. Law Problems (3)

Business law questions given in the C.P.A. examination. Fundamental principles of the law of contracts, agency, bailments, sales, negotiable instruments, partnerships, corporations, real and personal property, wills, insurance, suretyship, bankruptcy and other subjects. 3 lectures. Prerequisite: ACC 403, BUS 302 or consent of instructor.

ACC 476 C.P.A. Auditing Problems (3)

Standards and objectives; reports; internal control; examination of internal and external records; working papers; procedures; and other related topics. 2 lectures, 1 two-hour activity period. Prerequisite: ACC 419 or consent of the instructor.

ACC 477 C.P.A. Practice Problems and Theory (6)

Contemporary accounting theory with emphasis upon pronouncements of the American Institute of Certified Public Accountants, the American Accounting Association, and the Securities and Exchange Commission. Application to advanced problems of the type found in the C.P.A. examinations. 2 two-hour lectures, 2 two-hour activity periods. Prerequisite: ACC 401, 402, 403 or consent of instructor.

ACC 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

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BUSINESS MANAGEMENT

_____, *Chairman*

Richard Bergstrom
Edward B. Bonard
Madeline H. Currie
Leon A. Dale
Alfred M. Diaz
Joseph A. Feigo
David G. Foley
Robert J. Healey
Gilbert McKee
Peter M. Mills
Celestine Nwacukwu
Frank Paul
Leonard E. Ross
Richard Sabo
Shiori Sakamoto
Richard H. Schoning
Sandra Roy
Warren C. Weber
Paul F. Weisend
Mary E. Whitley
D. Wayne Williams
G. Dow Worley

The business management major offers options in industrial management and office management.

The industrial management option offers courses which provide a diversified background in industrial operations and production control techniques for management in industrial oriented organizations. This option contains all necessary prerequisites for an advanced degree.

Course offerings enable students to understand the basic principles of business and realize the significant interrelationships among the various segments of business and society. Students are prepared for a wide range of positions in industry, commerce, secondary education, and public service such as management trainee, purchasing agent, department store buyer, office manager, contract administrator, records supervisor, business teacher in secondary schools, executive secretary, or administrative assistant.

CORE COURSES FOR MAJOR

(Required of all students)

Principles of Accounting	ACC	124	(4)
Introduction to Managerial Accounting	ACC	125	(4)
Business and its Environment	BUS	103	(4)
Business Law	BUS	301	(4)
Business Law	BUS	302	(4)
Management Principles and Theory	BUS	307	(4)
Industrial Supervision	BUS	313	(4)
Business Statistics	BUS	314	(4)
Management Policies and Systems	BUS	410	(4)
Senior Project	BUS	461	(2)
Senior Project	BUS	462	(2)
Undergraduate Seminar	BUS	463	(2)
Introduction to Data Processing	DP	211	(4)
Systems Analysis	DP	222	(4)
Business and Corporation Finance	FIR	304	(4)
Advanced Finance Management	FIR	305	(4)
Marketing Principles	MKT	305	(4)
Marketing Management	MKT	306	(4)

OPTION COURSES FOR MAJOR

(Required for specific option)

Industrial Management

Personnel Management	ABM	402	(3)
or Contributions of Human Behav. to Business	BUS	418	
Managerial Accounting	BUS	310	(4)
Quantitative Analysis in Business	BUS	315	(4)
Industrial Management	BUS	331	(4)
Industrial Management	BUS	332	(4)
Inventory Control	BUS	402	(4)
or Marketing Logistics	MKT	309	
Production Analysis Planning & Control	IE	234	(4)
Industrial Marketing	MKT	407	(4)
or Industrial Relations	BUS	416	

Office Management

Typewriting	BUS	145	(2)
Records Management	BUS	403	(3)
Report Writing	COM	216*	(3)
Plus a minimum of 23 units (with consent of advisor) from those listed below			(23)
Personnel Management	ABM	402	
Shorthand	BUS	244	
Shorthand	BUS	245	
Shorthand	BUS	246	
Problems of Small Business	BUS	308	
Managerial Accounting	BUS	310	
Administrative Services	BUS	320	
Exec. Secretarial Practice	BUS	321	
Exec. Secretarial Practice	BUS	322	
Office Management	BUS	327	(4)

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Computer Programming	DP	221	
Fund Risk Insurance	FIR	307	
Investments	FIR	308	
Retail Store Management	MKT	308	

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Business Computations	BUS	152	(2)
Business Communications	COM	218	*(3)
Principles of Economics	EC	201	*(4)
Principles of Economics	EC	202	*(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Descriptive Statistics	MAT	107	*(3)
Physical Education	PE	141	*(3)
General Psychology	PSY	201	*(4)
Public Speaking	SP	100	*(4)
Natural Sciences			*(6)
Humanities			*(6)
Additional General Education Courses			*(9)
Courses to complete option			(31)
Electives			(37)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Business Administration.

Course Descriptions

BUS 103 Business and Its Environment (4)

American business system in its economic and social environment. A conceptual approach relating business and its legal forms to society as a whole. Career opportunities in business with emphasis on management. 4 lectures.

BUS 144 Typewriting (2)

Fundamentals of the touch system. Training in preparing business forms and business letters and the development of professional competency in typewriting. 4 one-hour activity periods.

BUS 145 Typewriting (2)

Fundamentals of the touch system. Training in preparing business forms and business letters and the development of prefessional competency in typewriting. 4 one-hour activity periods. Prerequisite: BUS 144 with a grade of "C" of better, or proficiency examination.

BUS 152 Business Computations (2)

Experience in the use and selection of adding and listing machines and rotary and printing calculators. Application of this experience to problems of interest, depreciation, sinking funds, annuities, statistics, discounts, merchandising mathematics, and payroll registers. 4 one-hour activity periods.

BUS 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

BUS 244, 245, 246 Shorthand (2-3) (2-3) (2-3)

Effective techniques for recording and transcribing personal dictation. 4 hours activity. Prerequisite: BUS 245, 244 or 60 wpm; BUS 246, 245 or 80 wpm.

BUS 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

BUS 301 Business Law (4)

The law of contracts according to the Uniform Commercial Code. Laws of personal property. Law of bailments: contract law and personal property. Law of sales updated to the Uniform Commercial Code. Law of transportation: duties, rights, and liabilities of common carriers and shippers. Casebook method. 4 lectures. Prerequisite: Junior standing or consent of instructor.

BUS 302 Business Law (4)

Law of agency. Law of employment. Law of partnership. The Uniform Commercial Code. Law of corporations. Law of trusts and estates. Law of security devices. Law of real property. Law of bankruptcy. Casebook method. 4 lectures. Prerequisite: BUS 301.

BUS 303 Institutional Law (4)

Identifies statutory and common law applicable to proprietary and public institutions. Emphasis upon application of legal doctrines as applied to educational, social hospital and proprietary entities. 4 lecture-discussions. Prerequisite: BUS 302.

BUS 307 Management Principles and Theory (4)

Principles and functions of management as a universal process. Analysis of theories of organization and management. 4 lectures.

BUS 308 Problems of Small Business (4)

Small business hazards and factors in business success. Adequate protection and financing for the small business. Analysis and discussion of typical situation-problems. 4 lectures. Prerequisite: ACC 125; BUS 307; MKT 305.

BUS 310 Intermediate Managerial Accounting (4)

Accounting as a managerial tool, budgets, cost analysis and interpretation. 4 lectures. Prerequisite: ACC 125. Not open to accounting majors.

BUS 313 Industrial Supervision (4)

Management of personnel; selection, motivation and supervision of subordinates; training, employee performance appraisal; communications; employee remuneration; union-management relations; executive development; personnel department assistance of supervisors in achieving company and departmental objectives. 4 lectures.

BUS 314 Business Statistics (4)

Business application of techniques that require knowledge of; data distributions such as binomial, Poisson, and normal; probability; sampling theory. Use of statistical tests for inference such as estimation, hypothesis testing, analysis of variance, regression and correlation. 4 lecture-discussions. Prerequisite: MAT 107.

BUS 315 Quantitative Analysis in Business (4)

Identification and solution of business problems by quantitative methods and techniques. Introduction to quantitative tools of analysis and construction of quantitative models useful in business decision making. Application of electronic computers. Seminars, lectures, and problem solving by small groups. 4 lectures. Prerequisite: BUS 314.

BUS 316 Purchasing and Contract Administration (4)

Buying practices of institutional, industrial, and governmental purchasing operations. Interrelationship of purchasing and the other aspects of the organization. Emphasis on quality, service and price. Legal aspects of purchasing and contract administration. Case problems. 4 lecture-discussions. Prerequisite: BUS 302, 307.

BUS 320 Administrative Services (3)

Services as related to office systems and procedures; use and integrated application of recording and communicating activities, transcribers, duplicators, copiers and miscellaneous office equipment in performing the functions of information handling. 2 lectures, 1 two-hour activity period. Prerequisite: BUS 144.

BUS 321, 322 Executive Secretarial Practice (4) (4)

Individual activities simulating those of an office. Practical application of secretarial theory and skills, including the use of machines. Management-level materials adapted to secretarial situations. 2 lectures and 2 two-hour activity periods. Prerequisite: Junior standing or consent of instructor.

BUS 324 Communication for Management (4)

Conducting management conferences, team project consultations and professional meetings using visual aids (charts, graphs, financial statements, progress reports, etc.). Briefing superiors on project status/projections. Techniques and devices of analysis and presentation of oral and written communications. Dictation machines employed. 4 lectures. Prerequisite: COM 218 or permission of instructor.

BUS 327 Office Management (4)

Relationship of office functions to the total business enterprise; planning, organizing, controlling and actuating in office management; analysis of information needs for management decisions; analytical approach to office services functions. 4 lectures.

BUS 331 Industrial Management (4)

An introduction to the fundamental concepts of industrial management. Allocating existing resources, product quality, manpower requirements, industrial scheduling and control, budgeting and investment analysis of equipment selection and replacement. 4 lecture-discussions. Prerequisite: BUS 307, 314.

BUS 332 Industrial Management (4)

A study of industrial organizations. Managerial applications and conceptual survey of facilities design and control systems for industrial operations, design of work systems, job simplification and motion and time study, analytical models and methods. Labor costs control and compensation. 4 lecture-discussions. Prerequisite: BUS 331.

BUS 340 Ethnic Business Problems (4)

Financial, marketing, and personnel problems of the minority individual and group, both as entrepreneur and employee. 4 Lecture/Seminars. Prerequisite: Junior standing.

BUS 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

BUS 402 Inventory Control (4)

Management problems of production, maintaining proper control records, financing, and materials handling and storage. Analysis and discussion of typical situation-problems. 4 lectures.

BUS 403 Records Management (3)

Problems in the creation, use, maintenance, storage, and disposition of records. Emphasis on records management as an administrative service. 3 lectures.

BUS 407 Hospital Administration (4)

Identifies current problems of the hospital administrator and examines approaches to their solutions. Case study approach which includes review of current literature. 4 lecture-discussion periods plus case studies. Prerequisite: BUS 307.

BUS 409 Social Institutional Management (4)

Universal principles of management applicable to social institutions. Administrative structures of social, religious and quasi-religious organizations. The business functions of socially-oriented organizations. Role behavior of the administrator. A comparative management study of institutions. 4 lecture-discussion periods and projects. Prerequisite: BUS 307.

BUS 410 Management Policies and Systems (4)

Case study approach to current administrative systems, and related problems and policies of general management—to include such areas as personnel, production, procurement, marketing, and finance. 4 lecture-discussion periods. Prerequisite: BUS 307.

BUS 416 Industrial Relations (4)

A micro analysis and emphasis upon industrial relations problems and developments in modern society; collective bargaining, labor law, managerial and economic factors relevant to union-management relations, wage markets, impact of public policy on the settlement of industrial disputes; increasing role of arbitration. 4 lectures. Prerequisite: BUS 301, BUS 307 and senior standing.

BUS 417 Law of Estates and Trusts (4)

Legal problems concerning the disposal of estates of deceased persons by will and under statutes of descent and distribution, probating estates of deceased persons, creation of trusts both inter vivos and testamentary, duties and liabilities of trustees, rights of beneficiaries of trusts. 4 lectures. Prerequisite: BUS 301.

BUS 418 Contributions of Human Behaviorists to Business (4)

Early behaviorist breakthroughs in the business environment. Expansion of the human behavior school of management following World War II. Modern behaviorist thought as it applies to business administration. 4 lectures.

BUS 419 Institutional Manpower Utilization (4)

Special problems of manpower procurement and utilization confronting nonprofit institutions. Employee recruitment, training, supervision, remuneration services and benefits as applications specialized to meet institutional requirements. Case studies. 4 hours seminar. Prerequisite: BUS 307, 313.

BUS 441, 442 Internship in Business Management (1–8) (1–8)

On-the-job training in business management involving new, collegiate-level learning experiences, with one unit of credit for each 150 hours of training not to exceed 6 units. Experiences may be useful as a basis for senior projects. Prerequisite: Permission of the Coordinator of Business Internships.

BUS 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Formal report is required. Prerequisite: Senior standing. Required minimum of 120 hours.

BUS 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the students' major fields. 2 lectures. Prerequisite: Senior standing or permission of instructor.

BUS 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

DATA PROCESSING

Gerald E. Wagner, *Chairman*
Thomas H. Athey
Donald Bell
Peter P. Dawson
Ronald W. Eaves
Koichiro R. Isshiki
Richard H. Smith
Robert E. Stroud
Robert V. Stumpf
Ward D. Testerman

The data processing profession is dynamic and ever-changing. Creative people often find data processing to be exciting, challenging, and rewarding.

The Cal Poly approach to data processing and computer education is unique in many ways. One, the major is applications-oriented rather than being highly theoretical. Two, the major courses are offered in the School of Business Administration rather than as a technical discipline. And, three, the major is designed with the student in mind—he or she is prepared not only to earn a living but also for a lifetime of learning and professional growth.

The student majoring in data processing selects one of two options—business systems and programming (BSP) or quantitative business analysis (QBA). The BSP option provides the necessary skills and background needed by the individual using the computer as a problem-solving tool for accounting, finance, marketing, and related operations in business.

The QBA option is designed to prepare the graduate for a position in the complex area of business research and forecasting or industrial production management and control requiring a sophisticated knowledge of quantitative methods.

CORE COURSES FOR MAJOR
(Required of all students)

Principles of Accounting	ACC	124	(4)
Principles of Accounting	ACC	125	(4)
Accounting Practice	ACC	145	(1)
Management Principles and Theory	BUS	307	(4)
Business Statistics	BUS	314	(4)
Quantitative Analysis in Business	BUS	315	(4)
Management Policies and Systems	BUS	410	(4)
Introduction to Data Processing	DP	211	(4)
Computer Programming Principles	DP	221	(4)
Systems Analysis	DP	222	(4)
Cobol Programming	DP	231	(4)
Design of DP Applications	DP	312	(4)
Data Processing Management	DP	421	(4)
Senior Project	DP	461	(2)
Senior Project	DP	462	(2)
Undergraduate Seminar	DP	463	(2)

OPTION COURSES FOR MAJOR
(Required in specific options)

Business Systems and Programming

Accounting Concepts & Application	ACC	300	(5)
Managerial Accounting	BUS	310	(4)
Contributions of Human Behaviorists to Business	BUS	418	(4)
Data Management Concepts	DP	325	(4)
Computer Based Information Systems	DP	332	(4)
Advanced Computer Concepts	DP	444	(4)
College Algebra	MAT	105	(4)
Introduction to Math Analysis	MAT	108*	(3)
Introduction to Math Analysis	MAT	109*	(3)

Quantitative Business Analysis

Cost Accounting	ACC	211	(5)
Computer Applications in Management Science	DP	316	(4)
Advanced Computer Programming	DP	322	(4)
Computer Based Business Simulation	DP	416	(4)
Analytic Geometry and Calculus	MAT	114*	(3)
Analytic Geometry and Calculus	MAT	115*	(3)
Analytic Geometry and Calculus	MAT	116	(3)
Calculus and Differential Equations	MAT	214	(4)
Calculus and Differential Equations	MAT	215	(4)

SUPPORT AND ELECTIVE COURSES
(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)

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Business Law	BUS	301	(4)
Business Law	BUS	302	(4)
Report Writing	COM	216*	(3)
Principles of Economics	EC	201*	(4)
Principles of Economics	EC	202*	(4)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Business and Corporation Finance	FIR	304	(4)
Advanced Financial Management	FIR	305	(4)
Descriptive Statistics	MAT	107*	(3)
Principles of Marketing Management	MKT	305	(4)
Principles of Marketing Management	MKT	306	(4)
Physical Education	PE	141*	(3)
General Psychology	PSY	201*	(4)
Public Speaking	SP	100*	(4)
Natural Sciences		*	(8)
Humanities		*	(8)
Electives			(27-28)
Courses to complete option			(34-35)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Business Administration.

Course Descriptions

DP 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

DP 211 Introduction to Data Processing (4)

Impact of computer technology on society. Automatic data processing vocabulary, concepts, and devices. Capabilities and limitations of the electronic computer with introductory programming problems. 4 lectures.

DP 215 Data Processing Practice (1)

Practice in writing programs to solve typical business problems for students who desire increased proficiency in the FORTRAN language. One 2-hour activity. Prerequisite: DP 211 or permission of instructor.

DP 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

DP 221 Computer Programming Principles (4)

Flowcharting as a primary programming tool. Assembly language concepts. Use of FORTRAN language to solve several business problems in batch and timesharing modes. 4 lectures and programming projects. Prerequisite: DP 211 or permission of instructor.

DP 222 Systems Analysis (4)

Problem definition, information gathering, analysis of facts, and evaluating courses of action. Tools and techniques of systems studies. Human aspects of systems analysis. Case studies. 4 lectures.

DP 231 COBOL Programming (4)

Structure of the COBOL programming language. Compiler operation. Capabilities and limitations. Use of COBOL language to solve several business problems. 4 lectures and programming projects. Prerequisite: DP 221 or permission of the instructor.

DP 312 Design of DP Applications (4)

Case study approach to the design of a data processing application. Involves analysis, information gathering and documentation followed by the actual design of forms, flowcharts, records, files, and controls to support a real world business system. 4 lectures. Prerequisites: DP 221 and 222, or permission of the instructor.

DP 316 Computer Applications in Management Science (4)

Analysis, modeling, and solving of quantitative business problems using student-prepared and standard statistical computer programs. 4 lectures and projects. Prerequisite: DP 211, and BUS 315, or permission of instructor.

DP 322 Advanced Computer Programming (4)

Practical business problems using various sorting techniques, internal tables, string data, list and tree structures, dynamic storage allocation, recursive sub-routines, modular programming, and other advanced programming concepts. 4 lectures and programming projects. Prerequisite: DP 231 or permission of instructor.

DP 325 Data Management Concepts (4)

Practical problems in the use of information storage and retrieval techniques. Includes sequential and random file organization, building and using directories, developing hashing algorithms using an inverted file structure and other file management techniques. 4 lectures and projects. Prerequisite: DP 221 and DP 231 or permission of instructor.

DP 332 Computer Based Information Systems (4)

Theory of computer-based management information systems. Case studies on attempts to apply theory to complex business environment. 4 lectures. Prerequisite: DP 312 or permission of instructor.

DP 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

DP 416 Computer Based Business Simulation (4)

The design and testing of models that simulate business subsystems. Literature, properties, classifications, and techniques of simulation models. Model construction and programming. 4 lectures. Prerequisites: DP 231 and BUS 314 or permission of instructor.

DP 421 Data Processing Management (4)

Organizational, decision-making and behavioral problems confronted by top and middle management in the automation of data processing activities. Case study approach. 4 lectures. Prerequisites: senior standing or permission of the instructor.

DP 431 Comparative Programming Languages (4)

A comparison of several higher level programming languages. Definition, history, standardization problems, structure, capabilities and limitations of each language. Programming practice in several types of languages. 4 lectures and programming projects. Prerequisite: DP 231 or permission of instructor.

DP 433 Business Oriented Symbolic Programming Languages (4)

Advanced business applications of symbolic addressing concepts, address modification, macro instructions, and assemblers. Use of assembly programs to optimize computer characteristics in processing business data. 4 lectures and programming projects. Prerequisite: DP 231 or permission of instructor.

DP 441, 442 Internship in Data Processing (1-8) (1-8)

College monitored on-the-job educational experiences in a real world data processing environment. Allocation of credit dependent on nature of work done and hours worked. One unit of credit is granted for each 150 hours of training. Students receive pay for participation. Prerequisite: junior standing and permission of internship coordinator.

DP 444 Advanced Computer Concepts (4)

Analysis of the capabilities and limitations of sophisticated systems produced by advanced computer technology to solve current data processing problems. Student projects and reports. 4 lectures. Prerequisites: DP 312 and DP 322 or permission of the instructor.

DP 453 Data Communications (4)

Data communications and teleprocessing in the business environment. Transmission techniques, communications lines, special hardware and design criteria. Students design a data communications system using commercially available hardware. 4 lectures. Prerequisite: DP 312 or permission of the instructor.

DP 461, 462 Senior Project (2) (2)

Selection, analysis, and solution of a real world data processing problem with minimal faculty supervision. Formal written report required. Prerequisite: senior standing.

DP 463 Undergraduate Seminar (2)

Research and discussion of current problems, opportunities, and developments in data processing. 2 lectures. Prerequisite: senior standing or permission of instructor.

DP 499 Special Topics for Upper Divison Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

FINANCE, INSURANCE, AND REAL ESTATE

----------, *Chairman*
Wallace C. Benjamin
Paul A. Hatt
Richard T. Nelson
Raymond C. Rauch
Alvin C. Ruppert

All students in the finance, real estate, and insurance major take a principles course in each area. The finance area offers education needed for managers in the banking, investment, and financial institutions. The area of insurance includes risk evaluation, marketing, and management of insurance programs. Real estate specialization offers courses in real property systems evaluation, and urban land utilization.

CORE COURSES FOR MAJOR

(Required of all students)

Principles of Accounting	ACC	124	(4)
Principles of Accounting	ACC	125	(4)
Business Law	BUS	301	(4)
Business Law	BUS	302	(4)
Management Principles and Theory	BUS	307	(4)
Business Statistics	BUS	314	(4)
Quantitative Analysis in Business	BUS	315	(4)
Introduction to Data Processing	DP	211	(4)
Systems Analysis	DP	222	(4)
Money and Banking	EC	308	(4)
Business and Corporation Finance	FIR	304	(4)
Advanced Financial Management	FIR	305	(4)
Real Property Systems	FIR	306	(4)
Fundamentals of Risk and Insurance	FIR	307	(4)
Investments	FIR	308	(4)
Senior Project	FIR	461	(2)
Senior Project	FIR	462	(2)
Undergraduate Seminar	FIR	463	(2)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Business Computations	BUS	152	(2)
Managerial Accounting	BUS	310	(4)
Industrial Supervision	BUS	313	(4)
Management Policies and Systems	BUS	410	(4)
Contributions of Human Behaviorists to Business	BUS	418	(4)
Business Communications	COM	218	*(3)
Principles of Economics	EC	201	*(4)
Principles of Economics	EC	202	*(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Descriptive Statistics	MAT	107	*(3)
Marketing Principles	MKT	305	(4)
Marketing Management	MKT	306	(4)
Physical Education	PE	141	*(3)
General Psychology	PSY	201	*(4)
Public Speaking	SP	100	*(4)
Natural Sciences			*(6)
Humanities			*(6)
Minimum of 4 Courses from 2 other schools			(7)
Free Electives			(30)
Directed Electives			**(16)

* May be used for the general education requirement. Select unspecified courses from the general education list.

** To be taken from the following list:

Land Appraisal and Sales	ABM	406	(4)
Accounting Concepts and Applications	ACC	300	(5)
Federal Tax I	ACC	431	(5)
Office Management	BUS	327	(4)
Industrial Management	BUS	331	(4)
Industrial Management	BUS	332	(4)
Computer Programming	DP	221	(4)
Computer Applications to Management Science	DP	316	(4)
Urban Land Economics	EC	319	(4)
Urban Land Utilization and Development	FIR	310	(4)
Special Problems	FIR	400	(1-2)
Security Analysis and Management	FIR	401	(4)
Mortgage Banking	FIR	402	(4)
Real Property Evaluation	FIR	403	(4)
Advanced Real Estate Appraisal	FIR	404	(4)
Real Property Management	FIR	406	(4)
Life and Casualty Insurance	FIR	411	(4)
Real Property Analysis	FIR	412	(4)
Social Insurance and Pension Plans	FIR	414	(4)
Risk Management	FIR	415	(4)
Legal Aspects of Real Estate	FIR	416	(4)
Law of Estates and Trusts	FIR	418	(4)
Internship in F.I.R.E.	FIR	411	(1-8)
Internship in F.I.R.E.	FIR	442	(1-8)
Introduction to Mathematical Analysis	MAT	108	(3)
Introduction to Mathematical Analysis	MAT	109	(3)
Marketing Communications	MKT	208	(4)
Retail Store Management	MKT	308	(4)

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Course Descriptions

FIR 200 Special Problems for Lower Divison Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

FIR 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

FIR 300 Finance and Investments (4)

Concepts and practices of finance useful to individuals and small organizations. Subjects covered include consumer credit insurance, real estate and security investments. Enrollment limited to non-School of Business Administration majors—junior standing. 4 lectures.

FIR 304 Business and Corporation Finance (4)

Analysis of business operations to determine type and amount of long term and short term financing. Comparison of alternative sources of financing. Analysis and evaluation of capital proposals. Emphasis on numerical problems and case studies. 4 lectures and case problems. Prerequisite: ACC 125, BUS 310.

FIR 305 Advanced Financial Management (4)

Theory and application of capital budgeting, treatment of uncertainty in financial decisions, and cost of capital theory. Case problems on financial decision making. 4 lectures and case problems. Prerequisite: FIR 304.

FIR 306 Real Property Systems (4)

Analysis of the fundamentals, nature, and classification of real property, emphasizing land utilization, urban study and growth, real estate market analysis, and property valuation. 4 lecture-discussion periods.

FIR 307 Fundamentals of Risk and Insurance (4)

Economics, legal and organizational aspects of insurance are investigated. Property insurance for personal and business uncertainties are covered. Emphasis is on the insurance mechanism as a tool for handling risk. Analysis and discussion of case problems dealing with current trends. 4 lecture-discussion periods.

FIR 308 Investments (4)

Mechanics of investment in insurance, real estate, industrials, railroads, public utilities, and financial institutions. Selection methods, fundamentals, and principles of investment analysis developed by project reports. 4 lectures.

FIR 310 Urban Land Utilization and Development (4)

Planning, estimating and development of real property. Emphasis will be on light and residential construction operations and subdivisions. 4 lectures.

FIR 317 Rights of Way—Acquisition and Appraisal (4)

Practical applications and methods of appraising. This includes related legal and economic background factors, vital concepts of market value, public use and public necessity, just compensation, severance damages, leasehold interests, specific case studies and other definite factors. 4 lectures. For engineering technology majors and other majors with permission of instructor.

FIR 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

FIR 401 Security Analysis and Management (4)

Analysis and evaluation of corporate securities and their price fluctuation. Portfolio management of various trust funds, mutual funds, and pension retirement plans. 4 lectures. Prerequisite: FIR 308.

FIR 402 Mortgage Banking (4)

Analysis of financial institutions and procedures involved in financing real estate, mortgage banking, and lending. Mortgage banking case problems. 4 lecture-discussion periods. Prerequisite: FIR 306.

FIR 403 Real Property Evaluation (4)

Analysis of various approaches to or measures of value of real property. Emphasis on urban properties; of value theory concepts through use of specific problems. Application of real property evaluation through demonstration reports. 4 lectures. Prerequisite: FIR 306.

FIR 404 Advanced Real Estate Appraisal (4)

The procedure appropriate to appraising business land, residential land, business buildings, residential structures and farm properties. Special reference will be made to scientific systems

developed to facilitate valuations. 4 lectures. Prerequisites: FIR 306, FIR 403.

FIR 406 Real Property Management (4)

A study of general practices, the legal aspects, and problem areas which are encountered by the professional property manager. 4 lectures. Prerequisites: FIR 304, FIR 305, FIR 412.

FIR 411 Life and Casualty Insurance (4)

Personal and business applications of the various types of life and casualty insurance coverages. Emphasis on estate planning, risk analysis and survey techniques. 4 lectures. Prerequisite: FIR 307.

FIR 412 Real Property Analysis (4)

Specific case or problem solving methods applied to various levels involved in analyzing investments, marketing, and urban growth as found in real property. Specific emphasis will be placed upon the physical, locational, and legal basis, and/or urban setting concepts of the value and use of real property. 4 lectures.

FIR 414 Social Insurance and Pension Plans (4)

Social aspects of insurance including the problems of old age, unemployment and disability will be investigated. Public and private solutions, including prevention and alleviation, will be explored. Emphasis will be on personal and business solutions relating to economic security. 4 lectures.

FIR 415 Risk Management (4)

Methods of handling risk and uncertainty as applied to the business organization. Assumption of risk, transfer of risk, self insurance, control of hazards, perils, and loss protection and prevention. Emphasis on tools and analysis of risk management using current problems and cases. 4 lectures. Prerequisite: FIR 307, 411.

FIR 416 Legal Aspects of Real Estate (4)

Rights and liabilities surrounding the acquisition, possession, and transfer of real property. Definition and description of land including: easements, deeds, zoning ordinances, mortgages, foreclosure actions, landlord and tenant. 4 lectures. Prerequisite: BUS 301.

FIR 417 Finance, Insurance and Bonding (4)

Analysis of construction operations to determine the types and amounts of financing selection of alternative sources using the tools of financial analysis. Insurance and risk problems of the construction industry including bonding and techniques to handle risk. 4 lectures. For engineering technology majors and other majors with approval of instructor.

FIR 418 Law of Estates and Trusts (4)

Legal problems concerning the disposal of estates of deceased persons by will and under statutes of descent and distribution, probating estates of deceased persons, creation of trusts both inter vivos and testamentary, duties and liabilities of trustees, rights of beneficiaries of trusts. 4 lectures. Prerequisite: BUS 301.

FIR 420 Institution Financial Management (4)

Application of financial management to the unique administrative problems of institutions such as cash flow, cost control, risk management, and capital funding from public and private sectors. 4 lectures and case studies. Prerequisite: FIR 304, 305, 307.

FIR 441, 442 Internship in Finance (1-8) (1-8)

On-the-job training in finance involving new, collegiate-level learning experiences. Experiences may be useful as a basis for senior projects. Prerequisite: Permission of the Coordinator of Business Internships.

FIR 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Formal report is required. Prerequisite: Senior standing. Required minimum of 120 hours.

FIR 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the student's major field. 2 lectures. Prerequisite: Senior standing or permission of instructor.

FIR 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

HOTEL AND RESTAURANT MANAGEMENT

The program in hotel and restaurant management has been designed to meet the growing need for managers in the rapidly expanding hotel and restaurant segments of the service sector of the American economy. Opportunities for building successful careers in these two fields are particularly good in the western states, including California.

The major focus of this program is to develop those managerial skills, abilities, and competencies essential to all professional managers as well as those unique to managers in the hotel and restaurant fields.

In addition to helping students develop basic managerial skills, majors in this program are expected to gain insight into the purchasing, control, preparation, and serving of food and to become knowledgeable about the economics and social aspects of the hospitality and leisure-time industries.

Laboratory experiences in foods and nutrition, interior design, and hotel and restaurant administration; field trips; individual and group projects; and practical work experience, gained via a supervised internship, are all important aspects of this program.

CORE COURSES FOR MAJOR

(Required of all students)

Principles of Accounting	ACC	124	(4)
Principles of Accounting	ACC	125	(4)
Business Law	BUS	301	(4)
Management Principles and Theory	BUS	307	(4)
Introduction to Data Processing	DP	211	(4)
Introduction to Leisure Industry	HRM	101	(4)
Senior Project	HRM	461	(2)
Senior Project	HRM	462	(2)
Undergraduate Seminar	HRM	463	(2)
Principles of Marketing Management	MKT	305	(4)
Principles of Marketing Management	MKT	306	(4)

Students are to select 21 units from the following with the consent of their advisor:

Meat Utilization	AS	327	(3)
Food Procurement	FN	224	(3)
Quantity Food Preparation	FN	331	(4)
Food Equipment and Layout	FN	427	(4)
Institutional Management	FN	436	(3)
Institutional Interiors	HE	307	(4)
Property Management	HRM	305	(4)
Hotel and Restaurant Management Law	HRM	310	(3)
Restaurant Management	HRM	405	(3)
Hotel Management	HRM	410	(4)
Travel Management	HRM	415	(3)

SUPPORT AND DIRECTED ELECTIVES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Business Statistics	BUS	314	(4)
Contributions Human Behaviorists to Business	BUS	418	(4)
Systems Analysis	DP	222	(4)
Principles of Economics	EC	201*	(4)
Principles of Economics	EC	202*	(4)
Freshman Composition	ENG	104*	(4)
Business and Corporation Finance	FIR	304	(4)
Advanced Financial Management	FIR	305	(4)
Introduction to Foods	FN	121	(4)
Nutrition and Physical Activity	FN	205	(3)
Food Services in Institutions	FN	337*	(4)
Introduction to Statistics	MAT	107*	(3)
Physical Education	PE	141*	(3)
Public Speaking	SP	100*	(4)
Natural Sciences			*(6)
Humanities			*(6)
Courses to complete general education requirements			** (10)
Electives			(56)

* May be used for the general education requirement. Select appropriate courses from general education list.

** Must include four courses from a minimum of two schools other than the School of Business Administration for fulfillment of the breadth requirements.

Course Descriptions

HRM 101 Introduction to the Leisure Industry (4)

Survey of the scope, history and interrelationships of hotel, restaurant, travel and leisure industries; the economic and social influences of leisure; vocational opportunities and limitations. 4 lectures.

HRM 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

HRM 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

HRM 305 Property Management (4)

Examines the technical, mechanical and economic aspects of hotel, motel, or restaurant management in the construction, renovation and maintenance of the physical plant; engineering and housekeeping staff coordination needed to maintain the desired environment. 4 lectures.

HRM 310 Hotel and Restaurant Management Law (3)

Fundamental elements of law which are of particular importance to hotels, restaurants, resorts and associated businesses; includes duties, rights and liabilities of the innkeeper-host and his guests. Cases. 3 lectures. Prerequisite: BUS 301.

HRM 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

HRM 405 Restaurant Management (3)

Management principles for restaurants, planning and organizing concepts; supervisory training, payroll analysis, merchandising approaches, cost control systems, scope and importance of restaurant industry, field trips to restaurants. 3 lectures. Prerequisite: HRM 101, BUS 307, FN 337.

HRM 410 Hotel Management (4)

Comprehensive study of management in the lodging industry; consideration of management responsibilities for planning, financial, promotional, personnel, and control functions; administrative techniques and procedures needed for effective operation of a hospitality system. Field trips. 4 lectures. Prerequisites: HRM 101, BUS 307.

HRM 415 Travel Management (3)

Comprehensive study of travel management; its principles, practices, philosophies and systems. Examination of tourism as a developing industry, its travel modes, organizations, laws and social and economic impact. Field trips. 3 lectures. Prerequisites: HRM 101, BUS 301, 307, MKT 305, 306.

HRM 441, 442 Internship in Hotel and Restaurant Management (1–8) (1–8)

On-the-job training in some phase of hotel, restaurant or travel. The experience must be new to the student. Analytical reports are made periodically to the faculty coordinator. One unit of credit is granted for each 150 hours of training. Units of college credit are dependent upon departmental approval. Prerequisite: HRM 101 and permission of the instructor.

HRM 461, 462 Senior Project (2) (2)

Management related on-the-job experience; selection of a typical current development or problem in the hotel, restaurant or travel industry; completion of the written project under faculty supervision. Prerequisite: senior standing. Required minimum 120 hours.

HRM 463 Undergraduate Seminar (2)

Study and discussion by students of their senior projects. Recent problems and developments in the students' major fields. Two seminar meetings. Prerequisite: senior standing or permission of the instructor.

HRM 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

MARKETING MANAGEMENT

_____, *Chairman*

Fred W. Cutler
James R. Hill
Arthur Johnsen
James C. Petersen
L. George Smith
Stanley B. Smith
Charles L. Taylor
Dolores A. Tomsic

The field of marketing management involves analysis of the ways business firms plan, organize, administer and control their resources to achieve marketing objectives. Business plans increasingly begin with consideration of market forces and opportunities as the basis for designing whole systems of action.

The curriculum focuses on market forces, growth and survival of firms in competitive markets, and the marketing strategy and tactics of the firm. Courses are oriented toward providing a basic knowledge of the tools, types of organization, and institutions utilized in performing various marketing functions; the student will develop the ability to solve problems and make decisions, to plan and implement marketing policies, strategies and procedures.

Through proper course selection, a student can develop specialized interests; this will prepare him for a career in general marketing management, selling and sales management, retail merchandising and management, market research and analysis, advertising and promotion management, physical distribution management, international marketing, or industrial marketing.

CORE COURSES FOR MAJOR

(Required of all students)

Introduction to Data Processing	DP	211	(4)
Systems Analysis	DP	222	(4)
Consumer Behavior	MKT	201	(4)
Marketing Communications	MKT	208	(4)
Principles of Marketing Management	MKT	305	(4)
Principles of Marketing Management	MKT	306	(4)
Adverting Management	MKT	307	(4)
Marketing Research	MKT	408	(4)
Marketing Problems	MKT	421	(4)
Senior Project	MKT	461	(2)
Senior Project	MKT	462	(2)
Undergraduate Seminar	MKT	463	(2)
(1) Major Electives			(20)

(1) The Major Electives Will Be Selected From:

Computer Applications In Managerial Science	DP	316	(4)
Retail Store Management	MKT	308	(4)
Marketing Logistics	MKT	309	(4)
Promotion Management	MKT	310	(4)
Industrial Marketing	MKT	407	(4)
International Business Envir.	MKT	413	(4)
International Marketing	MKT	414	(4)
Legal Environment of Marketing	MKT	419	(4)
Quantitative Methods in Marketing	MKT	420	(4)
Internship in Marketing	MKT	441	(1-8)
Internship in Marketing	MKT	442	(1-8)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Principles of Accounting	ACC	124	(4)
Introduction to Managerial Accounting	ACC	125	(4)
American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Business Law	BUS	301	(4)
Business Law	BUS	302	(4)
Management Principles and Theory Bus.	BUS	307	(4)
Intermediate Managerial Accounting	BUS	310	(4)
Business Statistics	BUS	314	(4)
Quantitative Analysis	BUS	315	(4)
Management Policies and Systems	BUS	410	(4)
Business Communications	COM	218*	(3)
Computer Programming Principles	DP	221	(4)
Principles of Economics	EC	201*	(4)
Principles of Economics	EC	202*	(4)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Business and Corporation Finance	FIR	304	(4)
Advanced Financial Management	FIR	305	(4)
Descriptive Statistics	MAT	107*	(3)
Physical Education	PE	141*	(3)
General Psychology	PSY	201*	(4)
Public Speaking	SP	100*	(4)
Natural Sciences		*	(6)

Humanities	* (7)
Other General Education Breadth Req.	**(6)
Electives	(28)

* May be used for the general education requirement. Select unspecified courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Business Administration for fulfillment of the breadth requirement.

Course Descriptions

MKT 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

MKT 201 Consumer Behavior

Analysis of psychological, sociological, cultural and economic determinants of the consumer decision process in a marketing context. The changing position of the consumer; causes of consumer discontent and effects on marketing policies. 4 lecture-discussions.

MKT 208 Marketing Communications (4)

Persuasive personal sales communications in behalf of products or services. Individual counseling on oral presentions. 4 lectures.

MKT 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

MKT 305, 306 Principles of Marketing Management (4) (4)

Meeting the firm's objectives by developing a marketing strategy that can best satisfy customers and society. Determination of decisions concerning product, price, promotion and distribution for given customer situations. Courses to be taken in sequence. 4 lecture-discussions.

MKT 307 Advertising Management (4)

Advertising as a communication tool in marketing management. Consideration of media strategy, campaign planning, budgeting evaluation of advertising effectiveness. Administration of the complete advertising program. 4 lecture-discussions. Prerequisite: MKT 306 or permission of instructor.

MKT 308 Retail Store Management (4)

Examination and evaluation of changing concepts of retailing from a management viewpoint. Philosophy of modern management and measures of retail productivity are employed in individual student field projects. 4 lectures, case study. Prerequisite: MKT 306.

MKT 309 Marketing Logistics (4)

Integration of transportation, warehousing and facility location for optimum performance of distribution systems relative to cost and customer service. Analysis and discussion of situation problems in logistical support of markets. 4 lectures. Prerequisite: MKT 306.

MKT 310 Promotional Management (4)

Examination of managerial strategies in dealing with personal selling, advertising, and sales promotion. Emphasis on buyer motivation and behavior, strategy for human and financial resources, media strategy and reseller support. 4 lectures. Prerequisite: MKT 208, 307.

MKT 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

MKT 407 Industrial Marketing (4)

Marketing structure for industrial goods and services. Written and oral analysis and defense of specific case problems. 4 lectures. Prerequisite: MKT 306.

MKT 408 Marketing Research (4)

Research process as an aid to decision-making in marketing. Fundamental techniques and practical experience in research methodology. Data sources, research design, sampling, investigation, analysis, and presentation of results of field projects. 4 lecture-discussions. Prerequisite: MKT 306, BUS 314.

MKT 413 International Business Environments (4)

Examination of major environmental factors and dynamic external forces which affect international business organizations. Reactions, responsibilities, and interrelationships of multinational business corporations and governments. 4 lectures. Prerequisite: MKT 306.

MKT 414 International Marketing (4)

Planning and organizing for international marketing operations. Cultural, economic and political influences on business arrangements in overseas markets and development of appropriate strategies. Analysis of management practices and problems. 4 lectures. Prerequisite: MKT 306.

MKT 419 Legal Environment of Marketing (4)

Analysis of dyamic social, economic and technological factors which influence the firm's strategies and decisions. Development of trade legislation and governmental agencies responsible for this legislation. 4 lectures. Prerequisite: MKT 306, BUS 302.

MKT 420 Quantitative Methods in Marketing (4)

Application of quantitative techniques to solving marketing problems. Decision theory, model building and analysis, correlation, regression, factor and discriminant analysis, for use in marketing information systems and decision-making. 4 lectures. Prerequisite: DP 221, MKT 306 BUS 315.

MKT 421 Marketing Problems (4)

Application of marketing theory to contemporary marketing problems. Emphasis on the techniques of successful marketing decision-making. Problem approach utilized to develop student's ability to integrate all major areas of marketing. 4 lecture discussions.

MKT 441, 442 Internship in Marketing (1–8) (1–8)

On-the-job training in marketing involving new, collegiate level learning experiences. One unit of credit for each 150 hours of training, not to exceed six units. Experience may be useful as a basis for senior project. Prerequisite: Permission of the Coordinator of Business Internships.

MKT 461, 462 Senior Project (2) (2)

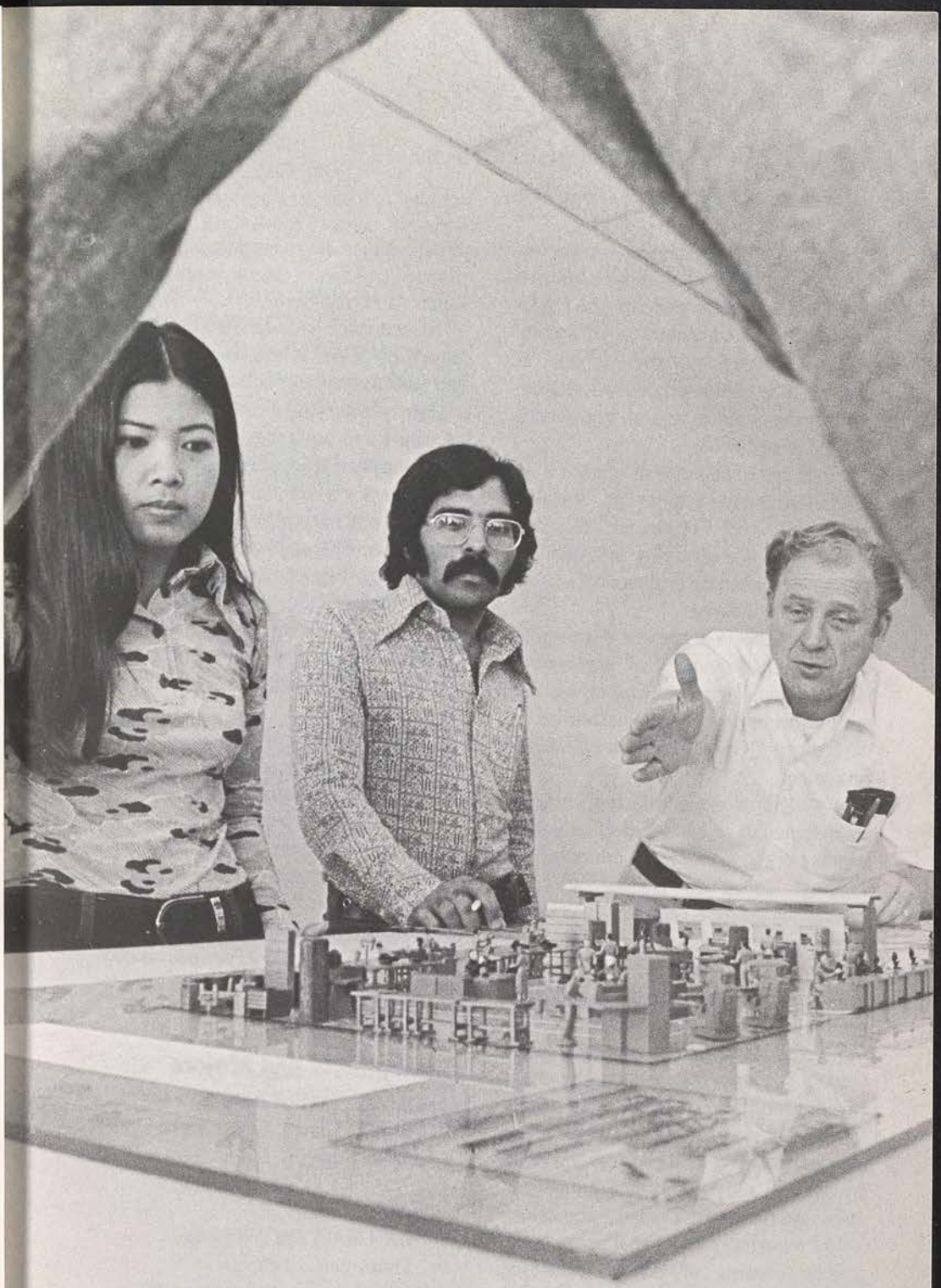
Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Formal report is required. Prerequisite: Senior standing. Required minimum of 120 hours.

MKT 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the students' major fields. 2 meetings. Prerequisite: Senior standing or permission of instructor.

MKT 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.



SCHOOL OF ENGINEERING

Rodney D. Sutherland, ***Acting Dean***

The School of Engineering is a professional engineering school whose purpose is to provide both undergraduate and graduate instruction in engineering. To accomplish its objectives, the School of Engineering is comprised of seven degree-granting departments and an engineering services department.

The degree of bachelor of science is offered in aerospace engineering, chemical engineering, civil engineering, electrical and electronics engineering, industrial engineering, mechanical engineering, and engineering technology.

The curricula in aerospace engineering, chemical engineering, civil engineering, electrical and electronics engineering, and mechanical engineering are accredited by the Engineers' Council for Professional Development.

All undergraduate engineering curricula are designed to give the student an understanding of the fundamental principles underlying scientific engineering and engineering practice. Each curriculum consists of four sequences: basic sciences and mathematics, humanities and social sciences, engineering sciences, and engineering analysis, design and systems.

Included in the basic sciences and mathematics sequence are general chemistry, covering inorganic chemistry and selected topics in organic and physical chemistry; physics, including both classical and modern physics; and mathematics through calculus and ordinary differential equations.

The humanities and social sciences sequence consists of American history, American government, principles of economics, and an elective group providing a means of broadening the perspective of the student in humanities.

The sequence in engineering sciences consists of studies in mechanics of solids, fluid mechanics, thermodynamics, transfer and rate mechanisms, electrical theory and the nature and properties of materials.

The engineering analysis, design and systems sequence is directed toward the creative and practical phases of economic design, involving analysis, synthesis, and engineering research and development. This sequence is the most distinctive feature of the engineering curricula, since it is the element of creative and economic design which distinguishes the engineer from the pure scientist.

Unlike the traditional engineering curricula which initiate course work in the major department in the junior year, engineering orientation courses begin in the freshman year, and are taken concurrently with mathematics, basic science and general education courses. Thus, the Cal Poly student obtains motivation and acquires knowledge of professional value in his chosen field as he progresses through his academic career.

Departments and Majors

AEROSPACE ENGINEERING
George R. Graves, Chairman
Aerospace major (BS)

CHEMICAL AND
MATERIALS ENGINEERING
C. James Barr, Chairman
Chemical Engineering major (BS)

CIVIL ENGINEERING
Ray Morales, Chairman
Civil Engineering major (BS); Options in Civil Engineering, Water Resources Engineering

ELECTRICAL AND ELECTRONICS ENGINEERING
Richard J. Hermsen, Chairman
Electrical and Electronics Engineering major (BS)

ENGINEERING SERVICE
Quay D. Ives, Chairman

ENGINEERING TECHNOLOGY
James P. Todd, Chairman
Engineering Technology major (BS)

INDUSTRIAL ENGINEERING
Joseph P. Wymer, Chairman
Industrial Engineering major (BS)

MECHANICAL ENGINEERING
Kenneth J. Schneider, Chairman
Mechanical Engineering major (BS)

AEROSPACE ENGINEERING

George R. Graves, *Chairman*
Donald C. Curran
Joseph W. McKinley
Conrade F. Newberry
Arthur G. Powell
Rodney D. Sutherland

Traditionally the aerospace engineer has been involved with the design and development of high speed vehicles such as aircraft, missiles and spacecraft. In recent years this list has evolved to include ocean vessels and high speed land vehicles. The extreme environments in which the above class of vehicles operate have dictated the construction of the most complex engineering systems devised by man. The aerospace engineer is confronted with problems which cannot be defined fully and require imaginative and sophisticated solutions.

The department offers a major in aerospace engineering. The major provides a broad background in the humanities and social sciences, mathematics, basic science, engineering science, analysis, design and systems. The basic concepts taught in the above areas are illustrated and reinforced by applications taken from current industrial practice. The advanced engineering (applied mechanics, computer applications, systems analysis, etc.) which has been pioneered by the aerospace industry is a mainstay of the program. Facilities available for experimental studies include subsonic and supersonic wind tunnels, environment simulation equipment, flight structures laboratory, and an aerospace construction laboratory.

Graduates of the program are prepared to do productive work in their first job as well as to grow with their profession throughout their engineering career. The curriculum is designed to prepare a student for direct entry into the engineering profession and for graduate school. The aerospace engineering curriculum is accredited by the Engineers' Council for Professional Development.

Aerospace engineering students have the opportunity to join the student branch of the American Institute of Aeronautics and Astronautics, a national society organized for the advancement of aerospace knowledge.

CORE COURSES FOR MAJOR

(Required of all students)

Aerospace Engr Fund	ARO	124	(2)
Aerospace Engr Fund	ARO	125	(2)
Aerospace Engr Fund	ARO	126	(2)
Theories of Experimentation	ARO	244	(2)
Intro to Engr Analysis	ARO	245	(2)
Intro to Engr Analysis	ARO	246	(2)
Vector Fluid Dynamics	ARO	301	(4)
Energy, Mass & Moment Trans	ARO	304	(4)
Engr Computer Applications	ARO	308	(4)
Gas Dynamics	ARO	311	(5)
Intro to Structural Mech	ARO	326	(4)
Aerospace Structural Mech	ARO	327	(4)
System Design	ARO	335	(4)
Dynamics of Aerospace Systems	ARO	409	(5)
Advanced Aerospace Analysis	ARO	444	(3)
Advanced Aerospace Analysis	ARO	445	(3)
Adv Aerospace Design Proj	ARO	446	(2)
Senior Project	ARO	461	(2)
Senior Project	ARO	462	(2)
Undergraduate Seminar	ARO	463	(2)
Vector Statics	ME	214	(3)
†Approved Electives			(16)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Life Science	BIO	110*	(3)
General Chemistry	CHM	111*	(3)
General Chemistry	CHM	112*	(3)
General Chemistry Lab	CHM	151*	(1)
General Chemistry Lab	CHM	152*	(1)
Principles of Economics	EC	201*	(4)
Elements of Elec Engr	EEE	231	(4)
Elec Instru & Control	EEE	333	(4)
Analog Comp Lab	EEE	343	(1)

Freshman Composition	ENG	104*	(4)
Engineering Graphics	ESG	121	(2)
Descriptive Geometry	ESG	125	(2)
Manufacturing Processes	ESM	221	(2)
Analytical Geom & Calc	MAT	114*	(3)
Analytical Geom & Calc	MAT	115*	(3)
Analytical Geom & Calc	MAT	116*	(3)
Calc & Differential Equa	MAT	214	(4)
Calc & Differential Equa	MAT	215	(4)
Calc & Differential Equa	MAT	216	(4)
Laplace Trans & Fourier Ser	MAT	317	(3)
Math Analysis of Engr Prob	MAT	318	(3)
Vector Dynamics	ME	215	(4)
Thermodynamics	ME	301	(4)
Materials Science	MTE	207	(3)
Physical Education	PE	141*	(3)
General Physics	PHY	131*	(4)
General Physics	PHY	132*	(4)
General Physics	PHY	133*	(4)
Basic Science Elective			(3)
Humanities		*	(8)
Social Science—Humanities		*	(7)
Electives			(6)

† To be selected with the approval of adviser.
* May be used for the general education requirements. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Engineering.

Course Descriptions

ARO 124 Aerospace Engr Fundamentals (2)

Application of basic engineering fundamentals to aerospace problems. Concepts of fluid flow. Instrumentation and operation of the subsonic wind tunnel. 2 three-hour laboratories.

ARO 125 Aerospace Engr Fundamentals (2)

The atmosphere, Archimedes' principle, properties of real fluids, viscosity, Reynolds' number, Stokes' law, laminar and turbulent boundary layers, effect of streamlining. 2 three-hour laboratories. Prerequisite: ARO 124.

ARO 126 Aerospace Engr Fundamentals (2)

Introduction to digital computation. Flow charting, computational error analysis, data evaluation and presentation. Solution of problems generated from the aerospace sciences. 1 lecture, 1 three-hour laboratory. Prerequisite: MAT 114.

ARO 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ARO 242 Aerospace Engr Fundamentals (3)

Fluid flow parameters, viscous flow characteristics, similarity parameters, boundary layer concepts. Planning of experiments, error analysis, data analysis by statistical and numerical methods. 1 lecture, 2 three-hour laboratories. Prerequisite: For transfer students who have completed a physics course equivalent to PHY 131.

ARO 244 Theories of Experimentation (2)

Planning of experiments, error analysis, checking and rejection of test data. Data analysis by statistical and numerical methods. Applications from the aerospace sciences. 2 three-hour laboratories. Prerequisites: ARO 125.

ARO 245, 246 Introduction to Engineering Analysis (2) (2)

Analytical and experimental approaches to the solution of engineering problems. Problem definition, modeling, analysis and evaluation. Applications from the aerospace sciences. 2 three-hour laboratories. Prerequisites: ARO 242, or 244, MAT 214, ME 214.

ARO 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

ARO 301 Vector Fluid Dynamics (4)

Properties of the continuum. Control volume and control surface concepts. Inertial and noninertial systems. Potential flow theory. Development and application of the Navier-Stokes equations. Boundary layer theory. 4 lectures. Prerequisites: ARO 125 or 242, PHY 132, MAT 318.

ARO 304 Energy, Mass and Momentum Transfer (4)

Kinetic theory. Transport properties. Transfer of momentum and energy in laminar and turbulent boundary layers. Energy transfer in high velocity, rarefied and dissociated flows. Energy transfer by conduction and radiation. Mass transfer, molecular diffusion, convection. 4 lectures. Prerequisite: ARO 301.

ARO 305 Aerodynamics (4)

Pressure distributions; airfoils, bodies of revolution. Thin airfoil theory; mappings. Wing characteristics; spanwise force and moment distributions, basic and additional lift effects, twist. Transonic flows; similarity parameters. 4 lectures, Prerequisites: ARO 301, 304.

ARO 308 Engineering Computer Applications (4)

Numerical methods in engineering. Algorithms. Interpolating polynomials, difference formulas, numerical differentiation and integration, matrix methods, linear systems. Solution of differential equations. Applications in the aerospace sciences. 4 lectures. Prerequisites: ARO 126, MAT 216.

ARO 311 Gas Dynamics (5)

Thermodynamic processes. One-dimensional compressible flow: area change, friction, heat addition. Normal and oblique shock waves. Nozzle and diffuser theory. Propulsion system analysis. Gas dynamics laboratory. 4 lectures, 1 three-hour laboratory. Prerequisites: ARO 301, ME 301.

ARO 326 Introduction to Structural Mechanics (4)

Vector statics for equilibrium. Engineering material properties, elasticity, plasticity, environmental effects, stress and strain. Uniaxial stress and deflection. Two- and three-dimensional states of stress and strain. Shear and moment diagrams, beam stresses and deflections. 4 lectures. Prerequisites: ME 214, MAT 215.

ARO 327 Aerospace Structural Mechanics (4)

Torsional shear stress and deflections. Pressure vessels. Column and instability theory. Theories of failure, statically indeterminate structures. Joints and connections. 3 lectures, 1 three-hour laboratory. Prerequisites: ARO 326, MAT 216.

ARO 328 Aerospace Structures (4)

Semi-monocoque structures, energy methods for deflections. Aerospace structural design, computer applications in structures. 3 lectures, 1 three-hour laboratory. Prerequisite: ARO 327.

ARO 335 System Design (4)

Techniques for the planning and design of complex systems. Needs analysis, information gathering, modeling, value theory, synthesis analysis, decision theory, optimization. Consideration of social, economic and environmental factors. 3 lectures, 1 three-hour laboratory. Concurrent: ARO 246, 308.

ARO 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ARO 404 Supersonic Aerodynamics (4)

Effects of compressibility; two-dimensional and conical supersonic flow fields; similarity concepts; solution of wave equations; shock expansion theory. 4 lectures. Prerequisite: ARO 311 or consent of instructor.

ARO 407 Aerospace Vehicle Performance (4)

Three dimensional rigid body motion methods of Newton and Lagrange. Euler Transformations. Performance analysis of aircraft, missiles and spacecraft. 4 lectures. Prerequisite: ARO 305, 409, MAT 318.

ARO 408 Computer Applications in Aerospace Structures (4)

Matrix operations. Stiffness and flexibility. Finite element properties, force method, stiffness method. Computer applications, advanced elements, structural dynamics, instabilities. 4 lectures. Prerequisites: ARO 308, 327.

ARO 409 Dynamics of Aerospace Systems (5)

Three-dimensional vector dynamics of aerospace systems; linear and angular momentum; Lagrangian dynamics; method of Euler; introduction to space vehicle motion. 4 lectures. Prerequisite: MAT 216, ME 216.

ARO 410 Hydronautics (4)

Statics and dynamics of ocean-surface craft and submersible craft; propeller and cavitation theory; hydrofoils, drag reduction; underwater propulsion systems. 4 lectures. Prerequisite: ARO 301 or conssent of instructor.

ARO 418 Atmospheric Pollution (4)

Application of engineering concepts to atmospheric pollution problems. Reaction kinetics. Diffusion. Atmospheric emissions; particulate, gaseous. Atmospheric boundary layer. Plume rise. Combustion; flame structure, droplet burning. Photochemical smog. Control concepts. 4 lectures. Prerequisites: ME 301, ARO 301 or consent of instructor.

ARO 426 Aerospace Surface Systems (4)

Aerospace fundamentals of high speed surface systems. Station-to-station concepts. Air cushion and tubeflight systems. Airload determination. Drag reduction. Propulsion systems and braking. Guideway considerations. Stability and control. 4 lectures. Prerequisites: ARO 301 or consent of instructor.

ARO 431 Experimental Stress Analysis (2)

Methods of measuring strain, deflection, acceleration, and velocity: strain gauge, mechanical transducer, brittle coating. Photoelastic techniques. Methods of dynamic stress analysis. Vibration measurement of natural frequency and normal mode shape. Laboratory and simulated flight test of aircraft structures and components. 2 three-hour laboratories. Prerequisite: ARO 327 or consent of instructor.

ARO 435 Experimental Techniques in Aerodynamics (2)

Test plan formulation. Pressure, temperature and force measurement. Test section calibration and correction. Subsonic and supersonic wind tunnel applications. 2 three-hour laboratories. Prerequisites: ARO 301, 311 or consent of instructor.

ARO 444 Advanced Aerospace Analysis (3)

Formulation of mathematical models for physical phenomena by vector and matrix methods. Coordinate systems and transformations. Free body methods. Generalized charge and generalized force techniques in system analysis. Virtual displacement techniques applied to steady state systems. 1 lecture, 2 three-hour laboratories. Prerequisite: ARO 301, 311, 327, 335, MAT 317. Concurrent: ARO 409.

ARO 445 Advanced Aerospace Analysis (3)

Formulation of mathematical models for unsteady state phenomena occurring in aerospace engineering. Numerical techniques of solution. Optimization and parametric studies of typical aerospace systems. 1 lecture, 2 three-hour laboratories. Prerequisite: ARO 444.

ARO 446 Advanced Aerospace Design Project (2)

Preliminary design of aerospace systems. System analysis. Design optimization. Design compromise in multi-disciplined systems. Verbal and written presentation of system design. 2 three-hour laboratories. Prerequisite: ARO 445.

ARO 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time. Concurrent: ARO 444.

ARO 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent engineering developments. 2 lectures. Concurrent: ARO 462.

ARO 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

CHEMICAL AND MATERIALS ENGINEERING

C. James Barr, *Chairman*
Christopher Caenepeel
Robert C. Feeney
William M. Harris
Edward C. Hohman
John L. Tomlinson

Chemical engineering is that branch of professional engineering which embraces the development and application of industrial processes and materials in which chemical and physical changes of material are involved. These changes are accomplished in a competitive economy to create products which are useful and essential to the modern world. Chemical engineering includes the design, development, and production of many products such as fuels and petrochemicals, plastics, fibers, paper, foods, building materials and pharmaceuticals.

The program blends the basic sciences with engineering disciplines to focus upon the design, development and engineering of industrial processes and plants. Students are well prepared upon graduation for beginning either their professional career or a program of graduate study.

The ECPD accredited curriculum provides courses leading to the B.S. degree with a major in chemical engineering. Each student is permitted 10 units of electives to provide emphasis in areas of his choice. The chemical engineering major includes, in addition to basic courses in chemistry, physics, mathematics, and electrical and mechanical engineering, a modern treatment of transport phenomena, unit operations and processes, thermodynamics, kinetics, design, engineering materials and economics. A senior research program enables the student to develop essential planning, experimenting and reporting skills in a subject of his choice. Extensive laboratory and test facilities exist for process and materials investigations, as well as complete pilot plant scale equipment for extended development and confirmatory studies.

Courses in materials engineering are offered by the department. These include studies in properties and behavior of engineering materials. Emphasis is placed on the atomic, molecular, and crystalline structure, the physical properties of solids, thermodynamic properties of materials, transport phenomena, reactions, and mechanical behavior. Problems in the preparation, properties, applications of ceramics, polymers, metals, and alloys are considered in light of scientific and engineering principles. The department's laboratories include facilities for metallography, heat treating, mechanical properties testing, materials joining, and non-destructive testing.

Students planning to enter the chemical engineering curriculum should take the maximum in high school or junior college in mathematics, chemistry and physics courses.

CORE COURSES FOR MAJOR

(Required of all students)

Chem Engr. Fundamentals	CHE	131	(2)
Fortre Prog Che Appl	CHE	132	(2)
Exp. Plan and Anal.	CHE	133	(2)
Stoichiometry	CHE	201	(3)
Energy Balances	CHE	202	(3)
CHE Thermo	CHE	302	(4)
CHE Thermo	CHE	303	(4)
Process, Kinetics and Cataly	CHE	304	(4)
Momentum Transport	CHE	311	(4)
Energy Transport	CHE	312	(4)
Mass Transport	CHE	313	(4)
Process Modeling	CHE	321	(4)
Unit Chemical Processes	CHE	401	(3)

Chemical Process Indus	CHE	402	(4)
Chem. Engr Proc Anal and Des	CHE	403	(4)
Advanced Unit Operations	CHE	421	(4)
Advanced Unit Operations	CHE	422	(2)
Senior Project	CHE	461	(2)
Senior Project	CHE	462	(2)
Undergraduate Seminar	CHE	463	(2)
Chem Proc Cont and Opt	CHE	471	(4)
Survey Matls Sci and Engr	MTE	233	(3)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
General Chemistry	CHM	111*	(3)
General Chemistry	CHM	112*	(3)
General Chemistry Lab	CHM	151*	(1)
General Chemistry Lab	CHM	152*	(1)
Organic Chemistry	CHM	211	(3)
Organic Chemistry	CHM	212	(3)
Quantitative Analysis	CHM	221	(4)
Organic Chemistry Lab	CHM	251*	(1)
Physical Chemistry	CHM	311	(4)
Physical Chemistry	CHM	312	(3)
Physical Chemistry	CHM	313	(3)
Principles of Economics	EC	201*	(4)
Ind Electr & Controls	EEE	231	(4)
Elect Instr & Control	EEE	333	(4)
Analog Comp Lab	EEE	343	(1)
Freshman Composition	ENG	104*	(4)
Engineering Graphics	ESG	121	(2)
Analytic Geom & Calculus	MAT	114*	(3)
Analytic Geom & Calculus	MAT	115*	(3)
Analytic Geom & Calculus	MAT	116*	(3)
Calc & Differential Equa	MAT	214	(4)
Calc & Differential Equa	MAT	215	(4)
Calc & Differential Equa	MAT	216	(4)
Vector Statics	ME	214	(3)
Vector Dynamics	ME	215	(4)
Strength of Materials	ME	218	(3)
Physical Education	PE	141*	(3)
General Physics	PHY	131*	(4)
General Physics	PHY	132*	(4)
General Physics	PHY	133*	(4)
Social Science elective			(4)
Humanities		*	(9)
†Mathematics Electives			(3)
†Electives			(10)

* May be used for the general education requirements. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Engineering.

† Upper division courses to be selected with adviser's approval.

Course Descriptions

CHE 131 Chemical Engineering Fundamentals (2)

Lectures and discussions of chemical engineering. Formulation and solution of elementary problems in material and energy balances. Laboratory work with basic unit operations, with emphasis on report writing. 1 lecture, 1 three-hour laboratory.

CHE 132 FORTRAN Programming with Chemical Engineering Applications (2)

Use of the computer in solving chemical engineering problems. Proficiency developed in writing FORTRAN programs. 1 lecture, 1 three-hour laboratory. Prerequisite: CHE 131.

CHE 133 Experimental Planning and Analysis (2)

Statistical methods in the planning and analysis of chemical engineering experimentation. Studies utilizing typical chemical process equipment, such as mass transfer columns, dryers, heat exchangers, fluid loops and mixers. 1 lecture, 1 three-hour laboratory. Prerequisite: CHE 132.

CHE 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

CHE 201 Stoichiometry (3)

Basic material and energy balances with emphasis on chemical engineering economics. Application of the digital computer to plant operation and to solving problems. 3 lectures. Prerequisite: CHE 123, CHM 112.

CHE 202 Energy Balances (3)

Energy calculations and laboratory experiments typical of many chemical engineering problems. Emphasis: the use and application of the first law of thermodynamics and energy balances in chemical reactions. 2 lectures, 1 laboratory. Prerequisite: CHE 201.

CHE 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

CHE 302 Chemical Engineering Thermodynamics (4)

The first and second laws of thermodynamics with applications to industrial chemical processes. Ideal gases. The phase rule. P-V-T relations of fluids, particularly non-ideal gases. Sensible heat, latent heat, heats of reaction and combustion, and heats of mixing. The calculation of thermodynamic properties from laboratory data. 4 lectures. Prerequisite: MAT 216.

CHE 303 Chemical Engineering Thermodynamics (4)

Thermodynamics of flow processes. Applications of the first and second laws to heat engines and heat pumps. Refrigeration using heat pumps, absorption and the Joule-Thompson effect. Thermodynamic analyses of processes. Phase equilibria of ideal and non-ideal systems. The Gibbs-Duhem equation. Chemical reaction equilibria. 4 lectures. Prerequisite: CHE 302.

CHE 304 Process Kinetics and Catalysis (4)

Chemical reaction kinetics of homogeneous and heterogeneous systems. Application to chemical reactor design and operation with emphasis on catalytic processes. 4 lectures. Prerequisite: CHE 303, CHE 311.

CHE 311 Momentum Transport (4)

Basic course in fluid mechanics with emphasis on real fluids, including topics in fluid properties, kinematics, and dynamics of fluid flow, friction, boundary conditions, classic flows and turbulence. 4 lectures. Prerequisite: CHE 202, 321.

CHE 312 Energy Transport (4)

Heat transfer with application to the unit operations of chemical engineering, including topics in energy transfer by conduction, convection and radiation in chemical process equipment. 3 lectures, 1 laboratory. Prerequisite: CHE 311.

CHE 313 Mass Transport (4)

Mass transfer and its application to the unit operations of chemical engineering, including topics in molecular diffusion, convective diffusion, simultaneous heat and mass transfer, distillation and extraction. 3 lectures, 1 laboratory. Prerequisite: CHE 304, 312.

CHE 321 Process Modeling (4)

Solution of problems starting with fundamental physical and chemical principles. Development of methods of solution of problems encountered in the study of transport phenomena. Treatment includes solution of ordinary differential equations by analytical, series, and computer methods. 4 lectures. Prerequisite: MAT 216.

CHE 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

CHE 401 Unit Chemical Processes (3)

Study of the individual unit processes involved in the complex overall industrial chemical process. Basic reactions, unit operations and equipment, and economic influences attending each unit process. 3 lectures. Prerequisite: Senior standing. Background in organic and physical chemistry, thermodynamics, and kinetics.

CHE 402 Chemical Process Industries (4)

Study of the total chemical manufacturing process. Analysis of major industrial chemical processes of the world, emphasizing the economic basis underlying their development. 3 lectures, 1 three-hour laboratory. Prerequisite: CHE 401.

CHE 403 Chemical Engineering Process Analysis and Design (4)

Economic and engineering principles guiding the selection of chemical processes, design of optimum flows and equipment and design of process operations and a plant. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 212, CHM 313, CHE 304, CHE 313

CHE 421 Advanced Unit Operations (4)

Applications of the topics previously introduced in the junior level transport courses, extended to include an analysis of multicomponent systems for both homogeneous and heterogeneous systems. 3 lectures and 1 three-hour laboratory. Prerequisite: CHE 313 and senior standing.

CHE 422 Advanced Unit Operations (2)

Experiments in the applications of transport theory to the unit operations of chemical engineering, including exercises requiring group planning, data gathering and treatment, report writing and oral defense of the reports. 2 three-hour laboratories. Prerequisite: CHE 421.

CHE 432 Chemical Engineering in Environmental Control (2)

Identification and development of solutions to problems created in the human environment by modern industry. Categorization and analysis of major influences imposed on the environment by industrial plants, by application of principles, equipment and techniques of chemical engineering. 1 lecture, 1 three-hour laboratory. Prerequisite: Senior standing.

CHE 461, 462 Senior Project (2) (2)

Formal encounter with a professional assignment, simulating the graduate chemical engineer at work, and culminating in a final engineering report. Prerequisite: Senior standing.

CHE 463 Undergraduate Seminar (2)

Research on, and presentation of, recent developments in chemical engineering. 2 lectures. Prerequisite: Senior standing.

CHE 471 Chemical Process Control and Optimization (4)

Introduction to theory and application of automatic control to chemical processes. Techniques for optimizing chemical process models. 3 lectures, and 1 three-hour laboratory. Prerequisites: CHE 321, EEE 333, EEE 343, or permission of the instructor.

CHE 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

MTE 124 Extractive Metallurgy (2)

Mineral dressing; fuels and refractories. Extractive methods involving pyrometallurgy, hydrometallurgy, and electrometallurgy. 2 lectures. Prerequisite: CHM 112.

MTE 207 Materials Science (3)

Engineering requirements of materials. Interatomic forces and the arrangement of atoms in materials. Imperfections in solids including dislocations. Phase equilibria and transformation. Relation between structural features and properties. 3 lectures. Prerequisite: CHM 112, MAT 116, PHY 132.

MTE 233 Survey of Materials Science and Engineering (3)

Introduction to the structure and properties of engineering materials. Application of basic principles of chemistry and physics to the study of crystalline and non-crystalline materials, including metals, alloys, and polymeric (plastic) materials, and to the selection and use of materials in engineering. 3 lectures. Prerequisite: CHM 201, Concurrent: ME 218.

MTE 234 Materials Joining (3)

Application and automation of welding processes in industry, related thermal effects and joint design. Welding of plastics. Adhesive bonding. Evaluation methods. Industrial safety related to subject areas. For Industrial Engineering majors. 2 lectures, 1 three-hour laboratory. Prerequisite: PHY 131. Concurrent: CHM 111.

MTE 238 Weldment Engineering (2)

Fundamentals of metal joining utilizing welding processes particularly applicable to the aerospace and electronics industries. Thermal effects of processes, effects of previous processing, evaluation, joint design, joint and process selection. For Aerospace and Electrical and Electronics Engineering majors. 1 lecture, 1 three-hour laboratory. Prerequisite: PHY 131.

MTE 251 Fundamentals of Art Welding (3)

Fundamentals of welding processes. Emphasis on skills and techniques required to develop competency to visualize the potentials and limitations in self-expression in the media of metals. 2 lectures, 1 three-hour laboratory.

MTE 304 Engineering Metallurgy (3)

Structure of metals. Constitutional diagrams. Relationship of properties and structure. Mechanical working. Thermal processing. Applications and designations of steel and light metals. Principles of metallography and laboratory practice. 2 lectures, 1 three-hour laboratory. Prerequisite: CHM 112, PHY 131.

MTE 305 Physical Metallurgy (4)

Basic principles underlying the structure and properties of crystalline solids. Metallic and covalent bonding theories; crystallography; solid solutions, intermetallic compounds and alloys. Crystal imperfections, elastic and plastic deformation. 4 lectures. Prerequisite: Material Science or Metallurgy course.

MTE 306 Advanced Physical Metallurgy (4)

Principles of solid-state reactions including elementary kinetics, nucleation and growth theory; annealing of cold-worked metals; diffusionless transformation, precipitation reactions and tempering; physical metallurgy of steels; relation

between properties and microstructure. Laboratory experiments related to phase transformations in steel and precipitation hardening. 3 lectures, 1 three-hour laboratory. Prerequisite: material science or metallurgy course.

MTE 311, 312 Metallurgy and Physics of Welding (4) (4)

Thermal behavior of metals during welding, effects of welding on the properties of metals. Examination of welding processes from metallurgical and properties viewpoints. 3 lectures, 1 three-hour laboratory. Prerequisite: A course in materials or metallurgy, and a course involving welding processes.

MTE 332 Polymeric Materials (4)

The composition, structure, and physical properties of polymers employed as structural and non-structural materials, with an emphasis on their physical state, elasticity, strength, and mass, thermal, and electrical transport properties. 3 lectures, 1 three-hour laboratory. Prerequisites: MTE 233 or MTE 304, ME 218, CHM 201.

MTE 337 Welding Fabrication and Design (3)

Introduction to welding design, including properties and geometry of welded joints. Consideration of thermal effects and previous processing. Application of selected welding processes. Automation related to design. Evaluation methods. Cost factors. 2 lectures, 1 three-hour laboratory. Prerequisite: ME 214, MTE 304.

MTE 423 Welding Engineering (4)

Case study method of evaluating welding engineering problems. Including but not limited to: electrical and electronic characteristics of welding power supplies and controls, codes and specifications, materials, design, processes, tooling, quality control, cost factors. 3 lectures, 1 three-hour laboratory. Prerequisites: MTE 312, 427.

MTE 424 Polymeric Materials in Industry (4)

An introduction to the materials engineering of non-crystalline materials for structural and non-structural applications. Glasses, plastics, fibers, rubbers, wood, paper, semi-solids, and viscous liquids. 3 lectures, 1 three-hour laboratory. Prerequisite: MTE 332.

MTE 427 Nondestructive Testing (4)

Physical principles of the various methods of nondestructive testing. Correct application of the various methods. Techniques. Results to be expected. 3 lectures, 1 three-hour laboratory. Prerequisite: PHY 132, 133 or 204, MTE 304 or 207.

MTE 431 Mechanical Behavior of Materials (4)

Mechanical behavior in processing and service related to elasticity, anelasticity, plasticity, superplasticity, strength, and failure. Dislocation mechanics in relation to yielding, strain hardening, crack initiation and propagation. Static and dynamic behavior at low and high temperatures. Materials selection of metallics, ceramics and composites to suit the mechanical-environmental situation. 4 lectures. Prerequisites: MTE 305, 332 or 304 along with ME 219.

MTE 443 Applied Welding (4)

Techniques of metal joining with the various processes. Selection of process, joint design, and evaluation methods. Cost estimating. 2 lectures, 2 three-hour laboratories. Prerequisite: A course involving welding principles.

MTE 451 Ceramic and Composite Materials (4)

Nature and properties of ceramic and composite materials. The atomic, micro-, and macrostructure of these materials related to their stability in electrical, mechanical and thermal environments. Laboratory exercises measuring mechanical and thermal properties. 3 lectures, 1 three-hour laboratory. Prerequisites: MTE 306 or 431 or permission of the instructor.

CIVIL ENGINEERING

Ray Morales, *Chairman*
Donald Breyer
John W. Comer
Fenton Harding
Donald W. King
Claude B. Ogle
Robert R. Schneider
Harrison P. Seuberling
James B. Thompson
Blaine Vogen
Donald G. Wells

The civil engineering program prepares graduates to enter the profession in design, construction, or maintenance capacities on such projects as freeways, highways, major buildings, dams, bridges, aqueducts, pipelines, airports, water supply, waste disposal, flood control, and urban development. The department offers a major in civil engineering with options in civil engineering and water resources engineering. The civil engineering option is fully accredited by the Engineers' Council for Professional Development. Students desiring to develop a background in the design and structural aspects of the profession should select this option.

The water resources engineering option provides the student with the opportunity to develop a background in the acquisition and uses of water.

Graduates are employed by governmental agencies at federal, state, and municipal levels and by contractors and private consulting firms. Other areas of employment are maintenance and sales engineering, teaching, research, materials testing, city planning, and administrative fields.

Many projects, including freeways, water supply and control facilities, waste disposal units, and new housing developments offer excellent opportunities for demonstration and practical applications of classroom and laboratory instruction.

CORE COURSES FOR MAJOR

(Required ofall students)

Civil Engineering	CE	122	(4)
Elementary Surveying	CE	134	(4)
Advanced Surveying	CE	135	(5)
COM PPAP, PP08Structural Analysis	CE	304	(3)
Structural Analysis	CE	305	(3)
Engineering Soil Mechanics	CE	323	(4)
Hydraulic Engineering	CE	332	(4)
Water Supply Engineering	CE	431	(4)
Water Quality Engineering	CE	432	(4)
Senior Project	CE	461	(2)
Senior Project	CE	462	(2)
Undergraduate Seminar	CE	463	(2)
Engineering Statics	ME	211	(3)
Engineering Dynamics	ME	212	(4)
Courses to complete major			(44)

OPTION COURSES FOR MAJOR

(Required for specific option)

General Civil Engineering

Transportation Engr	CE	221	(4)
Highway Engr Design	CE	222	(4)
Structural Design: Steel	CE	306	(4)
Struc Design: Rein conc	CE	421	(5)
Struc Design: Timber	CE	433	(3)
Elem of Elec Engr	EEE	231	(4)
Thermodynamics	ME	301	(4)
Engineering Materials in Design	ME	315	(4)
Technical Electives			(6)
Free Electives			(6)
† Technical Electives: Any engineering, mathematics or science courses in the 300 or 400-level			(6)

Water Resources Engineering

Ecology for Sanitary Engrs	BIO	305	(3)
Limnology	BIO	434	(3)
Resource Interchange Sys	CE	251	(4)
Indus & Radioactive Wastes	CE	434	(3)
Engineering Hydrology	CE	451	(4)
Water Quality Mgmt	CE	454	(3)
River & Coastal Engineering	CE	455	(3)
Nuclear Chemistry	CHM	436	(4)
Elem of Elect Engr	EEE	231	(4)
Climatology	ESC	303	(3)
Technical Electives			(4)
Free Electives			(6)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Life Science	BIO	110*	(3)
Economics of Engr Decisions	CE	302	(3)
Engr Law, Contracts & Specs	CE	403	(3)
General Chemistry	CHM	111*	(3)
General Chemistry	CHM	112*	(3)
General Chemistry Lab	CHM	151*	(1)
General Chemistry Lab	CHM	152*	(1)
Technical Writing	COM	219*	(4)
Principles of Economics	EC	201*	(4)
Freshman Composition	ENG	104*	(4)
Engineering Geology	ESC	321	(4)
Engineering Graphics	ESG	121	(2)

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Anal Geom & Calculus	MAT	114*	(3)
Anal Geom & Calculus	MAT	115*	(3)
Anal Geom & Calculus	MAT	116	(3)
Calc & Differential Equa	MAT	214	(4)
Calc & Differential Equa	MAT	215	(4)
Calc & Differential Equa	MAT	216	(4)
Statistical Methods in Engr	MAT	309	(3)
Strength of Materials	ME	218	(3)
Strength of Materials	ME	219	(3)
Fluid Mechanics	ME	311	(3)
Physical Education	PE	141*	(3)
General Physics	PHY	131*	(4)
General Physics	PHY	132*	(4)
General Physics	PHY	133*	(4)
General Psychology	PSY	201*	(4)
Humanities		*	(11)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Engineering.

Course Descriptions

CE 122 Civil Engineering (4)

Elementary digital computer programming for civil engineering problems. The technical, professional, and social responsibilities of the civil engineer. Engineering communications. 2 lectures, 2 three-hour laboratories.

CE 134 Elementary Surveying (4)

Use and care of surveying instruments, fundamental surveying methods, traverse measurements, area computations, precise equipment and topographic mapping. 2 lectures, 2 three-hour laboratories. Prerequisite: MAT 104 or equivalent.

CE 135 Advanced Surveying (5)

Astronomical observations. Theory of hydrographic, geodetic and control surveys. City and land surveys. Route location and layout. Simple, transition and vertical curves. Earthwork computations. Introduction to electronic and photogrammetric methods. 3 lectures, 2 three-hour laboratories. Prerequisite: CE 134.

CE 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

CE 221 Transportation Engineering (4)

History and operation of the several principal modes of transportation. The principal modes include highways, air, inland waterways, railroads, coastwise shipping and ocean transportation. Emphasis is placed on the financing and planning aspects of transportation. Special modes are also developed. 2 lectures, 2 three-hour laboratories. Prerequisite: CE 135 or consent of instructor.

CE 222 Highway Engineering Design (4)

Geometric design of highways; highway substructure design; roadway structural section; flexible pavement design; rigid pavement design; highway surface treatments and stabilization. 3 lectures, 1 three-hour laboratory. Prerequisite: CE 221.

CE 240 Additional Engineering Laboratory (1–2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 three-hour laboratories.

CE 251 Resource Interchange Systems (4)

Engineered systems for optimum beneficial use and management of water resources. Technical, aesthetic, and social aspects of water quality control. 3 lectures, 1 three-hour laboratory. Prerequisite: CE 122 or consent of instructor.

CE 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

CE 302 Economics of Engineering Decisions (3)

Principles governing the economic aspects of engineering decisions. Retirement and replacement studies. Effect of taxes on engineering decisions. 3 lectures.

CE 304 Structural Analysis (3)

Determination of shears, moments, and deflections in statically determinate structures such as beams, trusses, bents, and arches involving both graphical and analytical methods of solution by means of structural mechanics. 3 lectures. Prerequisite: ME 219.

CE 305 Structural Analysis (3)

Determination of forces, moments, and deflections of statically indeterminate structures such as beams, bents, and gabled frames utilizing the methods of virtual work, slope deflection, and moment distribution. 3 lectures. Prerequisite: CE 304.

CE 306 Structural Design—Steel (4)

Theory and practice in design, analysis, and detailing of structural steel members and their connections including beams, columns, trusses, and building frames in accordance with applicable material and building codes. Consideration of lateral load effects. Elements of plastic design. 3 lectures, 1 three-hour laboratory. Prerequisite: CE 305.

CE 323 Engineering Soil Mechanics (4)

Structure, identification and classification of soil for engineering purposes. Determination of physical properties of soils by laboratory experiments including consolidation, shearing strength, permeability. Application to problems. 3 lectures, 1 three-hour laboratory. Prerequisite: ESC 321.

CE 332 Hydraulic Engineering (4)

Principles of hydrostatics, hydrokinetics, and hydrodynamics. Problems involving dam analyses, flow in open channels, flow through pipes, pipe networks, pump-pipe-reservoir systems, surge tanks, water hammer, and turbines. 3 lectures, 1 three-hour laboratory. Prerequisite: ME 311.

CE 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

CE 403 Engineering Law, Contracts & Specifications (3)

Basic principles of law and contract documents as applied to civil engineering practices; varieties of construction contracts; relationship of owner, engineer and contractor. 3 lectures.

CE 421 Structural Design—Reinforced Concrete (5)

Analysis, design, and detailing of reinforced concrete structural elements including beams, columns, slabs, footings, and retaining walls. Elements of composite building design utilizing both working stress and ultimate strength design theories. Concrete usage as a construction material including its composition, proportioning and control, testing and strength. 4 lectures, 1 three-hour laboratory. Prerequisite: CE 306.

CE 423 Substructure Design (3)

Analysis and design of foundations and substructures. 3 lectures. Prerequisite: CE 421, 437.

CE 427 Photogrammetry (4)

Interpretation of aerial photographs. Stereoscopy. Application of aerial surveying to engineering problems, mapping. 2 lectures, 2 three-hour laboratories. Prerequisite: CE 134.

CE 429 Traffic Engineering (4)

Driver and vehicle characteristics. Origin and destination studies. Volume, speed and accident studies. Traffic control devices. Channelization design. Parking facilities design. Intersection design. Roadway lighting. Administration and financing of improvements. 3 lectures, 1 three-hour laboratory. Prerequisite: CE 222.

CE 431 Water Supply Engineering (4)

The hydrologic cycle and its influence on the natural distribution of water. Statistical methods for determination of water demand and for enhancing flood mitigation. Ground water and stream flow determinations for the economic design of a water supply system with special emphasis on collection, reservoir management, quality control, and public distribution of water. 3 lectures, 1 three-hour laboratory. Prerequisite: CE 332.

CE 432 Water Quality Engineering (4)

Characteristics of waste waters; analysis and treatment of sewage and industrial wastes. Basic design of waste treatment plants and sewerage systems. 3 lectures, 1 three-hour laboratory. Prerequisite: CE 431.

CE 433 Structural Design—Timber (3)

Analysis and design of timber structures, members, and connections in accordance with material and building code specifications. Consideration of lateral load effects upon design and detailing. 2 lectures, 1 three-hour laboratory. Prerequisite: CE 421.

CE 434 Industrial and Radioactive Wastes (3)

Source of industrial water pollutants; processes for prevention and treatment of industrial wastes. Elements of radioactive wastes and disposal methods. 2 lectures, 1 three-hour laboratory. Prerequisite: CE 432.

CE 437 Foundation Soil Engineering (4)

Consolidation of soil and settlement of structures. Strength properties of soil, stability of slopes. 3 lectures, 1 three-hour laboratory. Prerequisite: CE 323.

CE 442 Masonry Design (4)

Properties of clay brick and concrete masonry materials. Analysis and design of reinforced masonry members, and structural systems with emphasis on lateral force analysis of masonry structures and their connections. Reinforced masonry applications in high rise construction. 4 lectures. Prerequisite: CE 421.

CE 443 Flexible Pavement Design (4)

Study of asphalt materials; design control and testing of asphaltic mixtures; asphaltic concrete mix design; road-mix asphalt pavement control, design and test methods; surface treatments. 2 lectures, 2 three-hour laboratories. Prerequisite: CE 222, 323 or consent of instructor.

CE 451 Engineering Hydrology (4)

Modern hydrology related to surveys on water resources for the analyses of the magnitude and frequency of floods and prediction of dependable water supplies. Hydraulics of water movement in porous materials. 3 lectures, 1 three-hour laboratory. Prerequisite: CE 431.

CE 454 Water Quality Management (3)

Engineering aspects of quality management. Technological and economic feasibility of water renovation for return to the resource pool. The economics of regional water quality management. 3 lectures. Prerequisite: CE 432.

CE 455 River and Coastal Engineering (3)

Hydrology and sedimentation mechanics related to river hydraulics and multiple purpose river development. Estuarine waters and marine disposal of wastes. 3 lectures. Prerequisite: CE 432.

CE 456 Water Resources Development (4)

Optimum development of a drainage basin system. Basic water resources engineering subjects applied for the most advantageous use of available water. 3 lectures, 1 three-hour laboratory. Prerequisite: CE 432.

CE 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their field of employment. Presentation of project in a formal report. Minimum 120 hours total time. Prerequisite: Senior standing.

CE 463 Undergraduate Seminar (2)

Seminar discussion of new developments, policies, practices and procedures. Preparation and presentation by each student of an engineering development in his chosen field. 1 lecture, 1 three-hour laboratory. Prerequisite: Senior standing.

CE 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

ELECTRICAL AND ELECTRONICS ENGINEERING

Richard J. Hermsen, *Chairman*
Arthur Y. Arellanes
Melvin B. Belcherter
Robert A. Bruns
Jacob I. Castleman
Shu-Bing Chan
Henry M. Clanton
David L. Clark
Alan P. Felzer
Arthur Glenn
Richard J. Hermsen
Alben C. Johnson
A. Russell Knudsen
Seung P. Li
Wilbur W. Maves
James A. McAllister
John C. McMillan
George A. Mellard
Herbert Missler
Daniel J. Nesin
Norman S. Nise
John P. Palmer
Earl E. Schoenwetter
Harold P. Skamser
Owen K. Skousen
Donald B. Smedley
Arthur W. Sutton, Jr.
William O. Thomas
Gustav N. Wassel
Harry K. Wolf
William T. Wootton

Choosing a major in electrical and electronics engineering enables the student to prepare for a career in the application of science in that branch of engineering concerned with communications, electrical and electronic controls, computer design and application, ultrahigh frequency techniques, electrical and electronic metrology, and the generation, distribution and utilization of electrical power. The curriculum specifies units common to all electrical and electronics engineering majors. From the electrical and electronics engineering electives, the student may choose, with the approval of the department, a series of courses which provide additional professional development in either electrical power systems or electronics.

Graduates of this department are sought by a broad cross section of industry, government agencies, public utilities, marketing groups and educational institutions and are employed in design and development, in test and evaluation, in applied research, and in technical sales.

For this major the high school student should take a balanced program including mathematics and physical science. The transfer student should take courses which fulfill requirements of this curriculum, especially mathematics through calculus and the natural sciences.

Membership is available in a student branch of the Institute of Electrical and Electronics Engineers.

CORE COURSES FOR MAJOR

(Required of all students)

Intro to El & Elcs Engr	EEE	107	(4)
Intro to El & Elcs Engr	EEE	108	(4)
Physical Electronics	EEE	202	(4)
Network Theory	EEE	208	(4)
Network Theory	EEE	209	(4)
Electronics Lab	EEE	242	(1)
Comp Appl Elec Net	EEE	250	(2)
Network Lab	EEE	252	(1)
Network Lab	EEE	253	(1)
Basic Active Ckts	EEE	304	(4)
Linear Act. Ckts Des.	EEE	305	(4)
Wave Shaping Ckts Des.	EEE	306	(4)
Network Theory	EEE	308	(4)
Network Theory	EEE	309	(4)
Electromechanics	EEE	317	(4)
Electronic Engr. Instrumentation	EEE	324	(4)
Basic Active Circuits Design Lab	EEE	344	(1)
Linear Active Circuits Design Lab	EEE	345	(1)
Wave Shaping Circuits Design Lab	EEE	346	(1)
Computer Simulation	EEE	349	(2)
Electromagnetic Fields	EEE	402	(3)
Control Systems Engr	EEE	413	(3)
Systems Lab	EEE	442	(1)
Senior Project	EEE	461	(2)
Senior Project	EEE	462	(2)
Undergraduate Seminar	EEE	463	(2)
†EEE Restricted Electives			(16)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)

American Civilization	AMC	202*	(4)
General Chemistry	CHM	111*	(3)
General Chemistry	CHM	112*	(3)
General Chemistry Lab	CHM	151*	(1)
GeneralChemistry Lab	CHM	152*	(1)
Technical Writing	COM	219*	(4)
Principles of Economics	EC	201*	(4)
Spec Topics for EEE Engrs.	EGR	126	(3)
Freshman Composition	ENG	104*	(4)
Analytic Geom & Calc	MAT	114*	(3)
Analytic Geom & Calc	MAT	115*	(3)
Analytic Geom & Calc	MAT	116*	(3)
Calc & Differential Equa	MAT	214*	(4)
Calc & Differential Equa	MAT	215*	(4)
Calc & Differential Equa	MAT	216*	(4)
Advanced Math (Mat 300 or 400 Level)			(3)
Vector Statics	ME	214	(3)
Vector Dynamics	ME	215	(4)
Thermodynamics	ME	301	(4)
Engineering Materials	ME	314	(3)
Physical Education	PE	141*	(3)
General Physics	PHY	131*	(4)
General Physics	PHY	132*	(4)
General Physics	PHY	133*	(4)
General Psychology	PSY	201*	(4)
Basic Science Elective		†	(3)
Adv Science Elective		†	(3)
Humanities		*	(7)
Socio-Humanistic Elective		†	(4)
Engineering Elective		†	(6)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Engineering.

† Select with adviser's approval.

Course Descriptions

EEE 107 Introduction to Electrical and Electronics Engineering (4)

Modern engineering problem solutions. Linear and non-linear DC circuit analysis including topology and network solutions by computer. Methods and procedures associated with an electronics laboratory with emphasis on the use of modern test equipment and the reporting of test results. 3 lectures and 1 three-hour laboratory.

EEE 108 Introduction to Electrical and Electronics Engineering (4)

Selected topics and laboratory experiments designed to familiarize the student with the electrical and electronics engineering profession. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 107.

EEE 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

EEE 202 Physical Electronics (4)

Fundamentals of semiconductor physics, and devices. Physical characteristics of junctions, diodes, and transistors. Basic bias circuits for transistors. 4 lectures. Prerequisites: EEE 108 or EEE 210, MAT 214, PHY 133, CHM 111. Concurrent: EEE 242.

EEE 208, 209 Network Theory (4) (4)

An introduction to network analysis in the time and frequency domains with computer applications. 4 lectures. Prerequisites: MAT 214, EGR 126, PHY 133, EEE 108 or equivalent. Prerequisite or concurrent: MAT 215.

EEE 210 Introduction to Electrical and Electronics Engineering (4)

Introduction to the fundamental laws of electrical engineering, applications to D.C. circuit analysis, selected laboratory experiments emphasizing the use and operation of electrical test equipment, for transfer electrical engineering majors. 2 lectures, 2 three-hour laboratories. Prerequisite: Consent of instructor.

EEE 231 Elements of Electrical Engineering (4)

Electrical principles, DC and AC circuit analysis, simple transients, three phase circuits, introduction to semiconductors, AC-DC motor applications, industrial wiring practice, electrical instruments and measurements, for non-electrical engineering majors. 3 lectures, 1 three-hour laboratory. Prerequisite: MAT 116, PHY 133.

EEE 242 Electronics Laboratory (1)

Fundamental experiments concerned with the more common types of semiconductor devices. 1 three-hour laboratory. Concurrent or prerequisite: EEE 202.

EEE 250 Computer Applications to Electrical Networks (2)

Fortran computer programming for electrical and electronics engineers, problem-oiented computer language applications to electrical networks. 1 lecture, 1 one-hour recitation period. Prerequisite: EEE 108, or equivalent, may be taken concurrently with EEE 210.

EEE 252, 253 Networks Laboratory (1) (1)

Selected laboratory exercises in electrical engineering. 1 three-hour laboratory. Prerequisite or concurrent: EEE 208, 209.

EEE 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

EEE 304 Basic Active Circuits (4)

Biasing and thermal stability. Low and high frequency incremental models of bipolar and field-effect transistors. Basic configurations of amplifiers. Noise in amplifiers, feedback amplifiers. 4 lectures. Prerequisite: EEE 202, 242, 208; MAT 214. Concurrent: EEE 344.

EEE 305 Linear Active Circuit Design (4)

Integrated circuit technology, stability and oscillators, operational amplifiers, tuned amplifiers, large signal amplifiers, regulated power supplies, SCR power circuits. 4 lectures. Prerequisite: EEE 209, 304, 344, MAT 215. Concurrent EEE 345.

EEE 306 Wave Shaping Circuit Design (4)

Applications of active semiconductor electronic circuits, wave shaping, timing, digital, and pulse circuits. 4 lectures. Prerequisites: EEE 209, 304, 344, MAT 216. Concurrent: EEE 346.

EEE 308, 309 Network Theory (4) (4)

Analysis and synthesis of network functions in the time domain and frequency domain. 4 lectures. Prerequisite or concurrent: MAT 216 or equivalent. Prerequisite: EEE 209.

EEE 310 Environmental Test Engineering (2)

Study and operation of major environmental test equipment in the environmental lab (shock, vibration, acceleration, humidity, temperature, altitude, sound intensity). Test engineering instrumentation, calibration. Test laboratory organization, test procedures. 1 lecture, 1 three-hour laboratory. Prerequisite: EEE 253, 304, 344 or equivalent and consent of instructor.

EEE 311 Engineering Reports, Specifications, and Proposals (4)

Techniques of conveying and interpreting technical information, developing a facility with engineering language, both written and oral, reading drawings, making sketches, and reading schematics, technical proposals. Avoiding technical, legal and manufacturing pitfalls in engineering specification. 3 lectures, 1 discussion period. Prerequisite: ENG 104, EEE 210 or PHY 133, or equivalent.

EEE 313 Electric Machines (3)

Physical and electrical characteristics of the more common types of DC and AC machinery. Provides background facilitating selection of appropriate machine for a specific job. For non-electrical engineering majors. 2 lectures, 1 three-hour laboratory. Prerequisite: EEE 231.

EEE 317 Electromechanics (4)

Basic principles of electromechanical energy conversion, basic rotating machines, engineering considerations underlying machine ratings, applications and governing test codes and standards. General relationships with emphasis upon DC machines. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 209, 253.

EEE 318 Electromechanics (4)

Continuation of EEE 317 with emphasis upon AC machine analysis, operation and applications. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 317.

EEE 319 Electromechanics (4)

Continuation of EEE 317 and 318 with emphasis upon special purpose machines, new energy conversion devices, control circuits, transfer functions and the consideration of the machine as a component of a system. For Power Systems Engineering students. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 318.

EEE 324 Electronic Engineering Instrumentation (4)

Major types of instrumentation and techniques used in the measurement of electrical and non-electrical parameters, electronic circuits associated with instrumentation systems, sensors and data presentation methods. Statistical methods, applicable to measurements and information transmission. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 303, 344 or equivalent. EEE 305 recommended.

EEE 325 Underwater Electronics (4)

Electronic instrumentation for basic underwater measurements of flow, pressure, water analysis, etc. Data readout displays and recording. Data transmission from underwater sites. Principles of underwater acoustics. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 231, or equivalent and consent of instructor.

EEE 333 Electronic Instrumentation and Controls (4)

Magnetics, transformers, impedance matching, gain, phase measurement, frequency response, correlation to time response, major instrumentation used with sensor-actuator sys-

tems, for non-electrical engineering majors. 3 lectures, 1 three-hour laboratory. Prerequisites: EEE 231, MAT 215.

EEE 343 Analog Computers Lab (1)

Application of analog computer to solutions of engineering problems with emphasis on system simulation. For non-electrical engineering majors. 1 three-hour laboratory. Prerequisite: MAT 216, EEE 333 (EEE 333 may be taken concurrently).

EEE 344 Basic Active Circuits Design Lab (1)

Experimental determination of the important characteristics of audio and voltage amplifiers. Standard performance testing. One three-hour lab. Prerequisite: EEE 242, concurrent EEE 304.

EEE 345 Linear Active Circuits Design Lab (1)

Experimental determination of the important characteristics of tuned radio frequency power and voltage amplifiers, audio and RF oscillators. Standard performance testing. 1 three-hour lab. Prerequistite: EEE 344, concurrent EEE 305.

EEE 346 Wave Shaping Circuits Design Lab (1)

Experimental determination of the important characteristics of wave shaping circuits. Standard performance testing. 1 three-hour lab. Prerequisite: EEE 344, concurrent 306.

EEE 349 Computer Simulation of Dynamic Systems (2)

Analog and digital simulation of dynamic systems utilizing time and frequency modeling techniques. Signal flow graphs, transfer functions and state variables. 1 lecture, 1 laboratory. Prerequisite: EEE 308.

EEE 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

EEE 402 Electromagnetic Fields (3)

Static and quasi-static fields; laws of Coulomb, Gauss, Ohm, Faraday, Ampere; equations of electrostatic and magnetic fields, boundary value problems; introduction to time varying fields. Vector analysis used throughout. 3 lectures. Prerequisite: MAT 216; EEE 309.

EEE 404 Digital Systems Design (3)

Logical and Switching circuit design consisting of: applied Boolean algebra, functions and truth tables, number systems and binary arithmetic operations, combinatorial switching circuit simplification techniques, including topological nets and Karnaugh maps; adders and counters, coding, introduction to sequential circuit design. 3 lectures. Prerequisite: EEE 306. Concurrent: EEE 444.

EEE 405 Communications Engineering (3)

Unified treatment of various types of transmission systems with emphasis on the role of system bandwidth and noise in limiting the transmission of information. Information theory as applied to contemporary communication techniques. 3 lectures. Prerequisite: EEE 309, 324.

EEE 406 Electromagnetic Fields and Applications (3)

Continuation of EEE 402. Electromagnetic fields and Maxwell's equations. Transmission line equations and solutions. Smith charts, impedance matching. 3 lectures. Prerequisite: EEE 402, sequenced by EEE 446.

EEE 407 Advanced Circuit Design (4)

The practical design, testing, and evaluation of specialized circuits utilizing the latest and most advanced solid-state devices. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 309, 305.

EEE 408 Network Synthesis (4)

An introductory study of the methods used to develop circuits and networks that satisfy present conditions. Elements of realizability theory. Elements of transfer function synthesis. Maximally flat filters and Chebyshev filters. 4 lectures. Prerequisite: EEE 308, 309; MAT 317.

EEE 409 Communications Engineering (4)

Random noise and signal theory. Comparative performance analysis of information, transmission systems, introduction to digital communications. 3 lectures, recitation period. Prerequisite: EEE 404, 405.

EEE 410 Microwave Engineering (4)

Microwave generation, field theory, Maxwell's equations, boundary conditions, wave mechanics, coupling structures with emphasis on physical concepts and applications to specific laboratory measurements. 3 lectures and 1 three-hour laboratory. Prerequisite: EEE 402 and 406, or equivalent.

EEE 412 Solid State Electronics (4)

A unified treatment of the physical principles underlying electron devices, including the theory and application of solid state electronic devices, with considerable emphasis on recent developments in the field. 3 lectures, recitation period. Prerequisite: EEE 305.

EEE 413 Control Systems Engineering (3)

System modeling and performance specifications. Analysis and design of feedback control systems via root locus and frequency response techniques. State space analysis. 3 lectures. Prerequisite: EEE 309, 317, 349.

EEE 414 Control Systems Engineering (4)

Performance integrals. Design of series equalization. AC control systems. Continuation of state space analysis. Introduction to nonlinear and sampled-data systems. 3 lectures, 1 recitation period. Prerequisites: EEE 413. Concurrent: EEE 442.

EEE 415 Electronic Design (4)

Creative thinking and engineering analysis of electronic design problems. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 202, 305, 306, consent of instructor.

EEE 416 Electronic Instrument and Measurement Engineering (4)

Synthesis and analysis of measurement systems. Sophisticated instrumentation systems, sensors, signal conditioners. Data transmission, data presentation methods. Special applications in industry and science. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 305, 324.

EEE 417 Advanced Analog Computation (4)

Operation and design of analog computer components. EAC solution of linear and nonlinear ordinary differential equations, partial differential equations and simultaneous algebraic equations. System optimization. Introduction to hybrid computation. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 309, 413, 442.

EEE 418 Integrated Circuit Design (4)

Analytic treatment of integrated electronics. Active and passive elements in integrated circuits. Thin film technology. Oxide isolation. Vacuum systems. Integrated circuit processing. Designing with integrated circuits. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 305, 306, MAT 317.

EEE 420 Lasers (4)

Fundamental principles of lasers. Energy levels and mechanisms of excitation, basic types of lasers—Argon ion; He-Ne, CO_2, Pulsed Ruby, Semiconductor injection. Q Switching and modes. Laser Detectors. Use of Advanced Laser Technology in practical problems. 3 lectures, 1 recitation period. Prerequisite: EEE 202 and 304

EEE 421 Energy Conversion Systems Engineering (4)

Advanced and special methods of analysis of power systems, symmetrical components, representation of power systems, use of AC network boards, analog and digital computers for the solution of systems problems, power system transmission line concepts. 3 lectures, 1 three-hour laboratory. Prerequisite: Senior standing and EEE 319, or equivalent.

EEE 422 Energy Conversion Systems —Problems and Design (4)

System stability and fault conditions, specific design considerations, load flow studies, economic operation practices, standards and requirements governing industrial and utility systems operation. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 421.

EEE 425 Digital Circuits Design (4)

A systems approach to the design of combinational and sequential networks to perform specified computing functions. Hybrid computers and their applications. 3 lectures, 1 three-hour laboratory. Prerequisite: EEE 404, 444.

EEE 442 Systems Laboratory (1)

Selected laboratory exercises based upon the course work of EEE 413. 1 three-hour laboratory. Prerequisite: Senior standing, EEE 349, 413.

EEE 444 Digital Circuits Laboratory (1)

Selected laboratory exercises from topics covered in EEE 404. 1 three-hour laboratory. Prerequisite: EEE 346. Concurrent: EEE 404.

EEE 445 Communications Laboratory (1)

Demonstrations of the individual aspects of communication techniques. 1 three-hour laboratory. Prerequisite: EEE 349, 405

EEE 446 Electromagnetic Fields and Applications Laboratory (1)

Experimental consideration of the characteristics and behavior of VHF and UHF transmission lines. Stub matching and transmission line parameter measurements by several methods. 1 three-hour laboratory. Prerequisite: EEE 402, 406.

EEE 451 Industrial Electronics (1)

Selected engineering activity with industry. Design, test, evaluation, and analysis responsibilities of the junior engineer. 1 three-hour laboratory. Prerequisite: Senior standing, consent of instructor. May be repeated.

EEE 461, 462 Senior Project (2) (2)

Completion of a project under faculty supervision. Project results are presented in a formal report. Minimum 120 hours total time. Prerequisite: EEE 463.

EEE 463 Undergraduate Seminar (2)

New developments, policies, practices, procedures and ethics in Electrical and Electronics engineering. Each student is responsible for the preparation of an approved project proposal in the field of electrical and electronics engineering. 2 lectures. Prerequisite: Completion of all 100–300 level required courses. EEE 309 may be concurrent.

EEE 499 Special Topics For Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

ENGINEERING SERVICE

Quay D. Ives, *Chairman*
Bratcher L. Bright
Walter J. Ebersole
Daniel H. Fillhart
Edward D. Galbraith
Jack L. Pomeroy

Courses offered in engineering service provide students with an industrial orientation, basic skills, theoretical and practical knowledge, a fundamental understanding of technological concerns, and a base for the development of judgment referenced to manufacturing methods, processes, and operations. Emphasis is placed upon product planning, applied design and graphical representation, process control, economical utilization of materials, production techniques, machine capabilities and limitations as they are related to present day engineering and manufacturing enterprises.

Laboratories in the department are equipped with modern machine tools, attachments, instrumentation, and precision instruments for the construction of dies, tools, jogs, and fixtures. Punch presses, die-sinking machines, plastic presses and plastic mold-making equipment are provided. Manufacturing analysis demands that the student make use of mathematical concepts, industrial practices, computers, and the higher intellectual processes of analysis and problem solving to meet the present demands and future needs of industry.

Course Descriptions

ESM 221 Manufacturing Processes—Metal Removal (2)

An introduction to the principles of metal removal and the physics of metal cutting. The student studies tool geometry requirements of modern processes. Consideration of machine speeds, feeds, tolerances, and surface finish determinates as related to both manually and numerically controlled machines. 1-hour lecture; 1 three-hour laboratory.

ESM 222 Manufacturing Processes—Tool Selection (2)

Machine tools referenced to the study of cutting tool geometry, tool materials, cutting forces, feed, speed, surface finish, horsepower requirements, capacity, capability, efficiency, coolants, vibration, and machine tool evaluation with computer applications. 1 lecture, 1 three-hour laboratory. Prerequisite: ESM 221, or consent of instructor.

ESM 230 Manufacturing Processes—Forming and Assembling (2)

An overview of processes and operations employing pressure and temperature to shape metals by utilizing its plastic qualities. Basic sheet metal and pressworkings are used in the research, design, and manufacture of a marketable product. Emphasis is-placed upon analysis and synthesis of the problem-solving processes. 1-hour lecture; 1 three-hour laboratory.

ESM 327 Manufacturing Processes—Numerical Control (2)

Theory and application of the control of machines and manufacturing processes through the utilization of numerical control (N/C) systems. Course will relate basic manufacturing processes to the manual and computer assisted programming of N/C systems. The course will emphasize the influence of N/C systems on the engineering design of manufactured products. 1 lecture, 1 three-hour laboratory. Prerequisite: ESM 222 or equivalent experience.

ESM 438 Manufacturing Processes—Non-Metallic (2)

Review of rheology of thermoplastic and thermosetting materials. Processing of plastics by injection, compression, transfer molding. Mixing, laminating, vacuum forming, machining, and handling characteristics of plastics. Included are field trips to plastic processors. 1 lecture, 1 three-hour laboratory.

ESG 121 Engineering Graphics (2)

Functional graphic communication of engineering information including projection theory, sectional and auxiliary views, dimensioning, tolerancing, fastening devices, drawings for typical manufacturing methods, current drafting materials and practices. 2 three-hour laboratories. Prerequisite: One full year of high school mechanical drawing, or consent of instructor.

1229 1 23 9 300

ESG 125 Descriptive Geometry (2)

Study of spatial geometric relationships between lines and planes. Graphical solution of common problems encountered in descriptive engineering expression. 2 three-hour laboratories. Prerequisite: ESG 121.

ESG 210 Computer-Aided Drafting (2)

Application of the digital computer and plotter to engineering drafting. 2 three-hour laboratories. Prerequisite: ESG 121, 125.

ENGINEERING TECHNOLOGY

James P. Todd, *Chairman*

The department offers courses leading to a bachelor of science degree in engineering technology. The program has a flexible, broad curriculum to enable each student to match his talents and interests with a career objective, and emphasizes the upper division education of technology graduates from community colleges. Students having a certificate or an associate's degree in technology from a community college should be able to complete degree requirements in two additional years.

Engineering technology is concerned primarily with the application of established scientific and engineering knowledge and methods. Elective courses will permit each student to pursue an area of interest (e.g., electronics, construction, aero-mechanical, production drafting, manufacturing, etc.). An advisor will coordinate the curriculum for each student. All students will have required courses in the shops and laboratories where they learn to use instruments and equipment which are characteristic of their career objective. Fundamentals and basic engineering principles will be taught in terms of typical problems which require applied solutions for industry.

Industrial specialization in this country continues to increase the need for engineering teamwork, and engineering teams require both engineering technologists and engineers.

CORE COURSES

(Required of all students)

Engr Graphics	ESG	121	(2)
Descriptive Geometry	ESG	125	(2)
Manufacturing Processes	ESM	221	(2)
Manufacturing Processes	ESM	230	(2)
Electrical Technology	ETT	101	(4)
Comp Prog E.T.	ETT	110	(4)
Engineering Materials	ETT	207	(4)
Applied Mechanics	ETT	210	(4)
Strength Mat'ls E.T.	ETT	220	(4)
Materials Joining	ETT	234	(2)
Engr Econ Analysis E.T.	ETT	305	(4)
Applied Fluid Mechanics	ETT	310	(4)
Senior Project	ETT	461	(2)
Senior Project	ETT	462	(2)
Undergraduate Seminar	ETT	463	(2)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Life Science	BIO	110*	(3)
College Chemistry	CHM	104*	(3)
College Chemistry Lab	CHM	141*	(1)
Tech Writing	COM	219	(4)
Principles of Economics	EC	201*	(4)
Freshman Composition	ENG	104*	(4)
Trigonometry	MAT	104*	(4)
College Algebra	MAT	105*	(4)
Int Math Analysis	MAT	108*	(3)
Int Math Analysis	MAT	109*	(3)
Physical Education	PE	141*	(3)
College Physics	PHY	121*	(4)
College Physics	PHY	122*	(4)
College Physics	PHY	123*	(4)
Communication Arts Elective		*	(4)
Engineering Technology Elective			(56)
Humanities Electives		*	(8)
Math Elective		*	(4)
Social Science Elective			(4)
Electives			(22)

* Used to satisfy the general education requirements. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Engineering.

Course Descriptions

ETT 101 Electrical Technology (4)

Introduction to operation and application of basic electrical measuring instruments. D.C. and A.C. circuit applications involving resistance, inductance and capacitance. 3 lectures, 1 three-hour laboratory. Prerequisite: PHY 123 or equivalent.

1236 1 23 9 335

ETT 110 Computer Programming for Engineering Technologist (4)

Structure and operation of computer systems. Block Diagramming, Documentation and Programming problems applicable to the various fields of Engineering Technology. 2 lectures, 2 three-hour laboratories. Prerequisite: None.

ETT 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ETT 207 Engineering Materials (4)

Concepts of the structure and properties of materials and their relevance to industrial applications, properties of metals, ceramics, plastics, and composites, and semiconductors. 3 hours lecture and 1 three-hour laboratory. Prerequisite: CHM 104.

ETT 210 Applied Mechanics (4)

Introduction to the basic concepts of mechanics emphasizing the action of forces on rigid bodies and the response of those bodies to the applied forces. The first portion is devoted to the study of statics or stationary bodies followed by a study of forces acting on bodies in motion (dynamics). 4 hours lecture. Prerequisite: MAT 108, PHY 121.

ETT 220 Strength of Materials for Engineering Technology (4)

Stress-strain diagrams, tension and compression, working stresses and factors of safety, torsion in shafts, stresses in beams, riveted joints, welded connections, columns. 3 hours lecture, 1 three-hour laboratory. Prerquisite: ETT 210 or equivalent.

ETT 234 Materials Joining (2)

Methods of materials joining used in modern industry as applied to metals and plastics. Introduction to evaluation methods. 1 hour lecture, 1 three-hour laboratory. Prerequisite: CHM 104, PHY 121.

ETT 270, 370, 470 Engineering Technology Internship (4) (4) (4)

Supervised on-the-job engineering technology employment. Analytical reports of assigned tasks and relevant engineering technology publication reviews. One quarter by arrangement. Prerequisite: none.

ETT 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

ETT 305 Engineering Economics Analysis for Engr. Technology (4)

Fundamental principles and basic techniques of economic analysis of engineering and manufacturing projects. Topics such as costs and their estimation, time value of money, economic evaluation criteria, basic comparative models, and replacement analysis. Consideration of income taxes, risk, and intangibles. 4 hours lecture. Prerequisite: MAT 105 or equivalent.

ETT 310 Applied Fluid Mechanics (4)

Applied principles of fluid flow. Properties of fluids. Fluid impulse and momentum. Viscous flow in pipes and open channels. 4 hours lecture. Prerequisite: PHY 122, MAT 109.

ETT 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ETT 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their field of employment. Presentation of project in a formal report. Minimum 120 hours total time. Prerequisite: Senior standing.

ETT 463 Undergraduate Seminar (2)

Seminar discussion of new developments, policies, practices and procedures. Preparation and presentation by each student of his senior project. 2 hours seminar per week: ETT 462.

ETT 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

ETA 222 Aerospace Construction Laboratory (2)

Techniques, procedures, materials and tools involved with manufacture and maintenance of aerospace structures. Light metal forming, joining and riveting, piping. Use of plastics. 2 three-hour laboratories. Prerequisite: ESM 230, ETT 234.

ETA 301 Applied Aerodynamics (4)

The atmosphere, dynamics and thermodynamics of air, airspeed determinations, types of fluid flow, fluid friction, airfoil theory, wing theo-

ry, lift induced drag, parasite drag, power. 4 hours lecture. Prerquisite: ETT 310.

ETA 323 Wind Tunnel Testing (2)

Theory and operation of the subsonic and supersonic wind tunnel. Testing and instrumentation methods. Model design. Analysis of test results. 2 three-hour laboratories. Prerequisites: ETA 301.

ETA 324 Applied Aerospace Structures (4)

Aerospace vehicle load factors. Shear and moment computation, beam deflection. Analsis of thin web structural sections: bending, torsion, buckling. Truss analysis. 4 hours lecture. Prerequisite: ETT 220.

ETA 349 Aerospace Structures Laboratory (2)

Structural testing of aerospace vehicle components. Strain gage, photoelastic and stress coat methods. Instrumentation of components for testing. 2 three-hour laboratores. Prerequisite: ETA 324.

ETA 405 Principles of Flight (4)

Performance analysis of propeller and jet aircraft. Lift and drag analysis. Stability and control, static and dynamic balance, wing moments, operation of control surfaces. 4 lectures. Prerequisite: ETA 301.

ETC 101 Construction Engineering (3)

An introduction to Construction Engineering. An overview of the Construction Engineering program, the scope of the field of the field of construction engineering and the responsibilities of the construction engineer. 2 hours lecture, 1 three-hour laboratory. Prerequisite: None.

ETC 102 Construction Drafting (3)

Structural, topographic, plan and profile and surveying drawing practices. Line and lettering work, use of drafting machines and office practices are stressed. 1 lecture, 2 three-hour laboratories. Prerequisite: ESG 101.

ETC 301 Equipment and Facilities Cost Analysis (3)

Fundamental principles and basic techniques of cost analysis of equipment and facility ownership, retirement and replacement considering the time value of money, income taxes and risk. 3 hours lecture. Prerequisite: None.

ETC 310 Rights of Way—Appraisal and Acquisition (3)

Principles of rights of way and industrial property assessment, appraisal and acquisition. 3 hours lecture. Prerequisite: None.

ETC 311 Structural Theory (3)

Fundamentals of structural analysis for beams, trusses and frames. Static and dynamic effects on statically determinate structures. 3 lectures. Prerequisite: ETT 220.

ETC 312 Construction Equipment and Methods (4)

Construction procedures, job planning layout and scheduling, selection and application of construction equipment to building and heavy construction projects. 3 hours lecture, 1 three-hour laboratory. Prerequisite: None.

ETC 313 Construction Costs and Estimates (4)

Construction costs and estimates of building and heavy construction from the point of view of the construction engineer. Estimating procedures considering equipment, labor, material and overhead costs. 3 hours lecture and 1 three-hour laboratory. Prerequisite: None.

ETC 315 Timber & Formwork Design (4)

Design of timber structure elements and their connection. Design of formwork and shoring for the construction of concrete structures. 3 hours lecture, 1 three-hour laboratory. Prerequisite: ETC 311.

ETC 402 Contracts, Plans and Specifications (4)

Basic principles and detailed review of design drawings and contract documents, including plans, specifications and agreements involved in the construction of facilities. 3 lectures, 1 three-hour laboratory. Prerequisite: ETC 102.

ETC 405 Construction Planning and Cost Control (4)

Methods and procedures used in planning, scheduling and cost control related to construction projects. Principles of Critical Path Method (CPM) techniques will be emphasized. 3 lectures, 1 three-hour laboratory. Prerequisite: ETT 110.

ETC 406 Construction Organization and Management (4)

Contractor's policies and procedures used for centralized and/or job-site management of construction projects. Personnel job descriptions and assignments, and their relationship to the functional structure of an organization. Material procurement and control. 3 lectures, 1 three-hour laboratory. Prerequisite: None.

ETC 411 Foundations and Soil Mechanics (3)

Selection and methods of installation of foundations and other soil-supported structures. Footings, piles, caissons, retaining structures, soil embankments and fills. 2 lectures, 1 three-hour laboratory. Prerequisite: ESC 321 or equivalent.

ETE 102, 103 Electrical Circuits (4) (4)

D.C. and A.C. circuit analysis involving resistance, inductance and capacitance. Basic magnetic circuits. Theory of operation and application of basic electrical measuring instruments. 3 hours lecture, 1 three-hour laboratory. Prerequisite: ETT 101 or equivalent, MAT 104 or equivalent.

ETE 203, 204, 205 Electronic Devices and Circuits (4) (4) (4)

A study of vacuum, gaseous and semiconductor electronic devices. Operating characteristics, parameters, biasing and circuit applications, algebraic and graphical analysis of circuits. 3 lectures, 1 three-hour laboratory. Prerequisite: ETE 103 or equivalent.

ETE 270 Electrical Installations (4)

Familiarization with practical electricity, power requirements, distribution components, and central circuitry. Determination of required cable and switch sizes and component capabilities. Development of adequate schematics and drawings. Coordination of national, state, and municipal codes and industrial specifications with job requirements. 3 lectures, 1 three-hour laboratory. Prerequisite: ETT 101 or equivalent.

ETE 300 Electrical Power Circuits (4)

Single and polyphase circuit concepts as applied to electrical power systems. Magnetic circuits and transformers. 3 lectures, 1 three-hour laboratory. Prerequisite: ETE 103 or equivalent.

ETE 303 Switching and Waveshaping Circuits (4)

A study of pulse, waveshaping and switching circuits primarily related to digital computers. Multivibrators, pulse and switching amplifiers, special waveshape generators. 3 lectures, 1 three-hour laboratory. Prerequisite: ETE 205 or equivalent.

ETE 314 Linear Amplifier Circuits (4)

Thermal stability, small signal equivalent circuits, multistage and large signal amplifiers, frequency response, feedback amplifiers and oscillators. 3 lectures, 1 three-hour laboratory. Prerequisite: ETE 204 or equivalent.

ETE 315 Logic Systems (4)

Introduction to Boolean algebra and theory of logical systems. Implementation of digital logic elements and memory devices. Application of logic circuits in computers. IC logic modules. 3 lectures, 1 three-hour laboratory. Prerequisite: ETE 303 or equivalent.

ETE 318 Integrated Circuits (4)

Fabrication techniques of monolithic, film and hybrid circuits. Linear integrated circuit applications. 3 lectures, 1 three-hour laboratory. Prerequisite: ETE 314 or equivalent.

ETE 320 Electrical Machines (4)

A.C. and D.C. machines including associated equipment and control circuits. Machine ratings, test methods and industrial standards. 3 lectures, 1 three-hour laboratory. Prerequisite: ETE 300 or equivalent.

ETE 430 RF Measurements (4)

Electronic measurement equipment and techniques for measurements at radio frequencies of such quantities as power, impedance, standing wave ratio, frequency, voltage, and current, Smith Charts, impedance matching, radio receiver measurements, antenna measurements. 2 hours lecture, 1 three-hour laboratory. Prerequisite: ETE 315 or equivalent.

ETE 435 Industrial Communication Systems (4)

Industrial Communication Systems. Telemetry, modulation and detection, multiplexing, SSB and other common types of RF transmission, video communication, radar and wire systems. 3 hours lecture, 1 three-hour laboratory. Prerequisites: ETE 315, ETE 430.

ETE 438 Microwave Techniques (4)

Microwave safety, generation, transmission, wave guides, wave guide components and measurements. Microwave measurement systems and techniques. 3 lectures, 1 three-hour laboratory. Prerequisite: MAT 109, ETE 430, or consent of instructor.

ETE 440 Industrial Computer Systems (4)

Study and operation of logic subsystems of digital computers. Adders, counters, sequential circuits, etc. Computer organization, working with I/O, memory, control and arithmetic units of a computer. 3 hours lecture, 1 three-hour laboratory. Prerequisites: ETE 303 or equivalent.

ETE 448 Digital Computer Operations (4)

Operation, maintenance and trouble shooting of computers. Familiarization with logic and circuit documentation used in solving problems. Peripheral equipment and service routines. 3

lectures, 1 three-hour laboratory. Prerequisite: ETE 440.

ETE 450 Developmental Testing (4)

Evaluation and qualification of electromechanical components and systems under individual or combined ambient conditions. Developing performance specifications, procedures, techniques, and instrumentation pertinent to this function; utilizing, calibrating, and maintaining these systems. 2 lectures, 2 three-hour laboratories. Prerequisites: ETM 330 or consent of instructor.

ETM 306 Applied Thermodynamics (4)

Applications of fundamental concepts of work, heat, and energy. Basic power and refrigeration cycles, and reciprocating machines. First and second law of thermodynamics as applied to engineering technologist. Use of generalized charts and handbooks in solving thermodynamic problems. 4 hours lecture. Prerequisite: PHY 123, ETT 210.

ETM 308 Applied Heat Transfer (3)

Survey of the application of empirical and algebraic equations used in the solution of practical and laboratory type of heat transfer problems. Includes three modes of heat transfer: conduction, convection, and radiation. 3 lectures. Prerequisite: ETM 306.

ETM 315 Machine Elements (3)

The practical application of the fundamentals of mechanics and the strength of materials to the design of machine elements. 3 lectures. Prerequisite: ETT 207, ETT 220.

ETM 324 Applied Mechanisms (4)

A study of the elements of mechanisms: cams, gears, kinematics. 2 lectures, 2 three-hour laboratories. Prerequisite: ESG 121, ETT 210.

ETM 330 Instrumentation Applications (3)

Application of engineering measurement techniques, pressure gages, calibration and servicing, strain gages and strain indicators, pressure transducers and instrumentation, thermocouples and instrumentation. 2 lectures, 1 three-hour laboratory. Prerequisite: PHY 123, ETT 101 or equivalent.

ETM 334 Applied Heating and Air Conditioning (4)

Installation of heating and air conditioning units. Types available. Layout of associated ducting and plumbing. Systems balancing. Controls. 3 lectures, 1 three-hour laboratory. Prerequisite: ESG 121 or equivalent.

ETM 335 Heating and Air Conditioning (4)

Thermal environmental requirements for human habitation. Psychrometrics. Building heating and cooling loads. Air-handling equipment. 3 hours lecture, 1 three-hour laboratoy. Prerequisite: ETM 306, ETT 310.

ETM 340 Internal Combustion Engines (3)

Theory and performance of internal combustion engines including spark ignition, diesel and gas turbine. Operation of carburetion, ignition and cooling systems. Selection and rating of fuels. 3 lectures, 1 three-hour laboratory. Prerequisite: ETM 306.

ETP 276 Production Control (4)

Principles of planning and controlling production activities; product devlopment, forecasting, scheduling and loading, routing, material control, dispatching, progress reporting and corrective action. Design of production control systems. 3 lectures, 1 three-hour laboratory. Prerequisite: None.

ETP 279 Engineering Cost Accounting (4)

Fundamental concepts, definitions and terminologies of engineering cost accounting. Basic techniques and policies commonly employed in engineering cost accounting systems by industry. 3 lectures. 1 three-hour laboratory per week. Prerequisite: None.

ETP 305 Manufacturing Engineering Technology Supervision (3)

An in-depth study of technological and professional specialization in engineering supervision within manufacturing engineering. This course will cover processes, materials, tooling, tool control, quality control, methods, production as focal points of concern in manufacturing engineering management. 3 lectures. Prerequisite: junior standing.

ETP 307 Manufacturing Engineering Technology Management (3)

An in-depth study of technological and professional specialization in engineering management within manufacturing engineering. This course will cover systems, product, forecasting, sales, plant layout, production as focal points of concern in manufacturing engineering management. 3 lectures. Prerequisite: junior standing.

ETP 308 Applied Metallurgy (4)

Structural and phase changes resulting from plastic deformation and thermal treatments. Application economics in the selection of metals and metallurgical processing. 3 lectures, 1 three-hour laboratory. Prerequisite: ETT 207.

ETP 323, 324 Production Drafting (2) (2)

Continuation of engineering graphics with emphasis upon industrial practice. Preparation of working drawings. 2 three-hour laboratories. Prerequisite: ESG 121 or equivalent.

ETP 325, 326 Metrology (2) (2)

Methods used in industrial measurement with emphasis upon precision measuring instruments and measurement using light waves. Application of metrology to industrial manufacturing quality control. 1 lecture, 1 three-hour laboratory. Prerequisite: None.

ETP 334 Materials Joining (2)

Consideration of materials and relative cost factors in the selection and application of joining processes. 1 lecture, 1 three-hour laboratory. Prerequisite: ETT 207, ETT 234 or equivalent.

ETP 335 Production Welding (4)

Production welding applications considered in terms of codes and specifications and production cost. Preparation of detailed welding procedures. 2 lectures, 2 three-hour laboratories. Prerequisite: ETP 334.

ETP 355, 356 Production Machining (2) (2)

Precision machining operations with emphasis on methods used in mass production. Cutting tools and fluids used in production machining. Selection of machines and tooling for production operation. 1 lecture, 1 three-hour laboratory. Prerequisite: ESM 221 or equivalent.

ETP 365, 366 Pressed Metal Technology (2) (2)

A study emphasizing the techniques in pressed metal design. Machine types, characteristics, and capabilities are stressed with reference to function and economical factors. Hot and cold working of materials. 1 lecture, 1 three-hour laboratory. Prerequisite: ESM 230.

ETP 371 Production and Facilities Planning (4)

Concepts and methods of planning engineering projects, production programs, and plant layouts and facilities. Loading and scheduling, product and process planning, facilities analysis, layout planning, and materials analysis. 3 lectures, 1 three-hour laboratory. Prerequisite: ETP 276 or equivalent.

ETP 372 Printed Circuit and Electronic Packaging Technology (4)

Fundamental principles and basic techniques of manufacturing with particular emphasis on printed circuit and electronic packaging technology. Topics such as process and product development procedures, wiring techniques, circuit packaging, materials and processes, costs. 3 lectures, 1 three-hour laboratory. Prerequisite: ETE 314.

ETP 373, 374 Tool and Die Technology (2) (2)

An introduction to tool and die fundamentals. Function, components, and appropriate manufacturing techniques are stressed. Die life, maintenance, storage, and safety are included. 1 lecture, 1 three-hour laboratory. Prerequisite: ETP 355 and 365.

ETP 375, 376 Quality Assurance (2) (2)

Quality planning, analysis and control. Inspection systems, process control techniques, and acceptance sampling methods. Use of statistical and other methods for assuring desired quality levels. 2 lectures; 1 lecture, 1 three-hour laboratory each. Prerequisite: MAT 107.

ETP 377 Systems Engineering and Operations Analysis (3)

Study and use of systems engineering methods. Analysis, application and computation of statistical methods and mathematical programming procedures to engineering and industrial systems. 2 lectures, 1 three-hour laboratory. Prerequisite: MAT 107.

ETP 381 Foundry Techniques (2)

Design and production of patterns. Sand system and metallurgical properties influencing castings. Thermal control and heat treating of casting to achieve engineering properties. Gate and riser design. Students will work with sand, investment, centrifugal and die casting. 1 lecture, 1 three-hour laboratory. Prerequisite: IE 134, ETT 207.

ETP 385, 386 Numerical Control (2) (2)

Advanced numerical control systems including positioning and contouring metal cutting machines. Application of numerical control to industrial manufacturing processes, including computer-aided manufacturing. 1 lecture, 1 three-hour laboratory. Prerequisite: ESM 327.

ETP 404 Manufacturing Engineering Technology Administration (3)

A current appraisal of knowledge, understanding, skill and judgment required of an administrative manufacturing engineering in the areas of processes, materials, tool and control, operations, plant layout and material handling, quality control, methods, product and production as forms of manufacturing engineering. 3 lectures. Prerequisite: junior standing.

ETP 432 Applied Weld Design (4)

Design and performance of welded joints. Effects of variations in materials and processes and their relation to tooling. 3 lectures, 1 three-hour laboratory. Prerequisite: ETT 210, ETT 234, ETP 308.

ETP 433 Welding Design Applications (2)

Case studies of design of weldments, brazements and tooling. 2 three-hour laboratories. Prerequisite: ETP 432.

ETP 437 Nondestructive Testing (4)

Discontinuities in materials and their detection. Process principles and equipment for radiographic, magnetic particle, penetrant, and eddy current methods. Reference to other processes. Radiation health physics. 3 lectures, 1 three-hour laboratory. Prerequisite: ETT 207.

ETP 470 Computer-Aided Manufacturing (3)

A synthesis of computer utilization in manufacturing engineering. N/C, automation, cybernetics, data systems, CAD/CAM, and computer simulation. 2 lectures, 1 three-hour laboratory. Prerequisite: junior standing.

ETP 473, 474 Project Planning and Control (2) (2)

Concepts and techniques for planning, scheduling and controlling of projects. Use of analytical methods such as activity analysis, critical path method. PERT, resource allocation, Line of Balance, learning curves and decision-making under uncertainty. 1 lecture, 1 three-hour laboratory each. Prerequisite: senior standing.

INDUSTRIAL ENGINEERING

Joseph P. Wymer, *Chairman*
Leonhard M. Myers
John D. O'Neil
Robert A. Quaney
Panchatcharam Ramalingham
Richard H. Schippers
J. Garrard Wright

The industrial engineering major prepares graduates for a variety of assignments in industry such as manufacturing engineering, production planning and control, plant layout and materials handling, methods and standards, quality control, operations research, systems and procedures, engineering liaison, and other duties concerned with improving efficiency and quality.

Emphasis is placed on planning the use of tools and equipment rather than on designing the equipment; on the production method and quality of the product rather than on designing the product itself; and on the managerial and financial aspects of planning, production, and sales. The industrial engineer considers not only the functions of tools and equipment, but also the behavior of people as they operate together in organizations.

Instruction is realistic and characteristic of the requirements of industry. Many local industries have permitted students to work on projects in their plants.

CORE COURSES FOR MAJOR

(Required of all students)

Industrial Engineering Fund	IE	111	(4)
Process Design	IE	128	(4)
Work Analysis and Design.....	IE	224	(4)
Work Analysis and Design.....	IE	225	(4)
Production Plng and Control..	IE	236	(4)
Indus Costs and Controls.....	IE	239	(5)
Indus Engr Math Anal.....	IE	311	(3)
Ele of Ind Engr Sys	IE	327	(4)
Plant Layout & Design	IE	331	(4)
Plant Layout & Design	IE	332	(2)
Engineering Economy	IE	405	(3)
Quality Control by Stat Met ..	IE	415	(4)
Intro to Oper Research	IE	416	(4)
Intro to Oper Research	IE	417	(4)
Reliability Concepts & Tech ..	IE	419	(3)
Industrial Computer Sys	IE	428	(4)
Industrial System Design	IE	429	(4)
Senior Project	IE	461	(2)
Senior Project	IE	462	(2)
Undergraduate Seminar	IE	463	(2)
Industrial Engr electives.....			(3)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Life Science	BIO	110*	(3)
General Chemistry	CHM	111*	(3)
General Chemistry	CHM	112*	(3)
General Chemistry Lab.....	CHM	151*	(1)
General Chemistry Lab.....	CHM	152*	(1)
Technical Writing	COM	219*	(4)
Principles of Economics	EC	201*	(4)
Principles of Economics	EC	202*	(4)
Elements of Elec Engr	EEE	331	(4)
Elect Inst & Contr	EEE	333	(4)
Freshman Composition.....	ENG	104*	(4)
Engineering Graphics	ESG	121	(2)
Anal Geometry & Calculus	MAT	114*	(3)
Anal Geometry & Calculus	MAT	115*	(3)
Anal Geometry & Calculus	MAT	116*	(3)
Calc & Differential Equa.....	MAT	214	(4)
Calc & Differential Equa.....	MAT	215	(4)
Calc & Differential Equa.....	MAT	216	(4)
Stat Methods in Engr	MAT	309	(3)
Vector Statics.....	ME	214	(3)
Vector Dynamics.....	ME	215	(4)
Strength of Materials.....	ME	218	(3)
Strength of Materials.....	ME	219	(3)
Engineering Metallurgy	MTE	304	(3)
Physical Education	PE	141*	(3)
General Physics.....	PHY	131*	(4)
General Physics.....	PHY	132*	(4)
General Physics.....	PHY	133*	(4)
General Psychology	PSY	201*	(4)
Literature or Philosophy		*	(6)
Engr Science Electives			(11)
Basic Science Electives			(4)

* May be used for general education requirements. Select appropriate courses from general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Engineering.

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Course Descriptions

IE 111 Industrial Engineering Fundamentals (4)

Introduction to industrial engineering concepts, functions and techniques. Fundamentals of digital computer methods; logic diagramming; FORTRAN programming. Solution of elementary industrial engineering problems. 3 lectures, 1 three-hour laboratory.

IE 128 Process Design (4)

Development of the methods of manufacture of the product design so that the product can be produced at a competitive price. Evaluation of alternative methods of processing relative to delivery, volume, and quality specifications. Capabilities and limitations of commonly used industrial processes. 3 lectures, 1 three-hour laboratory.

IE 134 Molding and Casting (2)

Shaping of metals while in the liquid state; common molding and casting techniques for both ferrous and non-ferrous materials and alloys. 1 lecture, 1 three-hour laboratory.

IE 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

IE 214 Industrial Incentives (3)

Types of incentives used in industry. Individual and group incentive plans, bonus plans, and suggestion systems. 3 lectures. Prerequisite: IE 224, 225.

IE 224, 225 Work Analysis and Design (4) (4)

Theory and application of work analysis as related to process design, facilities, work place layout, tools and equipment and services. Analytical techniques of measurement of work content including stopwatch time study, micro-motion study, predetermined time systems, and work sampling. Survey of man's psychological and physiological characteristics and how they influence engineering and design of machines and man-machine systems. 3 lectures, 1 three-hour laboratory.

IE 234 Manufacturing Systems and Standards (4)

Plant location, selection and utilization of plant equipment, materials handling and flow, principles of plant layout. Theory and application of work analysis as it relates to facilities layout, work place layout, tools, and equipment. Analytical techniques of the measurement of work content including stop watch, predetermine time systems, and work sampling. 3 lectures, 1 three-hour laboratory.

IE 236 Production Planning and Control (4)

Principles of planning and controlling manufacturing activities. Product development, forecasting, scheduling and loading, process planning and routing, materials planning and control, dispatching, progress reporting, and corrective action. Quantitative methods. Design of planning and control systems. Case studies of actual systems. 3 lectures, 1 three-hour laboratory. Prerequisite: IE 111.

IE 239 Industrial Costs and Controls (5)

Engineering approach to cost recording, budgetary procedures and controls. Estimating production costs. Engineering problems used to teach fundamentals. Current techniques in mechanizing the cost recording and cost control functions. 3 lectures, 2 three-hour laboratories. Prerequisite: IE 236.

IE 299 Special Topics For Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

IE 311 Industrial Engineering Mathematical Analysis (3)

Applications of linear equations, matrices, and determinants to the solution of industrial engineering problems. Mathematical analysis of the results of changing manufacturing and distribution parameters to improve quality and/or to reduce costs. Discussion of some nonlinear mathematical relationships between production variables. 3 lectures. Prerequisite: MAT 215 or consent of instructor.

IE 324 Production Engineering (3)

Review of the principles of design as applied to a product. Product redesign based on the use of cost analysis and value engineering principles. The design and development of a detailed plan. Selection of production processes, sequence of operations, equipment, facilities, methods, tool plans, and requirements. 2 lectures, 1 three-hour laboratory. Prerequisite: ESG 121, IE 128, 236 or equivalent.

IE 325 Production Engineering (3)

Designing the required tools—jigs, fixtures, dies, special purpose tools, and numerical control programs—required to provide economy and the quality of manufacturing required. Designing tools for automated manufacturing processes, integrated methods, transfer mechanisms, etc. Design of production accessories, electromechanical tooling devices. Review of tool manufacturing techniques. 2 lectures, 1 three-hour laboratory. Prerequisite: ESG 121, IE 128, 236 or equivalent.

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IE 327 Elements of Industrial Engineering Systems (4)

Concepts and principles of system engineering theory as related to the large scale human system problem. Introduction to the theory and methodology of the engineered system. Development of analytic techniques to establish needs, objectives, priorities and utilities, and the evaluation of system effectiveness. 3 lectures, 1 three-hour laboratory. Prerequisite: MAT 116, MAT 309, IE 311 or consent of instructor.

IE 331, 332 Plant Layout and Design (4) (2)

Planning and designing plant layouts, physical requirements, and material handling systems. Use of quantitative analysis techniques. Projects. 331: 3 lectures, 1 three-hour laboratory; 332: 1 lecture, 1 three-hour laboratory. Prerequisite: IE 128, IE 236, MAT 309 recommended.

IE 400 Special Problems For Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

IE 405 Engineering Economy (3)

Techniques for comparing the relative economies of engineering and manufacturing investments. Use of the scientific method and compound interest and depreciation formulas to compare alternatives before and after federal income taxes. Increment and sunk costs; retirement and replacement studies; sensitivity analysis; concepts of cash flow and capital rationing; consideration of intangibles. 3 lectures. Prerequisite: Junior standing in engineering courses.

IE 415 Quality Control by Statistical Methods (4)

Systems of inspection, analysis and action taken to control manufacturing processes. Process control techniques, acceptance sampling methods, statistical analysis and other techniques used by management to control costs and improve quality. 4 lectures. Prerequisite: MAT 309.

IE 416 Introduction to Operations Research (4)

Application of statistical methods, linear programming, queuing and other analysis techniques to problems encountered in industry. 4 lectures. Prerequisite: IE 311, MAT 309.

IE 417 Introduction to Operations Research (4)

Development and application of planning and inventory models, network techniques, Markov analysis, waiting lines, simulation and scheduling algorithms to problems encountered in industry. 4 lectures. Prerequisite: IE 416.

IE 419 Reliability Concepts and Techniques (3)

Reliability concepts and techniques as they are used in various types of industrial organizations. Analysis of the influence of reliability on such factors as complexity, state of the art, environment and workmanship. Component reliability related to systems requirements. 3 lectures. Prerequisite: IE 415.

IE 427 Computer Programming of Numerical Control Machines (4)

Theory and application of digital computer methods for the programming of control systems for numerically controlled machines. The basic systems and procedures for standard programming methods (APT, AD-APT, Autoprops, Split, Pronto, etc.) are examined and compared. Actual experience with at least one programming system will be obtained in the laboratory. 2 lectures, 2 three-hour laboratories. Prerequisite: ESM 327.

IE 428 Industrial Computer Systems (4)

Provides basic familiarity with digital and analog computers. How computers function and the range of industrial applications for which they are appropriate. Integration, evaluation, and design of computer-centered systems. 2 lectures, 2 three-hour laboratories. Prerequisite: Junior standing, computer programming course.

IE 429 Industrial Systems Design (4)

Systems analysis, design and measurement. Data gathering and analytical tools used in formulating and optimizing work systems. Theory of systems concepts based on logical synthesis and empirical analysis. Case studies and industrial simulations. 3 lectures, 1 three-hour laboratory. Prerequisite: IE 327, 428, MAT 309.

IE 446 Die Casting (1)

Principles and techniques of hot chamber and cold chamber die casting. Comparison of the relative economy of die casting with other methods of manufacturing the same parts. Fundamentals of die design and construction. 1 three-hour laboratory. Prerequisite: IE 134.

IE 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a for-

mal report. Minimum 120 hours total time. Prerequisite: Senior standing.

IE 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent engineering developments. 2 lectures. Prerequisite: Senior standing.

IE 499 Special Topics For Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

MECHANICAL ENGINEERING

Kenneth J. Schneider, *Chairman*
Robert L. Beardmore
Leonard Berkowitz
John R. Biddle
Charles E. Cartmill
George F. Engelke
Harold H. Ford
James D. Goodin
Charles J. Kessler
Gary W. Koonce
E. Richard Mertz
Thomas S. Morris
Harvey A. Mylander
Edwin H. Williams
Darryl C. Zell

Mechanical engineering encompasses the creation and development of equipment, machines, products and all mechanical devices and things which are concerned with making useful power. The interrelation of wheels, gears, levers, and strength and heat characteristics of structural materials are explored. Breadth, individuality and flexibility are prime characteristics of mechanical engineering.

Graduates in mechanical engineering obtain employment with manufacturers, contractors, public utilities, and government agencies, working in design, development, production, testing, maintenance, marketing, sales, administration and are associated with areas such as mass transportation, automotive and industrial pollution and emissions control, air conditioning and refrigeration, biomedical engineering, hydraulics, electromechanical controls and ocean engineering.

During the junior and senior years students may choose approved electives in any recognized engineering discipline or any area related to engineering practice. The department offers technical electives in the areas of advanced machine design, nuclear engineering, heat and power, environmental engineering, advanced vibrations, creativity, and human engineering. Principles developed in the classroom are applied to the operation and testing of heat transfer equipment, fluid-handling apparatus, heat power equipment, internal combustion engines, and engineering materials.

The high school student preparing for a career in mechanical engineering should take a balanced high school program including mathematics, physical sciences, mechanical drawing, and industrial arts. It is now possible for the community college transfer to complete a B.S. degree at Cal Poly in six quarters (four semesters) after transferring. The junior college student planning to transfer into this department should consult with his school counselor or contact the department at Cal Poly concerning courses which meet the accredited curriculum requirements of the Engineers' Council for Professional Development.

CORE COURSES FOR MAJOR

(Required of all students)

Mechanical Engr Fund	ME 131	(4)
Engr Digital Computations	ME 132	(2)
Intro to Mechanical Design	ME 133	(4)
Vector Statics	ME 214	(3)
Vector Dynamics	ME 215	(4)
Strength of Materials	ME 218	(3)
Strength of Materials	ME 219	(3)
Thermodynamics	ME 301	(4)
Thermodynamics	ME 302	(4)
Fluid Mechanics	ME 311	(3)
Fluid Mechanics	ME 312	(4)
Heat Transfer	ME 313	(4)
Vector Dynamics	ME 316	(2)
Stress Analysis	ME 319	(4)
Machine Design	ME 325	(4)
Synth of M.E. Problems	ME 340	(3)
Mechanical Vibrations	ME 413	(4)
Adv Engineering Meas	ME 435	(3)
Senior Project	ME 461	(2)
Senior Project	ME 462	(2)
Undergraduate Seminar	ME 463	(2)
Technical Electives		(4)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC 201*	(4)

American Civilization	AMC	202*	(4)
General Chemistry	CHM	111*	(3)
General Chemistry	CHM	112*	(3)
General Chemistry Lab	CHM	151*	(1)
General Chemistry Lab	CHM	152*	(1)
Principles of Economics	EC	201*	(4)
Elem of Elec Engr	EEE	231	(4)
Electric Machines	EEE	313	(3)
Elec Instr & Control	EEE	333	(4)
Freshman Composition	ENG	104*	(4)
Engineering Graphics	ESG	121	(2)
Descriptive Geometry	ESG	125	(2)
Manufacturing Processes	ESM	221	(2)
Manufacturing Processes	ESM	230	(2)
Engineering Economy	IE	405	(3)
Analytic Geom & Calculus	MAT	114*	(3)
Analytic Geom & Calculus	MAT	115*	(3)
Analytic Geom & Calculus	MAT	116*	(3)
Calc & Differential Equa	MAT	214	(4)
Calc & Differential Equa	MAT	215	(4)
Calc & Differential Equa	MAT	216	(4)
Engineering Metallurgy	MTE	304	(3)
Welding Fabrication & Des	MTE	337	(3)
Physical Education	PE	141*	(3)
General Physics	PHY	131*	(4)
General Physics	PHY	132*	(4)
General Physics	PHY	133*	(4)
Basic Science Elective		*	(6)
Humanities Electives			*(10)
Math Elective (300 and 400 series)			(3-4)
Social Science Electives		*	(4)
Technical Electives			(11-12)
Electives			(3)

* May be used for the general education requirement. Select unspecified courses from the general education list. For general education breadth requirements, select four courses from a minimum of two schools other than the School of Engineering.

Course Descriptions

ME 131 Mechanical Engineering Fundamentals (4)

Fundamentals of mechanical engineering experimentation, instrumentation, computation, and data presentation. The use of basic concepts of dimension, time, temperature, pressure, motion and energy in problem solutions and laboratory measurements. Preparation of formal engineering reports from laboratory experiments performed with instruments found in general use in industry. 2 lectures, 2 three-hour laboratories.

ME 132 Engineering Digital Computations (2)

Problems involving basic computational methods including elementary concepts of digital computer programming. Proficiency will be gained in writing computer programs using fortran. Assignments include the use of the College's computer facilities. 1 lecture, 1 three-hour laboratory.

ME 133 Introduction to Mechanical Design (4)

Introduction to machine and product design techniques and the design and selection of power transmission elements such as couplings; U-joints; roller and silent chains; V, flat and gear belts; gears and gear transmissions; cams, and friction drives. The execution of layouts and engineering specifications for manufacture. 2 lectures, 2 three-hour laboratories. Prerequisite: ESG 120 or 121.

ME 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ME 201 Statics for Architects (2)

A course tailored to the needs of architects. Involves a classical approach to equilibrium in two- and three-dimensional frames and trusses; cables; beams. 2 lectures. Prerequisite: PHY 123, MAT 109.

ME 202 Strength of Materials for Architects (4)

A course tailored for architects. Shear and moment diagrams; analysis of axial, transverse and bending stresses in structural members including beams, columns and shafts; riveted and welded joints; introduction to repeated loading and fatigue. 4 lectures. Prerequisite: ME 201.

ME 211 Engineering Statics (3)

Classical treatment of statics. Resultants and resolution of forces. Two- and three-dimensional equilibrium, trusses, frames and machines, dry friction. Centroids and centers of gravity of composite areas and bodies. Moments of inertia of areas and masses. Parallel axis theorem and radius of gyration. For majors in EEE, CHE, CE, IE, MAT and ESC. 3 lectures. Prerequisites: PHY 131, MAT 115, or MAT 141.

ME 212 Engineering Dynamics (4)

Classical treatment of dynamics. Kinematics and kinetics of particles and rigid bodies. Rectilinear, curvilinear and plane motion. Newton's second law, work-energy and impulse-momentum. For majors in EEE, CHE, CE, IE, MAT and ESC. 4 lectures. Prerequisite: ME 211, MAT 116 or MAT 142.

ME 214 Vector Statics (3)

Two and three dimensional equilibrium of frames, machines and trusses employing vector algebra. Principles of dry friction, centroids, moments and products of inertia. 3 lectures. Prerequisite: PHY 131, MAT 116 or MAT 142 concurrent.

ME 215 Vector Dynamics (4)

Vector mathematics treatment of absolute and relative motion of particles and rigid bodies in translating and rotating reference frames. Newton's laws of motion, work-energy, impulse-momentum. 4 lectures. Prerequisite: ME 214.

ME 218 Strength of Materials (3)

Plane stress and strain. Principal stresses and strains, Mohr's Circle. Properties of materials, stress strain diagrams. Design loads, working stresses, and factor of safety. Statically indeterminate axially loaded members. Torsional shearing stresses and displacements. Flexural and transverse shear stresses. Shear and moment diagrams. Beams of two materials. 3 lectures. Prerequisite: ME 214 or ME 211 and MAT 116 or MAT 142.

ME 219 Strength of Materials (3)

Deflection and slope of beams by double integration, singularity functions, area-moment, superposition and Castigliano's Theorem. Statically indeterminate beams. Column analysis—centric and eccentric loading. Commercial and standard test of materials. Experimental stress analysis—strain gauges and photoelasticity. 2 lectures, 1 three-hour laboratory. Prerequisite: ME 218, MAT 116.

ME 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

ME 301 Thermodynamics (4)

Thermodynamics systems; adiabatic, reversible and irreversible processes; the first and second laws of thermodynamics; equations of state, work and heat; enthalpy, entropy; application of Mollier diagram to various cycles; steady flow processes and general energy equation, and conduction heat transfer applications. 4 lectures. Prerequisites: Phy 132, MAT 116.

ME 302 Thermodynamics (4)

Irreversibility and efficiency, reciprocating machines, indicator diagrams, power and refrigeration cycles, flow through nozzles and blade passages, impulse and reaction turbines. 4 lectures. Prerequisite: ME 301.

ME 311 Fluid Mechanics (3)

Properties and behavior of fluids at rest and in motion with emphasis on both liquids and gases. Fundamental concepts; fluid statics, steady flow energy transformation; flow of incompressible frictionless fluid; laminar and turbulent flow or real liquid in pipes; impulse and momentum applied to fluids (including theory of jet and rocket propulsion). 3 lectures. Prerequisites: ME 212 or 215. Concurrent: ME 301, MAT 215.

ME 312 Fluid Mechanics (4)

Selected topics in fluid mechanics, including: calculation of head losses in pipes and fittings; similarity and dimensional analysis; flow of real compressible fluids; and forces on immersed objects. 3 lectures, 1 three-hour laboratory. Prerequisite: ME 311.

ME 313 Heat Transfer (4)

Basic principles of conduction, convection and radiation heat transfer. One-dimensional and multi-dimensional conduction, steady and unsteady state. Theoretical and empirical relations for free and forced convection in external surface flows and in tube and duct flows. Boiling heat transfer, condensation, and heat exchanger design. Basic laws of radiation heat transfer, radiation properties of surfaces, and radiant energy exchange among simple surfaces. 4 lectures. Prerequisites: ME 301, MAT 215 or MAT 241.

ME 315 Engineering Materials in Design (4)

Concepts of materials science and their relevance to electrical and electronics engineering. Requirements for conductors, insulators, encapsulation, adhesives, and magnetic, thermal, and mechanical applications. Properties of metals, ceramics, organics and semiconductors are compared. 3 lectures. Prerequisites: CHM 112, PHY 133.

ME 316 Vector Dynamics (2)

Three-dimensional kinematics and dynamics of rigid bodies. Moments and products of inertia. Rotating axis transformation. Kinetic energy and angular momentum. 2 lectures. Prerequisite: ME 215.

ME 319 Stress Analysis (4)

Fundamentals of elasticity. Combined stresses from machine loads. Theories of failure. Stress concentration determination and reduction. Repeated loading fatigue, endurance strength. Connections, joints, and springs. Beam analysis. Stability phenomena. Thick-walled pressure vessels. 4 lectures. Prerequisite: ME 219.

ME 320 Creativity (3)

A survey of creativity. Learning the skill and technique of creative thought. Demonstration of creative solutions to problems. 3 lectures. Prerequisite: junior standing.

ME 325 Machine Design (4)

Design and application of machine components such as brakes, clutches, gears, mechanisms, bearings, ways, sleeves, and bushings. Lubrication of machine elements, gaskets, seals, "o" rings, and fasteners. Acceleration and loading of machine members. Designing with friction materials design techniques and the design of a simple machine. 3 lectures, 1 three-hour laboratory. Prerequisite: ME 133, ME 215, ME 319, ESM 221, ESM 222 or 230.

ME 326 Machine Design (3)

The emphasis of this course will be placed on the actual process of design and the lectures and laboratories will be devoted to the design of a complete and complex machine or product. The projects are so chosen as to demand the application of knowledge learned in other courses and act as a synthesizing agent. 1 lecture, 2 three-hour laboratories. Prerequisite: ME 325.

ME 330 Engineering Numerical Computations (4)

Use of digital computers and numerical techniques for solving the more difficult problems in mechanical engineering. Emphasis on flow charting, programming and numerical techniques. 4 lectures. Prerequisites: MAT 216, ME 132, 215, and 301.

ME 340 Synthesis of Mechanical Engineering Problems (3)

Synthesis and analysis of steady state and transient engineering problems associated with mechanical engineering. Variable fluid flow, mixture processes, reaction and decay rates, dynamical and vibrational energy systems, electro-mechanical systems, compound interest application, and heat flow systems will be treated from a synthesis aspect. 3 lectures. Prerequisite: MAT 216.

ME 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ME 408 Nuclear Engineering (4)

Atomic structure, binding energy, nuclear stability, radioactivity, neutron reactions. Nuclear fission; general features of nuclear reactors; fission cross-sections; fission products; accumulation, radioactivity, and decay of fission products. The production of neutrons; interaction of neutrons with matter; scattering and capture of neutrons; delayed neutrons; reactor power, decay heat power. 4 lectures. Prerequisite: ME 311, ME 313.

ME 411 Combustion Engines (4)

Application of thermodynamics and heat transfer principles to actual power plant cycles. Steam and gas turbine theory and laboratory experiments. Modern combustion power plant component operation, including detailed discussion of auxiliary equipment. Economics of power generation. 3 lectures, 1 three-hour laboratory. Prerequisites: ME 302, ME 312, ME 313. -

ME 412 Heat Power (4)

The development of analytical and experimental techniques to estimate the performance of internal combustion engines. Discussion includes ideal and actual cycles, combustion, carburetion, fuel injection, ignition, supercharging, cooling, and fuels as applied to spark ignition and compression ignition engines. 3 lectures, 1 three-hour laboratory. Prerequisites: ME 302, ME 312, ME 313.

ME 413 Mechanical Vibrations (4)

Free and forced vibrations with and without damping. Rayleigh's method. Rotating unbalance, vibration isolation, vibration measuring instruments, vibration of several degrees of freedom. 3 lectures, 1 three-hour laboratory. Prerequisite: ME 212 or ME 215, MAT 216.

ME 414 Advanced Vibrations (3)

Vibrations of multi-degree freedom systems employing matrix methods; transient vibrations; shock response spectrum; Holzer's method; phase plane methods. 3 lectures. Prerequisite: ME 413.

ME 417 Air Conditioning (4)

Thermal environmental requirements for human habitation. Psychrometrics. Building heating and cooling loads. Air handling equipment and distribution systems. Refrigeration systems and equipment. Heating systems and equipment. 4 lectures. Prerequisites: ME 302, 313.

ME 418 Air Conditioning (2)

Application of the principles of Environmental Engineering in the design of a complete system of compatible components for the control of the thermal environment. 1 lecture and 1 three-hour laboratory. Prerequisite: ME 417.

ME 421 Mechanisms and Dynamics of Machinery (4)

Displacement, velocity and acceleration analysis of mechanical mechanism by graphical means. Graphical design of cams and gears. Balancing of rotating masses. 3 lectures and 1 three-hour laboratory. Prerequisite: ME 215.

ME 435 Advanced Engineering Measurements (3)

Application of sensing, modifying and signal read-out equipment to problems of engineering measurements. Experimental errors are predicted using statistical methods. Preparation of both formal engineering reports and memo-type reports are required. 2 lectures, 1 three-hour laboratory. Prerequisites: ME 313, and EEE 333.

ME 438 Human Engineering in Design (2)

Design of products and/or systems based on the theory of human engineering principles, study of dimensional and strength characteristics of human anatomy, capabilities and limitations of senses, responses to sensory stimuli. The application of human engineering principles or human factors in the design and mock-up of projects. 1 lecture, 1 three-hour laboratory. Prerequisite: ME 325 or design background.

ME 439 Advanced Machine Design (4)

Design and comparisons of hydraulic and pneumatic power systems. Control logic using Boolean algebra and truth tables. Pneumatic control circuit theory and design. Fluidic circuit theory and design. Electrical control circuit theory and design. Hydraulic power and control circuit design. Introduction to dynamic response in control systems. The design of control projects. Recent design developments. 2 lectures, 2 three-hour laboratories. Prerequisite: ME 325.

ME 441 Control Systems (4)

Introduction to the design and analysis of control systems (primarily linear systems) for non EE majors. Applications to mechanical, electromechanical, hydraulic, pneumatic and biological systems. Mathematical and graphical techniques will be emphasized. 4 lectures. Prerequisite: MAT 216, MAT 317.

ME 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time. Prerequisite: senior standing.

ME 463 Undergraduate Seminar (2)

New developments, policies, practices, and procedures are discussed through regular seminar. Each individual is responsible for the development and oral presentation of one or more topics in his chosen field. The presentation shall include audio-visual aids prepared by the student. 2 lectures. Prerequisite: Completion of senior project or permission of instructor.

ME 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

Courses in Related Engineering

EGR 126 Special Topics in Mathematics (3)

Solutions of first and second order homogeneous and non-homogeneous linear differential equations with constant coefficients, with applications in electric circuit theory; matrix algebra and determinants; introduction to infinite series and Euler's equation. Not open to Mathematics majors. 3 lectures. Corequisite: MAT 116. Not open to students with credit for MAT 215 or 241.

EGR 201 Role of Engineering in Society (3)

A study of the development of technology, explosion of knowledge in the scientific fields; impact on culture, education and economics; automation; current developments in industry and technology. For non-engineering majors. 3 lectures.



SCHOOL OF ENVIRONMENTAL DESIGN

H. Frederick Koeper, *Acting Dean*

The School of Environmental Design offers three undergraduate majors leading to the bachelor of science degree and three programs leading to the master's degree. Information concerning the master's curricula may be found in the *Graduate Bulletin.*

The undergraduate programs provide a broad range of occupational choice from positions with many offices engaged in private practice to civil service opportunities with city, county, state, and federal governments.

The school aims to develop professionals with both a pragmatic and a futures orientation. The programs strive to develop professionals who can mold a new environment through the existing arts and sciences and through new forms of their own creation.

The core of environmental design courses are taken by students in all majors, based on the theory that a common environmental perspective is a necessary requirement for landscape architects, urban planners, and architects. Because these professions critically influence city and regional development, the practitioners must understand the fundamental and interlocking concepts of community growth and renewal.

The core of environmental design courses helps design specialists to learn to work together and benefit from the relevant contributions that each has to offer. The interdisciplinary program gives students an opportunity to understand the relationship between their own major discipline and the theory and practice of other environmental design professions.

Departments and Majors

ARCHITECTURE
Richard J. Chylinski, Acting Chairman
Architecture major (BS)
Master of Architecture

LANDSCAPE ARCHITECTURE
Cameron Man, Chairman
Landscape Architecture major (BS)
Master of Landscape Architecture

URBAN PLANNING
Harry A. Anthony, Chairman
Urban Planning major (BS)
Master of Urban Planning

Course Descriptions

ENV 101 Theory of Design (4)
Development of man's relationship to his environment through design awareness and an understanding of vocabulary, form, function, and design process. 4 lectures.

ENV 102 Fundamentals of Design (4)
The theory and practice of environmental design applied to architecture, urban planning, and landscape architecture. 1 lecture, 3 three-hour laboratories. Prerequisite: ENV 101.

ENV 131 Design Graphics (3)
Basic graphic techniques in environmental design; drawing for reproduction; equipment and materials of graphic communication. 3 three-hour laboratories.

ENV 132 Communication Techniques (3)
Familiarization with presentation techniques and equipment, and development of skills in a variety of methods for presenting ideas and design concepts. 3 three-hour laboratories. Prerequisite: ENV 131.

ENV 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ENV 201, 202 Basic Environmental Design (4) (4)

Fundamentals of design programming, research and analysis; preparation of design solutions for a variety of environmental problems. 1 lecture, 3 three-hour laboratories. Prerequisite: ENV 102.

ENV 221 History of Environmental Design (4)

The study of man's efforts to create and control his environment emphasizing qualitative, physical solutions from political, social, and economic relationships. 4 lectures. Prerequisite: ENV 101, 102.

ENV 233 Perspective and Delineation (3)

Mechanical and freehand perspective. Drawing and rendering techniques in a variety of media. 3 three-hour laboratories. Prerequisite: ENV 131.

ENV 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

ENV 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ENV 422 Environment of the Middle Ages (3)

The study of architecture and urban development in relationship to the fundamental economic, social, and political institutions of the era between the late Roman Empire and the Renaissance. 3 lectures. Prerequisite: ENV 221. HST 321 may be substituted with departmental approval.

ENV 423 History of Environmental Design, Europe, 15th to 18th Centuries (3)

Urban spatial concepts: architectural and landscape architectural design from the rise of humanism to the age of reason. Renaissance and baroque concepts of environmental analyses. 3 lectures. Prerequisite: ENV 221.

ENV 424 Gardens and Architecture of the Orient (3)

The history of environmental design, specific gardens and architecture, as developed in various Eastern cultures and the relevant influences on Western design including religious and philosophic concepts. 3 lectures. Prerequisite: ENV 221.

ENV 425 History of Environmental Design: Evolution of Cities (3)

Historical review of cities and of the urbanization movement. Ecological, social, economic, technological, political and cultural determinants of city location, form, growth or decline. The role of the city as a force of culture and civilization. American and world urbanization following the industrial revolution. The urban development of the Los Angeles region. 3 lectures. Prerequisite: ENV 221.

ENV 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

ARCHITECTURE

Richard J. Chylinski, *Acting Chairman*
Stuart Baesel
Robert Brooks
J. Ingraham Clark
H. F. Koeper
Hueng Nam
Edward Pickard
Elpidio Rocha
Dariouche Showghi
Bernard Zimmerman

The Department of Architecture offers a program of study leading to a bachelor of science in architecture. To qualify for professional registration as an architect, the student should follow this curriculum with a two-year master of architecture degree.

Any student intending to enter the undergraduate curriculum in architecture, should, during February of his senior year in high school or no later than December of his freshman year in college, take the Architectural School Aptitude Test, which is administered at regular times each year at announced locations throughout the United States. Applications and information can be obtained from the Educational Testing Service, Princeton, New Jersey, 08540.

The undergraduate major in architecture is designed to enlarge the liberal education of the general student, through an introduction to perpetual thinking, through examination of the condition of the man-made environment, and through studies in creative response to visual and environmental situations. The bachelor of science in environmental design degree provides a foundation for later professional work in architecture, landscape architecture or urban planning.

The central core of the undergraduate curriculum in architecture is the study of design, with related exercises and drawing, graphics, visual composition, photography and model building. The student is given an opportunity to develop his creative as well as his analytical powers by finding solutions to programs employing the requirements of contemporary buildings and paralleling the conditions to be encountered in later practice. Instruction is generally in the form of guidance and suggestion on the part of the instructor to each student individually, accompanied by group discussions, lectures, and demonstrations. Solutions are submitted as drawings or models for review and judgment by a jury of teachers, practicing architects, and such designers or specialists as the occasion may require. All work executed in classes administered by the school becomes the property of the school and will be retained, or returned, at the discretion of the faculty.

The Department of Architecture is a full member of the Association of Collegiate Schools of Architecture and has applied for accreditation by the National Architectural Accrediting Board. It is expected that an accreditation visit will be made in the academic year 1973–74. Most faculty are registered architects and hold individual professional memberships in the American Institute of Architects, American Institute of Planners, or American Society of Planning Officials.

CORE COURSES FOR MAJOR

(Required of all students)

Architectural Design	ARC	203	(4)
Architectural Design	ARC	301	(4)
Architectural Design	ARC	302	(4)
Architectural Design	ARC	303	(4)
Environmental Control Systems	ARC	341	(3)
Architectural Design	ARC	401	(4)
Architectural Design	ARC	402	(4)
Architectural Design	ARC	403	(4)
Architectural Administration	ARC	431	(3)
Senior Project	ARC	461	(2)
Senior Project	ARC	462	(2)

Undergraduate Seminar	ARC	463	(2)
Theory of Design	ENV	101	(4)
Fundamentals of Design	ENV	102	(4)
Design Graphics	ENV	131	(3)
Communication Techniques	ENV	132	(3)
Basic Environmental Design	ENV	201	(4)
Basic Environmental Design	ENV	202	(4)
History of Environmental Design	ENV	221	(4)
Perspective and Delineation	ENV	233	(3)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Architectural Administration	ARC	231	(3)
Architectural Administration	ARC	331	(3)
Architectural Administration	ARC	332	(3)
Structure	ARC	361	(3)
Structure	ARC	362	(3)
Structure	ARC	363	(3)
Intro to Data Processing	DP	211	(4)
Principles of Economics	EC	201*	(4)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Environment of Middle Ages	ENV	422	(3)
History of Environmental Design: Evolution of Cities	ENV	425	(3)
Urban Land Utilization and Dev	FIR	310	(4)
Basic Mathematics	MAT	101*	(3)
Introduction to Mathematical Analysis	MAT	108*	(3)
Introduction to Mathematical Analysis	MAT	109*	(3)
Statics for Architects	ME	201	(2)
Strength of Materials for Architects	ME	202	(4)
Physical Education	PE	141*	(3)
Introduction to Philosophy	PHL	201*	(3)
College Physics	PHY	121*	(4)
College Physics	PHY	122*	(4)
College Physics	PHY	123*	(4)
General Psychology	PSY	201*	(4)
Principles of Urban Planning	UP	301	(4)
Community Facilities	UP	302	(4)
Land Planning	UP	303	(4)
Literature		*	(3)
Social Sciences (Dir)			(8)
Electives			(17)

* May be used for the general education requirement. Select unspecified courses from the general education list. Must include four courses from a minimum of two schools other than the School of Environmental Design for fulfillment of the breadth requirement.

Course Descriptions

ARC 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ARC 203 Architectural Design (4)

Design as it relates to geophysical forces—site, sun, wind, ecology, geology. Investigation of form determinants. 1 lecture, 3 three-hour laboratories. Prerequisite: ENV 202.

ARC 231 Architectural Administration (3)

Introduction to architectural practice, administration, building materials, and contract drawings. 3 three-hour laboratories. Prerequisite: ENV 233.

ARC 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

ARC 301, 302, 303 Architectural Design (4) (4) (4)

Architectural Design and Theory. The interaction of aesthetic, economic, technological, and social determinants structuring the form of the living and working unit. Emphasis on quantitative analysis, construction techniques, and systems related to multiple units. 1 lecture, 3 three-hour laboratories. Prerequisite: ARC 203, PHY 123 and MAT 102.

ARC 331 Architectural Administration (3)

Contract drawings and specification writing. 3 three-hour laboratories. Prerequisites: ARC 234 and ARC 203.

ARC 332 Architectural Administration (3)

Advanced courses in contract drawings, specifications, performance specification writing, and industrial components and systems. 3 three-hour laboratories. Prerequisite: ARC 331.

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ARC 361, 362, 363 Structure (3) (3) (3)

Fundamental theories of structural design and the creative relationship of structure to form function, and economics. Analysis of structural system, including the determination of forces, stresses, deflections, and the use of the common formulas in the design of wood, steel, and concrete structures. 3 lectures. Prerequisites: MAT 102, PHY 123, DP 200 and ARC 203.

ARC 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units with a maximum of 2 units per quarter.

ARC 401, 402, 403 Architectural Design (4) (4) (4)

Synthesis of previous design courses; architectural design problems of increasing complexity; design of the physical environment of urban and suburban areas. 1 lecture, 3 three-hour laboratories. Prerequisite: ARC 303, ARC 332, ARC 363 and ARC 441.

ARC 431 Architectural Administration (3)

Architecture contracts, architect-owner-contractor relations, legal aspects of practice and business relations. 3 lectures. Prerequisite: ARC 331, PHY 123.

ARC 451 Environmental Control Systems (3)

Study of mechanical, electrical, and acoustical systems related to buildings and urban environment. 3 lectures. Prerequisite: PHY 123 and MAT 102.

ARC 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Project typical of problems which graduate must solve in the architectural field with emphasis placed upon structure. Project results presented in a formal report. Minimum 120 hours total time.

ARC 463 Undergraduate Seminar (2)

Methods, developments, and ethics in the profession of architecture. The role of the architect in society. The interaction of architects, engineers, and the multi-disciplines. 2 meetings. Prerequisite: Senior standing.

ARC 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

LANDSCAPE ARCHITECTURE

Cameron Man, *Chairman*
Stephan Bochkor
Jere S. French
Henry Kordus
John T. Lyle
Bruce G. Sharky
William E. Sparks
D. Rodney Tapp
Robert W. Tyler
Takeo Uesugi
Chester A. Volski
Mark J. von Wodtke

The landscape architecture program is based on the premise that proper utilization of land depends on an understanding of natural processes. The undergraduate curriculum is accredited by the American Society of Landscape Architects and approved by the California Board of Landscape Architects.

A curriculum leading to the Master of Landscape Architecture degree is also offered by the department. Requirements for this degree may be found in the *Graduate Bulletin.*

The program emphasizes two areas—regional landscape design and urban landscape design.

The regional emphasis includes conservation measures and proper use of land for recreational and resource development purposes. Employment opportunities for graduates are found with the U.S. Forest Service, National Park Service, state departments of parks and recreation, county flood control agencies, and civil systems divisions of aerospace companies.

The urban emphasis is concerned with man's urbanizing environment and includes exposure to the social, economic, and political forces. The student is involved with complex problems concerning residential, commercial, and industrial developments, recreational and educational facilities planning, and new towns. Employment opportunities are found in private practice, with municipal and county park departments and planning departments, with industrial and commercial firms, and with residential construction companies.

Laboratory for Experimental Design

The laboratory has been established to carry on research and pilot projects in the application of experimental methods in landscape architecture. Several projects are now underway. Generally, the work is done by faculty members and graduate students working in teams which often include members from other departments. Some assistantships are available to students who have attained a high level of professional skill.

CORE COURSES FOR MAJOR

(Required of all students)

Theory of Design	ENV	101	(4)
Fundls of Design	ENV	102	(4)
Design Graphics	ENV	131	(3)
Basic Env Design	ENV	201	(4)
Basic Env Design	ENV	202	(4)
Basic Landscape Design	LA	203	(4)
Inter Landscape Des	LA	301	(4)
Inter Landscape Des	LA	302'	(4)
Inter Landscape Des	LA	303	(4)
Landscape Constr	LA	331	(3)
Landscape Constr	LA	332	(3)
Adv Construction Drawing	LA	333	(3)
Plant Matls & Des	LA	343	(3)
Plant Matls & Des	LA	344	(3)
Adv Landscape Des	LA	401	(4)
Adv Landscape Des	LA	402	(4)
Adv Landscape Des	LA	403	(4)
Senior Project	LA	461	(2)
Senior Project	LA	462	(2)
Undergraduate Seminar	LA	463	(2)

SUPPORT & ELECTIVE COURSES

(Required of all students)

Surveying Fundls	AE	131	(2)
Surveying Application	AE	132	(2)
American Civilization	AMC	201*	(4)

American Civilization	AMC	202*	(4)
Life Science	BIO	110*	(3)
Plant Environments	BOT	116*	(3)
Fundls of Chemistry	CHM	103*	(4)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Communication Technique	ENV	132	(3)
History of Env Des	ENV	221	(4)
Perspective & Delineation	ENV	232	(3)
Environment of the Middle Ages	ENV	422	(3)
or History of Env Design 15th to 18th Centuries	ENV	423	
Gardens & Architecture of the Orient	ENV	424	(3)
or Hist of Env Des: Evolution of Cities	ENV	425	
Plant Matls & Des	LA	241	(3)
Plant Matls & Des	LA	242	(3)
Basic Mathematics	MAT	101*	(3)
Basic Mathematics	MAT	102*	(3)
Physical Education	PE	141*	(3)
Fundls of Physics	PHY	102*	(4)
General Psychology	PSY	201*	(4)
General Soils	SS	221	(5)
Humanities		*	(8)
Directed Electives			(36)
Electives			(12)

* May be used for the general education requirement. Select unspecified courses from the general education list. General education breadth requirement is an additional four courses from a minimum of two schools outside the School of Environmental Design.

Course Descriptions

LA 200 Special Problems for Lower Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

LA 203 Basic Landscape Design (4)

A continuation of the fundamental spatial design concepts as they apply in particular to land forms, climate, orientation, and plant material with emphasis on small scale problem solving. 2 lectures, 2 three-hour laboratories. Prerequisite: ENV 202.

LA 211 Landscape Drawing and Design (4)

Technique of landscape graphics and basic design analysis. For non-majors. 2 lectures, 2 three-hour laboratories.

LA 212 Landscape Materials (4)

Physical properties and landscape use of organic and inorganic materials in the garden and park. For non-majors. 1 lecture, 3 three-hour laboratories. Prerequisite: LA 211.

LA 213 The Park and Recreation System (4)

Technique of park and recreation area and facility analysis. For non-majors. 2 lectures, 2 three-hour laboratories. Prerequisite: LA 212.

LA 241, 242 Planting Materials and Design (3) (3)

The study of trees, shrubs and vines adaptable or native to southern California and their functional, ecological, and aesthetic use in solving problems in planting design. 1 lecture, 2 three-hour laboratories. Prerequisite: ENV 102, or consent of instructor.

LA 299 Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

LA 301, 302, 303 Intermediate Landscape Design (4) (4) (4)

The application of design concepts and principles to increasingly more difficult problems involving the total range of physical environment. 1 lecture, 3 three-hour laboratories. Prerequisite: LA 203. Limited to 4 units per quarter.

LA 331, 332 Landscape Construction (3) (3)

Landscape construction problems involving the formulation and preparation of plans for grading, drainage, staking, reference and lighting, planting, irrigation, construction details, structures, and other working drawings; relationship to specifications and contract documents. 1 lecture, 2 three-hour laboratories. Prerequisite: MAT 102, LA 203, AE 131.

LA 333 Advanced Landscape Construction (3)

A continuation of LA 432 with greater emphasis on structural design projects, engineering and specifications completed through working drawings. 1 lecture, 2 three-hour laboratories. Prerequisite: LA 332, LA 302.

LA 343, 344 Planting Materials and Design (3) (3)

A continuation of LA 242 with greater emphasis given to organization and composition of plant materials and the development of planting plans and specifications. 1 lecture, 2 three-hour laboratories. Prerequisite: LA 242.

LA 400 Special Problems for Upper Division Students (1–2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

LA 401, 402, 403 Advanced Landscape Design (4) (4) (4)

The analysis, programming, and solution to advanced projects in landscape design. Students must select, as an area of specialization, a section dealing in emphasis of either 1) urban, 2) rural regional projects, or 3) special landscape problems. 1 lecture, 3 three-hour laboratories. Prerequisite: LA 303.

LA 441 Internship (1–8)

On-the-job training in the profession dealing with some aspect of landscape architecture. The experience must involve learning as well as production. Internships must be approved in advance by the departmental internship coordinator. One unit of credit is granted for each 150 hours of training under a licensed professional. May be repeated for a maximum of 9 units. Prerequisite: Approval of instructor.

LA 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

LA 463 Undergraduate Seminar (2)

Methods, developments, practices, ethics, office procedures in the profession of landscape architecture. Discussions of environmental design problems. The role of the designer in society. 2 meetings. Prerequisite: Senior standing.

LA 499 Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

URBAN PLANNING

Harry A. Anthony, *Chairman*
David E. Bess
Robert A. Catlin
William R. Dale
John M. Ducey
Frank A. Ducote
Sherman W. Griselle
Stephan A. Kaufman
Paul Hilo
Harvey Steinberg
William C. Warner

The goal of the undergraduate urban planning curriculum leading to the Bachelor of Science in Urban Planning degree is to develop planners with imagination and a desire to serve people. The education of urban planners with a problem-solving orientation is a basic aim. The curriculum is designed to meet both present and future requirements of the planning profession. A proper balance among the physical, social, economic, ecological, and political forces necessary for a planner to understand in dealing with urbanization is stressed.

The department also offers a curriculum leading to the degree Master of Urban Planning. Requirements for this degree may be found in the *Graduate Bulletin.*

CORE COURSES FOR MAJOR

(Required of all students)

Theory of Design	ENV	101	(4)
Fundls of Design	ENV	102	(4)
Basic Env Design	ENV	201	(4)
Basic Env Design	ENV	202	(4)
Prin of Urban Planning	UP	301	(4)
Community Facilities	UP	302	(4)
Land Planning	UP	303	(4)
Research & Analysis	UP	331	(4)
Planning Studies	UP	332	(4)
Plan & Urban Des Thr World	UP	412	(3)
Plan & Urban Des Thr World	UP	413	(3)
General Plan Survey	UP	431	(4)
General Plan Devel	UP	432	(4)
Regional Planning	UP	433	(4)
Community Devel & Renewal	UP	434	(4)
Senior Project	UP	461	(2)
Senior Project	UP	462	(2)
Undergraduate Seminar	UP	463	(2)
Urban Planning Implementation	UP	465	(4)

SUPPORT & ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Report Writing	COM	216*	(3)
Intro to Data Processing	DP	211	(4)
Prin of Economics	EC	201*	(4)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Design Graphics	ENV	131	(3)
Communication Tech	ENV	132	(3)
History of Env Design	ENV	221	(4)
Physical Geology	ESC	221*	(4)
†Basic Mathematics	MAT	101*	(3)
†Basic Mathematics	MAT	102*	(3)
Introduction to Statistics	MAT	107*	(3)
Physical Education	PE	141*	(3)
Public Administration	PLS	314	(4)
Interest Group Politics	PLS	325	(4)
Issues in Calif Govt	PLS	480	(4)
Gen Psychology	PSY	201*	(4)
Human Relations	PSY	314*	(4)
Urban Sociology	SOC	401*	(4)
Public Speaking	SP	100*	(4)
Conf Tech & Group Disc	SP	307	(4)
Natural Science		*	(3)
Humanities		*	(8)
Directed Electives			(22)
Electives			(12)

* May be used for the general education requirement. Select unspecified courses from the general education list.

† Advanced students in mathematics may substitute MAT 104 and MAT 105, or may substitute MAT 108 and MAT 109.

Course Descriptions

UP 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

UP 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

UP 301 Principles of Urban Planning (4)

A review of the historical determinants of urban growth and evolution of the modern city. The planning function in government. The planning process. Principles for projecting land requirements and locations for various urban land

uses. Ways of implementing the plans. 4 lectures.

UP 302 Community Facilities (4)

The importance of community facilities and services to urban development. Discussion of the planning, construction, and operation of a variety of urban facilities. Review of technological advances. 3 lectures, 1 three-hour laboratory.

UP 303 Land Planning (4)

Design of subdivisions and the redesign of urban land. Problems in street, lot, and utility systems design. Review of recent trends in land planning. 1 lecture, 3 three-hour laboratories. Prerequisite: ENV 202 or Chairman's permission.

UP 331 Research and Analysis (4)

Problem and methods of urban planning research and analysis. Types of data required, information sources, collection and analysis of basic planning data. Review of important research studies. Emphasis is on individual research, report writing, and presentation. 1 lecture, 3 three-hour laboratories.

UP 332 Planning Studies (4)

Review of typical planning studies from California and elsewhere and advanced methods of research analysis. Study and formulation of new survey and projection techniques. 1 lecture, 3 three-hour laboratories. Prerequisite: UP 302 and 331 or Chairman's permission.

UP 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

UP 412, 413 Planning and Urban Design Throughout the World (3) (3)

Illustrated lectures on contemporary planning and urban design theory and practice currently in evidence in Europe, Latin America, Asia and Africa. Contemporary theories and concepts as related to present social concerns. Relevance of the European and World experience to the solution of America's urban problems. 3 lectures. Prerequiste: upper division standing or permission of instructor.

UP 431 General Plan Survey (4)

General plan research and survey procedures. Programming for a general plan. 1 lecture, 3 three-hour laboratories. Prerequisite: UP 332.

UP 432 General Plan Development (4)

Emphasis on policy planning, synthesis, and formulation of a general plan through individual creative effort. 1 lecture, 3 three-hour laboratories. Must be taken immediately following UP 431.

UP 433 Regional Planning (4)

Review of county, regional, state, and national planning. Emphasis on regional planning. 1 lecture, 3 three-hour laboratories. Prerequisite: UP 432 or permission of the instructor.

UP 434 Community Development and Renewal (4)

The history and legal background of community development and urban renewal. The process of acquisition and redevelopment of urban land and buildings by government action. Study of conservation and rehabilitation practices. Problems involved in federal and local, public and private, renewal efforts. Economic, social, ethnic and racial integration of communities and the dynamics of depressed urban areas. 3 lectures, 1 three-hour laboratory. Prerequisite: UP 301 or permission of instructor or Department Chairman.

UP 441 Field Work (2-3)

Practical application of urban planning techniques through supervised field work. Written report and evaluation of experience required. (One unit of credit will be allowed for each 60 hours of field work.) May be repeated for a maximum of 6 units. One lecture and 6 to 12 hours of field work. Prerequisite: permission of instructor or department chairman.

UP 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in urban planning field. Project results presented in a formal report. Minimum 120 hours total time per two-unit course. Prerequisite: senior standing.

UP 463 Undergraduate Seminar (2)

Intensive study of the legal, ethical, and professional aspects of urban planning in public and private practice. Review of urban planning problems. 1 two-hour seminar. Prerequisite: Senior standing.

UP 465 Urban Planning Implementation (4)

Review of zoning ordinances, subdivision regulations, capital improvement programs, and other devices and techniques used to implement a general plan. 4 lectures. Prerequisite: Senior standing or permission of the instructor.

UP 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

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SCHOOL OF SCIENCE

Vincent E. Parker, *Dean*

The curricula offered in the School of Science combine fundamental education in science or mathematics with a broad human outlook which develops the student's mental horizon beyond the limits of his immediate vocational objective.

Each curriculum is designed to prepare graduates for specific professional positions in industry, government and teaching, or for graduate and professional work in their disciplines. The four-year sequence covers the basic major courses and has sufficient free electives to allow the students to develop specializations within the major and closely related fields.

General education courses are offered for all students. The need to understand the concepts of modern science and mathematics and their relationship to life in our present world is important. The School of Science also offers basic supporting courses for students enrolled in the professional and technological degree programs in other schools of the university.

Majors in eight fields leading to the bachelor of science degree, and curricula in two fields leading to the master of science degree are offered by the School of Science. Information concerning the masters curricula may be found in the *Graduate Bulletin.*

The standard teaching credential program is offered for both the elementary specialization and the secondary specialization in a number of majors and minors.

A pre-professional program is offered for students preparing for medical or dental school.

An active co-curricular program includes Beta Beta Beta Biological honor society; Biological Sciences Club; a chapter of Kappa Mu Epsilon (mathematics); a chapter of student affiliates of the American Chemical Society; Society of Physics Students; Sigma Pi Sigma, national honor society in physics; the Geology Club and other organizations.

Departments and Majors

BIOLOGICAL SCIENCES
- Ralph W. Ames, Chairman
- Biology major (BS); Botany major (BS); Microbiology major (BS); Zoology major (BS); Option in Entomology
- Secondary Credential Program, major in Biological Science
- Elementary Credential Program, major in Biological Sciences
- Master of Science in Biological Sciences

CHEMISTRY
- Esther B. Leffler, Acting Chairman
- Chemistry major (BS)
- Secondary Credential Program, major in Chemistry
- Master of Science in Chemistry

MATHEMATICS
- Sidney Birnbaum, Chairman
- Mathematics major (BS)
- Secondary Credential Program, major in Mathematics
- Elementary Credential Program, major in Mathematics
- Master of Science in Mathematics

PHYSICS AND EARTH SCIENCES
- Johannes Tuul, Chairman
- Earth Sciences major (BS); Physics major (BS)
- Secondary Credential Program, major in Physics
- Secondary Credential Program, major in Earth Science

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PREPROFESSIONAL PREPARATION

Any university major is suitable for undergraduate preparation for medical and dental schools. The list below summarizes the recommendations of the Preprofessional Advisory Committee for premedical students; predental recommendations would vary somewhat from this list, as would requirements for particular professional schools. Students who are interested in preprofessional preparation should consult with their department chairman and their departmental preprofessional advisory committee member as soon as possible after admission.

RECOMMENDED COURSES

Basic Biology	BIO	115	(5)
History of Biology	BIO	200	(3)
Genetics	BIO	303	(4)
Advanced Genetics	BIO	421	(3)
General Chemistry	CHM	111	(3)
General Chemistry	CHM	112	(3)
General Chemistry Lab	CHM	151	(1)
General Chemistry Lab	CHM	152	(1)
Chemical Principles	CHM	113	(4)
Quantitative Analysis	CHM	221	(4)
Organic Chemistry	CHM	211	(3)
Organic Chemistry	CHM	212	(3)
Organic Chemistry	CHM	213	(3)
Organic Chemistry Lab	CHM	251	(1)
Organic Chemistry Lab	CHM	252	(2)
Organic Chemistry Lab	CHM	253	(2)
Analytic Geometry & Calculus	MAT	114	(3)
Analytic Geometry & Calculus	MAT	115	(3)
Analytic Geometry & Calculus	MAT	116	(3)
or Calculus	MAT	140	(4)
or Calculus	MAT	141	(4)
or Calculus	MAT	142	(4)
Introduction to Statistics	MAT	107	(3)
General Physics	PHY	131	(4)
General Physics	PHY	132	(4)
General Physics	PHY	133	(4)
or College Physics	PHY	121	(4)
or College Physics	PHY	122	(4)
or College Physics	PHY	123	(4)
Invertebrate Zoology	ZOO	137	(5)
Vertebrate Zoology	ZOO	138	(5)
Embryology	ZOO	323	(4)
Comparative Anatomy	ZOO	326	(4)
Histology	ZOO	422	(4)

BIOLOGY

One of the four majors offered in the Biological Sciences department is biology. For other programs in this department see botany, microbiology, and zoology.

Howard S. Brown
Timothy W. Brown
Ronald S. Daniel
Bruce L. Firstman
Diana Garcia
Edward K. Mercer
Ronald D. Quinn
Lenard R. Troncale
Jia-Hsi Wu

The biology section stresses a balance between the theoretical aspects of biology and actual experience in field and laboratory. The variety of courses offered in a flexible curriculum provides an opportunity for a wide range of experience in both animal and plant sciences.

The offerings of this curriculum provides the student with a strong preparation for graduate and professional schools in fields ranging from molecular to field biology. Departmental facilities include laboratories, greenhouses, controlled environmental units, a radiation biology center, and an electron microscope facility. Ecological studies are facilitated by accessibility to natural habitats on campus and by the college's proximity to desert, mountain, and seashore areas.

The curriculum prepares prospective teachers for the primary or secondary education credential. Graduate courses enable students to complete requirements for the junior college credential.

The biology section also offers a curriculum leading to the Master of Science in Biology with emphasis in biology.

CORE COURSES FOR MAJOR

(Required of all students)

Basic Biology	BIO	115	(5)
Conservation	BIO	201	(3)
Principles of Evolution	BIO	213	(3)
Genetics'	BIO	303	(4)
† Principles of Taxonomy	BIO	306	(3)
† Principles of Ecology	BIO	325	(4)
Biotechniques	BIO	341	(2)
Biotechniques	BIO	342	(2)
Senior Project	BIO	461	(2)
Senior Project	BIO	462	(2)
Undergraduate Seminar	BIO	463	(2)
Plant Structures and Functions	BOT	124	(5)
Plant Morphology	BOT	125	(5)
Basic Microbiology	MIC	201	(5)
Invertebrate Zoology	ZOO	137	(5)
Vertebrate Zoology	ZOO	138	(5)
General Entomology	ZOO	226	(4)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
College Chemistry	CHM	104	*(3)
College Chemistry	CHM	105	*(3)
College Chemistry Laboratory	CHM	141	*(1)
College Chemistry Laboratory	CHM	142	*(1)
Organic Chemistry	CHM	201	*(3)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Trigonometry	MAT	104	*(4)
College Algebra	MAT	105	*(4)
Physical Education	PE	141	*(3)
College Physics	PHY	121	*(4)
College Physics	PHY	122	*(4)
College Physics	PHY	123	*(4)
Humanities			*(7)
Courses to complete general education requirements			**(8)
Approved Electives			(31)
Electives			(41)

* May be used for the general education requirement. Select unspecified courses from the general education list.

† Plant Physiology (BOT 322), Animal Physiology (ZOO 324) or Cellular Physiology (BIO 435) may be substituted.

** Must include four courses from a minimum of two schools other than the School of Science for fulfillment of the breadth requirement.

Course Descriptions

BIO 100 Fundamentals of Biology (4)

A lecture-laboratory demonstration and discussion course dealing with various aspects of scientific investigation, environmental problems, population, genetics, evolution, physiology and

other student selected topics. Limited to EOP students. 3 lectures, 1 three-hour laboratory.

BIO 110 Life Science (3)

Biological implications in the modern world. The relation of biology and technology to problems in population, reproduction, heredity, evolution, and conservation. Designed for all majors other than Biological Sciences, Agriculture, and Physical Education. 3 lectures.

BIO 115 Basic Biology (5)

Introduction to living things; basic structure and function of plants and animals and their relationship to the physical world. 3 lectures, 2 three-hour laboratories.

BIO 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

BIO 201 Conservation of Natural Resources (3)

Fundamental concepts, historical development, problems and practices concerning conservation of natural resources in the United States. 3 lectures. Prerequisite: BIO 110, 115 or equivalent.

BIO 202 History of Biology (3)

Chronological resume of events, inventions, discoveries, and workers contributing to growth of biological sciences. 3 lectures.

BIO 213 Principles of Evolution (3)

Introduction to plant and animal evolution. 3 lectures.

BIO 225 Microtechnique (3)

Methods of preparing plant and animal tissues for microscopic study. 1 lecture, 2 three-hour laboratories. Prerequisite: BIO 115.

BIO 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

BIO 300 Heredity and Man (3)

Nontechnical introduction to hereditary principles with emphasis on man and society. Eugenics, hereditary diseases, blood types, mutation, radiation, and evolution. For non-majors. 3 lectures. Not open to students with credit for BIO 303. Prerequisite: BIO 110 or equivalent.

BIO 301 Biology of Human Sex (4)

Anatomy, physiology and behavior related to human sexual reproduction including fertility, pregnancy, childbirth, birth control, venereal disease, sexual anomalies and sexual response. 3 lectures, 1 two-hour discussion session. Prerequisite: BIO 110 or BIO 115.

BIO 303 Genetics (4)

Principles of heredity. 4 lectures. Prerequisite: BIO 110 or 115.

BIO 305 Ecology for Sanitary Engineers (3)

The environment as an ecosystem, emphasizing man's role in manipulating such systems. Of particular interest are questions and problems relating to energy flow in natural and man-made environments. 3 lectures. Prerequisite: BIO 110.

BIO 306 Principles of Taxonomy (3)

Major principles of taxonomy, classification, biosystematics, and nomenclature as applied to plants and animals. 3 lectures. Prerequisite: BIO 110 or BIO 115.

BIO 325 Principles of Ecology (4)

A study of ecosystems; the interactions between organisms and environment. 3 lectures, 1 three-hour laboratory. 3 one-day weekend field trips. Prerequisite: BOT 124 and ZOO 138.

BIO 328 Natural History of Plants (4)

Characteristics, classification and natural history of the major groups of plants; basic principles of ecology; conservation ethics. Identification of common native plants; field study of natural plant communities and life zones. 3 lectures, 1 three-hour laboratory. Not open to botany majors. Prerequisite: BIO 110 or 115 or consent of instructor.

BIO 329 Natural History of Animals (4)

Characteristics, classification and natural history of the major groups of invertebrate and vertebrate animals; identification and field study of local species. 3 lectures, 1 three-hour laboratory. Not open to zoology majors. Prerequisite: BIO 110 or 115 or consent of instructor.

BIO 341 Biotechniques (2)

Botanical techniques; collecting, preservation, preparation of botanical specimens. 2 three-hour laboratories. Prerequisite: BOT 124.

BIO 342 Biotechniques (2)

Zoological techniques; collecting, preservation, preparation of zoological specimens. 2 three-hour laboratories. Prerequisite: ZOO 138.

BIO 352 Genetics Laboratory (2)

Laboratory techniques in genetics. 2 three-hour laboratories. Taken concurrently with or after BIO 303.

BIO 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

BIO 410 Biophysics (3)

Concepts and mechanisms involved in the interpretation of biological systems. A description of living processes in physical terms. 3 lectures. Prerequisite: PHY 123 or permission of instructor.

BIO 411 Biometrics (3)

Application of statistical methods to the analysis and interpretation of biological data. Principles of sampling, the use of means, frequencies, measures of variability, correlation, diversity, and their value to biologists. 3 lectures. Prerequisite: MAT 105 or equivalent.

BIO 418 Population Ecology (3)

Factors affecting the abundance and distribution of animal populations in their natural environment. 2 lectures, 1 three-hour laboratory. Prerequisite: BIO 311 and 325.

BIO 421 Advanced Genetics (3)

Continuation of studies in genetics with emphasis at the biochemical level. Further work on mutations, chromosomal aberrations, radiation effects and their use in plant and animal studies. 3 lectures. Prerequisite: BIO 303.

BIO 423 General Cytology (4)

Ultrastructure of the cell; mechanics of mitosis, meiosis, and fertilization; and the relation of karyotype changes to genetics and evolution. 2 lectures, 2 three-hour laboratories. Prerequisite: BOT 124, ZOO 138, BIO 303.

BIO 430 Fresh Water Biology (5)

Ecology, taxonomy, morphology and natural history of major plant and animal groups in various fresh water habitats, and their relationship to fisheries, wildlife management, water sanitation, and conservation. 3 lectures, 2 three-hour laboratories. Prerequisite: BOT 125, ZOO 137 and consent of instructor.

BIO 431 Radiation Biology (5)

Introduction to radioisotope tracer techniques, radiometric analyses, effects of ionizing radiation, radiation safety and health physics as applied to life sciences and public health. 3 lectures, 2 three-hour laboratories. Prerequisite: 12 units of Biological Sciences, 8 units of Chemistry, 8 units of Physics.

BIO 434 Limnology (3)

Evaluation of physical and biological factors affecting ponds, lakes and streams. 3 lectures. Prerequisite: CE 431 or consent of instructor.

BIO 435 Cellular Physiology (4)

Physical mechanisms at the cellular level. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 327.

BIO 440 Biology of Symbiosis (4)

Physiological, ecological, and behavioral aspects of heterospecific associations, including parasitism, mutualism, and commensalism. 2 lectures, 2 three-hour laboratories. Prerequisite: ZOO 324 or BOT 322.

BIO 442 Marine Ecology (4)

Structure and function of marine ecosystems with emphasis on littoral environments. 2 lectures, 2 three-hour laboratories. Prerequisite: ESC 335, ZOO 137, BIO 325.

BIO 450 Techniques and Theories of Molecular Biology (5)

Introduction to the instrumentation, experimental methodologies, and theoretical concepts frequently encountered in current and past research into biological systems at the molecular level. 3 lectures and 2 three-hour labs. Prerequisite: Consent of instructor.

BIO 460 Air Pollution Problems (3)

Concepts of air pollution; major air pollutants; sources; effects on plants and animals and materials; controls; future problems. 3 lecture-discussions. Prerequisite: senior standing and consent of instructor.

BIO 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields. Results presented in a formal report. Minimum of 120 hours total time.

BIO 463 Undergraduate Seminar (2)

Study and discussion of recent developments in biology. 2 lectures. Prerequisite: BIO 462.

BIO 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

BOTANY

One of the four majors offered in the Biological Sciences department is botany. For other programs in this department see biology, microbiology, and zoology.

Ralph W. Ames, *Chairman*
Lawrence M. Blakely
Jerome E. Dimitman
Jack L. Erspamer
Marion P. Harthill
Harold L. Lint
Raymond Z. Riznyk
Martin F. Stoner

The botanical curriculum offers a four-year sequence of foundation courses, plus electives to provide the fundamentals of plant sciences as well as the necessary flexibility to permit selection of courses for several lines of study. Such versatility covers the major disciplines of plant science—physiology, morphology and systematics, and also provides for careers in mycology-pathology, ecology, field biology, and similar occupational areas which require a strong background of basic plant studies.

Of considerable advantage to the program are the various distinct plant communities, from the coastal strand through desert regions to sub-alpine meadows, available nearby for field study.

Other centers of botanical study and resources close at hand include the Los Angeles State and County Arboretum, Huntington Botanical Garden, and the Rancho Santa Ana Botanic Garden. In addition, the department maintains one of the largest collections of fungi in the West—the C. J. Humphrey Mycological Herbarium—completely available for study.

The botany section also offers a curriculum leading to the Master of Science in Biology degree with emphasis in botany.

CORE COURSES FOR MAJOR

(Required of all students)

Principles of Evolution	BIO	213	(3)
Genetics	BIO	303	(4)
Principles of Taxonomy	BIO	306	(3)
Plant Structures and Functions	BOT	124	(5)
Plant Morphology	BOT	125	(5)
Plant Physiology	BOT	322	(5)
Principles of Ecology	BOT	325	(4)
Plant Anatomy	BOT	335	(4)
Taxonomy of Higher Plants	BOT	343	(2)
Phycology	BOT	433	(4)
or Mycology	BOT	426	
Senior Project	BOT	461	(2)
Senior Project	BOT	462	(2)
Undergraduate Seminar	BOT	463	(2)
Organic Chemistry	CHM	201	(3)
Basic Microbiology	MIC	201	(5)
Invertebrate Zoology	ZOO	137	(5)
Vertebrate Zoology	ZOO	138	(5)
General Entomology	ZOO	226	(4)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Basic Biology	BIO	115	*(5)
College Chemistry	CHM	104	*(3)
or General Chemistry	CHM	111	
College Chemistry	CHM	105	*(3)
or General Chemistry	CHM	112	
College Chemistry Laboratory	CHM	141	*(1)
or General Chemistry Laboratory	CHM	151	
College Chemistry Laboratory	CHM	142	*(1)
or General Chemistry Laboratory	CHM	152	
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Trigonometry	MAT	104	*(4)
College Algebra	MAT	105	*(4)
Physical Education	PE	141	*(3)
College Physics	PHY	121	*(4)
or General Physics	PHY	131	
College Physics	PHY	122	*(4)
or General Physics	PHY	132	
College Physics	PHY	123	*(4)
or General Physics	PHY	133	
Humanities			*(7)
Courses to complete general education requirements			**(7)
Approved Electives			(31)
Electives			(34)

* May be used for the general education requirement. Select unspecified courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of

Science for fulfillment of the breadth requirement.

Course Descriptions

BOT 116 Plant Environments (3)

Effects of environmental factors on the growth and distribution of plant materials used in landscaping. Not open to majors in the Biological Sciences department. 2 lectures, 1 three-hour laboratory.

BOT 120 Elements of Botany (4)

Principles of structure, function, and classification of seed plants and fungi with special application to agriculture. 3 lectures, 1 three-hour laboratory. Prerequisite: BIO 115.

BOT 124 Plant Structures and Functions (5)

Structure and function of plants. 3 lectures, 2 three-hour laboratories. Prerequisite: BIO 115.

BOT 125 Plant Morphology (5)

Comparative morphology and phylogenetic relationships of plant groups from bacteria to angiosperms. 3 lectures, 2 three-hour laboratories. Prerequisite: BIO 115.

BIO 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

BOT 223 General Plant Pathology (4)

Principles of the nature and control of plant diseases caused by bacteria, fungi, nematodes, viruses, and physiological factors. 2 lectures, 2 three-hour laboratories. Prerequisite: BOT 120 or 125.

BIO 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

BOT 307 Plants and Man (3)

Natural history and uses of plants important to man. Open to all majors. 3 lectures.

BOT 322 Plant Physiology (5)

Life processes of plants: water relations; nutrition and metabolism; growth and development. 3 lectures, 2 three-hour laboratories. Prerequisite: CHM 211 or 201; BOT 120 or 124.

BOT 343 Field Botany (3)

Collection, classification, and identification of native California flowering plants. Field identification of plants characteristic of common California plant communities. 1 lecture, 2 three-hour laboratories. Prerequisite: BOT 120 or BOT 124 or consent of instructor.

BIO 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

BOT 421 Plant Ecology (4)

Effects on plant growth and development of environmental factors such as soil, water, temperature, light, atmosphere, topography, organisms and fire. The communities and dynamics of vegetation and the causal phenomena involved. 3 lectures, 1 three-hour laboratory. Prerequisite: BIO 325.

BOT 423 Plant Nematology (3)

Classification of nematodes associated with economic plants; basic morphology, biology and control of important parasitic plant nematodes. 2 lectures, 1 three-hour laboratory. Prerequisite: ZOO 137.

BOT 424 Advanced Plant Pathology (4)

Discussion of current topics in plant pathology; experience in advanced methods for the study of pathological problems. 2 lectures, 2 three-hour laboratories. Prerequisite: BOT 223.

BOT 425 Mycology (4)

Morphology, physiology, culture, pathology, taxonomy, and general biology of Acrasiales, Labyrinthulales, Myxomycetes, Oomycetes, and Zygomycetes. 2 lectures, 2 three-hour laboratories. Prerequisite: BOT 120, 125 or consent of instructor. Preferably taken before BOT 426.

BOT 426 Mycology (4)

Morphology, physiology, culture, pathology, taxonomy and general biology of Ascomycetes, Deuteromycetes, and Basidiomycetes. 2 lectures, 2 three-hour laboratories. Prerequisite: BOT 120, 125 or consent of instructor. Preferably taken after BOT 425.

BOT 433 Phycology (4)

Morphology, taxonomy, ecology, and physiology of the fresh-water algae. Culture work, collection, and identification emphasized in the laboratory. 2 lectures, 2 three-hour laboratories. Prerequisite: BOT 125, MIC 201.

BOT 434 Morphology of Embryophytes (5)

Evolution of the embryophytes as illustrated by the comparative morphology, life patterns and relationships of the liverworts, mosses, and vascular plants. 3 lectures, 2 three-hour laboratories. Prerequisite: BOT 125 or consent of the instructor.

BOT 435 Plant Anatomy (4)

Microscopic study of representative common plants dealing with origin, development, and structure of cells, tissues and tissue systems in roots, stems, and leaves. 2 lectures, 2 three-hour laboratories. Prerequisite: BOT 124.

BOT 436 Advanced Plant Taxonomy (4)

Phylogeny of the vascular plants; recognition of the major orders and families. 2 lectures, 2 three-hour laboratories. Prerequisite: BOT 343.

BOT 444 Marine Botany (4)

Ecology, taxonomy, and morphology of marine plants. Study of the planktonic and littoral flora. Weekend field trips required. 2 lectures and 2 three-hour laboratories. Prerequisite: BOT 125, BOT 442.

BOT 461, 462 Senior Project (2) (2)

Selection and completion of a project under a minimum of supervision. Projects typical of problems which graduates must solve in their fields. Results presented in a formal report. Minimum of 120 hours total time.

BOT 463 Undergraduate Seminar (2)

Study and discussion of recent developments in botany and critical examination of senior theses. 2 lectures. Prerequisite: BOT 462.

BOT 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

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CHEMISTRY

Esther B. Leffler, *Acting Chairman*
John L. Abernethy
Charles Bowen
Vasu Dev
Irwin Geller
George Gulnikov
David A. Haner
Paul C. Hiemenz
Yu-Ping Hsia
Ruth J. McKown
Walter Maya
Gabriel T. Moran
Earl L. Pye
Elmer H. Rice
Dorothy W. Richardson
Stuart E. Salot
J. Ernest Simpson
Donald D. Smith
Arnulf Vollmar

The Chemistry department offers an undergraduate major in chemistry designed to prepare students either for careers as chemists in private industry and government or for graduate study. Together with fifth year courses offered as part of the credential program, the major satisfies requirements leading to the Standard Teaching Credential. Through choices of electives, students may specialize in all the major areas of chemistry. The department is on the approved list of the American Chemical Society. Students may choose to follow the ACS curriculum by taking the prescribed electives listed below, and this degree will be certified as having met the ACS standards. Within the core curriculum students can pursue programs in pre-medicine, pre-dentistry, biochemistry and clinical chemistry by an appropriate choice of electives, worked out with their departmental advisor.

A curriculum leading to the Master of Science degree in Chemistry is also offered in the department. Requirements for this degree may be found in the *Graduate Bulletin.*

CORE COURSES FOR MAJOR

(Required of all students)

General Chemistry	CHM 111	(3)
General Chemistry	CHM 112	(3)
Chemical Principles	CHM 113	(4)
General Chemistry Lab	CHM 151	(1)
General Chemistry Lab	CHM 152	(1)
Organic Chemistry	CHM 211	(3)
Organic Chemistry	CHM 212	(3)
Organic Chemistry	CHM 213	(3)
Quantitative Analysis	CHM 221	(4)
Organic Chemistry Lab	CHM 251	(1)
Organic Chemistry Lab	CHM 252	(2)
Organic Chemistry Lab	CHM 253	(2)
Physical Chemistry	CHM 311	(4)
Physical Chemistry	CHM 312	(3)
Physical Chemistry	CHM 313	(3)
Adv Analytical Chem	CHM 332	(4)
Instrumental Analysis	CHM 333	(4)
Physical Chemistry Lab	CHM 352	(2)
Physical Chemistry Lab	CHM 353	(2)
Inorganic Chemistry	CHM 401	(3)
and Inorganic Chemistry	CHM 402	(3)
or Biochemistry	CHM 327	(4)
and Biochemistry	CHM 328	(4)
Senior Project	CHM 461	(2)
Senior Project	CHM 462	(2)
Undergraduate Seminar	CHM 463	(2)
† Advanced Chemistry Electives		(6)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC 201	*(4)
American Civilization	AMC 202	*(4)
General Biology	BIO 115	*(5)
Freshman Composition	ENG 104	*(4)
Freshman Composition	ENG 105	*(4)
Elementary German	GER 101	*(4)
Elementary German	GER 102	*(4)
Elementary German	GER 103	*(4)
‡Analytic Geometry and Calculus	MAT 114	*(3)
‡Analytic Geometry and Calculus	MAT 115	*(3)
‡Analytic Geometry and Calculus	MAT 116	*(3)
‡Calculus and Differential Equations	MAT 214	(4)
‡Calculus and Differential Equations	MAT 215	(4)
Physical Education	PE 141	*(3)
General Physics	PHY 131	*(4)
General Physics	PHY 132	*(4)
General Physics	PHY 133	*(4)
Introduction to Nuclear Physics	PHY 213	(3)
Elementary Modern Physics	PHY 235	(4)
Humanities		*(8)
Four Courses from Agriculture, Engineering or Business		*(8)
Electives		(38-40)

* May be used for the general education requirement. Select unspecified courses from the general education list.

† 400-level courses excluding CHM 400, 461,

462, and 463.

‡ The calculus sequence MAT 140, 141, 142, 240, 241 may be substituted.

A reading knowledge of a foreign language, especially German, is strongly recommended for students planning advanced study in science.

Course Descriptions

CHM 103 Fundamentals of Chemistry (4)

Atoms, molecules and physical states of matter. Important classes of chemical compounds and chemical reactions. Experimentation as the approach to solving problems of natural phenomena. Not open to students who have credit for CHM 104 or 111. 3 lectures, 1 recitation.

CHM 104 College Chemistry (3)

Principles of atomic structure, periodicity and bonding. Stoichiometry and chemical calculations. Solutions and gases. General chemistry for those who do not require calculus in their major. 3 lecture-discussions. Prerequisite: CHM 103 or one year of high school chemistry with an average grade of B or better. Concurrent: CHM 141.

CHM 105 College Chemistry (3)

Chemical equilibrium. Calculations involving pH and solubility. Coordination compounds, electrochemistry and reaction kinetics. 3 lecture-discussions. Prerequisite: CHM 104. Concurrent: CHM 142.

CHM 111 General Chemistry (3)

Atomic theory, atomic structure, the periodic table, chemical bonding, molecular structure, chemical properties of atoms and molecules. 3 lecture-discussions. Prerequisite: CHM 103 or one year of high school chemistry with an average grade of B or better. Concurrent: CHM 151 and MAT 114.

CHM 112 General Chemistry (3)

Oxidation-reduction, kinetic molecular theory of gases, gas laws, solids, liquids, solutions, colligative properties, equilibrium, thermodynamics, and kinetics. 3 lecture-discussions. Prerequisite: CHM 111. Concurrent: CHM 152.

CHM 113 Chemical Principles (4)

Chemistry of the elements, their properties and reactions; nuclear chemistry, and special topics. Laboratory work includes qualitative analysis, chemical preparations. 3 lecture-discussions, 1 three-hour laboratory. Prerequisite: CHM 105 or 112.

CHM 141 College Chemistry Laboratory (1)

Use of analytical balance. Experiments in stoichiometry, acid-base, and redox reactions. Accuracy and precision in experimental measurements. 1 three-hour laboratory. Concurrent: CHM 104.

CHM 142 College Chemistry Laboratory (1)

Measurement of gases, colligative properties, pH titration. Qualitative ionic equilibria. 1 three-hour laboratory. Prerequisite: CHM 141. Concurrent: CHM 105.

CHM 151 General Chemistry Laboratory (1)

Use of the analytical balance and development of laboratory techniques. Experiments in stoichiometry, gas laws, colligative properties. 1 three-hour laboratory. Concurrent: CHM 111.

CHM 152 General Chemistry Laboratory (1)

Experiments in thermochemistry, redox systems, acid-base properties, and ionic equilibria. 1 three-hour laboratory. Prerequisite: CHM 151. Concurrent: CHM. 112.

CHM 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

CHM 201 Elements of Organic Chemistry (3)

The fundamental concepts of organic chemistry with emphasis on practical applications. For students who are required to take one quarter of organic chemistry. Not open for credit to chemistry majors. 3 lectures. Prerequisite: CHM 105 or 112. Concurrent: CHM 250 for students planning to take CHM 321.

CHM 211 Organic Chemistry (3)

Modern concepts of chemical bonding, molecular structure; basic principles of stereochemistry and conformation; organic reaction intermediates; alkanes, alkenes, and alkynes. 3 lecture-discussions. Prerequisite: CHM 105 or 112. Concurrent: CHM 251.

CHM 212 Organic Chemistry (3)

Alicyclic and aromatic hydrocarbons; functionally substituted aliphatic and aromatic hydrocarbons. 3 lecture-discussions. Prerequisite: CHM 211. Concurrent: CHM 252 for chemistry majors.

CHM 213 Organic Chemistry (3)

Organic nitrogen compounds, optical isomerism, carbohydrates, amino acids, proteins, terpenes, and steroids. 3 lecture-discussions. Prerequisite: CHM 212. Concurrent: CHM 253 for chemistry majors.

CHM 221 Quantitative Analysis (4)

Fundamentals of gravimetric and volumetric analysis. Focus on laboratory work, with class discussion supplying supporting theory. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 105 or 112.

CHM 250 Elements of Organic Chemistry Laboratory (1)

Introduction to general techniques of the organic laboratory for the separation, purification, and identification of organic substances. Survey of the laboratory preparation and reactions of different functional groups with emphasis on the practical application. 1 three-hour laboratory. For students who are required to take CHM 201. Not open for credit to chemistry majors. Prerequisite: CHM 105 or 112. Concurrent: CHM 201.

CHM 251 Organic Chemistry Laboratory (1)

Introduction to general techniques of the organic laboratory for the separation, purification, and identification of organic substances. 1 three-hour laboratory. Prerequisite: CHM 105 or 112. Concurrent: 211.

CHM 252 Organic Chemistry Laboratory (2)

Syntheses to illustrate reaction mechanisms and reaction sequence. 2 three-hour laboratories. Prerequisite: CHM 251. Concurrent: CHM 212.

CHM 253 Organic Chemistry Laboratory (2)

Qualitative analysis for the elements, reactions of functional groups and preparation of derivatives needed for structural determination of organic molecules supplemented by methods of instrumental analysis. 2 three-hour laboratories. Prerequisite: CHM 252. Concurrent: CHM 213.

CHM 256 Glassblowing (1)

Fundamental techniques of laboratory glassblowing. A practical course to teach students to construct and repair special pieces of glass apparatus used in advanced chemistry courses and senior project work. 1 three-hour laboratory. Prerequisite: CHM 105 or 112.

CHM 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

CHM 311 Physical Chemistry (4)

Properties of gases, kinetic molecular theory and thermodynamics. 4 lecture-problems. Prerequisite: MAT 215 or the equivalent, CHM 112, one year of college physics.

CHM 312 Physical Chemistry (3)

Atomic and molecular structure; chemical kinetics. 3 lectures. Prerequisite: CHM 311.

CHM 313 Physical Chemistry (3)

Phase equilibria, solutions, transport phenomena, and surface and colloid chemistry. 3 lectures. Prerequisite: CHM 312.

CHM 321 Elements of Biochemistry (4)

The fundamental concepts of biochemistry with emphasis on structure-function relationships as they relate to carbohydrates, lipids, proteins, and nucleic acids. Designed for students who are required to take one quarter of biochemistry. Not open for credit to Chemistry majors. 3 lectures, 1 three-hour laboratory. Prerequisite: CHM 201 and 250, or CHM 211, 251 and 212.

CHM 327 Biochemistry (4)

Chemistry of carbohydrates, lipids, proteins, and other classes of substances found in living tissues. Chemical nature of enzymes and their action including digestion and intermediary metabolism. Laboratory work includes test-tube reactions, enzymology, and analytical procedures employing volumetric and colorimetric procedures. 3 lectures, 1 three-hour laboratory. Prerequisite: CHM 211, 251, and 212.

CHM 328 Biochemistry (4)

Chemistry of metabolic processes in plants and animals including respiration, functions of blood, hormones, nitrogen metabolism, energy metabolism, and chemical aspects of nutrition. Laboratory work includes study of live plants and animals as well as surviving tissues. 3 lectures, 1 three-hour laboratory. Prerequisite: CHM 327.

CHM 329 Biochemistry (4)

Amino acid, purine, and pyrimidine metabolism; metabolism of water and electrolytes; biochemistry of toxic materials, immunochemistry. 3 lectures, 1 three-hour laboratory. Prerequisite: CHM 328.

CHM 331 Clinical Methods of Analysis (4)

Fundamentals of instrumental analysis based on biological and biochemical applications. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 221 and 327 or 321.

CHM 332 Advanced Analytical Chemistry (4)

Analytical chemistry with particular emphasis on electrochemical methods of analysis including potentiometric, conductometric, and ampe-

rometric titrimetry and electrodeposition techniques. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 221 and 311.

CHM 333 Instrumental Analysis (4)

Modern techniques of chemical analysis based primarily on optical instrumental methods such as UV and IR spectrophotometry, emission spectroscopy, and X-ray diffractometry. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 221.

CHM 352 Physical Chemistry Laboratory (2)

Physiochemical measurement. Laboratory experiments illustrating principles of physical chemistry. 2 three-hour laboratories. Prerequisite: CHM 221, 311. Concurrent: CHM 312.

CHM 353 Physical Chemistry Laboratory (2)

Advanced laboratory applications of physical chemistry. 2 three-hour laboratories. Prerequisite: CHM 352. Concurrent: CHM 313.

CHM 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

CHM 401 Inorganic Chemistry (3)

Detailed study of theories of bonding in inorganic compounds, with emphasis on coordination complexes, inorganic stereochemistry; uncommon oxidation states; study of relationship of properties to electronic structure. 3 lecture-problems. Prerequisite: CHM 312.

CHM 402 Inorganic Chemistry (3)

Mechanisms of inorganic reactions with special emphasis on coordination chemistry. Isomerization and racemization reactions. Free radical reactions. Catalytic effects of coordination compounds. 3 lecture-problems. Prerequisite: CHM 401.

CHM 405 Physical Organic Chemistry (3)

The application of physico-chemical principles to organic chemistry with emphasis on the kinetic approach to the postulation of reaction mechanisms. 3 lectures. Prerequisite: CHM 213 and 313.

CHM 409 Macromolecular Chemistry (3)

Types of polymers and polymerization reactions; properties of polymer solutions and the determination of molecular weights; elasticity and other bulk properties. 3 lectures. Prerequisite: CHM 313.

CHM 411 Reaction Kinetics (3)

Kinetics and mechanisms of chemical reactions. Transition state theory, collision theory, photochemical excitation and dissociation, homogeneous and heterogeneous catalysis. Analysis and solution of problems. 3 lectures. Prerequisite: CHM 313.

CHM 413 Introduction to Colloid and Surface Chemistry (3)

Gas-liquid, gas-solid and solid-liquid interfaces. Adsorption and surface area determination. Application to flotation, catalysis and detergency. 3 lectures. Prerequisite: CHM 313.

CHM 415 Chemical Thermodynamics (3)

Fundamental aspects of chemical thermodynamics, including the first, second, and third laws. Studies of chemical and phase equilibria, enthalpy, entropy, work, and free energy. Relationship to molecular structure and statistical mechanics. 3 lectures. Prerequisite: CHM 313.

CHM 421 Chemical Separation Methods (4)

Emphasis on the various chromatographic methods of separation, including gas, liquid, paper, thin-layer electro, ion exchange and gel chromatographics. Solvent extraction, precipitation, and distillation are also included. Three lectures, one 3-hour laboratory. Prerequisite: CHM 332, 333.

CHM 422 Organic Synthesis (4)

Examples from recent chemical journals of the modern methods of organic synthesis in preparations involving multistep synthesis, with emphasis on mechanism and stereochemistry. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 253, 313.

CHM 423 Inorganic Synthesis (4)

Systematic study of the preparation, properties, analysis, and reactions of inorganic compounds emphasizing the application of thermodynamics and physico-chemical techniques. 2 lecture-problems, 2 three-hour laboratories. Prerequisite: CHM 402.

CHM 436 Nuclear Chemistry (4)

Principal types of nuclear radiation and their properties. Detection of radiation, dosimetry and safety. Radioisotope tracing. Decay laws, precursor-product relationships. Statistical aspects of decay and detection. 2 lectures, 2 three-hour laboratories. Prerequisite: MAT 116, CHM 221 or equivalent.

CHM 442 X-ray Methods of Analysis (4)

Introduction to X-ray spectrometric and diffraction methods of chemical analysis. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 313 and 353 or consent of instructor.

CHM 446 Corrosion Chemistry (4)

The basic principles of theoretical and applied electrochemistry as it pertains to corrosion. Thermodynamics and kinetics of oxidation. Aqueous corrosion, stress corrosion, hydrogen cracking, fatigue. Corrosion testing, inhibition, and design. Cathodic and anodic protection, metal and chemical coatings. 3 lectures, 1 three-hour laboratory. Prerequisite: CHM 313 or instructor's consent.

CHM 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Independent study and introduction to research. A formal report is required. Minimum of 120 hours total time.

CHM 463 Undergraduate Seminar (2)

A study of current developments in chemistry and a discussion of periodical literature at an appropriate level. 2 lecture-discussions.

CHM 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

EARTH SCIENCES

One of the two majors offered in the Physics and Earth Sciences department is earth sciences. For the other program in this department see Physics.

Gerald V. Henderson, Coordinator, Earth Sciences
Lawrence J. Herber Walter H. Hesse Bernard O. Lane

The curriculum in earth science is designed for students who desire a broad background in geology and related sciences. It prepares students for careers as geologists with state and federal geologic agencies, in industry and for graduate work. Students interested in geology should be well-versed in math, physics and chemistry.

CORE COURSES FOR MAJOR

(Required of all students)

Physical Geology	ESC	111	(3)
Historical Geology	ESC	112	(3)
Physical Geology Laboratory	ESC	151	(2)
Historical Geology Laboratory	ESC	152	(1)
Crystallography	ESC	221	(3)
Mineralogy	ESC	222	(4)
Optical Mineralogy	ESC	223	(4)
Invertebrate Paleontology	ESC	331	(4)
Stratigraphy	ESC	332	(3)
Structural Geology	ESC	333	(4)
Petroleum Geology	ESC	351	(3)
Igneous and Metamorphic Petrology	ESC	422	(4)
Economic Geology	ESC	433	(4)
Field Methods	ESC	455	(4)
Senior Project	ESC	461	(2)
Senior Project	ESC	462	(2)
Undergraduate Seminar	ESC	463	(2)
Summer Field Geology	ESC	490	(8)
Courses to Complete Major			(16)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Basic Biology	BIO	115	*(5)
General Chemistry	CHM	111	*(3)
General Chemistry	CHM	112	*(3)
Chemical Principles	CHM	113	*(3)
General Chemistry Laboratory	CHM	151	*(1)
General Chemistry Laboratory	CHM	152	*(1)
Principles of Economics	EC	201	*(4)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
Introduction to Engineering Graphics	ESG	120	†(3)
Descriptive Geometry	ESG	125	(2)
Analytic Geometry and Calculus	MAT	114	*(3)
Analytic Geometry and Calculus	MAT	115	*(3)
Analytic Geometry and Calculus	MAT	116	*(3)
Physical Education	PE	141	*(3)
General Physics	PHY	131	*(4)
General Physics	PHY	132	*(4)
General Physics	PHY	133	*(4)
General Psychology	PSY	201	*(4)
Public Speaking	SP	100	(4)
Basic Soil Science	SS	231	(4)
Soil Physics	SS	432	(4)
Invertebrate Zoology	ZOO	137	(5)
Courses to complete general education requirements			(12)
Electives			(24)

* May be used for the general education requirement. Select unspecified courses from the general education list.

† Students with high school drafting may take ESG 121.

** Must include four courses from a minimum of two schools other than the School of Science for fulfillment of the breadth requirement.

Course Descriptions

ESC 101 Fundamentals of Earth Science (4)

Geologic features and processes. Solar phenomena and concepts. The scientific method of investigating the earth and neighboring planets for a better understanding of man's physical environment. 3 lectures, 1 recitation. Not open to students who have credit for ESC 111, 321.

ESC 111 Physical Geology (3)

Fundamental geologic processes, general surface features and the earth's interior. Minerals, rocks and structures. 3 lectures.

ESC 112 Historical Geology (3)

Changes in continents and ocean basins, fossil populations during successive geological ages. 3 lectures. May be taken without lab by non-majors.

ESC 151 Physical Geology Lab (2)

Classification of minerals and rocks. Reading topographic and geologic maps. 1 three-hour laboratory and a minimum of 3 full-day field trips. Must be taken concurrently with ESC 111.

ESC 152 Historical Geology Lab (1)

Classification of fossil invertebrates. Paleogeographic maps, problems in structural geology, geologic maps. Required of majors. One three-hour laboratory. ESC 112 concurrent.

ESC 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ESC 215 Astronomy (3)

Astronomical properties of the solar system. Instruments, methods, and principles of astronomical investigation. Theories as to the origin, state, and future of the universe. A consideration of man's place in the cosmos. 3 lectures. Not open to students who have credit for ESC 101.

ESC 221 Crystallography (3)

Prerequisite for Mineralogy, ESC 222. Formation of crystals; seven crystal classes, 32 crystal systems; symmetry operations related to point groups, space groups, bravais lattices, translation rows, nets and lattices; crystal projections (stereo nets), introduction to x-ray crystallography. 2 lectures, 1 three-hour laboratory. Prerequisite: ESC 111, 151 or consent of instructor.

ESC 222 Mineralogy (4)

Identification, occurrence, and origin of the common rock-forming minerals. Introduction to crystal physics and crystal chemistry. Application of petrographic and x-ray powder diffraction techniques to mineralogic problems. 2 lectures, 2 three-hour laboratories. Prerequisites: ESC 111, 151, 221, CHM 111, and CHM 151.

ESC 223 Optical Mineralogy (4)

The chemistry (primarily phase relationships) of the common rock-forming minerals. The description, composition, texture and origin of the common rock-forming minerals according to their optical properties as determined with the petrographic microscope. Two lectures, 2 three-hour labs. Prerequisite: ESC 222, CHM 112.

ESC 224 Geology of California (4)

Physiography, structure, and geological evolution of California. Origin, occurrence, and uses of metallic and non-metallic ores including oil and water. Problems related to landslides, earthquakes, subsidence, and flood control. 3 lectures, and a minimum of 3 full-day field trips. Prerequisite: ESC 111, or consent of instructor.

ESC 250 Environmental Geology (3)

Geologic problems related to environment; geologic hazzards (landslides, earthquakes, floods); groundwater development, pollution and depletion; natural resources; soil erosion and conservation; human interference with geologic processes; geothermal power. 3 lectures.

ESC 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

ESC 303 Climatology (3)

Introduction to the weather-producing processes. The earth's heat budget, thermodynamics of the atmosphere, cloud and precipitation mechanisms and the cause of atmospheric circulation. 3 lectures. Prerequisite: PHY 133.

ESC 321 Engineering Geology (4)

Fundamentals of geology applied to engineering problems. Emphasis on rock types, structure, erosion, sedimentation, and soil movements. 3 lectures, 1 three-hour laboratory. Not open to students who have credit for ESC 111. For junior engineering majors. Prerequisite: CE 135.

ESC 323 Geomorphology (3)

Various landforms and interpretation of forces resulting in these landforms. 2 lectures, 1 three-hour laboratory. Prerequisite: ESC 101 or 111.

ESC 331 Invertebrate Paleontology (4)

Morphology and evolution of fossil invertebrates. Includes discussions of ancient environments and changes in life forms with time. 3 lectures, 1 three-hour laboratory. Prerequisite: ESC 112, ZOO 137.

ESC 332 Stratigraphy (3)

Stratigraphic procedures; correlation, classification and origin of stratigraphic units, index fossils. 3 lectures. Prerequisite: ESC 112, 152, 331.

ESC 333 Structural Geology (4)

Structural features and deformation of the earth's crust. Solution of geologic field problems. 3 lectures, 1 three-hour laboratory. Prerequisites: Trigonometry, ME 125, ESC 111.

ESC 335 Oceanography (3)

Physical dimensions, geologic structure of the ocean floor, properties of sea water. Ocean currents, tides, wave action. Influence of the sea on weather. Resources, pollution and influence on life. 2 lectures, one three-hour laboratory. Prerequisite: CHM 105 or 112; PHY 123 or 133 or consent of instructor.

ESC 351 Petroleum Geology (2)

Origin and occurrence of petroleum and related products. Study of the geologic structure and stratigraphy of major oil and gas fields. 3 lectures, 1 three-hour laboratory.

ESC 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ESC 421 Igneous and Metamorphic Petrology (4)

Descriptive, chemical, mineralogic and textural studies of igneous and metamorphic rocks using primarily petrographic techniques. Theory of the classification of these rocks. Field trips required. 2 lectures, 2 three-hour laboratories. Prerequisite: ESC 223.

ESC 422 Sedimentary Petrology (4)

Descriptive, chemical, mineralogic and textural studies of sedimentary rocks, using primarily petrographic, sieve and sedimentation techniques. Theory of the classification and origin of these rocks. A continuation of ESC 421. Field trips required. 2 lectures, 2 three-hour laboratories. Prerequisite: ESC 421.

ESC 433 Economic Geology (4)

Geochemistry and economic aspects of ore deposits, occurrence and distribution of metallic and nonmetallic ores. Laboratory examination of ore suites and common rock materials. Field trips to selected mineral locations required. 3 lectures, 1 three-hour laboratory. Prerequisite: ESC 223 and consent of instructor.

ESC 455 Field Methods (4)

Techniques of recognizing, plotting, collecting and interpreting geologic structures and earth features. Surveying with plane table, alidade, Brunton compass and tape. 1 lecture, 3 three-hour laboratories. Prerequisite: Consent of instructor.

ESC 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Independent study and introduction to research. A formal report is required. Minimum of 120 hours total time.

ESC 463 Undergraduate Seminar (2)

A study of current developments in earth science and a discussion of periodical literature at an appropriate level. 2 lecture-discussions.

ESC 490 Summer Field Geology (8)

A six-week course in geological field methods. Preparation of geological maps of igneous and sedimentary areas and a report on areas mapped. Field-laboratory work. Prerequisite: ESC 455.

ESC 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

MATHEMATICS

Sidney Birnbaum, *Chairman*
Laure I. Abu-Haydar
Charles Amelin
Cameron C. Bogue
Demetrios Brizolis
Hasan Celik
Yu Chang
Tsu-yee Chen
Theodore J. Cullen
Hsin Ya Fan
John R. Fisher
Carlos Ford-Livene
Samuel Gendelman
Frank Glaser
Simon Green
Emil R. Herzog
Jack E. Hofer
Donald Hook
David A. Horwitz
Alice A. Huffman
Larry D. Irwin
Martha Janson
Joseph Kachun
Thomas K. King
Gail S. Konkle
Kenneth B. Kriege
Peter A. Laszlo
Kei A. Lee
Ta Li
Kenneth A. MacDonald
Henryka Maslowski
William McIntosh
William C. Paugstat
Alan Radnitz
Richard A. Robertson
Lydia M. Ross
Harold F. Simmons
V. Merriline Smith
Harry A. Wilson
Carol A. Ziegler

The Mathematics department offers a flexible major program which may be adapted to serve a variety of needs and interests. The student may develop elective patterns which will prepare him for entry into credential programs for elementary, secondary or junior college education or for employment in industry and government.

However, each student is urged to develop an elective pattern which will also prepare him for graduate study either in mathematics or in some quantitative discipline in the sciences, engineering, economics or business. Courses at the 500-level are available as part of a graduate program.

The Mathematics department recommends that each student use several of his free electives to develop depth in some discipline other than mathematics.

Students who plan to enter a credential program should make their desires known as early as possible in order to make effective use of the special counseling available in this area.

Transfer students should complete as much of the calculus sequence as possible before entering Cal Poly. Chemistry and physics courses to be transferred should be those which require calculus concurrently or as a prerequisite.

A high school student planning a major in mathematics should complete one year of physics, one year of chemistry, and four years of mathematics to include thorough preparation in trigonometry and advanced algebra.

CORE COURSES FOR MAJOR

(Required of all students)

Calculus & Anal Geometry	MAT	141	(4)
Calculus & Anal Geometry	MAT	142	(4)
Linear Algebra	MAT	208	(4)
Calculus & Diff Equation	MAT	240	(4)
Calculus & Diff Equation	MAT	241	(4)
Calculus & Diff Equation	MAT	242	(4)
Intermediate Analysis	MAT	314	(4)
Intermediate Analysis	MAT	315	(4)
Modern Algebra	MAT	417	(4)
Modern Algebra	MAT	418	(4)
Senior Project	MAT	461	(2)
Senior Project	MAT	462	(2)
Undergraduate Seminar	MAT	463	(2)
Mathematics Electives (300–400 level)			(20)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
General Chemistry	CHM	111	*(3)
General Chemistry	CHM	112	*(3)
General Chemistry Laboratory	CHM	151	*(1)
General Chemistry Laboratory	CHM	152	*(1)
Fortran	CS	205	(4)
Freshman Composition.....	ENG	104	*(4)

Freshman Composition	ENG	105	*(4)
Calculus and Analytical Geometry	MAT	140	*(4)
Introduction to Probability	MAT	236	(4)
Physical Education	PE	141	*(3)
General Physics	PHY	131	*(4)
General Physics	PHY	132	*(4)
General Physics	PHY	133	*(4)
Humanities			*(8)
Courses to complete general education requirements			(5)
Electives			(68)

* May be used for the general education requirement. Select appropriate courses from the general education list.

Course Descriptions

MAT 1 Preparatory Mathematics (3)

Fundamentals of arithmetic, denominate numbers, introduction to algebra, percentage, exponents, simultaneous linear equations. 3 lectures.

MAT 101 Basic Mathematics (3)

Graphs, charts, ratio, proportion, variation, basic algebraic operations, linear and quadratic equations, logarithms. Not open to any student whose major requires the MAT 114 or 140 sequence or to any student with college credit for any previous math course. 3 lectures. Prerequisite: high school algebra and geometry or MAT 1.

MAT 102 Basic Mathematics (3)

Elements of trigonometry, analytic geometry, statistics. Not open to any student whose major requires the MAT 114 or 140 sequence. 3 lectures. Prerequisite: MAT 101 or MAT 112.

MAT 104 Trigonometry (4)

The circular functions, general reduction formulas, inverse functions, graphs, exponential and logarithmic functions, Law of Sines, Law of Cosines, identities and complex numbers. Not open to any student with credit for MAT 115 or MAT 141. 4 lectures. Prerequisite: MAT 101 or MAT 112.

MAT 105 College Algebra (4)

Real numbers, inequalities, absolute value, coordinate systems, functions, progressions, linear and quadratic systems, polynomials and mathematical induction. Not open to any student with credit for MAT 115 or MAT 141. 4 lectures. Prerequisite: MAT 101 or MAT 112.

MAT 107 Introduction to Statistics (3)

Collection and summarization of data; measures of central tendency and dispersion, probability, binomial and normal distributions, sampling theory. Not open to Mathematics or Engineering majors. 3 lectures. Prerequisites: MAT 101 or MAT 112.

MAT 108, 109 Introduction to Mathematical Analysis (3) (3)

For economics, business administration, agriculture, biological and social science majors. Selected topics from analytic geometry and the calculus of functions of one variable, including applications of differentiation and integration. Not open to any student whose major requires the MAT 114 or 140 sequence. 3 lectures. Prerequisite: MAT 101 or MAT 112 or equivalent.

MAT 110, 111, 112 Introductory Mathematics (3) (3) (3)

A course sequence designed for two purposes. The complete three quarter sequence will equip the student to pursue other mathematics courses, such as MAT 104, MAT 105, MAT 107, MAT 108, as required by his major department. The first two quarters will satisfy general education requirements with regard to mathematics. Enrollment requires approval of the Mathematics Department. 3 lectures.

MAT 114, 115, 116 Analytic Geometry and Calculus (3) (3) (3)

Introduction to analytic geometry, elementary functions, limits. Theory and technique of differential and integral calculus of one variable. 3 lectures. Prerequisite: MAT 104 and 105 or equivalent.

MAT 140, 141, 142 Calculus and Analytic Geometry (4) (4) (4)

Introduction to analytic geometry. Theory, technique and application of the calculus of a single variable, including limits, differentiation, integration. 4 lectures. Prerequisite: MAT 104 and MAT 105, or equivalent.

MAT 150 Great Ideas in Mathematics (4)

Exploration of seminal ideas in mathematics and their consequences for mathematics, science, technology, and philosophy. Significant concepts of number, algebra, geometry, set theory, the infinite and infinitesimal, computing models of the real (and other) world. 4 lectures.

MAT 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

MAT 204 Introduction to Mathematical Analysis (3)

Partial differentiation, maxima and minima of functions of several variables including use of Lagrange multipliers. Introduction to differential equations with some applications. 3 lectures. Prerequisite: MAT 109.

MAT 205 Basic Concepts of Elementary Mathematics (4)

Development of systems of numeration; evolution of the logical basis of the number systems of arithmetic; elementary concepts in set theory. 3 lectures, 1 two-hour activity. Prerequisite: High school algebra and geometry.

MAT 208 Introduction to Linear Algebra (4)

Introduction to linear transformations of the plane, vector space of n-tuples, matrix algebra, determinants, systems of linear equations. 4 lectures. Prerequisite: MAT 214 or 240.

MAT 214, 215, 216 Calculus and Differential Equations (4) (4) (4)

Vector analysis applied to three dimensional analytic geometry. Theory and technique of multivariable calculus, power series, and differential equations (with emphasis on the linear case). 4 lectures. Prerequisite: MAT 116.

MAT 236 Introduction to Probability (4)

Set-theoretic approach to probability in finite sample spaces. Conditional probability, independence, the binomial distribution. 4 lectures. Prerequisite: MAT 105.

MAT 240, 241, 242 Calculus and Differential Equations (4) (4) (4)

Infinite series and sequences; analytic geometry of quadric surfaces and space curves; partial differentiation; multiple integration; standard techniques and theory of ordinary differential equations to include series solutions and operator methods. 4 lectures. Prerequisite: MAT 142 or equivalent.

MAT 259 Mathematical Analysis for Economics (3)

Special topics in difference equations; vectors and matrices with applications to the solution of linear systems, linear programming, etc. 3 lectures. Prerequisite: MAT 109.

MAT 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

MAT 300 Concepts of Elementary Mathematics (4)

Selected topics in algebra and geometry appropriate for prospective elementary school teachers. 3 lectures, 1 two-hour activity. Prerequisite: MAT 205.

MAT 306 History of Mathematics (4)

Development of mathematics over four millenia. Recommended for students preparing to teach mathematics. 4 lectures. Prerequisite: MAT 215 or 241.

MAT 309 Statistical Methods in Engineering and the Physical Sciences (3)

Use of statistical methods in experimentation, testing, inspection and production. Measurement errors, comparison of two or more variances; correlation; design of engineering experiments. Not open to mathematics majors. 3 lectures. Prerequisite: MAT 214 or 240.

MAT 314, 315 Intermediate Analysis (4) (4)

Metric spaces and continuity. Analysis of functions of a single variable. Sequences, limits, continuity, differentiation, integration, introduction to function spaces. 4 lectures. Prerequisite: MAT 216 or MAT 242.

MAT 317 Laplace Transforms and Fourier Series (3)

Introduction to Fourier Series and Integrals with applications. Elementary theory of Laplace transformation with applications including the solution of differential equations. 3 lectures. Prerequisite: MAT 216 or 242.

MAT 318 Mathematical Analysis of Engineering Problems (3)

Introduction to the algebra and calculus of vectors including the divergence and Stokes' theorem. Introduction to analytic functions of a complex variable. Not open to mathematics majors. 3 lectures. Prerequisite: MAT 216 or 242.

MAT 356 Foundation of Elementary Geometry (4)

For prospective elementary teachers. Intuitive nonmetric geometry; Euclidean geometry; the role of axioms and theorems; measurement; introduction to coordinate geometry. 4 lectures. Prerequisite: MAT 300 or consent of instructor, and junior standing.

MAT 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

MAT 401, 402 Numerical Analysis (4) (4)

The basic methods of numerical mathematics with special emphasis on error analysis. Topics will include non-linear systems of equations, differentiation and integration techniques, practical solutions of ordinary and partial differential equations, introduction to approximation theory. 4 lectures. Prerequisites: CS 205, or consent of instructor.

MAT 403 Numerical Methods in Linear Algebra (4)

Treatment of numerical methods for determinants, systems of linear equations, matrix inversion, eigen values and eigen vectors. 4 lectures. Prerequisite: MAT 208.

MAT 413 Advanced Calculus (4)

Differential and integral calculus of functions and transformations in several real variables. 4 lectures. Prerequisite: MAT 315.

MAT 415 Foundations of Geometry (4)

Axiomatic development of selected topics from euclidean and neutral geometries; introduction to non-euclidean geometry with emphasis on the hyperbolic case. 4 lectures. Prerequisite: MAT 208 and 241.

MAT 416 Projective Geometry (4)

Synthetic and analytic treatment of selected topics from projective geometry: classical theorems, conics, polarities; quadratic and bilinear forms. 4 lectures. Prerequisite: MAT 208 and 241.

MAT 417, 418 Modern Algebra (4) (4)

Introduction to algebraic structures: groups rings, integral domains, fields; mappings with emphasis on morphisms. 4 lectures. Prerequisite: MAT 208.

MAT 419 Abstract Linear Algebra (4)

Vector spaces and dimension, linear transformations, dual spaces, adjoints of transformations, multilinear forms, eigenvectors, the Cayley-Hamilton theorem, inner product spaces, orthogonality, similarity transformations, the spectral theorem, Jordan form. 4 lectures. Prerequisite: MAT 208.

MAT 420, 421 Differential Geometry (4) (4)

The Frenet formulas, covariant derivatives, frame fields, the structure equations, differential forms on a surface, normal curvature, Gaussian curvatures; intrinsic geometry of surfaces in E^3, the Gauss and Bonnet theorem. 4 lectures. Prerequisite: MAT 208 and MAT 216 or MAT 242.

MAT 428, 429 Functions of a Complex Variable (4) (4)

Algebra and geometry of complex numbers; analyticity, mappings of elementary functions; Cauchy integral formula, Taylor and Laurent series, the residue theorem; conformal mapping with applications. 4 lectures. Prerequisite: MAT 314 or consent of instructor.

MAT 431, 432 Differential Equations (4) (4)

Partial differential equations with applications to wave motion, heat transfer and fluid flow. Ordinary differential equations: linear with variable coefficients, linear systems; stability and qualitative behavior of solutions. 4 lectures. Prerequisite: MAT 216 or 242, and 208 or consent of instructor.

MAT 440, 441 Mathematical Statistics (4) (4)

Discrete and continuous probability distributions; moments, moment generating functions; transformations of random variables; limiting distributions, sampling distributions; point and interval estimations, tests of hypotheses. 4 lectures. Prerequisite: MAT 236 and either MAT 204 or MAT 216 or MAT 242.

MAT 442 Design of Experiments (4)

Latin-square, split-plot, simple and partially confounded factorial designs; incomplete block designs, treatment of missing data, techniques of experimentations. Introduction to development of sampling systems. 4 lectures. Prerequisite: MAT 441.

MAT 444, 445 Vector and Tensor Analysis (4) (4)

An integrated course in the algebra and calculus of vectors and tensors: topics in differential geometry; applications to mechanics of deformable media, hydrodynamics, general relativity. 4 lectures. Prerequisite: MAT 208, and 216 or 242. PHY 321 is recommended.

MAT 450 Set Theory (4)

Introduction to cardinal and ordinal number theory, well-ordering, the axiom of choice. Analysis of the linear continuum and the real number system. 4 lectures. Prerequisites: MAT 216 or MAT 242.

MAT 455 Mathematical Logic (4)

Validity, deducibility, consistency, and completeness in propositional and predicate calculus. Introduction to computability and decision procedures. 4 lectures. Prerequisite: CS 210 or consent of instructor.

MAT 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum of 120 hours total time.

MAT 463 Undergraduate Seminar (2)

Discussions through seminar methods of new developments in the fields of student's particular interests. 2 lecture-discussions. Prerequisite: Senior standing in mathematics.

MAT 470 Topics in Contemporary Mathematics (2-3)

Individual or group investigations of topics of increasing or unusual significance in the application, development, or understanding of mathematics. May be repeated for a maximum of 6 units. 2 or 3 lecture-discussions. Prerequisite: Senior standing or consent of instructor.

MAT 480 Mathematical programming (4)

Treatment of linear inequalities, duality, general algorithms, application of linear programming. Introduction to discrete and nonlinear programming. 4 lectures. Prerequisite: MAT 208 and CS 205, or consent of instructor.

MAT 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

Computer Sciences

CS 110 Introduction to Computing (4)

Algorithms, flow charts, programming statements, representation of data, computer arithmetic, organization of computers, nature of programming languages. 4 lectures. Prerequisite: MAT 105.

CS 120 Computer Programming (4)

Computer structure and machine language, addressing techniques, digital representation of data, symbolic coding and assembly language, compilers and procedure-oriented languages. 4 lectures. Prerequisite: CS 110.

CS 205 Fortran (4)

Fortran programming for the digital computer. Execution of numerical algorithms; interpolation, integration, solution of linear systems, approximation of roots of nonlinear equations. 4 lectures. Prerequisite: MAT 109 or MAT 115 or MAT 141.

CS 210 Introduction to Applied Logic (4)

Boolean Algebra and propositional calculus with applications to computers and logic design. 4 lectures. Prerequisite: MAT 105, CS 110 or consent of instructor.

CS 301 Introduction to Numerical Analysis (4)

Elementary discussion of errors. Finite difference calculus. Polynomial interpolation. Solution of nonlinear equations. Linear systems of equations. Numerical intergration and differentiation. 4 lectures. Prerequisite: CS 205, and MAT 216 or 242.

CS 320 Algorithmic Languages (4)

Formal analysis of algorithmic languages with emphasis on Algol. 4 lectures. Prerequisite: CS 110, and CS 205, or consent of instructor.

CS 410, 411 Applied Algebra (4) (4)

Partial order, lattices, boolean algebra, applications to computer design. Groups and rings with application to codes. Introduction to finite-state machines and computability. 4 lectures. Prerequisite: CS 210 or consent of instructor.

MICROBIOLOGY

One of the four majors offered in the Biological Sciences department is microbiology. For other programs in this department, see biology, botany, and zoology.

Robert L. Barlet
Brigette H. Goehler
James O. Jackson
George W. Martinek
Fred Shafia

The microbiology major chooses one of the options offered by the section, microbiology or medical technology. The program offered in the microbiology section constitutes excellent undergraduate training and can also be oriented towards the pre-professional fields depending on the individual needs. The microbiology core curriculum offers a strong background in various areas of biology to better prepare the students for their chosen fields. Completion of the medical technology option meets the qualification requirements for the licensing examinations of the California State Department of Public Health (clinical technologist and public health microbiologist) and certification for the examination of the registry of medical technologists of the American Society of Clinical Pathologists (medical technologist).

The microbiology section also offers a curriculum leading to the Master of Science in Biology degree with emphasis in microbiology.

CORE COURSES FOR MAJOR

(Required of all students)

Basic Biology	BIO	115	(5)
Genetics	BIO	303	(4)
Plant Morphology	BOT	125	(5)
Invertebrate Zoology	ZOO	137	(5)
Vertebrate Zoology	ZOO	138	(5)
General Entomology	ZOO	226	(4)
Basic Microbiology	MIC	201	(5)
Microbial Struc. & Func.	MIC	300	(5)
Pathogenic Bacteriology	MIC	410	(5)
Immunology-Serology	MIC	415	(5)
General Virology	MIC	430	(5)
Senior Project	MIC	461	(2)
Senior Project	MIC	462	(2)
Undergraduate Seminar	MIC	463	(2)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Freshman Composition	AMC	104*	(4)
Freshman Composition	ENG	105*	(4)
College Chemistry	CHM	104*	(3)
or General Chemistry	CHM	111*	
College Chemistry	CHM	105*	(3)
or General Chemistry	CHM	112*	
Chemical Principles	CHM	113*	(4)
College Chemistry Laboratory	CHM	141*	(1)
or General Chemistry Laboratory	CHM	151*	
College Chemistry Laboratory	CHM	142*	(1)
or General Chemistry Laboratory	CHM	152*	
Quantitative Analysis	CHM	221	(4)
Organic Chemistry	CHM	211	(3)
Organic Chemistry	CHM	212	(3)
Organic Chemistry	CHM	213	(3)
Organic Chemistry Laboratory	CHM	251	(1)
Biochemistry	CHM	327	(4)
Biochemistry	CHM	328	(4)
Biochemistry	CHM	329	(4)
Trigonometry	MAT	104*	(4)
College Algebra	MAT	105*	(4)
Analytic Geometry & Calculus	MAT	114*	(3)
College Physics	PHY	121*	(4)
College Physics	PHY	122*	(4)
College Physics	PHY	123*	(4)
Physical Education	PE	141*	(3)
Humanities			*(8)
Courses to complete general education requirements			**(8)

* May be used for the general education requirement. Select appropriate courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Science for fulfillment of the breadth requirement.

OPTION COURSES FOR MAJOR

(Required for specific option)

Microbiology

Advanced Genetics	BIO	421	(3)
Cellular Physiology	BIO	435	(4)

Plant Structures and Functions	BOT	124*	(5)
Applied Microbiology	MIC	310	(5)
Medical Mycology	MIC	425	(4)
Medical Parasitology	ZOO	425	(4)
Electives			(18)

Medical Technology

Clinical Methods	CHM	331	(4)
Clinical Laboratory Procedure	MIC	422	(4)
Medical Mycology	MIC	425	(4)
Hematology	MIC	444	(4)
Immunohematology	MIC	445	(4)
Human Anatomy	ZOO	234	(4)
Human Physiology	ZOO	235	(4)
Medical Parasitology	ZOO	425	(4)
Electives			(11)

*- May be used for the general education requirement. Select appropriate courses from the general education list.

Course Descriptions

MIC 100 Elements of Microbiology (3)

Microorganisms and man's existence. Elements of microbiology and applications to daily life. For nonbiological science majors. 3 lecture-discussions.

MIC 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

MIC 201 Basic Microbiology (5)

Morphology, classification, physiology, and cultivation of bacteria; relation of bacteria to health of man, animals, and plants. 3 lectures, 2 three-hour laboratories. Prerequisite: BIO 110 or 115; CHM 111, 151 or CHM 104, 141.

MIC 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

MIC 300 Microbial Structures and Functions (5)

Advanced aspects of general microbiology with emphasis upon structure and function of cell components, nutritional types of bacteria, and growth and enumeration of bacteria. 3 lectures, 2 three-hour laboratories. Prerequisite: MIC 201, CHM 201, and 250 or 211, 212 and 251.

MIC 310 Applied Microbiology (5)

The microbiology of foods, air, water, and sewage, stressing the utilization of microbial activities in manufacturing processes of foods, types and prevention of food spoilage, aims and methods of water treatment and sewage disposal. 3 lectures, 2 three-hour laboratories. Prerequisite: MIC 201, CHM 201, and 250 or 211, 212 and 251.

MIC 320 Food Microbiology (4)

The microbiology of foods as related to storage, transit, human consumption, and health. For foods and nutrition majors. 2 lectures, 2 three-hour laboratories. Prerequisites: MIC 201, CHM 201 and 250 or 211, 212 and 251.

MIC 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

MIC 410 Pathogenic Bacteriology (5)

Characteristics of disease-producing bacteria, their means of transmission, host-parasite interactions, and laboratory methods of diagnosis. 3 lectures, 2 three-hour laboratories. Prerequisite: MIC 300.

MIC 415 Immunology-Serology (5)

Principles of serology and immunology with emphasis on mechanisms of evaluating resistance to pathogens, and on mechanism of response to antigens on the molecular and cellular level. 3 lectures, 2 three-hour laboratories. Prerequisite: MIC 410.

MIC 422 Clinical Laboratory Procedures (4)

Principles and methods in clinical analysis and evaluation of fluids, cells, tissues, and other body components, waste products, or chemical derivatives. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 328, ZOO 235.

MIC 430 General Virology (5)

Chemical composition and physical structure of viruses; their mechanism of reproduction; relationship to man, animals, and plants. Introduction to diagnostic techniques used in the isolation and identification of viruses. 3 lectures, 2 three-hour laboratories. Prerequisite: MIC 300.

MIC 444 Hematology (4)

Anatomy and physiology of the normal hematopoietic system. Most frequently encountered blood dyscrasies with emphasis on their morphological characteristics as manifested in both bone marrow and peripheral blood. 3 lectures, 1 three-hour laboratory. Prerequisite: ZOO 138 or permission of instructor.

MIC 445 Immunchematology (4)

Immunologic characteristics of human red blood cells; immunologic basis for isosensitization, general characteristics of blood group antibodies, plant hemagglutinin and inheritance of blood agglutinogens. 3 lectures, 1 three-hour laboratory. Prerequisite: MIC 415, 444.

MIC 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields. Results presented in a formal report. Minimum of 120 hours total time.

MIC 463 Undergraduate Seminar (2)

Study and discussion of recent developments in microbiology and critical examination of senior theses. 2 lectures. Prerequisite: MIC 462.

MIC 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

PHYSICS

One of the two majors offered in the Physics and Earth Sciences department is physics. For the other program offered in this department see Earth Sciences.

Johannes Tuul, *Chairman*
Keith H. Brown
Robert T. Bush
Robert D. Eagleton
Horace G. Ferris
Douglas Giancoli
Edward M. Kelly
James D. Kerwin
John Macropl
Barton Palatnick
Miguel Rios

The major in physics prepares students for careers as physicists with industry, government, and university laboratories. The program also qualifies as a subject matter major for the standard teaching credential-secondary specialization through fifth-year courses offered in physics for the credential program. By suitably chosen electives, students may emphasize the interdisciplinary areas of biophysics or geophysics.

CORE COURSES FOR MAJOR

(Required of all students)

General Physics	PHY	131	(4)
General Physics	PHY	132	(4)
General Physics	PHY	133	(4)
Waves	PHY	234	(4)
Elem Modern Physics	PHY	235	(4)
Physics of Elec & Mag	PHY	313	(3)
Physics of Elec & Mag	PHY	314	(3)
Physics of Elec & Mag	PHY	315	(3)
Mechanics	PHY	321	(4)
Mechanics	PHY	322	(4)
Modern Physics	PHY	401	(4)
Quantum Mechanics	PHY	402	(4)
Adv. Physics Lab.	PHY	430	(3)
Senior Project	PHY	461	(2)
Senior Project	PHY	462	(2)
Undergraduate Seminar	PHY	463	(2)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201	*(4)
American Civilization	AMC	202	*(4)
Basic Biology	BIO	115	(5)
General Chemistry	CHM	111	*(3)
General Chemistry	CHM	112	*(3)
General Chemistry Laboratory	CHM	151	*(1)
General Chemistry Laboratory	CHM	152	*(1)
Freshman Composition	ENG	104	*(4)
Freshman Composition	ENG	105	*(4)
† Analytical Geometry and Calculus	MAT	114	*(3)
† Analytical Geometry and Calculus	MAT	115	*(3)
† Analytical Geometry and Calculus	MAT	116	*(3)
† Calculus and Differential Equations	MAT	214	(4)
† Calculus and Differential Equations	MAT	215	(4)
† Calculus and Differential Equations	MAT	216	(4)
Physical Education	PE	141	*(3)
General Psychology	PSY	201	*(4)
Humanities			*(8)
2 Courses: School of Arts			*(6)
2 Courses: School of Engineering, Business or Agriculture			*(6)
Advanced Electives			(24)
Electives			(43)

* May be used for the general education requirement. Select unspecified course from the general education list.

† Or MAT 140, 141, 142, 240, 241, 242.

Course Descriptions

PHY 102 Fundamentals of Physics (4)

Various theories of matter and energy and the principles and laws that describe their behavior and applications. Some special knowledge of modern science that will function in a socially-desirable manner in the lives of students. 3 lectures, 1 recitation. Prerequisite: A college math course. PHY 102 is not open to students who have credit for PHY 121 or 131.

PHY 121, 122, 123 College Physics (4) (4) (4)

Principles of mechanics, vectors, force, motion, momentum, work and energy, gravity; heat and kinetic theory; wave motion, sound, light; electricity, magnetism; theory of special relativity, quantum theory, atomic structures, the nucleus and radioactivity. 3 lectures, 1 three-hour laboratory. Not for students majoring in physics or engineering. To be taken in sequence. Prerequisite; MAT 102 or MAT 104 or equivalent.

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PHY 131 General Physics (4)

Fundamental principles of mechanics. Vectors, statics, uniform motion, accelerated motion, work and energy, and rotational motion. 3 lectures, 1 three-hour laboratory. Prerequisite: MAT 114 or MAT 140; MAT 115 or MAT 141 must be taken concurrently.

PHY 132 General Physics (4)

Fundamental principles of harmonic motion, waves, fluid mechanics, thermodynamics, kinetic theory, and geometrical optics. 3 lectures, 1 three-hour laboratory. Prerequisite: MAT 115 or MAT 141, PHY 131; MAT 116 or MAT 142 must be taken concurrently.

PHY 133 General Physics (4)

Fundamental principles of electricity and magnetism. Coulomb's law, electric fields, potential, properties of dielectrics, capacitance, Ohm's law, magnetism and magnetic fields, measuring instruments, magnetic field of moving charges, induced emf, AC circuits. 3 lectures, 1 three-hour laboratory. Prerequisite: PHY 131; MAT 116 or MAT 142 (or may be taken concurrently).

PHY 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

PHY 202 Today's Physics (4)

For non-science majors. A layman's view of modern physics: relativity, elementary particles, quantum theory, radioactivity, lasers, space physics, etc. Not open to students who have taken PHY 121, or PHY 131, or the equivalent. 3 lectures, 1 recitation.

PHY 213 Introduction to Nuclear Physics (3)

Elementary theory of nuclear structure, including a study of nuclear reactions, particle accelerators, and nuclear instruments. Application in atomic energy and nuclear engineering. 3 lectures. Prerequisite: PHY 235 or consent of instructor.

PHY 234 Waves (4)

Fundamentals of wave motion, including electromagnetic waves, light, sound and particle waves. 3 lectures, 1 three-hour laboratory. Prerequisite: PHY 133, MAT 214.

PHY 235 Elementary Modern Physics (4)

Theory of special relativity; origin of the quantum theory; Bohr theory; wave mechanics and atomic structure; introduction to nuclear physics. 3 lectures, 1 three-hour lab. Prerequisite: PHY 234 or consent of instructor.

PHY 240. Electronics for Scientists (2)

Basic concepts of electrical circuits, vacuum tubes, and solid state devices. Circuit analysis and operation of instruments commonly encountered in science lab. 2 lectures. Prerequisite: PHY 123 or 133 or consent of instructor.

PHY 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

PHY 302 Optical Physics (3)

Physical optics: interference, diffraction, polarization, electromagnetic nature of light; geometrical optics. Prerequisite: PHY 234. 2 lectures, 1 three-hour laboratory.

PHY 306 History of Physics (3)

History of physics from Thales of Miletus to the present with special emphasis on 19th and 20th Century developments. 3 hours lecture.

PHY 313, 314, 315 Physics of Electric and Magnetic Phenomena (3) (3) (3)

Electrostatics, magnetostatics, circuit theory, time-varying fields, Maxwell's equations, and electromagnetic waves. 3 lectures. Prerequisites: PHY 133 and MAT 216.

PHY 321, 322 Mechanics (4) (4)

Vector algebra, principles of Newtonian mechanics, conservative forces, harmonic motion, central-force motion, the two-body problem, center of mass coordinates, statics and dynamics of rigid bodies, accelerated coordinate systems, normal coordinates, and Lagrange's equations. 4 lectures. Prerequisite: PHY 133 and MAT 216.

PHY 333 Thermal Physics (4)

Fundamental principles of thermodynamics and kinetic theory of gases. 4 lectures. Prerequisite: PHY 133 and MAT 215.

PHY 340 Physics of Environmental Problems (4)

Physical aspects of environmental problems are analyzed quantitatively. Topics include transportation, the internal combustion engine, electric energy production, natural resources, air pollution, thermal pollution of water, and nuclear radiation hazards. 3 1-hour lectures. Prerequisite: PHY 123 or 133: CHM 105 or 112.

PHY 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

PHY 401 Modern Physics (4)

Theory of special relativity; quantum mechanics; Schrödinger wave equation and its solution; hydrogen atom. 4 lectures. Prerequisites: MAT 216; PHY 235, 315 (may be taken concurrently), 322, or CHM 313, or consent of instructor.

PHY 402 Quantum Mechanics (4)

Schrödinger theory; identical particles; the Pauli exclusion principle; perturbation theory; multielectron atoms and coupling; scattering theory; matrix mechanics; angular momentum. 4 lectures. Prerequisite: PHY 401 or consent of instructor.

PHY 403 Advanced Nuclear Physics (4)

Nuclear disintegration and nuclear reactions, fusion, fission, nuclear models. Elementary particle and high energy physics. 4 lectures. Prerequisite: PHY 401.

PHY 406 Solid State Physics (4)

Geometry of perfect crystals, crystal imperfections, diffusion of atoms, electronic states in solids. The basic solid types: metals, ionic crystals, covalent crystals, molecular crystals. Transport properties and specific heat of metals. Physical properties of semiconductors, theory of semiconductor devices. Behavior of dielectrics, diamagnetism and paramagnetism, ferromagnetism (domain theory). 4 lectures. Prerequisite: PHY 133 and MAT 216.

PHY 407 Statistical Physics (4)

Study of the statistical behavior of physical systems composed of large numbers of similar particles. Derivation and application of the distribution functions for the cases of Maxwell-Boltzmann statistics, Bose-Einstein statistics and Fermi-Dirac statistics. 4 lectures. Prerequisite: PHY 235, 333 and MAT 216.

PHY 412, 413 Mathematical Methods of Physics (4) (4)

Solutions of problems in physics by mathematical methods such as differential equations, calculus of variations, complex variables. 4 lectures. Prerequisite: MAT 216, PHY 315, 322 or consent of instructor.

PHY 417 Advanced Optics (3)

Quantum optics; lasers; spectroscopy; electro optics. 3 lectures. Prerequisites: PHY 302 and PHY 401 or consent of instructor.

PHY 420 Sonics (3)

Wave motion, acoustics and ultrasonics. Transverse waves, longitudinal waves, vibration of bars. Application to the production, transmission and reception of sound. Study of the acoustic wave equation in two and three dimensions. 3 lectures. Prerequisite: PHY 234 or consent of instructor.

PHY 425 Space Physics (3)

Topics in space physics such as: planetary investigations, astrophysics, solar emissions, supernovae, formation of the elements in the solar system, star formation processes, cosmic rays, physics of the interplanetary region, upper atmosphere phenomena. 3 lectures. Prerequisite: PHY 235, 315, 322, or consent of the instructor.

PHY 430 Special Laboratory Experimental Physics (3)

Selected topics in advanced experimental physics. 3 three-hour laboratories. Prerequisite: Consent of department. To be scheduled only 1 unit at a time.

PHY 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results presented in a formal report. Minimum of 120 hours total time.

PHY 463 Undergraduate Seminar (2)

Study of current developments in physics and discussion of periodicals of an appropriate level. 2 lecture-discussions.

PHY 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

ZOOLOGY

One of the four majors offered in the Biological Sciences department is zoology. For other programs in this department see Biology, Microbiology, and Botany.

Robert Barrett
Johathan N. Baskin
Jack L. Bath
Peter Castro
William D. Edmonds
Donald C. Force
Lamar M. Knill
Edward T. Roche
Glenn R. Stewart
Laszlo J. Szijj

Qualified zoology majors are well prepared for employment in a variety of state and federal agencies dealing with fish and game, wildlife management and related areas. An entomology option offered under the zoology major prepares the student for work in many areas of insect control and research.

The curriculum in zoology provides strong pre-medical, pre-dental, and pre-veterinary preparation, as well as preparing the student for graduate studies in zoology.

Facilities include a large animal colony, a representative collection of living local reptiles and amphibians and an extensive study collection of bird, mammal, amphibian and fish specimens. Unique and extensive wild areas are available on the campus for animal studies.

The zoology section also offers a curriculum leading to the Master of Science in Biology with emphasis in zoology.

CORE COURSES FOR MAJOR

(Required of all students)

Principles of Evolution	BIO	213	(3)
Genetics	BIO	303	(4)
Biometrics	BIO	311	(3)
Principles of Ecology	BIO	325	(4)
Plant Structures and Functions	BOT	124	(5)
Plant Morphology	BOT	125	(5)
Basic Microbiology	MIC	201	(5)
Invertebrate Zoology	ZOO	137	(5)
Vertebrate Zoology	ZOO	138	(5)
General Entomology	ZOO	226	(4)
Senior Project	ZOO	461	(2)
Senior Project	ZOO	462	(2)
Undergraduate Seminar	ZOO	463	(2)
Courses to Complete Major			(24-38)

OPTION COURSES FOR MAJOR

(Required for specific option)

Zoology

Embryology	ZOO	323	(4)
Animal Physiology	ZOO	324	(4)
Comparative Anatomy of Vertebrates	ZOO	326	(4)
Approved Electives			(26)

Systematic Entomology

Insect Classification	ZOO	327	(4)
Insect Ecology	ZOO	412	(3)
Structure and Function in Insects	ZOO	423	(5)
Immature Insects	ZOO	434	(3)
Approved Electives			(9)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civilization	AMC	201*	(4)
American Civilization	AMC	202*	(4)
Basic Biology	BIO	115*	(5)
Plant Pathology	BOT	223	(4)
†College Chemistry	CHM	104*	(3)
†College Chemistry	CHM	105*	(3)
†College Chemistry Laboratory	CHM	141*	(1)
†College Chemistry Laboratory	CHM	142*	(1)
‡Organic Chemistry	CHM	201	(3)
‡Organic Chemistry Laboratory	CHM	251	(1)
#Elements of Biochemistry	CHM	321	(1)
Freshman Composition	ENG	104*	(4)
Freshman Composition	ENG	105*	(4)
Introduction to Analysis	MAT	108*	(3)
Introduction to Analysis	MAT	109*	(3)
Physical Education	PE	141*	(3)
College Physics	PHY	121*	(4)
College Physics	PHY	122*	(4)
College Physics	PHY	123*	(4)
Humanities		*	(9)
Courses to complete general education requirements		**	(8)
Free Electives			(32-46)

* May be used for the general education requirement. Select appropriate courses from the general education list.

** Must include four courses from a minimum of two schools other than the School of Science for fulfilment of the breadth requirement.

† Or General Chemistry CHM 111, 112, 151, 152

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‡ Or Organic Chemistry 211, 212, 213 and Organic Chemistry Lab 251, and 252.
# Or Biochemistry 327, 328, 329.

Course Descriptions

ZOO 137 Invertebrate Zoology (5)

Systematics, morphology, and biology of invertebrate animals from protozoa to chordates. 3 lectures, 2 three-hour laboratories. Prerequisite: BIO 115.

ZOO 138 Vertebrate Zoology (5)

Structure and function of vertebrate organ systems, with emphasis on man and domestic animals; study of interrelationships within the Phylum Chordata. 3 lectures, 2 three-hour laboratories. Prerequisite: BIO 115.

ZOO 200 Special Problems for Lower Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ZOO 226 Introduction to Entomology (4)

General aspects of insect structure and function, development, behavior and influence on human activity; includes a survey of the principal insect groups. 3 lectures, 1 three-hour laboratory. Prerequisite: BIO 115, ZOO 137.

ZOO 234 Human Anatomy (4)

Lectures devoted to a description of human anatomy. Laboratories involved with cat anatomy dissection with reference and comparison to human structure. 2 lectures, 2 three-hour laboratories. Prerequisite: BIO 115.

ZOO 235 Human Physiology (4)

Functions of the major organ systems of the human body with emphasis on the homeostatic mechanisms. 3 lectures, 1 three-hour laboratory. Prerequisite: BIO 115.

ZOO 236 Advanced Invertebrate Zoology (4)

A systematic and comparative survey of all invertebrate groups, including the minor phyla, with emphasis on morphology and phylogeny. (Insects and parasites are omitted.) 2 lectures, 2 three-hour laboratories and field work. Prerequisite: ZOO 137.

ZOO 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor.

ZOO 323 Embryology (5)

Embryonic development of the vertebate body. 2 lectures, 3 three-hour laboratories. Prerequisite: ZOO 138

ZOO 324 Animal Physiology (4)

Introduction to functions of vertebrate and invertebrate organ systems. 2 lectures, 2 three-hour laboratories. Prerequisite: ZOO 137, 138.

ZOO 326 Comparative Anatomy of Vertebrates (4)

Comparative structure of vertebrate organ systems. 2 lectures, 2 three-hour laboratories. Prerequisite: ZOO 138.

ZOO 327 Insect Classification (4)

Aspects of taxonomic procedure and study of classifications of the Class Insecta. Collection, identification and recognition of significant insect families. 2 lectures, 2 three-hour laboratories. Prerequisite: Z00 226.

ZOO 329 Ornithology (3)

Identification, structure, physiology, ecology, behavior and economic importance of birds, especially of Pacific Coast region. 2 lectures, 1 three-hour laboratory or field exercises and field project. Prerequisite: ZOO 138.

ZOO 341 Mammalogy (3)

Morphology, classification, distribution, ecology, behavior and economic importance of mammals; identification, life histories, and field study of local species. 2 lectures, 1 three-hour laboratory. Prerequisite: ZOO 138 or equivalent.

ZOO 400 Special Problems for Upper Division Students (1-2)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ZOO 412 Insect Ecology (3)

Principles of ecology as they apply to insects and other invertebrates. 3 lectures. Prerequisite: ZOO 226, BIO 325.

ZOO 419 Animal Behavior (3)

Biological, physiological, genetic and anatomical principles of animal behavior. Ethnology and experimental psychology involving wild and laboratory animals. 2 lectures, 1 three-hour laboratory. Prerequisite: ZOO 138 or consent of instructor.

ZOO 422 Histology (4)

Microscopic study of vertebrate tissues: organology and correlation of form with function. 2 lectures, 2 three-hour laboratories. Prerequisite: ZOO 138.

ZOO 423 Structure and Function in Insects (5)

Comparative functional morphology of insects; aspects of insect physiology, 3 lectures, 2 three-hour laboratories. Prerequisites: ZOO 226, junior standing.

ZOO 425 Medical Parasitology (4)

Study of protozoa and helminth parasites of man; life cycles, pathology, epidemiology and control. 2 lectures, 2 three-hour laboratories. Prerequisite: ZOO 137.

ZOO 429 Herpetology (3)

Morphology, classification, distribution, ecology, behavior and economic importance of amphibians and reptiles; identification, life histories, and field study of local species. 2 lectures, 1 three-hour laboratory. Prerequisite: ZOO 138 or equivalent.

ZOO 431 Insect Pathology (4)

Study of insect mortality and population size regulation caused by microorganisms, parasitic insects and physiological-genetic factors. 3 lectures, 1 three-hour laboratory. Prerequisites: ZOO 226, MIC 201.

ZOO 434 Immature Insects (3)

Study of the development, biology and classification of immature insects. 1 lecture, 2 three-hour laboratories. Prerequisites: ZOO 226, 326.

ZOO 435 Public Health Entomology (4)

Role of insects, mites, ticks and other arthropods in the causation and transmission of human disease. 3 lectures, 1 three-hour laboratory. Prerequisite: ZOO 226.

ZOO 436 Applied Entomology (4)

Study of economic problems caused by insects and approaches to their solution. 3 lectures, 1 three-hour laboratory. Prerequisite: ZOO 226, 326.

ZOO 441 Ichthyology (4)

The structure, relationships, classification, general biology and zoogeography of fishes. Collection, identification and field study of local species, and laboratory work with preserved and living material. 2 lectures and 2 three-hour laboratories. Prerequisite: ZOO 138 and permission of instructor.

ZOO 442 Acarology (3)

Identification, biology, ecology and importance of injurious and beneficial mites and ticks; methods of preparation for study. 1 lecture, 2 three-hour laboratories. Prerequisite: ZOO 137.

ZOO 450 Physiology of Marine Animals (4)

Physiological adaptations of invertebrates and vertebrates to the marine environment. Emphasis on littoral forms. 2 lectures, 2 three-hour laboratories. Prerequisite: ZOO 324.

ZOO 461, 462 Senior Project (2) (2)

Selection and completion of a project under a minimum of supervision. Projects typical of problems which graduates must solve in their fields. Results presented in a formal report. Minimum of 120 hours total time.

ZOO 463 Undergraduate Seminar (2)

Study and discussion of recent developments in zoology and critical examination of senior theses. 2 lectures. Prerequisite: ZOO 462.

ZOO 499 Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor.

SCIENCE

SCI 120 Science of the Sea (3)

A nontechnical introduction to the problems of the sea as they relate to Man. With worldwide interest and concern being directed toward the sea, this is a timely addition for non-science students.

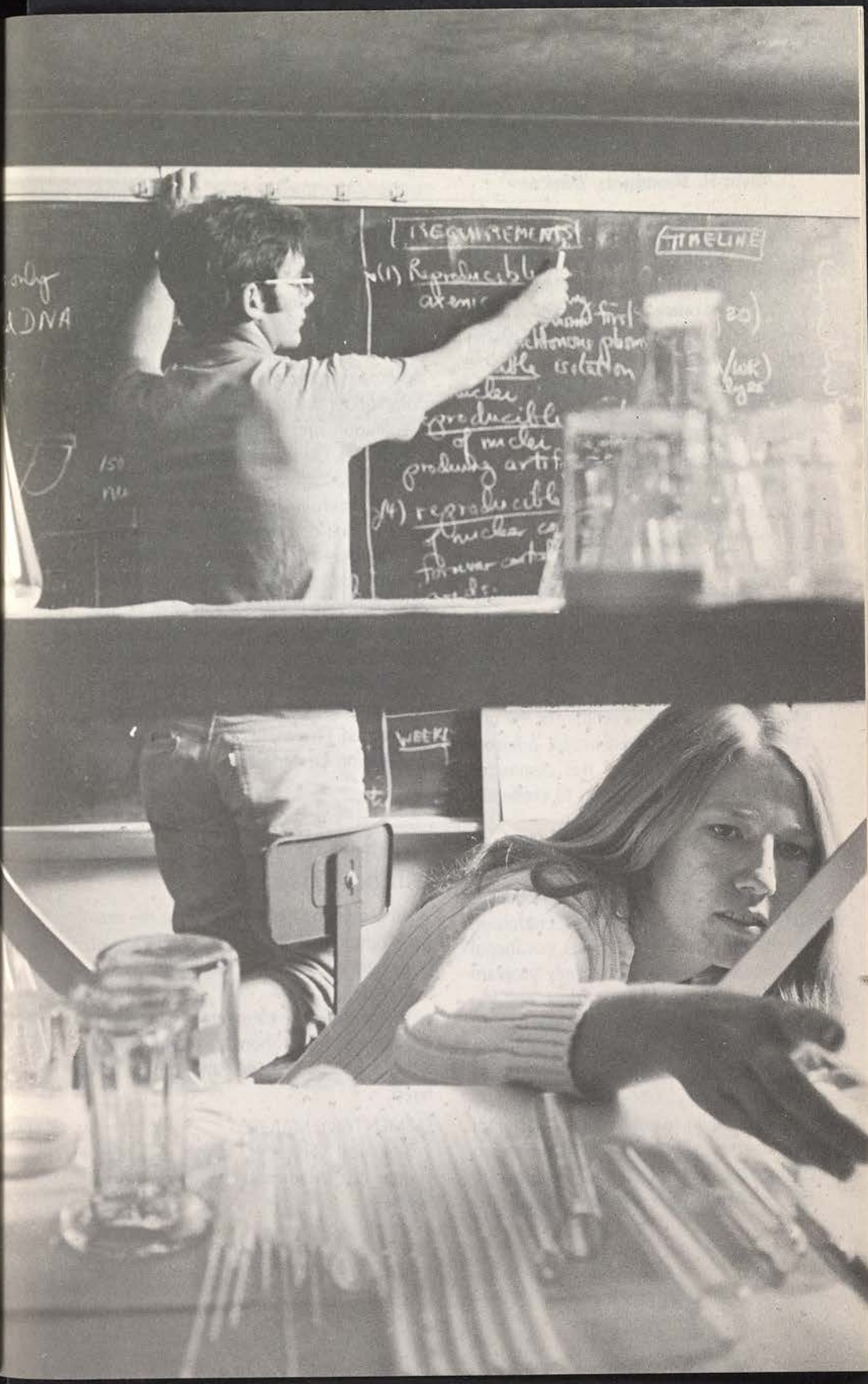
SCI 210, 211, 212 Physical Science (4) (4) (4)

The basic elements of physics, chemistry, and the earth sciences taught in an interdisciplinary manner. Laboratory sessions emphasize fundamental experiments that will be particularly useful for elementary school teachers. 3 lectures, 1 three-hour lab. Courses must be taken in sequence.

SCI 450 Philosophic Implications of Science (3)

Reading and discussion of works of eminent scientists and philosophers concerning those results of science that have a bearing on philosophic problems. Readings may be from authors such as Schrodinger, Russell, Huxley, Chardin, Kuhn. 3 lectures. Prerequisite: senior standing in one of the natural or physical sciences, mathematics or consent of the instructor.

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REQUIREMENTS
TIMELINE
WEEK

TEACHER PREPARATION CENTER

Alvin H. Thompson, *Director*

Teacher preparation is a university-wide function. The Teacher Preparation Center serves as the university-wide planning and coordinating office for all teaching credential programs. All members of the Teacher Education Advisory Committee have a role to play in meeting the teacher preparation objectives. Faculty members on the committee hold a joint appointment in their department and the center.

The university is accredited by the State Board of Education to recommend qualified students for the standard teaching credential with elementary specialization and the standard teaching credential with secondary specialization. Information on admission and course requirements for the standard teaching credentials is available from the Director of the Teacher Preparation Center and from members of the university-wide Teacher Education Advisory Committee. Members of this committee act as departmental advisers to credential students.

The center has initiated a program in vocational education. The prospective vocational teacher will be required to obtain a standard secondary teaching credential. For the 1973–74 academic year, vocational agriculture education is the only program available. For details regarding requirements in vocational agriculture see the vocational agriculture teacher trainer in the School of Agriculture. Complete credential information is available in the center.

A curriculum leading to the Master of Arts degree in education is administered through the center. Details of this program will be found in the *Graduate Bulletin.*

Teacher Preparation and Licensing Law of 1970

All teacher candidates who plan to teach in a multiple-subject self-contained classroom or single subject and who will be a *freshman, sophomore* or *junior* in July 1973 come under the provisions of the Teacher Preparation and Licensing Law of 1970 (Ryan Bill). One of the major provisions of this law mandates that any individual planning to teach in the elementary *multiple-subject* self-contained classroom must have a degree in a "diversified" or a "liberal studies" program. The liberal studies major satisfies this requirement.

The secondary or *single-subject* preparation program will also be changed. No minor will be required. Programs for multiple and single subject teachers are being formulated. Please check with the Teacher Preparation Center for additional information.

Credential Majors and Minors Offered

All seniors or higher, following the program described below in this catalog, must complete all work for the credential by September 15, 1974.

The prospective elementary or secondary teacher must choose a major and a teaching minor. Majors and minors offered:

ELEMENTARY MAJORS

Biological Sciences, Earth Sciences, Humanities, Mathematics, Music, Social Sciences

ELEMENTARY MINORS

Art, Biological Sciences, Chemistry, Earth Sciences, Economics, English, Ethnic Studies, Geography, History, Home Economics, Mathematics, Music, Physical Education, Physics, Political Science

SECONDARY MAJORS

Agricultural Sciences, Vocational Agriculture, Art, Biological Sciences, Business Education, Chemistry, Communication Arts (Journalism), Communication Arts (Speech), Drama, English, History, Home Economics, Humanities, Mathematics, Music, Physical Education, Physics, Political Science

SECONDARY MINORS

Agricultural Sciences, Art, Biological Sciences, Business Education, Chemistry, Drama, Economics, English, Ethnic Studies, History, Home Economics, Journalism, Mathematics, Music, Physical Education, Physics, Political Science, Speech

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TEACHER PREPARATION

Alvin H. Thompson, *Director*
Roy A. Armstrong
Rodman F. Garrity
Richard Hamblin
Virginia Johnson
Dawn E. Jones
Barbara Lingenfelter
Jane McGraw
George Platner
Evelyn Rossi
Cecilia C-R Suarez
Dorothy M. Tucker
Tom R. Valdiviez
George R. Walker

UNIVERSITY-WIDE TEACHER EDUCATION ADVISORY COMMITTEE

Virginia Adair
Roy Armstrong
Gertrude Boland
Ruth Bowen
David Church
Charles Coulter
Diane Divelbess
Richard Hamblin
Walter Hesse
David Horwitz
Virginia Johnson
Dawn Jones
John Jones
Margaret Kinzel
Bernard Lane
Barbara Lingenfelter
Martie Lisowski
Gloria Lothrop
Ralph McCormic
Crane Miller
Jo Oliver
Paul Peterson
Ronald Peterson
Kathreen Prout
Sylvia Ranney
Edward Roche
Audrey Scollard
Mary Ette Selle
Harold Simmons
Glen Stewart
Magnus Syverson
Halsey Taylor
Frank Tennant
Ruby Trow
Dorothy Tucker
Tom Valdiviez
Manuel Vizcaino
George Walker
Harold Wells
Mary Whitley

Ex-Officio

Dean A. J. Aschenbrenner
Dean Fred Beckett
Dean Henry House
Dean Robert Maurer
Dean Vincent Parker

Programs leading to the standard teaching credential, both elementary and secondary specialization are offered through the center. A curriculum leading to the master of arts degree is also offered through the center. Requirements for this degree may be found in the *Graduate Bulletin.*

Besides completing the required teacher preparation courses and the other steps outlined below, the credential candidate must have fulfilled the requirements of an acceptable major and minor (see page 151 for list).

Admission to the university is not equivalent to being accepted to the teacher preparation program. A candidate for a teaching credential is selected through a three-step process involving university-wide teacher education committees. These committees supervise the teacher preparation program, review the qualifications of the candidate, and decide whether or not the candidate should be admitted to the program.

A candidate for a teaching credential must be granted approval by the teacher education committees to enter the teacher preparation program, to participate in student teaching, and to receive a recommendation for the credential.

Admission to Candidacy for a Teaching Credential

To be admitted to candidacy for a teaching credential, the following action should be taken:

Step 1—Admission to the teacher preparation program.

a. Before a student may make formal application to the teacher preparation program he must be enrolled in or have completed TEP 301 (Principles of Education).

b. In addition to meeting the university general education requirements, credential candidates may have to fulfill other general education course requirements such as art, music, etc.

c. Secondary candidates must have completed 12 of the required units in their minor at time of application. They must test satisfactorily in their major.

Step 2—Admission to student teaching

a. When a teacher candidate is eligible to apply for student teaching, he must make a formal application through the center.

b. Student teaching is a full quarter assignment (12 weeks) at this university and is usually done in the last quarter before application for a credential. Secondary candidates must have their minor completed prior to student teaching.

c. The arrangements for student teaching are made by the director of the center with the assistance of the elementary and secondary coordinators. The director and coordinators work closely with district level administrators in the placement of student teachers in each school district. The selection of master teachers is done by the university coordinators in consultation with school principals.

Step 3—Application for the credential

a. The student must fulfill all university requirements for the credential he is seeking.

b. The student must have the approval of the university-wide Teacher Selection Committee that a recommendation be made to the Teacher Preparation and Licensing Commission that he be granted the standard teaching credential.

Evaluation of the student's qualifications as a credential candidate is based on the following factors:

1. *Achievement.* Satisfactory performance in the area of English usage, reading, spelling, arithmetic, science, handwriting, and the social studies as indicated by scores on achievement tests.

2. *Personal Adjustment.* Evidence of satisfactory personal adjustment, habits, interests and attitudes as shown by evaluation instruments, observation, interview, and faculty ratings.

3. *Speech.* Demonstration of satisfactory speech quality and habits as indicated by speech test.

4. *Physical Fitness.* Evidence of good physical health, to be shown before the time of student teaching.

5. *Scholarship.* Satisfactory scholarship on all work accepted by the university toward curriculum requirements must be evident. a. Undergraduates applying for the program must have an overall grade point average of 2.50, and must maintain at least this minimum average. b. In all courses taken for graduate credit an overall grade point average of 2.75 must be maintained.

6. *General Education Requirements.* Satisfactory grades and progress toward completing specific and degree requirements in general education.

7. *Professional Attitude.* Evidence of ability and willingness to work with pupils, parents, and school officials, through experience in working with youth activities.

Entrance into the teacher preparation program is prerequisite to taking certain professional courses and to student teaching.

Courses Required for Credential Programs

The courses listed below are required to gain university recommendation for the standard teaching credential, elementary or secondary specialization.

		Elem	*Sec*
Prin of Educ (Elem or Sec)	TEP 301	3	3
Psycho Foundations of Education	TEP 410	4	4
Elem School Prac and Proc	TEP 420	4	
Elem School Inst Analysis	TEP 421	4	
Found of Read Instr.	TEP 426	4	
Student Teaching (Secondary)	TEP 430		12
Student Teaching (Elementary)	TEP 431	12	
Seminars in Elem Education	TEP 432	3	
Secondary Curric Proc and Meth	TEP 503		6
Seminar in Sec Education	TEP 504		3
Philosophical—Sociological Foundations of Education	TEP 505	4	4
		38	32

GRADUATE STUDIES

A detailed description of the requirements for each degree program, as well as descriptions of graduate course offerings, will be found in the *Graduate Bulletin.* Several departments of the university offer courses at the graduate level for credential candidates and for other graduate students.

Teacher Preparation

TEP 301 Principles of Education (3)

Purposes, organization, development, and challenges of the public school in America. Emphasis on the elementary and secondary school curriculum through intensive study, school visitations and multi-media activities. 2 lectures, 2 one-hour activities. Prerequisite: Junior standing.

TEP 343 Lab and Field Methods for Prospective Teachers (4)

Study of materials and methods in laboratory and field work in the schools. Course will include studies in methodology and development of curricular approaches for the prospective teacher. Prerequisite: Consent of instructor.

TEP 401 Teaching Minority Group Children (4)

Analysis of educational philosophies, theories and practices concerning education of minority children. Critical factors in education of minorities. Overview of instructional strategies and programs for teaching of minority children. 3 lecture-discussion, 2 one-hour activities. Prerequisite: TEP 301 or consent of instructor.

TEP 410 Psychological Foundations of Education (4)

Nature and dynamics of growth and development during childhood and adolescence with implications for classroom learning and school adjustment. Principles of teaching-learning process, with attention to factors that enhance learning. Includes participation in field work with school-age children or youth. 3 lectures, 2 one-hour activities. Prerequisite: PSY 202 or equivalent.

TEP 420 Elementary School Practices and Procedures (4)

Elementary school curriculum, patterns of classroom organization. Scope, sequence, content of receptive and expressive language arts. Skills in developing basic education objectives, instructional planning, and methods, audio-visual activities, and curriculum designing. Emphasis on socio-economic and multi-cultural influences. 3 lectures, 2 one-hour activities. Prerequisite: Admission to teacher preparation program.

TEP 421 Elementary School Instructional and Learning Analysis (4)

Instructional strategies and their relationship to learning. Provides opportunities to participate, apply, and examine basic principles of instruction and methods. Scope, sequence, and content of social studies, science, and mathematics disciplines. 3 lectures, 2 one-hour activities. Prerequisite: TEP 420 and admission to teacher preparation program.

TEP 426 Foundations of Reading Instruction (4)

Reading principles, procedures, and program organizaton, and methods. Provides experiences for application of instructional designs. Includes socio-economic, multi-cultural, and dialectal dimensions. Lesson planning, execution, and evaluation. 3 lectures, 2 one-hour activities. Prerequisite: Admission to teacher preparation program.

TEP 430 Student Teaching (Secondary) (3–12)

Supervised teaching in major and minor fields in selected secondary schools. Includes participation in related activities in the secondary schools. Application for student teaching must be filed by Friday of second week of quarter preceding planned student teaching. Prerequisite: Committee approval of application.

TEP 431 Student Teaching (Elementary) (3–12)

Supervised teaching in selected elementary classrooms; varied experiences in socio-economic and multi-cultural settings. Application for student teaching must be filed by Friday of second week of quarter preceding planned student teaching. Prerequisite: Committee approval of application.

TEP 432 Seminar in Elementary Education (3)

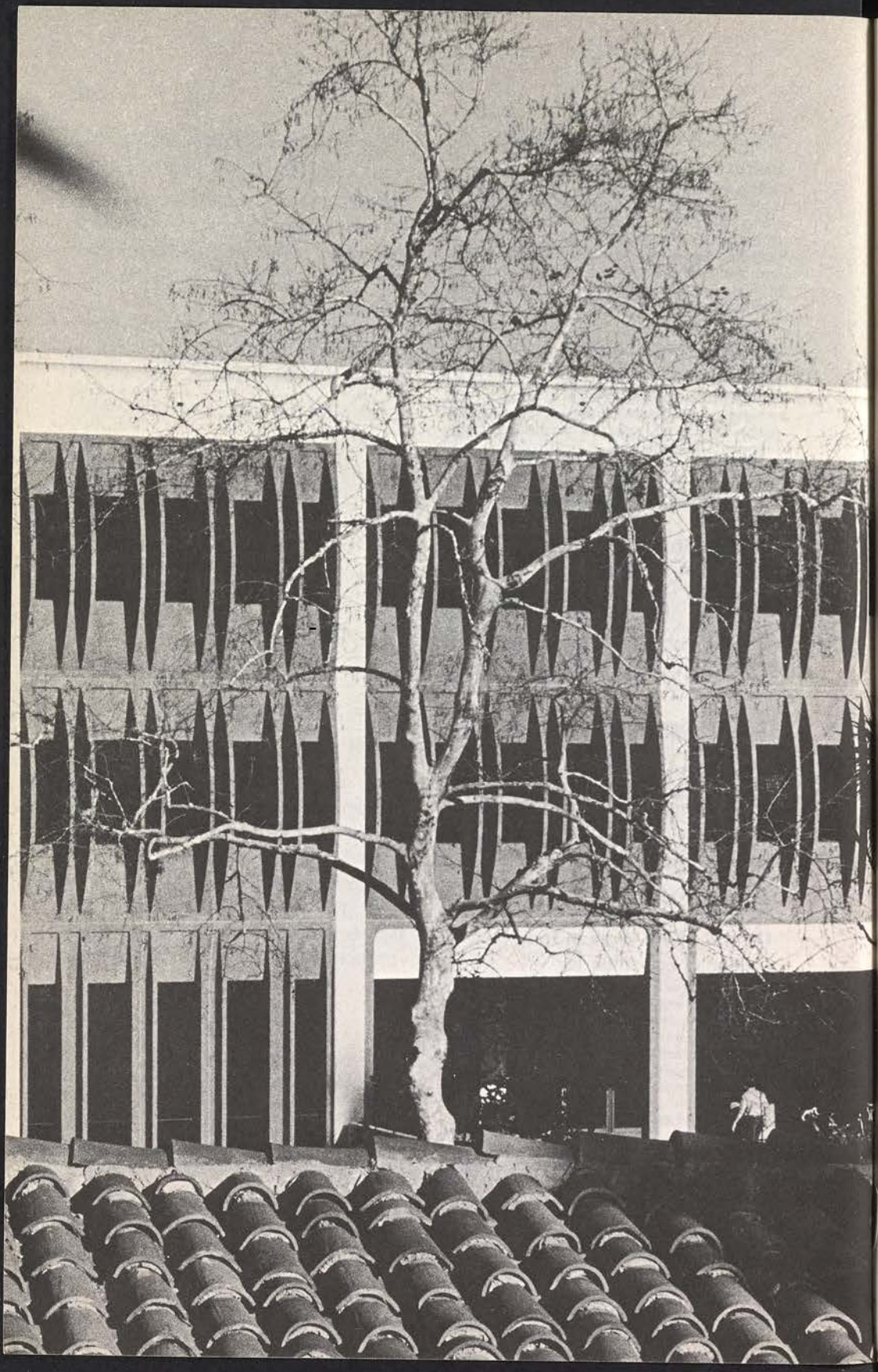
Critical analysis of problems of teaching and supervising in the elementary school. Evaluation of curriculum materials including textbooks and audio-visual materials. Analysis of teaching practices and procedures. Demonstrations and observation of current teaching materials, methods, and techniques. 3 lecture-discussions. Prerequisite: Concurrent enrollment in elementary student teaching.

TEP 435 Field Work in Early Childhood Education (2)

Field experience in early childhood programs under the direction of a selected teacher of an early childhood program with consultation from university supervisors. The student will be exposed to an overall view of the teaching-learning activities in early childhood programs. 1 lecture, one two-hour activity.

TEP 437 Early Childhood Education (3)

The stages of personal and social development of children with particular focus upon the pre-school years and the primary grades. Concepts of human growth with implications for classroom practices, and for developing school programs. 3 lectures.



UNIVERSITY PROGRAMS

Ethnic Studies . . . 304
Institute for Multidisciplinary Programs . . . 306
Liberal Studies . . . 308
Library Program . . . 309

ETHNIC STUDIES CENTERS

The ethnics studies program offers an option in Afro-American studies (Black studies) through the Black Studies Center and an option in Mexican-American studies (Chicano studies) through the Chicano and American Indian Studies Center. The courses provided in each option may be taken as electives by any student in any major.

The purposes of the ethnic studies programs are three-fold. The first is to give all students, (1) a better understanding of minority communities—their cultural heritage, socio-economic and political aspirations and desires; (2) an increased awareness of the historical contribution of minority peoples to American society; and (3) an increased understanding of the contemporary role of minority peoples in American society. In addition the programs are designed to provide the minority student the opportunity to achieve a sense of pride and integrity relative to his historical development both inside and outside American society; a necessary goal in keeping with the aims of modern higher education.

BLACK STUDIES CENTER

Donald E. Warfield, *Director*

The Black Studies Center coordinates the on-campus activities and curricular program for students and faculty interested in Black studies. The center offers an option in Black studies and a student may select courses to meet his particular needs and interests. The curriculum is inter-disciplinary in nature and may be taken by both minority and non-minority students. The option is a meaningful program for students of all majors and in particular for students who are preparing for a career in teaching or community affairs.

Black Studies Option

A minimum of 32 units must be taken to complete the option.

(a) Basic academic subjects: Minimum of 8 units from the following courses:

Culture and Personality	ANT	355	(4)
History of Minorities in American Life	HST	412	(4)
Survey of Black Thought	PHL	100	(4)
Ethnic Relations in America	SOC	320	(4)
Urban Sociology	SOC	401	(4)

(b) Minimum of 20 units from the following courses:

History of Tribal Arts	ART	410	(4)
Peoples and Culture of Africa	ANT	324	(4)
Ethnic Business Problems	BUS	340	(4)
Economic Problems	EC	213	(4)
Economics of Social Welfare	EC	437	(4)
Economics of Minority Groups	EC	497	(4)
The Black Writer in America	ENG	205	(4)
Ethnic Minorities in American Literature	ENG	215	(4)
Geography of Sub-Sahara Africa	GEO	358	(4)
The Black Man in America	HST	210	(4)
The Black Man in America	HST	211	(4)
The Black Man in America	HST	336	(4)
Pre-Colonial Africa	HST	421	(4)
History of Colonial Africa	HST	422	(4)
African Nationalism and Decolonization	HST	423	(4)
Ethnomusicology Performance	MU	199	(2)
History of Jazz	MU	310	(3)
Philosophy of Justice	PHL	310	(4)
Race Relations and the Law	PLS	207	(4)
Sociology of Poverty	SOC	322	(4)
Sociology of Minority Communities	SOC	323	(4)
Teaching Minority Group Children	TEP	401	(4)

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CHICANO AND AMERICAN INDIAN STUDIES CENTER

_____, *Director*

Patricia Hernandez Ho'o Mario Suarez Manuel Vizcaino
Benjamin Hernandez

The center is designed as a coordinating agency on campus for students and faculty involved in Chicano and American Indian programs. The center's programs are developed by joint student-faculty effort through the college wide advisory committee on Chicano and American Indian studies. Active student participation is openly sought in program orientation and design, and the study center maintains close and open contact with the Movimiento Estudiantil Chicano de Aztlan (MECHA) and the related Equal Opportunities Program (EOP).

The center offers an option in Chicano and American Indian studies. A student is able to select courses to suit his particular interest in either of the specific areas of Chicano or American Indian studies. This curriculum is by necessity an inter-disciplinary program geared to both the Chicano/American Indian and the non-Chicano/American Indian, because the primary interest of the center is to have all groups related on a human instead of a stereotypic level.

The option is seen as a meaningful program for students preparing themselves for teaching, social services, environmental design and in any other areas where an appreciation of the real and ever-present contribution of the Chicano and American Indian is needed.

Chicano Studies Option

A minimum of 32 units must be taken to complete the option.

(a) Basic academic subjects: Minimum of 8 units from the following courses:

Culture and Personality	ANT	355	(4)
History of Chicanos in the United States	HST	212	(4)
History of Minorities in American Life	HST	412	(4)
American Indian Thought & Religions	PHL	306	(4)
Ethnic Relations in America	SOC	320	(4)
Urban Sociology	SOC	401	(4)

(b) Minimum of 30 units from the following courses:

Indians of California	ANT	320	(4)
Indians of North America	ANT	321	(4)
Peoples & Culture of Meso America	ANT	322	(4)
Ethnic Minorities in American Literature	ENG	215	(4)
Geography of Mexico	GEO	367	(4)
History of Chicanos in the United States	HST	213	(4)
History of American Indians	HST	337	(4)
History of Mexico	HST	433	(4)
History of Mexico	HST	304	(4)
Mexican in the American Political Systems	PLS	322	(4)
Mexican in the American Political Systems	PLS	323	(4)
American Indian Thought & Religions	PHL	307	(4)
Pschology of Identity	PSY	321	(4)
Sociology of the Barrio	SOC	308	(4)
Spanish for the Spanish Speaking: Beg	SPN	204	(4)
Spanish for the Spanish Speaking: Inter	SPN	205	(4)
Language of the Barrio	SPN	210	(4)
Contemporary Literature of the Chicano	SPN	211	(4)
Literature of Mexico	SPN	304	(4)
Teaching Minority Group Children	TEP	401	(4)

INSTITUTE FOR MULTIDISCIPLINARY PROGRAMS

Lenard R. Troncale, *Coordinator*

Environmental and other systems-level problems are increasing because no single specialist can perceive all the elements of these problems, much less their solution. The courses listed will examine the relationships of the various disciplines and their applications to each other. Most societal problems are complex interactions of man's social, psychological, economic, and physical worlds. Practical solutions to these problems will require the development of multidisciplinary techniques. In addition to formal teaching techniques IMP course methodology will utilize independent study, audio-tutorial self-instruction, video-taped discussions with the full convocation of fellows and associate fellows participating, and scheduled discussions with student peer groups.

The Institute for Multidisciplinary Programs has three major objectives: (1) to train students in interdisciplinary methodology, (2) to organize students and faculty members into task forces for solving a single, regional societal problem and, (3) to conduct basic research in general systems theory. The institute is staffed by 30 faculty fellows, each from a different discipline. Associate fellows from business, industry, and government in southern California also participate in training students and evaluating their solution of societal problems.

Course Descriptions

MDT 101 Man and Environment—Resources (4)

The dynamic relationships between man and earth's resources: a multidisciplinary approach to theory with problem-oriented activities. 2 lecture/discussions, 2 two-hour activities.

MDT 102 Man and Environment—Organization (4)

How political, economic and cultural organizations affect man and the environment, particularly in relationship to earth's resources: a multidisciplinary approach to theory with problem-oriented activities. 2 lecture/discussions, 2 two-hour activities.

MDT 103 Man and Environment—Values (4)

Development of man's value systems in relation to social organizations, technology and the environment: a multidisciplinary approach to theory with problem-oriented activities. 2 lecture/discussions, 2 two-hour activities.

MDT 150 General Morphology (4)

General principles of morphology and their application to various fields. Dimensionless morphology in mathematics and the natural sciences. Mathematical structures and concepts developed morphologically to illustrate the method. 4 lectures. Prerequisite: approval of instructor.

MDT 210 Techniques for Analysis of Meetings for Action (4)

Analysis of meeting parameters which inhibit effective multidisciplinary information transfer and decision-making. Emphasis on multidimensional approaches for overcoming these obstacles. Activity provides practice in application of newly-developed techniques. 3 lectures, 1 two-hour activity. Prerequisite: sophomore standing or instructor's approval.

MDT 220 Active Forces in Culture (4)

Investigation of cultural forces in change. Interrelationship of societal art forms and technology. Influence of aesthetics on attitudes and behavior in societal systems. Emphasis on the detection and utilization of current cultural trends for environmental improvement. 3 lectures, 1 two-hour activity.

MDT 230 Survey of Organizational Special Interests (4)

Survey of organizations active in systems problems. Analyses of their special interests. Description, categorization and evaluation of organizational structures. Case studies and potential use of existing special interest groups

as a resource for solving multidisciplinary problems. 3 lecture/discussions, 1 two-hour activity. Prerequisite: requires instructor's approval.

MDT 240 Law as an Active Force (4)

Law applied to optimizing and correcting systems; survey of legislation and case law dealing with environmental problems. Emphasis on the special difficulties in writing laws of a multidisciplinary nature. 3 lectures, 1 two-hour activity.

MDT 250 Multimetrics (4)

Techniques and methods of measurement systems; comparative uses of metrics; design and application of metrics to human and environmental problems. Emphasis on exploration of the application of metric principles to the evaluation of qualitative differences. 3 lectures, 1 two-hour activity. Prerequisite: Statistics.

MDT 311 General Systems Theory: Hierarchies (4)

Introduction to hypothesis of natural systems evolution and optimization. Origins of hierarchical structure underlying established sciences on the astronomical, physical, chemical, biological, social and artificial levels. 4 lectures. Prerequisite: BIO 115, SCI 213, and MAT 109. Not offered until 1975.

MDT 312 General Systems Theory: Testing Hypotheses (4)

Identification of trends observable in level-to-level evolution of natural hierarchies; emphasizes rigorous testing of the validity of the general systems field axioms abstracted from these trends. 4 lectures. Prerequisite: MDT 311. Not offered until 1975.

MDT 313 General Systems Theory: Artificial Systems (4)

Applications of systems field axioms to the study of man-made systems malfunctions. Use of axioms to engineer optimal societal system. 4 lectures. Prerequisite: MDT 312. Not offered until 1975.

MDT 350 Introduction to Systems Theory (4)

Evolution of systems approach to problem solving; comparative overview of systems methodology. Case studies illustrating successful applications of the systems approach to governmental, biological, social, economic, and technological problems. 4 lectures. Prerequisite: MAT 236 and 259. Not offered until 1975.

MDT 351 Techniques of Systems Analysis (4)

Modeling of complex systems; analog and digital simulation; critical path methods; optimization methods; case studies illustrating applications of systems analysis techniques and design of new techniques. 3 lectures, 1 three-hour lab. Prerequisite: MDT 350. Not offered until 1975.

LIBERAL STUDIES

Harold F. Simmons, *Coordinator*

The liberal studies degree program has as its main objective the qualification of elementary teachers of multiple subjects. The major will meet the requirements of the new Teacher Preparation and Licensing Law of 1970 (Ryan Act) which requires that teachers in self-contained classrooms must have a diverse academic background in order to teach their subjects effectively. This interdisciplinary program will include four areas of liberal studies: English and speech; mathematics, physical and life sciences: social science; and humanities and fine arts. This central core will be supported by a broad background of basic and general studies, and also by further concentrated study in any one of several areas which is of special interest to the individual student.

As an alternative to teacher preparation, the liberal studies program will provide a full liberal education without the conventional specialization in particular subjects. This is in accordance with current trends in higher education recognizing that liberal education is not necessarily associated with vocational objectives or academic specialties. If a student does wish to go to graduate school, the concentrated study in the area of special interest will enable him to do so.

CORE COURSES FOR MAJOR

(Required of all students)

Soc. Anthro.	ANT	358	(4)
or Urban Soc.	SOC	401	
Creative Drams	DR	471	(4)
Adv. Prof. Writ.	ENG	301	(4)
Struc. Lang.	ENG	320	(4)
Grammars	ENG	321	(4)
Child Literature	ENG	416	(4)
Geography of Calif.	GEO	351	(4)
History of Calif.	HST	342	(4)
Conc. El. Math.	MAT	300	(4)
Survey Mu. Lit.	MU	104	(4)
Physical Science	SCI	212	(4)
Minority Comm.	SOC	323	(4)
Senior Project			(4)
Undergraduate seminar			(2)
Approved upper division elective in math or science			(3)
Approved electives in math or science			(4)
Art Skills			(3)
200-level literature			(4)
300-level literature			(3)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

American Civ.	AMC	201*	(4)
or Amer. Pol. Sci.	PLS	201	
American Civ.	AMC	202*	(4)
or U.S. History	HST	202	
Cult. Anthro.	ANT	102*	(4)
or Princ. of Soc.	SOC	201	
Basic Biology	BIO	115*	(5)
Freshman Comp.	ENG	104*	(4)
Freshman Comp.	ENG	105*	(4)
Hst. of Civ.	HST	101*	(4)
Hst. of Civ.	HST	102*	(4)
Hst. of Civ.	HST	103*	(4)
Conc. El. Math.	MAT	205**	(4)
Music Funds	MU	100*	(4)
Health Ed.	PE	107*	(3)
P.E. Activity	PE	141*	(3)
Intro. Phl.	PHL	201*	(3)
Gen. Psych.	PSY	201*	(4)
Physical Science	SCI	210*	(4)
Physical Science	SCI	211**	(4)
Public Speaking	SP	100*	(4)
or Oral Interp.	SP	203	
Special Problems	SCI	400**	(1)
Art Electives		*	(4)
Breadth requirements		**	(2)
Upper division electives			(8)
Electives			(30)

* May be used for the general education requirement. Select unspecified courses from the general education list.

** May be used for general education breadth requirement. Select unspecified course from any school other than arts or science.

LIBRARY PROGRAM

Harold F. Wells, *Director*
Erik Ennerberg Laura Smith

The library offers courses on the sources of information, on information-finding techniques, and on the place of libraries in schools. This preparation enables students to use indexes, abstracts, subject bibliographic guides, and reference sources. The student is introduced to the full range of information formats, including reports, documents, microforms, and journals. Courses are designed to enable the student to prepare a bibliography and do a report or project in acceptable style, to perform literature searches, and to maintain currency in his field, both now and after he enters his chosen profession.

Course Descriptions

LIB 103 Library and Bibliographical Techniques (3)

Fundamentals of finding information in the library and of obtaining information from government and commercial sources. General and specialized bibliographical citations. 3 lectures, 1 workshop.

LIB 331 School Libraries and Instructional Media Centers (3)

The purposes, organization and administration of instructional media, including sources, selection and current trends in media center services. 3 lecture-discussions, 1 two-hour activity. Prerequisite: Admission to Teacher Preparation Program.

GRADUATE COURSE OFFERINGS
DESCRIPTIONS OF GRADUATE COURSES

The following list indicates graduate courses that are offered by the university. See the Graduate Bulletin for description of these courses.

Agriculture

AG 550 Seminar in Agriculture (1–3)

Animal Science

AS 512 Nutritional Energetics (4)

AS 514 Population Genetics (3)

AS 545 Designed Analysis of Experimental Research (4)

AS 670 Animal Science Seminar (1)

AS 690 Animal Science Research (1–4)

AS 691 Directed Study (1)

AS 696 Thesis (1–3)

Architecture

ARC 511, 512, 513 Architectural Design (4) (4) (4)

ARC 531, 532, 533 Architectural Administration (4) (4) (4)

ARC 561, 562, 563 Architectural Seminar (2) (2) (2)

ARC 611, 612, 613 Architectural Design (6) (6) (6)

ARC 661, 662, 663 Architectural Seminar (2) (2) (2)

ARC 691 Directed Study (1–3)

ARC 695 Project (1–3)

ARC 696 Biology (1–3)

Biology

BIO 510 Cytogenetics (3)

BIO 520 Endocrinology (4)

BIO 525 Ecology of Fungi (4)

BIO 530 Mechanisms of Speciation (3)

BIO 535 Advanced Cell Biology (4)

BIO 540 Biogeography (3)

BIO 542 Graduate Laboratory (1–3)

BIO 545 Physiology of Plant Disease (4)

BIO 546 Mineral Nutrition of Plants (3)

BIO 550 Plant Growth and Development (4)

BIO 555 Microbial Genetics (4)

BIO 560 Bacterial Physiology (4)

BIO 565 Comparative Physiology (4)

BIO 570 Insect Physiology (4)

BIO 575 Advanced Topics in Biology (2)

BIO 576 Advanced Immunology (3)

BIO 577 Electron Microscope Techniques (3)

BIO 590 Experimental Biology (3)

BIO 680 Seminar in Biology (1–3)

BIO 690 Research in Biological Sciences (1–2)

BIO 691 Directed Study (1–3)

BIO 696 Thesis (1–3)

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Business Administration

GBA 510 Managerial Accounting (3)

GBA 511 Managerial Accounting (3)

GBA 515 Marketing Concepts (3)

GBA 516 Marketing Decisions in Business Administration (3)

GBA 520 Automated Business Information Systems (3)

GBA 521 Systems Analysis and Design (3)

GBA 525 Managerial Finance (3)

GBA 526 Advanced Managerial Finance (3)

GBA 530 Legal Environment of Business (3)

GBA 531 Management and Organizational Theory (3)

GBA 532 Business Statistics and Probability (3)

GBA 533 Management Policies (3)

GBA 534 Introduction to Quantitative Methods in Business (3)

GBA 540 Foundations of Business Education (3)

GBA 541 Review of Research in Business Education (3)

GBA 542 Problems in Business Education (3)

GBA 543 Innovations and Trends in Business Education (3)

GBA 550 Seminar in Business Education (3)

GBA 551 Accounting for Executive Administration (3)

GBA 561 Seminar in Organization Theory (3)

GBA 563 Executive Development (3)

GBA 564 Quantitative Business Analysis (3)

GBA 568 Programming for Business Systems (3)

GBA 571 Marketing Strategies (3)

GBA 581 Corporation Financial Planning (3)

GBA 582 Management of Financial Institutions (3)

GBA 617 Industrial Dynamics (3)

GBA 626 Instructional Development in Higher Education for Business (3)

GBA 627 Communications in Management (3)

GBA 631 Management of Marketing Channels (3)

GBA 633 Marketing Information and Communications Systems (3)

GBA 635 Motivation and Market Behavior (3)

GBA 643 Management Information Systems (3)

GBA 645 Methods in Operations Analysis (3)

GBA 651 Seminar in Marketing (3)

GBA 655 Security and Portfolio Management (3)

GBA 659 Seminar in Current Accounting Theory (3)

GBA 662 Corporation Financial Evaluation Seminar (3)

GBA 671 Management Seminar (3)

GBA 675 Theory of the Firm (3)

GBA 691 Directed Study in Business (1–3)

GBA 692 Independent Study (1–3)

GBA 694 Accounting Research (3)

GBA 695a Business Research Project (3)

GBA 695b Field Analysis of the Firm (3)

GBA 696 Thesis (3)

Chemistry

CHM 513 Independent Study in Advanced Chemistry (1–4)

CHM 521, 522 Theoretical Chemistry (3) (3)

CHM 541, 542 Advances in Organic Chemistry (3) (3)

CHM 543 Chemistry of Heterocyclic Compounds (3)

CHM 544 Chemistry of Natural Products (3)

CHM 545 Organic Photochemistry (3)

CHM 550 Seminar in Chemistry (1–3)

CHM 553, 554 Advanced Physical Chemistry (3) (3)

CHM 555 Molecular Spectroscopy (3)

CHM 561, 562 Selected Topics in Biochemistry (3) (3)

CHM 563 Enzymology (3)

CHM 564 Enzymology Laboratory (2)

CHM 565 Biochemical Mechanisms (3)

CHM 566 Biochemical Preparations (2)

CHM 567 Advanced Clinical Chemistry (3)

CHM 571, 572 Advanced Inorganic Chemistry (3) (3)

CHM 581, 582 Advances in Analytical Chemistry (3) (3)

CHM 691 Directed Study (1–2)

CHM 696 Thesis (1–3)

Economics

EC 510 Economic Analysis and Policy (3)

EC 511 Economic Analysis and Policy (3)

EC 540 Seminar in Economics (1–3)

EC 550 Microeconomic Analysis (4)

EC 551 Macroeconomic Analysis (4)

EC 552, 553 Econometrics (4) (4)

EC 560, 561 Managerial Economics and Operations Analysis (4) (4)

EC 654, 655 International Economics (4) (4)

EC 656, 657 Money and Capital Markets (4) (4)

EC 658 Industrial Organization and Public Policy (4)

EC 667, 668 Urban and Regional Economics (4) (4)

EC 691 Directed Study (1–2)

EC 696 Thesis (1–3)

Education

Graduate courses in education are listed under Teacher Preparation.

Engineering

EGR 510 Engineering Probability and Statistics (4)

EGR 511 Numerical Solutions of Engineering Problems (4)

EGR 512 Vector Analysis and Complex Variables (4)

EGR 513 Applied Transform Methods in Engineering (4)

EGR 514 Engineering Probability and Statistics (4)

EGR 515 Matrix Methods in Engineering (4)

EGR 516 Advanced Indeterminate Structures (4)

EGR 517 Advanced Structural Design—Steel (4)

EGR 518 Stability of Structures (4)

EGR 519 Advanced Indeterminate Structures (4)

EGR 520 Elasticity (4)

EGR 521 Structural Dynamics (4)

EGR 522 Advanced Reinforced Concrete Design (4)

EGR 523 Prestressed Concrete Design (4)

EGR 524 Mathematical Modeling in Transport Phenomena (4)

EGR 525 Foundation Engineering (3)

EGR 526 Hydrodynamics (4)

EGR 527 Advanced Gas Dynamics (4)

EGR 528 Hypersonic Aerodynamics (4)

EGR 529 Nuclear Engineering (3)

EGR 530 Theory of Structural Plates and Shells (4)

EGR 531 Atmospheric Pollution Dynamics (4)

EGR 532 Conduction Heat Transfer (3)

EGR 533 Mechanical Metallurgy (4)

EGR 534 Fracture of Solids (4)

EGR 535 Advanced Fluid Dynamics (4)

EGR 536 Aerodynamics of Ground Transportation Systems (4)

EGR 537 Boundary Layer Concepts (4)

EGR 538 Advanced Engineering Economy (4)

EGR 539 Advanced Human Factors in Engineering Design (4)

EGR 540 Linear Systems (4)

EGR 541 Advanced Networks Analysis (4)

EGR 542 Sampled-Data Control Systems (4)

EGR 543 Advanced Digital Computer Organization (4)

EGR 544 Communication Theory (4)

EGR 545 Advanced Engineering Thermodynamics (4)

EGR 546 Heterogeneous Phase Equilibria (4)

EGR 547 Separation Processes (4)

EGR 548 Solid State Electronics (4)

EGR 549 Advanced Methods in Operations Research (4)

EGR 550 Advanced Transport Phenomena (4)

EGR 551 Logical Design of Finite State Machines (4)

EGR 552 Nonlinear Control Systems (4)

EGR 553 Computer Simulation of

Engineering Systems (4)

EGR 554 Modern Algebra for Digital Systems (4)

EGR 555 Advanced Analytical Dynamics (3)

EGR 556 Advanced Mechanics of Materials (3)

EGR 557 Analysis of Mechanical Designs (3)

EGR 558 Solid State Electronics (4)

EGR 559 Applied Automata Theory (4)

EGR 560 Information Theory and Coding (4)

EGR 561 Computer-Aided Circuit Design (4)

EGR 599 Special Topics for Graduate Students (2–4)

EGR 690 Engineering Seminar (3)

EGR 691 Directed Study (1–3)

EGR 695 Master's Degree Project (1–3)

EGR 696 Master's Degree Thesis (1–3)

English

ENG 550 English Seminar (1–3)

ENG 570 Practical Criticism (3)

ENG 571, 572 Studies in Fiction (3) (3)

ENG 573, 574 Studies in Drama (3) (3)

ENG 575, 576 Studies in Poetry (3) (3)

ENG 577, 578 Studies in Non-fictional Prose (3) (3)

ENG 580 Seminar in Creative Writing (1–4)

ENG 581, 582 Studies in English Language (3) (3)

ENG 583 The Contemporary American Novel (3)

ENG 585 The New Rhetoric in Theory and Practice (3)

ENG 586 Problems in High School Composition (3)

ENG 587 The Teaching of Basic Language Skills (3)

ENG 588 Problems in College Freshman Composition (3)

ENG 589 Developmental Reading in the Secondary School and Community College (3)

ENG 600 Techniques of Bibliography and Research (3)

ENG 651, 652 Studies in English Literature (3) (3)

ENG 661, 662 Studies in American Literature (3) (3)

ENG 691 Directed Study (1–3)

Environmental Design

ENV 510 Environmental Design and Graphics (6)

ENV 511 Landscape Planting and Construction (6)

ENV 691 Independent Study (1–4)

History

HST 610 History of American Business (3)

International Programs

IPC 599 Foreign Study Topics: (1–6)

Landscape Architecture

LA 512 Methods and Applications for Landscape Architecture (12)

LA 513 Landscape and Human Habitat (6)

LA 531 Landscape Construction and Design (6)

LA 541 Landscape Planting (6)

LA 551 Graduate Seminar (2)

LA 601 Theory and Literature of Landscape Architecture (6)

LA 602 Ecosystematic Landscape Design (6)

LA 603 Human Needs in Landscape Design (6)

LA 604 Ecosystems Applications (6)

LA 605 Design of the Humanized Landscape (6)

LA 606 Environmental Analysis (6)

LA 632 Landscape Technology (6)

LA 642 Plant Ecology and Design (6)

LA 652 Graduate Seminar (2)

LA 691 Special Project (1)

LA 692 Directed Research (1–6)

LA 695 Project (2)

LA 696 Thesis (4)

Mathematics

MAT 511, 512 Real Analysis (4) (4)

MAT 517, 518 Abstract Algebra (4) (4)

MAT 521, 522 Topology (4) (4)

MAT 528, 529 Complex Analysis (4) (4)

MAT 535 History of Mathematics (4)

MAT 544, 545 Topics in Applied Mathematics (4) (4)

MAT 550 Seminar in Mathematics (1–3)

MAT 691 Directed Readings (1–2)

MAT 695 Project (1–3)

Physical Education

PE 510 Philosophical Bases of Physical Education (3)

PE 540 Cultural Patterns and Physical Education (3)

PE 550 Problems in Administration of Physical Education (3)

PE 553 Curriculum Development in Physical Education (3)

PE 580 Advanced Motor Learning and Human Performance (3)

PE 583 Advanced Motor Development (3)

PE 590 Research Methods and Design (3)

PE 640 Socio-cultural Aspects of Sport (3)

PE 643 World History of Physical Education (3)

PE 645 The Behavioral Sciences of Human Movement (3)

PE 650 Problems in Physical Education (3)

PE 653 Supervision of Physical Education (3)

PE 680 Advanced Kinesiological Analysis (4)

PE 683 Advanced Physiology of Exercise (4)

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PE 685 The Scientific Bases of Physical Education (3)

PE 691 Independent Study (1–2)

PE 696 Thesis (1–3)

Physics

PHY 550 Seminar in Physics (1–3)

Political Science

PLS 550 Seminar in Political Science (1–4)

Social Sciences

SSC 550 Seminar in the Social Sciences (1–3)

Teacher Preparation

TEP 503 Secondary Curriculum Procedures and Methods (3)

TEP 504 Seminar in Secondary Education (3)

TEP 505 Philosophical-Sociological Foundations of Education (4)

TEP 508 Philosophy of Vocational Education (3)

TEP 509 Education of Contemporary Youth (3)

TEP 510 Interpersonal Relations in Teaching (3)

TEP 511 Prescriptive Teaching and Behavioral Objectives (3)

TEP 512 Measurement in Education (4)

TEP 520 Diagnosis of Reading Difficulties (3)

TEP 521 Analysis of Corrective Reading Practices and Techniques (3)

TEP 522 Laboratory of Clinical Practice: Treatment of Reading Disorders (3)

TEP 523 Development of Pre-reading Skills (3)

TEP 525 Psychology of Reading (3)

TEP 530 Education of the Slow Learner and the Retarded Child (3)

TEP 531 Education of the Gifted Child (3)

TEP 540 Historical and Philosophical Bases in Early Childhood (3)

TEP 541 Learning Patterns in Early Childhood (3)

TEP 542 Curriculum in Early Childhood Education (3)

TEP 550 Seminar in Educational Issues (2–3)

TEP 570 Utilization of Media in the Classroom (3)

TEP 571 Graphics for Classroom Instruction (3)

TEP 574 Preparation of Audio Media (3)

TEP 650 Seminar in Current Problems and Strategies in Education (2–3)

TEP 688 Critique of Research in Education (3)

TEP 689 Methods and Techniques of Research (3)

TEP 691 Independent Study (1–3)

TEP 695 Project (1–3)

TEP 696 Thesis (1–3)

Urban Planning

UP 511, 512 Urban Theory and Practice (4) (4)

UP 534 Urban Housing and Development (4)

UP 535 Urban Data and Simulation Programs (4)

UP 536 Urban Circulation (4)

UP 537 Regional, State, and National Planning (4)

UP 621 Design of Urban Projects and Spaces (4)

UP 622 Design of the Residential Environment (4)

UP 623 Design of the Metropolis (4)

UP 651 Planning in Contemporary Society (3)

UP 652 Planning Administration (3)

UP 691 Urban Research Methods and Techniques (4)

UP 695 Project (1–3)

UP 696 Thesis (3)

For further information see Graduate Bulletin.

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Director of the Teacher Preparation Center	Alvin H. Thompson
Director of the College Library	Harold F. Wells
Chief, Reader Services	Thomas Welch
Acquisitions Librarian	Erik Ennerberg
Catalog Librarian	Marion Ferguson
Curriculum Librarian	Martie Lisowski
Periodicals Librarian	Karen Harvey
Reference Librarian	Walter Roeder
Vice President for Administration and Student Affairs	*James Bell*
Executive Dean	Robert G. Bonde
Building Program Coordinator	Harry V. Welch, Jr.
Dean of Students	Henry House
Associate Dean, Counseling and Testing	Kenneth A. Green
Medical Director	Lauren J. Henderson, M.D.
Director of Placement	John E. Jones
Director of Housing	Ruth Coopersmith
Director of Financial Aids	Harry M. Jacobs
Associate Dean, Activities	D. June Schaefer
Dean of Women	Mary Etta B. Selle
Associate Dean, Admissions and Records	Richard G. York
Registrar	Robert L. Losser
Director of Business Affairs	*William E. Fox*
Chief Accountant	
Director, Physical Plant	Seldon L. Kempton
Procurement and Support Services Officer	Ortize L. Moore
Personnel Officer	
Chief, College Police	Douglas W. Robinson
Supervisor, Clerical Services	
Director of Foundation Services	John A. Benham
Director, Food Services	C. W. Boyd
El Patio Bookstore	Ella York

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Economics

B.S., Purdue Univ., 1947; M.S., Mich. State Univ., 1948; Ph.D., 1952; post-doctoral grad. study, Harvard Univ.; Honorary Doctorate, Purdue Univ., 1968.

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Chemistry
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ABU-HAYDAR, LAURE I. (1960)
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Mathematics
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ADAIR, VIRGINA H. (1957)
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Professor
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AL-SAADI, MOHAMMED A. (1969)
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B.Arch., National Tech. Univ., Athens, 1945; MCP, Univ. of Paris, 1947; Docteur d' Université, Sorbonne, 1949; Ph.D., Columbia Univ., 1955. AIP. AIA.

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B.S.M.E., Univ. of Ill., 1951; M.S.M.E., 1952; Engineer's Degree, Stanford Univ., 1969; P.E.

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B.A., Ariz. State Univ., 1956; M.M., Eastman School of Music, 1959.

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B.S., M.S., Ore. State Univ., 1942 P.E.

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Behavioral Sciences
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Mechanical Engineering
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B.S., M.I.T., 1935; M.S., N.Y. Univ., 1962; P.E.

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History
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Professor
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Urban Planning
B.A., City & Regional Planning, Ill. Inst. of Tech., 1961; MSUP., Columbia Univ., 1972.

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B.S.,Middle East Tech. Univ., 1964; M.S., 1965; Ph.D., Univ. Cal. Santa Barbara, 1971.

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B.S.E.E., Univ. of Mich., 1963; M.S.E.E., Univ. of Mo., 1965; Ph.D., 1968.

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Mathematics
B.A., Cal. State Univ., Sacramento, 1961; M.A., Univ. of Cal., Davis, 1963.

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B.S., Univ. of Nev., 1963; M.B.A., 1968. C.P.A.

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B.S., Natl. Taiwan Univ., 1957; M.S., Univ. of Md., 1961; Ph.D., U.S.C., 1967.

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B.A., U.C.L.A., 1948; M.A., 1951, Ph.D., 1963.

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B.S., Beirut Coll. for Women, 1959; M.S., Univ. of Ky., 1961; M.P.H., U.C.L.A., 1967.

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B.S., Colo. State Univ., 1959; M.S., Univ. of Idaho, 1961; Ph.D., Univ. of Wisc., 1965.

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B.S., Univ. of Pittsburgh, 1933; M.D., Georgetown Univ., 1950.

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Mathematics
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B.S., U.S. Naval Acad., 1944; B.S.A.E., U.S. Naval Postgrad. School, 1952; A.E., Cal. Instit. of Tech., 1953.

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Data Processing
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