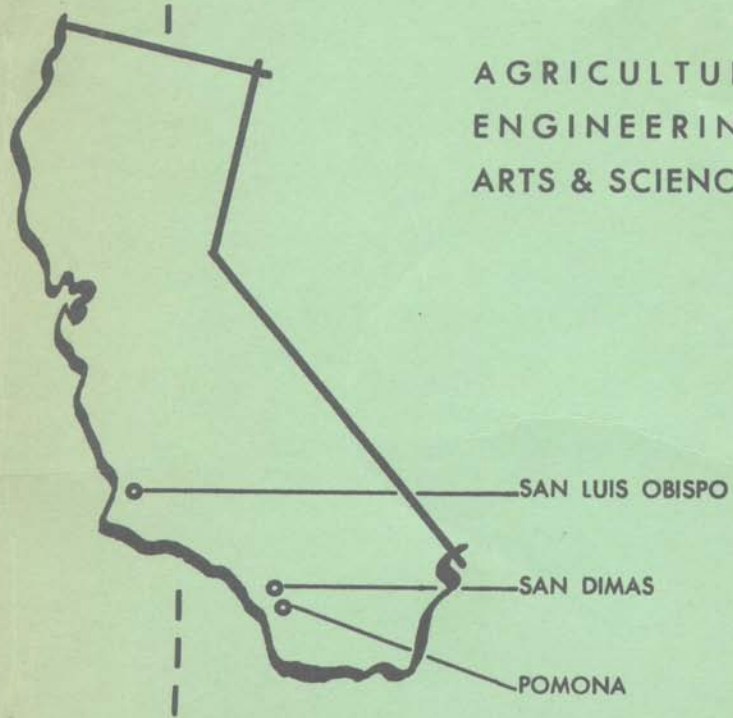


1960-61 | CATALOG

CALIFORNIA STATE POLYTECHNIC COLLEGE

Bulletin

AGRICULTURE
ENGINEERING
ARTS & SCIENCES



Attention, Prospective Students

A GUIDE TO PLANNING FOR COLLEGE

Below are listed basic questions which you should ask as you plan for your college education. Page references indicate where in this publication you can find the answers as they pertain to California State Polytechnic College.

In what fields of instruction does the college offer degrees?

Agriculture, at San Luis Obispo, page 55, and at Kellogg-Voorhis, page 233.

Engineering, at San Luis Obispo, page 107, and at Kellogg-Voorhis, page 265.

Arts and Sciences (including business), at San Luis Obispo, page 155, and at Kellogg-Voorhis, page 287.

Does the college offer nondegree occupational curricula? Page 56.

Can I meet the requirements for admission? Page 31.

May a student transfer from another college? Pages 31, 32.

What fees are charged? Page 34; at Kellogg-Voorhis Campus, page 229.

Where can I obtain board and room? Page 18; at Kellogg-Voorhis Campus, pages 225, 230.

What scholarships are available to freshmen? Page 23 and page 228.

Does the college have an ROTC unit? Page 20.

What services does the college maintain for students?

Counseling and testing, page 22.

Advising, page 22.

Health, page 22.

Assistance in finding part-time employment, pages 23, 227.

Loan funds, at San Luis Obispo, page 29; at Kellogg-Voorhis, page 227.

Placement at graduation, page 22.

Where do I write for further information?

San Luis Obispo Campus, San Luis Obispo, California.

Kellogg-Voorhis Campus, Pomona, California.

CALIFORNIA STATE POLYTECHNIC COLLEGE BULLETIN

SAN LUIS OBISPO CAMPUS



KELLOGG-VOORHIS CAMPUS



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1960-61

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CALIFORNIA STATE POLYTECHNIC COLLEGE

ACADEMIC CALENDAR—1960-61 (All Dates Inclusive)

SUMMER QUARTER, 1960

(San Luis Obispo Only)

Four-week Term

June 17	Friday	Guidance testing of new students
June 20	Monday, 8 a.m.	Registration and scheduling of all students
June 21	Tuesday	Classes begin for all students
June 24	Friday	Last day to add or drop courses without penalty Last day to enroll for four-week term
July 4	Monday	Independence Day—academic holiday
July 14-15	Thursday- Friday	Final examinations

Six-week Term

July 15	Friday	Guidance testing of new students
July 18	Monday, 8 a.m.	Registration and scheduling of all students
July 19	Tuesday	Classes begin for all students
July 22	Friday	Last day to add or drop courses without penalty Last day to enroll for six-week term
August 25-26	Thursday- Friday	Final examinations
August 26	Friday	End of summer quarter

FALL QUARTER

September 1	Thursday	Last day to file application for admission to fall quarter
September 19	Monday	Beginning of academic year (faculty only)
September 24	Saturday	Registration and scheduling of all students
September 26	Monday	Classes begin for all students
October 3	Monday	Last day to enroll for fall quarter Last day to add courses
October 17	Monday	Last day classes may be dropped without penalty
November 11	Friday	Veterans' Day—academic holiday
November 23 (noon)- November 26	Wednesday- Saturday	Thanksgiving—academic holiday
December 12-16	Monday- Friday	Final examinations
December 16	Friday	End of fall quarter
December 19- January 2	Monday- Monday	Christmas—academic holiday

ACADEMIC CALENDAR—1960-61—Continued

WINTER QUARTER		
January 3	Tuesday	Registration and scheduling of all students
January 4	Wednesday	Classes begin for all students
January 11	Wednesday	Last day to enroll for winter quarter Last day to add courses
January 24	Tuesday	Last day classes may be dropped without penalty
March 18-23	Saturday- Thursday	Final examinations
March 23	Thursday	End of winter quarter
March 24	Friday	Academic holiday
SPRING QUARTER		
March 25	Saturday	Registration and scheduling of all students
March 27	Monday	Classes begin for all students
March 31- April 2	Friday- Sunday	Easter—academic holiday
April 3	Monday	Last day to enroll for spring quarter Last day to add courses
April 17	Monday	Last day classes may be dropped without penalty
April 20	Thursday	Last day for acceptance of senior projects without penalty Last day to apply for June commencement
April 29	Saturday	Last day to file for master's examination
May 30	Tuesday	Memorial Day—academic holiday
June 10-15	Saturday- Thursday	Final examinations
June 15	Thursday	Commencement—Kellogg-Voorhis
June 17	Saturday	Commencement—San Luis Obispo End of spring quarter
June 18	Sunday	End of academic year (faculty only)

TENTATIVE SUMMER QUARTER, 1961

(San Luis Obispo Only)

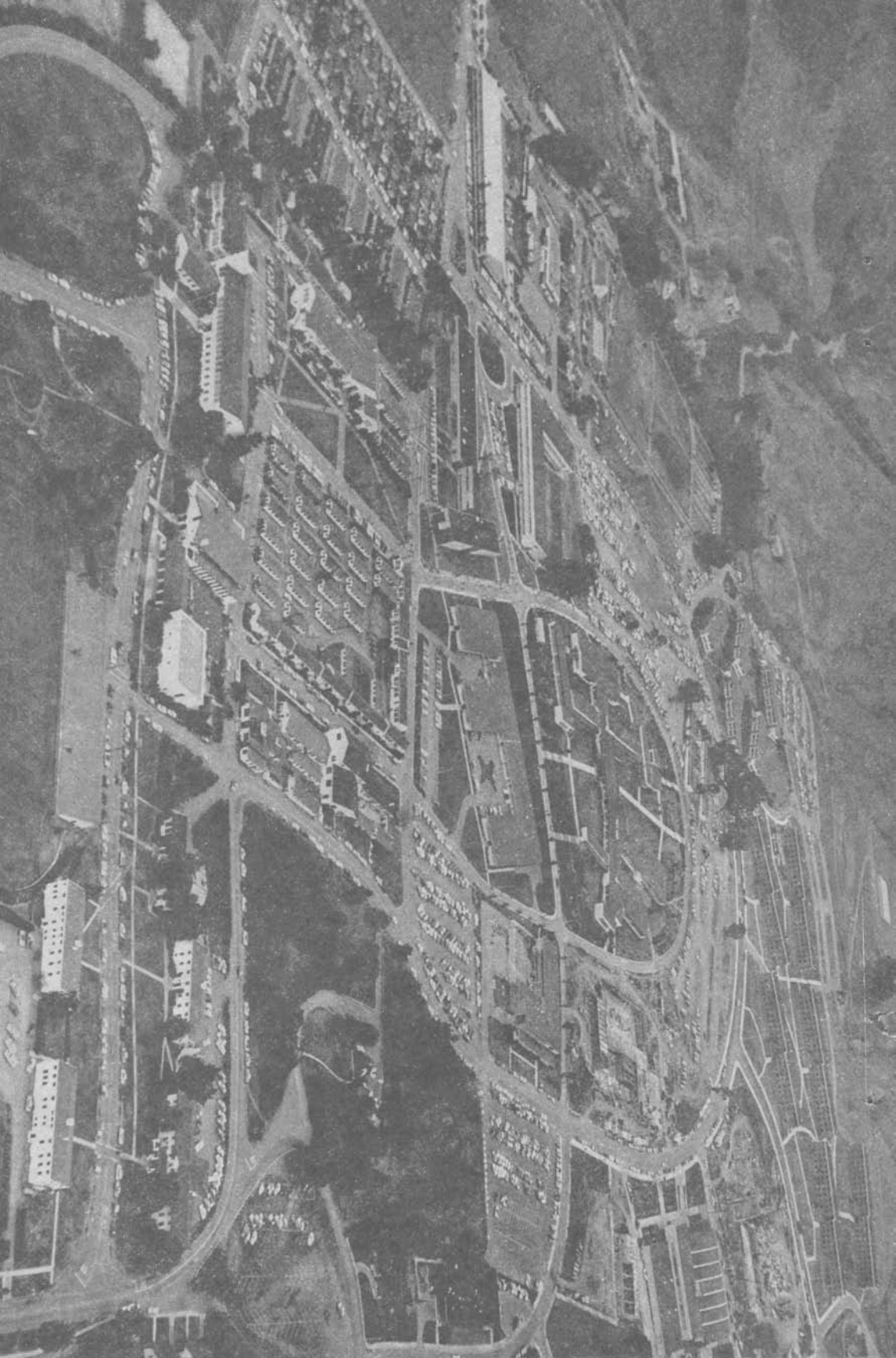
Four-week Term

June 23	Friday	Guidance testing of new students
June 26	Monday	Registration and scheduling of all students
June 27	Tuesday	Classes begin for all students
July 4	Tuesday	Independence Day—academic holiday
July 20-21	Thursday- Friday	Final examinations

Six-week Term

July 21	Friday	Guidance testing of new students
July 24	Monday	Registration and scheduling of all students
July 25	Tuesday	Classes begin for all students
August 31- September 1	Thursday- Friday	Final examinations

ADMINISTRATION



ADMINISTRATION

STATE BOARD OF EDUCATION

Louis Heilbron (President)	San Francisco
Thomas W. Braden (Vice President)	Oceanside
Byron H. Atkinson	Los Angeles
Mrs. Talcott Bates	Carmel
Warren M. Christopher	Los Angeles
Raymond J. Daba	Atherton
Donald M. Hart	Bakersfield
Dr. Mabel E. Kinney	Los Angeles
Mrs. Michaela Mathiesen	Fresno
Thomas L. Pitts	Alhambra
Roy E. Simpson (Secretary and Executive Officer)	Sacramento

STATE DEPARTMENT OF EDUCATION

Roy E. Simpson	Superintendent of Public Instruction and State Director of Education
J. Burton Vasche	Associate Superintendent of Public Instruction and Chief, Division State Colleges and Teacher Education
Donald R. Youngreen	Assistant Chief, Division State Colleges and Teacher Education
Wesley P. Smith	Director of Vocational Education

COLLEGE ADMINISTRATION

Julian A. McPhee	President
Leona M. Boerman	Secretary to the President
Robert E. Kennedy	Vice President
Harold O. Wilson	Dean, Student and College Affairs
George G. Glucas	Dean, Finance and Development
Clyde P. Fisher	Dean, Educational Services and Curriculum Development
Eugene E. Brendlin	Foundation Manager
Douglass W. Miller	Publications Manager

SAN LUIS OBISPO CAMPUS

Harold P. Hayes	Dean of the College
Roy E. Anderson	Acting Dean, Arts and Sciences Division
Everett M. Chandler	Dean of Students
Vincent J. Gates	Public Relations Coordinator
LeRoy B. Hughes	Director of Athletics
John D. Lawson	Associate Dean (Activities)
Lewis W. Lewellyn	Associate Dean (Counseling and Testing)
E. D. Lovett	College Physician
Mary Etta Murray	Associate Dean (Women)
Donald S. Nelson	Business Manager
Leon F. Osteyee	Acting Dean, Engineering Division
Eugene Rittenhouse	Placement Officer
Vard M. Shepard	Dean, Agricultural Division
C. Paul Winner	Associate Dean (Admissions and Records)
W. Saxon Wraith	Registrar

KELLOGG-VOORHIS CAMPUS

C. O. McCorkle	Dean of the College
Albert J. Aschenbrenner	Associate Dean (Counseling and Testing)
Carl R. Englund	Dean, Agricultural Division
Harold P. Skamser	Dean, Engineering Division
Henry House	Associate Dean (Activities)
Robert Bowlin	Registrar
Thomas H. McGrath	Dean of Students
Robert L. Maurer	Acting Dean, Arts and Sciences Division
J. Claude Scheuerman	Business Manager

← Air View of San Luis Obispo Campus →

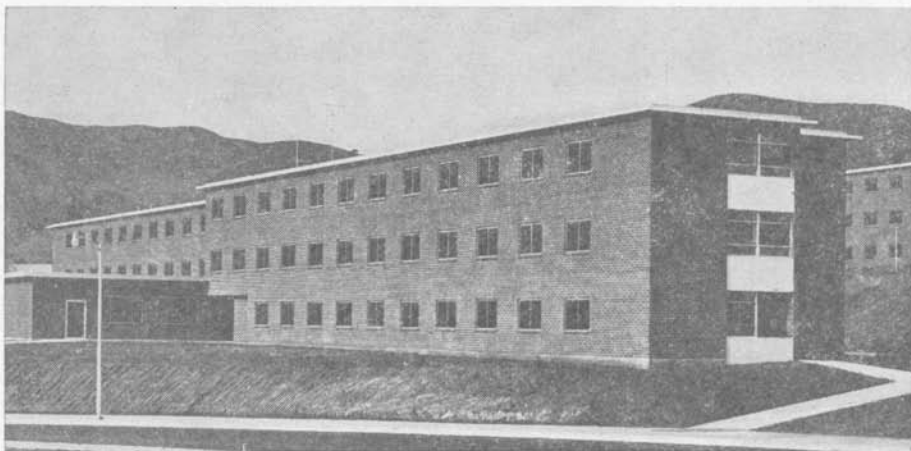
GENERAL INFORMATION



Dexter Memorial Library



Mountain Dormitories for Men



New Residence Halls—Four for Men, Two for Women

GENERAL INFORMATION

AIMS OF THE COLLEGE

California State Polytechnic College provides occupational education at the collegiate level in agriculture, engineering, and the arts and sciences. Its arts and sciences instruction also emphasizes the preparation of secondary school teachers. General education courses and participation in campus activities are combined with the college's specialized instruction to prepare graduates for citizenship and leadership.

The basic purpose of California State Polytechnic College is to prepare young men and women for managerial, technical, and teaching occupations by training the hands as well as the head, by adding "know-how" to "know-why." The training is specific and practical. Each year of study is planned to prepare the student for additional jobs in the training area of his major department. Requirements of the job, rather than of professional graduate schools, determine the educational experiences offered to each student. Practical laboratory work under job conditions is emphasized. Students learn by doing. They may also earn while learning through the project system of instruction in which the college has been a pioneer.

To make maximum use of the student's interest in his field of specialization as an incentive to study, work in the major department is begun in the freshman year. This plan also ensures job preparation for the student who cannot spend four years at college. The course of study, therefore, is "upside-down" in comparison with the conventional college program which groups general education courses and basic theory into the first two years while deferring the more specialized and practical work until the last two years. Through early contact between the student and the practical phases of his major subject, the college seeks also to make the student aware of the value of sciences related to his major so that he may apply himself more diligently to such courses.

The general education courses and the related courses which support the occupational instruction are offered in each of the four college years. This plan makes it possible to schedule in the later college years those courses with content which requires greater maturity and experience. Students thus have a better opportunity to understand what they are studying and to obtain maximum values in general education.

California State Polytechnic College accepts responsibility not only for the occupational education of its students but also for helping them to obtain the best possible career opportunities. Further, through follow-up visits to the graduate and his employer it provides on-the-job assistance to the Cal Poly graduate during his first years in the field.

HISTORY

California State Polytechnic College was established in 1901 by the Legislature of the State of California. It opened as a state vocational high school and was the forerunner in California of vocational education in agriculture and industry. In 1921 its Board of Trustees was dissolved and the State Board of Education took over this school. The level of instruction was raised in 1927 to that of a junior college. It was changed to a two-year and three-year technical college in 1933.

A degree transfer program was added in 1936, and in 1940 the State Board of Education authorized the college to grant the bachelor of science degree for completion of the four-year curriculum.

The first baccalaureate exercises were held in 1942. The college was approved on October 1, 1949, to grant the master of arts degree in education.

Originally coeducational, the college discontinued the enrollment of women in 1929. Enrollment of women as regular students was resumed in 1956 at San Luis Obispo.

In 1938, a completely equipped school and farm near San Dimas, in Los Angeles County, admirably situated and adaptable for technical instruction in citriculture, deciduous fruit production, agricultural inspection, and landscape gardening, was

deeded to California Polytechnic by its owners, Charles B. Voorhis of Pasadena, and his son, former Congressman Jerry Voorhis. This campus was immediately put to use as a plant industries branch of the college. Although it was necessary to close the Voorhis Unit during the war period, 1942-45, it was reopened in the fall of 1945.

In November, 1949, the college received as a gift from the Kellogg Foundation the Kellogg Arabian Horse Ranch near Pomona consisting of approximately 800 acres. The property was donated to the college for advancement of practical education and for the perpetuation and improvement of the Arabian horse breeding program of America. The property, now known as the Kellogg Unit, California State Polytechnic College, lies approximately one mile from the edge of the Voorhis Unit, and is one mile from Pomona.

ACCREDITATION

The college is fully approved as a four-year degree-granting institution by the Northwest Association of Secondary and Higher Schools, and the Western College Association.

The college has been granted regular accreditation by the State Board of Education to give the training and to make recommendation for the following credentials:

Special Secondary Credential in Vocational Agriculture.

Special Secondary Limited Credential in Agriculture.

Special Secondary Credential in Physical Education.

General Secondary Credential with teaching majors and minors in: Agriculture,

Health and Physical Education, Life Science and General Science, Mathematics,

Physical Science and General Science, and Social Studies.

General Elementary Credential.

LANDS AND LOCATION

The San Luis Obispo campus is midway between San Francisco and Los Angeles, at the foot of the Santa Lucia mountain range, 12 miles from the Pacific Ocean. The Voorhis Unit is near San Dimas in Los Angeles County and close by is the Kellogg Unit near Pomona.

Lands of the college total 3,823 acres: San Luis Obispo, 2,850 acres; Voorhis Unit, 157 acres; and Kellogg Unit, 816 acres.

A variety of land types is available for various agricultural uses. Some acreage at San Luis Obispo is used for range purposes; other land is in hay, alfalfa, and orchard. At San Dimas land is utilized for citrus, avocados, and small deciduous plantings.

Information regarding facilities, buildings, curricula, and course descriptions at the Kellogg-Voorhis campus will be found in the Kellogg-Voorhis section of this catalog.

THE FOUNDATION

The college's unique project system of "learning by doing" and "earning while learning" has been progressively developing since 1924. At that time, projects were organized on a small scale and were financed by the Citizen's State Bank. Faculty members and parents backed this arrangement for the protection of the bank. Several years later, a faculty committee assumed the responsibility for operating the housing facilities and a cafeteria. In 1940 a nonprofit corporation known as the California State Polytechnic College Foundation was organized. With faculty members as directors, the foundation has assumed the responsibility for financing and recording the project operations, operating and managing the cafeterias and housing facilities, and providing other services to students.

The foundation, at both campuses, operates under lease agreements made with the State Departments of Education and Finance. The provisions of these leases define the activities of the foundation and the use of its funds. The accounts are audited yearly by the Department of Finance.

Through the foundation there is available an \$80,000 revolving fund from which students may borrow to finance their projects. No cosigner is required for a student to borrow from the foundation, but he must present a working plan, a budget, and a signed contract with the foundation before starting a project. Each student

contributes a share from his earnings towards the project fund. Any losses in student projects are covered by the foundation from the fund contributed by project operators.

Typical agricultural projects include: Fattening steers, lambs, or swine; raising and breeding cattle, both beef and dairy, for a start towards future herds; growing crop projects, such as tomatoes, sweet corn, hay, and sugar beets; raising poultry, both meat birds and laying hens, and operating the hatchery; growing and marketing ornamental horticulture projects.

Engineering departments also conduct group projects. For example, the Electronic Engineering Department does extensive repair work on radio and television sets for students and faculty.

AGRICULTURAL PROJECT FACILITIES AT SAN LUIS OBISPO

The entire farm with its equipment, buildings, and livestock is available to students for their use in conducting a wide variety of agricultural projects.

The college foundation has some of the best breeding flocks and herds of livestock in the State. Many show champions have come from the beef herd, which includes Herefords, Angus, and Shorthorns, offsprings of which are sold to the students. All necessary equipment for beef cattle production—barns, dehorning and loading chutes, corrals, stock horses, etc., is available.

The college foundation swine herd consists of three major breeds—Poland Chinas, Duroc-Jerseys, and Berkshires. The facilities include a 12-unit farrowing house and outside lots and pastures for the brood sows. In addition there are 20 feeder units for student projects having a capacity of approximately 20 market hogs per unit. Student projects market between 700 and 800 fat market hogs each year.

The foundation breeding flock of sheep is made up of four breeds—Hampshire, Suffolk, Corriedale, Southdown. From 20 to 40 breeding ewes are maintained in each of the breeds, giving the students an opportunity of carrying on typical purebred breeding operations. There are student project facilities for approximately 400 to 500 market lambs that are fed for market each year. Students also have the opportunity of learning shearing and care of wool as well as lamb production.

The dairy herd includes purebred Jerseys, Guernseys, and Holsteins. Equipment includes all the necessary facilities for feeding and milking, care of calves and bulls, artificial insemination, milk testing, bottling, separating, and creamery operations. Students conducting dairy projects carry out their operations on a separate part of the college farm.

The poultry flock consists of between 3,500 and 4,000 birds. The equipment includes a modern incubator, egg-handling facilities, brooders and brooder houses, pens for trap-nesting and pedigree work, and related devices. A student assistant and the students themselves care for every operation under the supervision of the department head.

The Ornamental Horticultural Department occupies a unit consisting of four greenhouses and three lath houses together with a sales unit and two large labs used for nursery instruction. Student projects are operated in all phases of nursery work. Equipment includes all of the essential machinery necessary for operation of a modern unit.

The Crops Department is well equipped with all types of machinery found on mechanized farms in California. All of the farming operations are carried on by students under the supervision of the Crops and Farm Departments through project class work or paid student labor. Orchards, vineyards, crop land, fruit and vegetable packing facilities and marketing outlets are available for instructional purposes.

The Agricultural Engineering Department operating and servicing all of the mechanized equipment at the college has many opportunities for students to learn practical farm machinery maintenance and repair. The major part of the maintenance work is handled by students under faculty supervision.

BUILDINGS AND EQUIPMENT—SAN LUIS OBISPO CAMPUS

CLASSROOM AND LABORATORY BUILDINGS

Administration Building

This building accommodates a series of large lecture classrooms on the upper floor and administrative and faculty offices on the ground floor. The printing department, agricultural journalism department, publications offices, student body offices, and student stores are situated in the basement.

Aeronautical Engineering Buildings

Engine shop and laboratory; airframe shop, laboratory, and hangar; aeronautical laboratory; stress laboratory; all adjacent to the college flight strip.

Agricultural Education Building

The upper floor and the main floor of this building contain faculty offices and classrooms. The entire basement contains laboratories and facilities for the Printing Department.

Agricultural Engineering

Seven well equipped shops including farm mechanics, farm machinery, hydrology, farm power, and rural electricity. Drafting rooms, classrooms, and staff offices are provided in a separate building. Storage and repairs are provided for in the adjacent Farm Machinery Building.

Agriculture and Social Science

A new building containing nine modern agriculture laboratories including three for crops, three animal husbandry, one dairy, one ornamental horticulture, and one farm management; an accounting laboratory; 15 general purpose classrooms and offices for agriculture and social science instructors.

Air Conditioning and Refrigeration Building

Laboratories for the Air Conditioning and Refrigeration Engineering Department; design and drafting room; lecture rooms; offices; project rooms and departmental equipment repair facilities. A wing of this building houses laboratories, shops, and offices for the Industrial Engineering Department.

Architectural Engineering Buildings

Three-building unit, including two large design rooms, lecture rooms, project room, display area, and offices.

Athletic Facilities

Constructed in 1959, the men's gymnasium provides boxing, wrestling, and gymnastic rooms in addition to the main floor which contains three full-length cross-court basketball courts and seats 4,000 persons for athletic contests. Handball and tennis courts are adjacent to the gymnasium, along with a large playfield area for intramural sports and physical education classes. There is also a women's physical education building with ample space for minor sports and special women's physical education requirements. A heated indoor swimming pool is used both for physical education classes and for varsity water polo and swimming. The football stadium has permanent grandstand and bleachers seating 5,500 persons. There is also a spacious baseball field with permanent seating, and a track with a 220-yard straightaway.

Audiovisual Center

The Audiovisual Center is in the college library. The center provides audiovisual instructional materials and equipment to the entire college. Facilities include preview and listening areas, a recording studio, and a technical shop. In a building adjacent to the library are laboratory facilities for audiovisual education and the production of audiovisual materials.

East Engineering Building

Laboratories for the Electronic and Electrical Engineering Departments; design and drafting rooms; materials laboratory; lecture rooms, project rooms and departmental equipment repair rooms.

Home Management

A modern home facility for teacher training in home economics. The unit provides living-in space for eight girls and an instructor.

Library

The Walter F. Dexter Memorial Library seats 428 students in the reading rooms and provides four floors of stacks, film darkrooms, listening rooms, and seminar and visual education rooms. Professionally trained librarians are available to render assistance to students and faculty.

Machine and Welding Shops

Two large, well-equipped and well-lighted shops with adjacent specialized laboratories.

Mathematics and Home Economics

This building includes facilities for mathematics and specialized home economics laboratories; 14 general purpose classrooms, and offices for mathematics and home economics faculty.

Mechanical Engineering Laboratory Building

Laboratories for the Mechanical Engineering Department; fully equipped with internal combustion engines, steam turbine, gas turbine, fuel test engine, and a wide variety of instrumentation; adjacent to college central steam heating plant which is also used for special experiments by Mechanical Engineering Department

Science and Classroom Building

This building contains twelve general-purpose classrooms and 27 fully equipped laboratories. The laboratories provide facilities for instruction in soil science, veterinary science, botany, zoology, bacteriology, chemistry, and physics.

AGRICULTURAL UNITS

Beef Unit

Two project steer feeding barns, capacity 150 steers; commercial project feeding barn, capacity 200 steers; three barns for breeding beef cattle; 1,600 acres range and pasture; judging pavilion. Dormitory facilities for 12 students.

Central Feed Mill and Storage

Complete feed mill for grinding, mixing, and processing feeds; bulk storage for 1,500 tons of grain; hay barn, 600 tons capacity; hay grinder unit; sack storage for 250 tons concentrates.

Crops Unit

Vegetable packing and grading shed; fruit shed, beekeeping laboratory; deciduous orchard; citrus and avocado acreage; vineyard. Sixty acres of cultivated land provide for field crop and truck crop projects.

Dairy Unit

Thirty-unit milking barn; two shelter feed barns for 100 cows, judging pavilion, young stock barn, bull barn, and complete creamery building. Student project unit: milk barn, feed shelter barn for 70 head of student-owned projects, and calf sheds; 600 acres of pasture. Three dormitories for 36 students.

Horse Unit

Thoroughbred, quarter horse, and draft horse barns, paddocks, and pasture.

Ornamental Horticulture Unit

Propagation and storage building; four glasshouses, three lathhouses, and other propagation units; five acres for storage and growing area; 100 acres of landscaped campus.

Poultry Unit

Central egghouse, slaughter plant, battery brooder and incubation building; laying trap nest cage units and colony houses to handle 5,000 laying hens, 10,000 fattening birds, and 500 turkeys.

Sheep Unit

Central lambing barn; project feeding barn, capacity 400 lambs; 160 acres range and pasture.

Slaughterhouse and Meats Laboratory

Modern slaughterhouse, coolers, and meat cutting room.

Soils Unit

Three soils laboratories, two special preparation labs, lathhouse and glasshouse. Cropland and range area for fertilizer trials.

Swine Unit

Fourteen-unit central farrowing house; 18 double-unit colony houses; five boar units; 16 project feeder units; 30 acres of pasture. Yearly capacity, 800 head.

STUDENT HOUSING AND SERVICES**On-campus Housing—Men**

The San Luis Obispo campus has four new three-story residence halls for eight hundred men students. These four buildings are newly constructed, newly furnished, and large lounge rooms and recreation rooms are provided.

In addition to the new residence halls there are nine two-story permanent type residence halls, eight single-story dormitories, and five student cottages located at various agricultural units. A total of 1,581 single men students can be accommodated in these on-campus housing units.

Off-campus Housing—Men

There are several large privately owned and operated college approved co-operative housing units for single men students in downtown San Luis Obispo. Also there are private homes and apartments which have been inspected and approved by the college.

On-campus Housing—Women

Trinity and Santa Lucia are two new, three-story residence halls to provide on-campus housing for 400 women students. These new halls are well located, attractive, newly furnished, and designed for comfortable, pleasant living. Each hall has a large lounge, a recreation room, sewing room, and are under trained adult supervision. They provide excellent opportunities for leadership and activity programs, as well as guidance in community living.

Off-campus Housing—Women

College approved off-campus housing consists of a limited number of rooms in private homes in the San Luis Obispo area. Some of these include board; some kitchen privileges. The addresses are available in the office of the Dean of Students.

Undergraduate women students not living at home or with close relatives are required to live in campus residence halls or approved off-campus housing. Undergraduate women students living in unapproved housing must have written permission on file in the office of the Dean of Students, prior to registration.

Family Housing

There are a few one- and two-bedroom dwellings used to house families with children. These are very much in demand and a waiting list is maintained in the Housing Office.

The Off-Campus Housing Office maintains lists of available apartments, houses, and facilities in the area suitable for married students.

Cafeterias

A new, modern cafeteria which serves three meals daily, Monday through Friday, lunch and dinner on Saturdays, and dinner on Sunday, can accommodate 2,400 students per meal. In addition to the cafeteria for regular meals, a snack bar is provided, seating 400 students.

Health Center

The student Health Center is a well-equipped clinic and infirmary. Twenty-four hour medical service is provided while the college is in session during the Fall, Winter, and Spring quarters.

THE ALUMNI ASSOCIATION

The California State Polytechnic College Alumni Association is divided into eight geographic regions with a president for each region. These regions are:

Sacramento Valley, comprising Placer, Sutter, Colusa, Yuba, Nevada, Sierra, Butte, Glenn, Tehama, Plumas, Lassen, Shasta, Modoc, Siskiyou, and Trinity Counties.

North Coast, comprising Napa, Sonoma, Lake, Mendocino, Del Norte, and Humboldt Counties.

Golden Gate, comprising Marin, Contra Costa, Alameda, San Francisco, and San Mateo Counties.

San Joaquin Valley, comprising Kern, Kings, Fresno, Tulare, and Madera Counties.

Central, comprising Calaveras, Alpine, Amador, Sacramento, San Joaquin, Solano, Yolo, El Dorado, Mono, Mariposa, Merced, Stanislaus, and Tuolumne Counties.

Southern, comprising Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, Orange, Imperial, San Diego, and Inyo Counties.

South Coast, comprising Santa Cruz, Santa Clara, San Benito, Monterey, and San Luis Obispo Counties.

Hawaiian Islands, comprising all the islands constituting the State of Hawaii.

Region at Large, comprising the 48 other states, and other countries.

Affairs of the association are under the supervision of a Board of Directors, consisting of the national president, national vice president, national secretary-treasurer of the association, the president of each region, the past national president of the association and two ex officio members appointed by the president of the college.

To promote further the activities of the association, a membership and activities committee of 41 has been established, consisting of the chairman, the national vice-president of the association, the eight regional presidents, and four representatives from each region.

The association publishes the *Alumni News*. This is the official publication of the association aimed at keeping the members informed of its activities, the latest happenings at the college, and news about individual members.

The California State Polytechnic College at San Luis Obispo is the official headquarters of the association and inquiries may be addressed there to obtain information relative to membership and other matters pertinent to the association. In the Southern region, inquiries may be directed to the Kellogg-Voorhis Campus, Pomona.

SPECIAL INSTRUCTIONAL SERVICES

SUMMER QUARTER (San Luis Obispo)

The college offers a summer quarter for old and new students. Summer quarter offerings make it possible for a student to shorten the overall length of time necessary to complete a prescribed curriculum.

The summer quarter is divided into four- and six-week periods, making a total of 10 weeks. Students may elect to enroll for either the four- or six-week period or both if they choose.

Summer students are permitted a maximum load of 1½ quarter units per week of attendance. The maximum load in the four-week term is six units, and in the six-week term, nine units.

Admission requirements, fees and deposits, and other regulations are the same for the summer quarter as for the other three quarters of the school year.

EXTENSION COURSES

Extension courses on a college level may be given at various centers throughout the State in certain specialized fields, at such times as demand requires and instructors are available.

Full information concerning the extension course system will be sent on request.

INSERVICE TRAINING IN AGRICULTURE

The college plays an active role in the inservice training of teachers of vocational agriculture by providing instructional staff and facilities for workshops and training programs co-operatively sponsored by the college and the State Bureau of Agricultural Education.

The college provides an annual summer skills program of from one to three weeks, depending upon the needs and desires of the teachers as these are expressed through the Bureau of Agricultural Education. College staff members provide up-to-date training in the technical phases of agriculture and also contribute to the professional improvement of teachers by offering instruction in teaching methods.

The annual summer conference of the California Agricultural Teachers Association is held on the San Luis Obispo campus with an attendance of 400-500 persons. Facilities, special speakers, exhibits, and other services are provided by the college.

The college offers additional service to the agricultural teachers of the State by providing for off-campus field courses of short duration and concentrated form. Instruction is provided both by college faculty members and by special lecturers in specific fields of agriculture and professional methods.

EXTENSION SERVICES TO VOCATIONAL AGRICULTURE

Services to vocational agriculture departments in the secondary schools of California are provided by the college staff through such activities as: visiting vocational agriculture departments to discuss with teachers and students dairy, animal husbandry, deciduous and citrus fruits, field and truck crops, poultry, farm mechanics, farm management, and other problems; writing for agricultural magazines; assisting high school vocational agriculture departments to solve educational and agricultural problems through correspondence; judging of livestock, poultry, crops and other products at fairs; furnishing of breeding stock and hatching eggs to improve herds and flocks owned by Future Farmers throughout the State; and preparing a variety of teaching aids.

These services are provided by the college through a co-operative arrangement with the Bureau of Agricultural Education, some offices of which are located on the campus.

SHORT COURSE AND WORKSHOP PROGRAMS

The college makes its facilities and instructional staff available for a number of professional short courses, workshop programs, and conferences such as: Physical Education Workshop, California Nurserymen's Refresher Short Course, California Hereford Breeders Association, Livestock Judging Conference, Soil Conservation Service Special Courses, California Conference on Science and Mathematics in Public Schools, Grange Youth Conference, American Association of Physics Teachers, and FFA Conference.

RESERVE OFFICERS TRAINING CORPS

(San Luis Obispo)

California State Polytechnic College maintains a voluntary General Military Science Unit, Senior Division, of the Army Reserve Officers' Training Corps (ROTC) for the purpose of preparing students to become officers in the Army of the United States. Under the General Military Science curriculum, a student is given general army training without specialization in any one branch. For those students who are selected and who pursue the advanced course (third and fourth academic years), a choice of branch will be made prior to commissioning based upon the needs of the service and the individual's desires, academic background and abilities.

The Department of Military Science and Tactics serves the students of the entire college as well as contributing to the development of qualified officers for the Army of the United States. For additional information about ROTC see page 189.

STUDENT ORGANIZATIONS AND ACTIVITIES

(San Luis Obispo)

The college provides an integrated program of classroom and laboratory instruction, gainful employment, and co-curricular activities. The latter are under the direction of the Associate Dean (Activities) who is responsible for initiating and coordinating a well-rounded program of activities designed to develop leadership qualities in all students.

STUDENT GOVERNMENT

All students, both men and women, are members of the student association known as the "Associated Students of the California State Polytechnic College." The government of student affairs and the control of its property are vested in the Student Affairs Council, the members of which are selected according to regulations established in the student body constitution. In addition, there are boards established to oversee publications, athletics, music, College Union program, and Poly Royal. All interested students have an opportunity to participate in student government.

ATHLETICS

Intercollegiate competition is held under the rules and auspices of the National Collegiate Athletic Association. Conference competition is maintained in most sports as a member of the California Collegiate Athletic Association, one of the strongest small college conferences in the entire Country. A full program of intercollegiate competition is offered in football, basketball, baseball, track, boxing, wrestling, gymnastics, swimming, water polo, golf, and cross country, all of which are major sports. Awards are given to letter winners. Freshman competition is offered in sports where competition is available and sufficient interest warrants it.

The Department of Physical Education offers physical activities designed to provide a sound program of recreation, education in physical skills, and the give-and-take of games. Varsity teams in the intercollegiate sports offer opportunity for the more skilled. Intramural teams provide year-round competition in a dozen sports at an easier level of play to all who wish to enter. Trophies are awarded winners in touch football, track, horseshoes, basketball, volleyball, swimming, boxing, wrestling, badminton, softball, tennis and golf.

PUBLICATIONS

Publications of the student body at the California State Polytechnic College, San Luis Obispo, are not only written and edited by students, but are also printed in the college's printing department as laboratory work for students majoring in printing. Editorial and photographic work for publications is handled primarily by students of the journalism classes. Among the publications, two are outstanding. *El Mustang*, the official newspaper of the associated students of the San Luis Obispo campus, is published twice each week during the school year. *El Rodeo* is the yearbook of the San Luis Obispo campus. Miscellaneous publications include the *California Future Farmer* magazine, a monthly magazine supported by and mailed to 10,000 Future Farmers of America members in nearly 200 California high schools; the *Mustang Handbook*; *Poly Syllables*, a student literary magazine; and *Polygon*, an annual magazine sponsored by the Council of Engineering Clubs.

POLY ROYAL

Each year, during the spring, the California State Polytechnic College, San Luis Obispo, has an open-house exhibition and show conducted by the associated students. This event is known as the Poly Royal, "a country fair on a college campus." Its purpose is to display the work accomplished during the year by the students, particularly student-owned projects. Each department of the college prepares its own display, and the show is on a competitive basis among the departments.

Besides the shows and exhibits, there are many entertainment features. Each year, the athletic department schedules an intercollegiate baseball game. Other special events include an adult organization livestock judging contest, a student carnival, and an intercollegiate rodeo which attracts major colleges and universities of the West and Southwest.

CAMPUS ORGANIZATIONS

Clubs and organizations cover all departments and activities, and the opportunity exists for every student to take an active part in club life. There are departmental, vocational and professional organizations, hobby-interest clubs and many others serving the areas of honor societies, service clubs, residence groups, ethnic groups, and religious faith groups. The college does not recognize or encourage membership in either national or local social fraternities or sororities.

STUDENT PERSONNEL SERVICES

(San Luis Obispo)

The college provides a number of services designed to help the student in his college work. Some of the services are directed toward group activities and experiences, others toward helping students overcome individual problems.

Counseling and Testing

The Counseling Center, under the direction of the Associate Dean (Counseling and Testing) offers service in vocational, educational, and personal counseling in accordance with the needs of the student. A well-equipped test center, under the direction of the Test Officer, is available to assist the students and counselors.

Advising

Each new student is assigned an adviser when he enrolls at college. This adviser helps the new student solve problems involved in becoming oriented to college life and helps to arrange a sound course of study for him. Returning students and college transfers are also assigned an adviser who helps the student arrange his instructional program.

Health Service

Medical services, paid for by the State and by the student through the materials and service fee and the \$3 per quarter medical fee, are designed to provide the services of the family physician while the student is in college and does not include the service of any specialists. Diseases of a chronic nature which a student contracted before entering school are not covered. Students may consult the college physician at the Health Center by appointment.

The college maintains a well-equipped clinic and hospital beds for both men and women students. The Health Center is recognized as a hospital by the American Medical Association. In the event that special hospitalization is required, students may enter one of the four hospitals located in San Luis Obispo. The student, in turn, must pay for any such hospitalization which is required.

Registration is not complete until a student has completed the physical examination satisfactorily or made other arrangements with the Dean of Students.

Placement

A centralized placement service is available to students who have completed their college program. The Placement Office and departments work together in assisting students to obtain the most suitable employment consistent with their preparation and experience.

The college has been successful for a number of years in placing virtually all of its recommended graduates. Not only is placement attempted by the college for each graduate, but men so placed are contacted frequently. The followup program includes contacting both the graduate and the employer to appraise success of placement and satisfaction of employer and employee.

Summer Employment

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

The Placement Office receives many summer job listings. Ranchers and businessmen visit the campus in person and large business concerns send recruiters to interview undergraduates for summer employment. A summer job often leads to permanent employment.

Part-time Employment

In addition to opportunities for students to earn money through project activities, the college has established a policy of giving a maximum number of students experience by employing them to assist in the operations of the entire campus and farm. The number of campus jobs is greater than in the typical college where regular full-time employees do much more of the work.

SCHOLARSHIPS

(San Luis Obispo)

For scholarships available to students at the Kellogg-Voorhis Campus see under SCHOLARSHIPS in the Kellogg-Voorhis section of this catalog.

A number of freshman scholarships are available at California State Polytechnic College for students immediately after they have graduated from high school. In all cases, evidence must be submitted that additional financial assistance is necessary in order for the applicant to attend college.

The sophomore and advanced scholarships are granted on the basis of performance of the individual in his work and activities at California State Polytechnic College.

Applications for scholarships may be made by writing to the Admissions Office, California State Polytechnic College, unless otherwise stated.

FRESHMAN SCHOLARSHIPS

California State Grange Scholarships

Two California State Grange scholarships of \$250 are available for entering freshmen students who will enroll to study Animal Husbandry, Dairy Husbandry, or Field Crops at the San Luis Obispo Campus.

Challenge Creamery Scholarship

One annual scholarship of \$100 is awarded to a Future Farmer student who excels in dairy production and who enrolls as a freshman in dairy manufacturing at California State Polytechnic College. Applicant is chosen from the entire State.

Knudsen Foundation Scholarship

The Th. R. Knudsen and Valley M. Knudsen Foundation provides one annual \$500 scholarship for a student who enrolls in dairy manufacturing. This award is not restricted to entering freshmen, but where applicants are of equal merit preference shall be given to the entering freshman.

The E. C. Loomis and Sons Scholarship

One annual scholarship of \$100 is awarded to the outstanding graduate in the high school vocational agriculture department at San Luis Obispo, Arroyo Grande, Santa Maria, or Cambria.

Sears, Roebuck and Company Agriculture Scholarship Awards

Thirteen annual scholarships of \$300 each to be awarded to entering men students who enroll as freshmen in one of the agriculture majors or agricultural journalism.

The scholarship award to an applicant is determined on the basis of:

1. Financial need for assistance to continue his education.
2. Interest in agriculture and accomplishments as evidenced by his supervised home farm program.
3. Scholarship as shown on the transcript of high school credits which shall include a statement of the number in the graduating class and the applicant's scholarship ranking in the class.

4. Citizenship and moral integrity, as certified by the high school principal, agricultural teacher, and others qualified to pass judgment on the applicant.

Application may be made through the local high school agricultural teacher who will have all the necessary information. Applications should be in the hands of the scholarship committee by April 1st.

Sears, Roebuck and Company Home Economics Scholarship Awards

Four annual scholarships of \$300 each to be awarded to entering women students who enroll as freshmen in the major in home economics.

The scholarship award to an applicant is determined on the basis of:

1. Financial need for assistance to continue her education.
2. Interest in home economics as evidenced by her total program during the high school years.
3. Scholarship as shown on the transcript of high school credits which shall include a statement of the number in the graduating class and the applicant's scholarship ranking in the class.
4. Citizenship and moral integrity, as certified by the high school principal and others qualified to pass judgment on the applicant.

Marguerite S. Tyson Scholarship

An annual award of \$500 to an incoming student in the field of Dairy Production. One of the conditions of this award requires projects and similar activities with Guernsey cattle.

U.S. Motors Foundation Scholarship

The U.S. Motors Foundation provides four annual scholarships, each in the amount of \$250 per year: one for a freshman, one for a sophomore, one for a junior, and one for a senior student. These scholarships are awarded to students majoring in the electrical power field.

Washburn & Condon Scholarship

Washburn & Condon Livestock Commission Company of Los Angeles and San Francisco makes available a \$100 scholarship to a resident of any part of California. This young man must have carried an outstanding home farm project that included the production for market of some beef animals, hogs, or lambs, or two or more of them. He must have graduated from high school and be eligible to attend California State Polytechnic College for the school year immediately following the awarding of this scholarship, and he must enroll in the Animal Husbandry Department. He should expect to engage in the production of market livestock after completing his education.

West Coast Electronic Manufacturers' Association Scholarship

One \$300 scholarship is made available each year to a freshman student entering the Electronic Engineering Department. The award is based on a competitive examination.

Leopold Edward Wrasse Scholarships

Approximately 50 Wrasse scholarships in the amount of \$500 each are available annually to freshmen and advanced students enrolled in agriculture. These scholarships are derived from the income of the Leopold Edward Wrasse Scholarship Fund established by the will of Leopold Edward Wrasse.

The qualifications required of applicants are: (1) they must be of good character, industrious, and in need of assistance; (2) they must demonstrate interest in a major agricultural field of study offered by the California State Polytechnic College and have sufficient academic preparation and other background to show promise of success; (3) they must have taken an active part in community or school activities and have earned a sum equal to one-half of the amount of the scholarship award within the 12-month period prior to receiving an award; (4) the applicants will be selected in the following priority: (a) Caruthers Union High School; (b) any high school in Fresno County; (c) other California secondary schools or California State Polytechnic College.

ADVANCED STUDENT SCHOLARSHIPS AND AWARDS

American Welding Society Scholarship

One \$150 award is made available to a student who has completed one year in his major, who has had a concentration of welding courses, and who has shown exceptional interest and aptitude in his field.

Alumni Leadership Award

An alumnus of the college provides annually an award of a life membership in the California State Polytechnic College Alumni Association to an outstanding senior student who has demonstrated a high quality of leadership in his student life.

L. L. Bennion Scholarship

Mr. Paul Grafe of the Grafe-Callahan Construction Company makes available an annual \$250 scholarship known as the L. L. Bennion scholarship. This scholarship is awarded to an outstanding junior student who is specializing in the field of animal husbandry.

California Association of Nurserymen's Scholarship

The California Association of Nurserymen makes available to the California State Polytechnic College an annual \$100 scholarship. This scholarship is awarded to an outstanding sophomore student who is enrolled in the Ornamental Horticulture Department.

California Landscape Contractors Association Award of Merit

The California Landscape Contractors Association provides three scholarships in the amount of \$100 each for upperclassmen studying in the Ornamental Horticulture Department.

California State Grange Home Economics Fund

The California State Grange has established a fund at the San Luis Obispo campus from which grants (not to exceed \$100) may be awarded to currently enrolled women students from all divisions of the college who display academic ability but, due to unforeseen circumstances, would be unable to complete the quarter in attendance without financial aid.

Earth Equipment Corporation Scholarship

The Earth Equipment Corporation makes available one \$500 scholarship for a student working toward a bachelor of science degree in agricultural engineering or mechanized agriculture. The student must have demonstrated interest and ability in farm mechanics and ability and excellence in written English, basic bookkeeping, and accounting.

Harry Huston Scholarship in Agriculture

One \$500 scholarship is made available for a student who will enroll as a senior majoring in agriculture.

Hewlett-Packard-Alumni Scholarship

One Hewlett-Packard-Alumni Scholarship for an undetermined amount is provided for a student majoring in electronics engineering. The recipient must have completed at least five quarters of college level work. Funds for this scholarship are determined by the amount raised by alumni employees and matched by Hewlett-Packard Company.

Hugh H. Logan Foundation Scholarship

One \$500 scholarship is awarded by the Hugh H. Logan Foundation to a student studying in the Air Conditioning Department. The recipient must be enrolled as a senior in the year in which the scholarship is paid.

Kimber Scholarship in Poultry Husbandry

Kimber Farms, Inc., makes one annual \$400 scholarship award to a student who is majoring in poultry husbandry and who has completed at least three quarters of outstanding work in this department.

John C. Lindsay Award

An annual award of \$100 will be made to the junior student in architectural engineering, who in the opinion of the staff, has presented the best problem during the year.

Link-Belt Company Scholarship

The Link-Belt Company provides one \$500 scholarship to a student who will enroll with junior standing in the Mechanical Engineering department. Preference is given to a student from the localities of the company plants in California, i.e. San Francisco and Los Angeles.

Mahler Award

Each year, Martin Mahler, consultant on prestressed concrete, awards a membership in the American Society for Testing Materials to the student in architectural engineering doing the best work in the field of prestressed concrete.

Neely Enterprises Scholarship

One \$250 award to a sophomore majoring in the field of electronics. Recipient is chosen on the basis of need, academic ability, resident of California, Arizona, Nevada, or New Mexico, and the general participation in college activities.

Page Memorial Scholarship

This \$500 annual award is made available through the California Newspaper Publishers Association to a junior majoring in printing. A condition under this scholarship is that the awardee desire to work for a member paper of this organization.

The Poultrymen's Cooperative Association of Southern California Scholarship

One annual scholarship of \$200 is awarded to an outstanding student who is majoring in poultry husbandry and who has completed at least three quarters of work in this department. The applicant must be a resident of one of the following counties: Fresno, Kings, Los Angeles, Orange, Riverside, San Bernardino, Santa Barbara, San Diego, San Luis Obispo, or Ventura.

Harry E. Rosedale Memorial Scholarship

One \$100 scholarship is made available for a student enrolled in ornamental horticulture at the San Luis Obispo campus. The student must have completed one year of work in ornamental horticulture and must have been recognized in the ornamental horticulture field as expressed by employers' letters.

Rotary Scholarship

The San Luis Obispo club of the Rotary International makes available to California State Polytechnic College one annual \$250 scholarship. This scholarship is awarded to a student of outstanding ability in co-curricular activities. This student must maintain a better than average record and must have at least junior standing the full quarter following the scholarship awards. The first awards were made in the spring of 1947.

Sears, Roebuck and Company Sophomore Scholarship

Sears, Roebuck and Company, as a continuation of the freshman scholarship plan already described, awards a \$300 sophomore scholarship to the most outstanding student of those receiving Sears Roebuck awards as first-year students.

Solar Aircraft Company Scholarship

Five annual \$100 scholarship awards are made available for engineering students who are entering their junior year and who are citizens of the United States with a minimum of three quarters of work completed in residence at the California State Polytechnic College. One \$500 scholarship is made available for an engineering student who will enter the senior year and who had been a recipient of one of the five \$100 Solar Aircraft Company scholarship awards as a junior student.

Tractor and Implement Club of Southern California Scholarship

The Tractor and Implement Club of Southern California provides one \$500 scholarship for a sophomore or junior student who is specializing in the field of

Agricultural Engineering. Preference is given the student with interest in the power and machinery or mechanized agriculture phases of Agricultural Engineering.

West Coast Electronic Manufacturers' Association

One \$300 scholarship is made available each year to a student who has successfully completed a minimum of three quarters of work in the Electronic Engineering Department.

Leopold Edward Wrasse Scholarships

These scholarships, described above under "Freshman Scholarships," are also available to advanced students enrolled in an agricultural major.

OTHER SCHOLARSHIPS

Bank of America, N. T. & S. A. Scholarships

Four annual \$200 scholarships are awarded at the Grand National Junior Livestock Exposition on the basis of excellence of performance in the farm home program in the production of livestock. Applicants are limited to those participating in this special event. These scholarships may be used at the California State Polytechnic College.

Business and Professional Women's Club of San Luis Obispo

The Business and Professional Women's Club of San Luis Obispo provides one annual \$250 advanced scholarship for a woman student who is a resident of San Luis Obispo County and who will enroll at the California State Polytechnic College after the completion of two years of college work, either at Cal Poly or at another four-year college or junior college. Prospective applicants should contact the club secretary.

California Seed Association Scholarship

One annual scholarship of \$150 is offered to a Future Farmers of America member in California by the California Seed Association. The applicant must have an outstanding home farming program in truck crops or seed production, or an outstanding record in crops judging; and must enroll in crops production at certain California agricultural colleges including all branches of California State Polytechnic College. Application forms are available from high school FFA chapter advisers.

Union Pacific Railroad Scholarships

Four \$200 scholarships are made available by the Union Pacific Railroad, Omaha, Nebraska. Applicants must have completed two or more years of vocational agriculture, or 4-H club work, including commendable projects. One scholarship is to be awarded to one resident in each of the following counties: Los Angeles, Riverside, San Bernardino, and Orange. Scholarships may be used at California State Polytechnic College, University of California, or Chaffey Junior College. All applications, however, must be submitted not later than April 15. Scholarships shall be used within the calendar year after the date of graduation from high school. All project books, a picture of the applicant, and, if possible, pictures of his project must accompany the application.

Safeway Stores, Inc., Scholarships

Two annual \$200 scholarships are awarded at the Grand National Junior Livestock Exposition on the basis of excellence of performance in the farm home program in the production of livestock. Applicants are limited to those participating in this special event. The scholarship awarded to a Future Farmer must be used at California State Polytechnic College.

Santa Fe Scholarship

One annual scholarship of \$250 is offered to a Future Farmers of America member in California by the A. T. and S. F. Railway. The scholarship may be used at certain agricultural colleges within the State, including all branches of California State Polytechnic College. Application forms are available from high school FFA chapter advisers.

South San Francisco and Stockton Union Stockyards Company Scholarships

Two annual \$100 scholarships are awarded at the Grand National Junior Livestock Exposition on the basis of excellence of performance in the farm home program in the production of livestock. Applicants are limited to those participating in this special event. The scholarship award to a Future Farmer must be used at California State Polytechnic College.

Standard Oil Company of California Scholarships

Thirty annual scholarships of \$300 each are offered by the Standard Oil Company of California to members of the Future Farmers of America and members of 4-H clubs in California. Any of these scholarships may be used at either branch of California State Polytechnic College or other colleges. Future Farmers should apply through their agriculture teachers, 4-H club members through their club leaders and county club advisers.

STUDENT LOAN FUNDS

For loan funds available to students at the Kellogg-Voorhis Campus see under **LOAN FUNDS** in the Kellogg-Voorhis section of this catalog.

Student loan funds are available to provide temporary assistance to worthy students. Loans from these funds are made for varying periods of time, according to regulations determined by a faculty committee and in conformance with conditions prescribed in the establishment of the particular loan fund. Applications should be made in the office of the Dean of Students.

The character and integrity of the student are the primary qualifications for obtaining a loan. Evidence of real need for such temporary assistance must be shown. Students who have spent funds far beyond the necessary school expenses will not be considered for loans, even though need is shown.

Agricultural Engineering Society Loan Fund

The student chapter of the Agricultural Engineering Society of the college has established a loan fund to be used for either long- or short-term loans. Although preference is to be given to students majoring in agricultural engineering or mechanized agriculture, other students are not excluded from receiving loans from this fund.

Edgar E. Bilodeau Loan Fund

This fund, given by Mrs. Dorothy Bilodeau in memory of her husband, is primarily for engineering students, although other students are not excluded.

California Polytechnic Memorial Loan Fund

A loan fund has been established from the contributions made by numerous persons. It is designed to aid students who need immediate financial assistance.

The California State Polytechnic Women's Club Fund

The social club of women staff members and faculty wives at San Luis Obispo has established a student loan fund, increased each year by some type of public benefit. Loans are made to deserving students after one quarter of successful attendance.

W. B. Camp Revolving Scholarships in Agricultural Journalism

W. B. Camp of Bakersfield has provided \$1,000 to be used for either short- or long-term loans for students enrolled in the field of agricultural journalism. Preference for these loans is given first year students. However, other students are not excluded if sufficient funds exist.

W. B. Camp Educational Loan Fund

The Georgianna Camp Foundation of Bakersfield has established a \$5,000 W. B. Camp Educational Loan Fund to be used for making short- or long-term loans to students enrolled in the field of agricultural journalism. Preference is given to applicants who have successfully completed at least two academic quarters in agricultural journalism and who have farm backgrounds.

Horseshoeing and Animal Husbandry Loan Fund

A loan fund of \$600 has been granted by the former Horse and Mule Association of America to students enrolled in the special horseshoeing program.

Chris Jespersen Fund

A loan fund has been established by the faculty of the college in memory of Senator Chris Jespersen. This fund is to provide loans to needy students.

Issac Baer Fund

The Issac Baer Loan Fund has been established by a Cal Poly faculty member who wishes to remain anonymous. The purpose of this fund is to provide senior students with money to move from college to their place of employment in their first job out of Cal Poly.

Lee Gird Levering Memorial Loan Fund

The family and friends of Lee Gird Levering, a student killed in the Korean War, have established a memorial loan fund in his memory. The purpose of this fund is to make sums available to deserving students at California State Polytechnic College. Although preference is given to students majoring in sheep husbandry, animal husbandry, or in agriculture, other students are not excluded from receiving loans from this fund.

The Rotary Club Fund

The San Luis Obispo Rotary Club has established a student loan fund open to any deserving student after one quarter of successful attendance.

Laura E. Settle Loan Fund

A loan fund has been established by the California Retired Teachers Association in memory of Laura E. Settle who was instrumental in founding this organization. This money is available to Education majors.

Student Accommodation Loan Fund

The California State Polytechnic Women's Club and the Associated Students have set up a fund from which students may secure small, short-term loans.

Telegram Tribune Loan Fund

A loan fund has been established by the *Telegram Tribune*, San Luis Obispo daily newspaper, to make short-term loans to deserving students in agricultural journalism.

Wilder Memorial Loan Fund

The Alumni Association sponsors the Wilder Memorial Loan Fund in memory of Dr. G. W. Wilder, from which small, short-term loans are made to deserving students.

The Wrasse Fund

The Leopold Edward Wrasse Loan Fund was established for the benefit of deserving boys desirous of an education and needing financial assistance.

Yellow Dog Los Angeles Kennel Loan Fund

The Yellow Dog Society, Los Angeles Kennel, has established a student loan fund to be used for either short- or long-term loans. Although preference will be given to students majoring in dairy husbandry and dairy management, other students are not excluded from receiving assistance from this loan fund.

ADMISSIONS

Admission standards at California State Polytechnic College are stated in the California Administrative Code, Title 5, Education, which provides uniform admissions regulations for all California state colleges.

Admission to California State Polytechnic College is open to the graduate of any high school, or other applicant who is judged by the appropriate college authorities to possess equivalent preparation, upon the submission of evidence of fitness to profit by college instruction—such fitness to be shown by previous scholastic records and by evidence of good moral character and personal qualifications.

Guidance tests which are completed by incoming students are a part of the registration procedure and are given for the purpose of providing information for the student, his departmental adviser, and the counseling center. The departmental adviser uses guidance test results to determine the courses most suited to the student's needs at the time of registration. These are not entrance examinations.

New students who have not completed one or more appropriate college degree courses in English or mathematics are required to take the English placement test and the mathematics placement test. Students entering the major in elementary education at San Luis Obispo are given an additional test in penmanship by the Education Department.

At the time of admission to the college all students are accepted into a major field of study. To conform to admission requirements, every student must submit an application for admission and transcripts of previous high school and college training, including available test data. See also under "Matriculation."

Transcripts and records presented for admission or evaluation will remain in the student's folder as a part of his permanent record upon completion of registration.

Transfer Credit

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 of the various curricula with less than three full quarters of residence, two of which immediately precede graduation, nor with less than 50 quarter units of work received in residence at California State Polytechnic College.

Individuals transferring from colleges or universities will be considered for admission on a conditional basis at California State Polytechnic College if they have been on probation at the college or university last attended.

Evaluation of in-service military training will be made on the basis of American Council on Education recommendations.

REQUIREMENTS FOR ADMISSION AS AN UNDERGRADUATE STUDENT

HIGH SCHOOL GRADUATES

For admission to the college, a high school graduate, or other applicant who is judged by the appropriate college authorities to possess equivalent preparation, must, as a minimum, meet one of the following:

1. Have completed the equivalent of 70 semester periods of course work, in subjects other than physical education and military science, with grades of A or B on a five-point scale during the last three years in high school.
2. Have completed the equivalent of 50 semester periods of course work, in subjects other than physical education and military science, with grades of A or B on a five-point scale during the last three years in high school and attained the twentieth percentile on the national norm of a standard college aptitude test.

An applicant who fails to meet these standards may be admitted on a conditional basis, if in the judgment of the appropriate college authorities he gives promise of being able to succeed in college.

ADULT SPECIAL STUDENTS

An applicant who has attained the age of 21 years and is not a high school graduate may be admitted as an adult special student provided that he demonstrates to the proper college authorities ability to profit from college work.

LIMITED STUDENTS

Limited students (those registered for six units or less) are subject to the same admission requirements as regular students. See also under "Matriculation."

ADVANCED STANDING—BACHELOR OF SCIENCE PROGRAM

Bachelor of science degree candidates must complete the required curriculum as stated in Section 920, Title 5, of the California Administrative Code and listed in the college catalog for the major chosen. Preparation for specific occupational fields makes it essential for a transfer student to take sufficient work at California State Polytechnic College for major department personnel to become well acquainted with the student, so that an appropriate placement recommendation may be made. Persons who have attended junior colleges or four-year colleges will be given full credit for such college level courses as may be applicable to the pattern of course work in the California State Polytechnic College curriculum followed, and in general elective credit for those not so applicable.

Students Who Transfer From Four-year Colleges and Universities

An applicant who has earned credit in a four-year college or university may be admitted to the college if he meets the following standards.

1. He must have a grade-point average of 2.0 (grade of C on a five-point scale) or better for the total program attempted.
2. He may receive special consideration if he attains the twentieth percentile on the national norm of a standard college aptitude test provided that he must have been in good standing at the last college institution attended, and his previous record must be such that it would not disqualify him in the college to which he seeks admission.
3. A student who does not meet the above requirements may be admitted on a conditional basis, if in the opinion of the appropriate college authorities he can succeed in college.

Students Who Transfer From Junior Colleges

An applicant who has earned credit in a junior college may be admitted if he meets the standards listed immediately above except for the applicant who was ineligible for admission to the college on the basis of his high school record. In this case he must have completed 36 or more quarter units of college work with a grade-point average of 2.0 (grade of C on a five-point scale) or better in the total program attempted.*

Not more than 64 semester units (96 quarter units) may be allowed for credit earned in a junior college. No credit may be allowed for professional courses in education taken in a junior college.

Other Applicants for Admission With Advanced Standing

An applicant who fails to meet the standards listed above in this section may be considered by the appropriate college authorities for admission on a conditional basis when the facts in the case seem to warrant such action.

**ADVANCED STANDING—BACHELOR OF EDUCATION PROGRAM
(San Luis Obispo)**

Candidates for the bachelor of education degree must qualify for admission and complete requirements for the degree specified in Title 5, California Administrative Code, Section 921.

* Commencing in the fall term in 1961, students who are ineligible for admittance to the college directly from high school will be required to complete 60 semester units, with a grade point average of 2.0 (C). Students who complete 24 semester units, with a grade point average of 3.0 (B) may also be admitted.

To be admitted to the bachelor of education program an applicant must:

1. Hold a California provisional general elementary or kindergarten-primary credential.
2. Present evidence of having satisfactorily completed a minimum of 90 quarter units (60 semester units) of standard college work.
3. Have the general elementary credential as his objective.

REQUIREMENTS FOR ADMISSION AS A GRADUATE STUDENT—SAN LUIS OBISPO

All students desiring to do graduate work must file for admission at the Admissions Office. This applies not only to graduates of other colleges, but to students at the California State Polytechnic College. Graduates of this college must reapply for admission to the graduate division following graduation.

Further information concerning admission to graduate standing will be found in the section on the master of arts degree. Information concerning other phases of the graduate program will be found in the section headed "Degrees and Credentials."

FEES AND EXPENSES

STATE FEES AND DEPOSITS

Materials and service fee (quarter)	
Each student enrolled for six units or less.....	\$12.00
Each student enrolled for over six units.....	22.00
Each student enrolled in summer quarter.....	22.00
Nonresident tuition:	
Each nonresident student enrolled for 15 units or more (per quarter).....	86.25
Each nonresident student enrolled for less than 15 units (per quarter per unit or fraction of unit).....	5.75
Late registration fee.....	5.00
Transcript of record fee (no charge for first copy).....	1.00
Course credit by special examination fee (per unit).....	1.00
Extension course fee (per unit).....	1.00, 5.00 or 5.75
Change of program fee.....	1.00
Failure to meet administratively required appointment or time limit.....	2.00
Credentialed fee.....	4.00
Check returned for any cause.....	2.00
Parking fee (nonreserved spaces, per quarter)	
Regular students.....	9.00
Limited students.....	4.50
Each alternate car in addition to fee for first vehicle.....	1.00

OTHER FEES *

Associated student card fee (fall quarter).....	\$7.50
Associated student card fee (winter and spring quarters, each).....	3.75
Post office box rental (all students, per quarter).....	.50
Medical fee (per quarter).....	3.00
Graduation fee (must be paid at time application for graduation is submitted).....	10.00

NOTE: Fees for summer quarter are the same as for the other quarters. Fees are subject to change upon approval of the State Director of Education.

LIVING EXPENSES FOR STUDENTS LIVING IN CAMPUS RESIDENCE HALLS

Room and board per quarter, including parking fee (subject to change).....	\$230.00
Housing security deposit (payable prior to occupancy).....	20.00

NOTE: 1. Room and board payable in advance. Arrangements to pay in three equal installments may be made upon application for campus housing. A service fee of \$4.00 per quarter shall be charged for the right to make installment payments.

NOTE: 2. Students are required to furnish blankets, bed spreads, and study lamps.

NOTE: 3. The board plan includes three meals each day, Monday through Friday, lunch and dinner on Saturdays and dinner on Sundays. The cafeterias are closed on college holidays.

TYPICAL STUDENT EXPENSES

Following is an estimate of typical expenses per quarter for students living in campus residence halls. Of the total amount, the student should be prepared to

* Not state fees.

pay from \$325 to \$375, depending upon his major, at the time of fall quarter registration and approximately the same amount at the time of winter and spring quarter registration.*

Associated student card (fall quarter, \$7.50, winter and spring quarters, \$3.75 each)	\$7.50
Post office box rental (per quarter)50
Medical fee (per quarter)	3.00
Materials and service fee (per quarter)	22.00
Room and board (18 meals per week)	230.00
Books and supplies (estimated)	50.00 †
Weekend meals (estimated \$15 per month)	45.00
Laundry (estimated \$10 per month)	30.00
<hr/>	
Estimated total per quarter (approximately 3 months)	\$388.00

FAMILY HOUSING

The college foundation has available the following furnished on-campus housing accommodations:

Poly Ninos, one-bedroom apartments, including utilities (per month)	\$28.00
Poly Ninos, two-bedroom apartments, including utilities (per month)	32.00

Inquiries should be made of "Housing Officer," California State Polytechnic College, San Luis Obispo, for family housing either on or off campus well in advance of registration.

* Students enrolling under Public Law 550 should be prepared to pay all costs at the time of registration. Students enrolling under the auspices of other laws or agencies supplying educational assistance should check in advance with the appropriate agency representative regarding payment of fees and/or costs.

† Beginning engineering students should be prepared to pay up \$100 in their first quarter.

GENERAL REGULATIONS

MATRICULATION

Matriculation refers to the complete process of being admitted to the college as a candidate for a certificate, degree, or credential and requires that the student who applies for admission as an undergraduate present a completed application for admission and transcripts of his previous academic training including transcripts from high school and/or college. Applicants for admission as graduate students must present satisfactory evidence of their qualifications to enroll—usually a transcript of college work.

All students, whether regular or limited, must complete the matriculation process.* They must also complete Form SC-50, Statement of Residence, in advance so that their residence status can be determined prior to registration.

REGISTRATION PROCEDURE

A "Permit to Register" is prepared by the Registrar's Office for each student who has been accepted to register. All students are required to register as majors in a specific department of the college.

The schedule for registration and payment of fees is published in the "Class Schedule and Instructions for Registration" which is issued prior to the start of the academic year. Students should consult this booklet for detailed registration procedures.

Credit for course work completed is given only when the student is properly registered. A student is not properly registered unless his completed quarter registration forms, listing the program approved by his adviser, are on file in the Registrar's Office. Students are not admitted to courses unless they are registered as students at the college.

CHANGE OF CURRICULUM

Students who find that they are in a major which does not provide the type of education for which they have the greatest aptitude are encouraged to transfer to another curriculum as soon as the condition becomes apparent. Students should contact their adviser and the college Counseling Center for assistance in making curriculum changes. Approval by the Veterans Administration must be obtained by students enrolled under certain laws before the major curriculum can be changed.

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

Upon transfer from a degree to a technical curriculum, a student's record is evaluated in terms of a technical curriculum. Courses completed prior to transfer which are applicable to the required courses in the technical curriculum will be transferred intact. The remaining courses completed prior to transfer must apply as electives up to, but not in excess of, the number of elective units specified in the technical curriculum. In the case of an excess of elective units, the student may choose which units shall apply. For purposes of computing the grade point average for graduation, only those courses transferred as outlined above and those taken subsequent to transfer will be used.

* Exception is provided in the case of students who enroll in the 12-week horseshoeing course and for foreign students who enroll under the auspices of the U.S. Government.

REVISION OF CURRICULAR REQUIREMENTS

A student is not held for courses added to a curriculum in quarters which he has completed. However, a student shall meet all changes in curricular requirements affecting quarters which he has not completed. The determination of a student's standing, in reference to quarters completed, will be computed upon the basis of the number of units remaining to be completed in the student's selected curriculum.

CURRICULUM DEVIATION

Although the college has specified a curriculum for each major, under certain conditions a student may be permitted some deviation from the established curriculum. Detailed instructions for applying for a curriculum deviation may be obtained from the Registrar's Office.

CHANGE OF PROGRAM

The student is held responsible for every course appearing on his official program card. Each change must be made on or before the applicable last date as published in the academic calendar and must be filed with the Registrar's Office on the proper form.

Changes which must be made on or before the last day to add courses include adding a class, increasing units in a course, changing from audit to credit. Changes which must be made on or before the last day for dropping classes without penalty include dropping a class (no penalty), reducing units in a course, changing a section of a course, changing from credit to audit. Forms for the change of program may be obtained from the Registrar's Office.

A fee of \$1 will be charged for each program change made after the allowed time except in cases where the change is made upon the recommendation of the student's departmental adviser. Activity courses in physical education and music may be added and changes of program involving refresher courses in English, mathematics, and chemistry may be made during the first 21 calendar days.

A period of 21 calendar days at the beginning of the regular quarters is allowed for withdrawal from a course without penalty. After the 21-day period a student may withdraw from a course only by accepting a grade based upon his standing in the course at the time of withdrawal. The instructor will indicate on the form whether the student is to receive a grade of F (failure) or W (withdrew) for the course. The grade of W indicates that the student is passing (Grade A to D) in the course at the time of withdrawal.

Students who withdraw from college prior to the end of the quarter will receive a W or an F grade in each course depending upon whether passing or failing work has been accomplished up to the time of withdrawal.

CLASS ATTENDANCE

Students are expected to be regular in attendance to keep the quality and quantity of work high. Absence from classes is regarded as a serious offense, and no excuses for work missed are provided.

An excused absence can be allowed only by the instructor in charge of the class upon consideration of the evidence justifying the absence presented by the student. An excused absence merely gives the individual who missed the class an opportunity to make up the work and in no way excuses him from the work required.

MINIMUM GRADE REQUIREMENTS

A student will be subject to disqualification under either of the following conditions:

1. If the student's cumulative grade point average is less than 2.0 (C).
2. If the student's grade point average is less than 2.0 (C) for each of his last two consecutive regular quarters in attendance.

Preparatory course units, grades, and grade points will not be counted in determining the cumulative grade point average. Grades below "C" received in preparatory courses will be considered in determining academic disqualification.

A student who is disqualified will be so notified.

A student who is disqualified for failure to maintain satisfactory academic progress will not be readmitted either as a limited or as a regular student until at least one regular quarter has elapsed and then only after presentation to the college of satisfactory evidence that he has improved his chances of scholastic success. The request for readmission will be referred to the dean of the division in which the student wishes to enroll.

GRADING SYSTEM

The following grading system is in effect:

- A—Superior
- B—Better than average
- C—Average
- D—Barely passing
- E—Incomplete
- F—Failure
- P—Passing (workshops only)
- W—Withdrew from course without failure

Grade points are assigned to the various grades (except grade P) as follows:

- For each unit of Grade A—4 points
- For each unit of Grade B—3 points
- For each unit of Grade C—2 points
- For each unit of Grade D—1 point
- For each unit of Grade E—0 point
- For each unit of Grade F—0 point

Passing grades are marked A, B, C, D. Grade E (incomplete) indicates a record below passing. It can be made up or completed without repeating the course in class by re-examination, or completing all unfinished work, or both, as the instructor may determine. The removal of grade E entitles the student to the number of grade points to which he may be entitled for his passing grade.

Grade E may be given to a student for the following reasons:

1. Passing in classwork, but final examination not taken.
2. Passing in classwork completed and in final examination, but some assigned work not completed.

A grade of E must be made up to a passing grade within one year. In the event this is not done, the course must be retaken.

A student may repeat a course in which he has received a grade lower than C under the following condition: 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.

Students may have grades sent to their home addresses by leaving self-addressed stamped envelopes in the Registrar's Office at the end of the quarter; otherwise, grades will be sent to students through their campus mail boxes.

MAXIMUM AND MINIMUM LOADS

The maximum load for regular students is 20 quarter units of work including audited courses; the only exceptions are made with the approval of the student's division dean and completion of a petition to carry excess load. Regular credit will not be given for a course completed in any quarter unless the course appears on the student's approved program card for that quarter. A student who desires to carry 6 units or less in a regular quarter will register as a limited student. Maximum load requirements may be waived only on presentation of evidence of ability to carry successfully such a group of courses. Maximum load for graduate students is 16 units per quarter.

Veterans enrolled under Public Law 550 must enroll for a minimum of 14 units to receive full monthly payments.

HONORS (PRESIDENT'S LIST)

The "President's List" is published annually to honor those students who have earned a 3.0 grade point average in all their studies taken at the college. Students, to be considered for the President's List, must be enrolled for at least the minimum number of units to be considered a regular student during the enrollment period involved.

TRANSFER TO OTHER COLLEGES

Students who plan to transfer from the California State Polytechnic College to another college or university, should, at the earliest possible date, request that their transcript of record be forwarded by the Registrar's Office. Any evaluation of transcripts presented to another college or university will be made by the new institution in terms of its established policies.

CREDIT BY EXAMINATION

A student enrolled either as a regular or limited student may be permitted, at the discretion of his division 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 entered on the student's permanent record. The length of the examination will be consistent with the unit value of the course.

When a re-examination is requested for a course, a six-week period must elapse before a petition for credit by examination 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 college.

Detailed instructions for applying for credit by examination may be obtained from the Registrar's Office.

AUDITING OF COURSES

An auditor is a student who is attending courses for no credit. He must be registered with fees paid either as a regular or limited student for the quarter in which the course he desires to audit is offered. Audited courses must be included on the student's study list with the designation "AUD" in the "units" column along with the number of units.

In cases where class sections must be limited in enrollment, preference will be given to students enrolling for credit.

A limited student may not enroll for either credit or audit in courses totaling more than six units.

CREDIT FOR MILITARY SERVICE

1. Nine quarter units of elective credit will be allowed toward graduation to any student with honorable discharge submitting evidence of satisfactory completion of 15 weeks of training in the military service of the United States.

2. In addition to the nine quarter units under 1, 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.

3. In allowing for credit for inservice training, California State Polytechnic College follows the recommendations of the American Council on Education in terms of units allowed and subject matter covered.

ELIGIBILITY FOR INTERCOLLEGIATE ATHLETICS (San Luis Obispo)

Eligibility regulations are determined by the rules of the California Collegiate Athletic Association. Salient points are noted below:

1. Competition is open to regularly enrolled students carrying at least 12 units applicable toward an approved objective.
2. The student must have completed a minimum of 36 quarter units between seasons of competition in a sport and must maintain an overall "C" average.
3. Freshmen are not eligible for varsity competition.
4. Transfer students from four-year colleges must have a year of residence to be eligible.
5. Junior college transfers are immediately eligible. Two years of junior college competition are allowed, plus three years of varsity competition.

HONORABLE DISMISSAL

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

PROBATION, SUSPENSION, OR EXPULSION

In general, the college expects its students to conduct themselves as mature young men and women. Specifically, the college will not tolerate dishonesty, drinking on the campus, or being on the campus in an intoxicated condition.

Any student of a state college may be placed on probation, suspended, or expelled for one of more of the following causes:

- (a) Disorderly, unethical, vicious, or immoral conduct.
- (b) Violation of any regulation governing the use or parking of motor vehicles on the college campus.
- (c) Misuse, abuse, theft, or destruction of state property.

The period for which the student may be placed on probation or suspended shall not exceed 12 months. No fees or tuition paid by or for such student for the semester, quarter, or summer session in which he is suspended shall be refunded. If the student is readmitted before the close of the semester, quarter, or summer session in which he is suspended, no additional tuition or fees shall be required of the student on account of his suspension.

A student may be expelled by the Director of Education upon the recommendation of the President of the state college in which the student is enrolled.

HOUSING FOR WOMEN STUDENTS (San Luis Obispo)

All undergraduate women students not living at home or with close relatives are required to live in campus residence halls or in college approved off-campus housing. Any exceptions must have the written approval of the Dean of Students.

COURSE NUMBERING SYSTEM

The numbering system used is a three-digit system. Courses are grouped first into number series indicating the college level at which they are normally taught as follows:

1- 9—Preparatory courses	300-399—Junior courses
100-199—Freshman courses	400-499—Senior courses
200-299—Sophomore courses	500-599—Graduate courses
600-699—Professional courses	

The first digit indicates the level or year in which the courses are normally taught. The second digit indicates the type of course with numbers assigned as follows:

- 0 or 1—Lecture courses
- 2 or 3—Courses involving both lecture and laboratory
- 4 or 5—Courses composed entirely of laboratory work
- 6 or 7—Senior project or seminar
- 8 or 9—Graduate thesis or seminar

The third digit indicates the quarter in which the course is normally taught.

- 1, 4 or 7—Fall quarter course
- 2, 5 or 8—Winter quarter course
- 3, 6 or 9—Spring quarter course

NOTE: Courses numbered 1-9 carry no credit toward meeting degree requirements in any of the curricula. Courses numbered 300-499 may be used for graduate credit with permission of the Coordinator of Graduate Studies. Courses numbered 600-699 are for professional advancement within a special field. The courses do not carry credit for degree requirements in any of the curricula.

SYMBOLS

The following symbols are used to indicate departments in which the courses are offered:

ABM—Agricultural Business Management	LA—Landscape Architecture
Actg—Accounting	LMR—Labor and Management Relations
Aero—Aeronautical Engineering	Math—Mathematics
AC—Air Conditioning and Refrigeration Engineering	ME—Mechanical Engineering
AE—Agricultural Engineering	Mktg—Marketing
Ag Ed—Agricultural Education	MS—Machine Shop
AH—Animal Husbandry	Mu—Music
AV—Audio-Visual Education	OA—Office Administration
Arch—Architectural Engineering	OH—Ornamental Horticulture
Art—Art	Path—Pathology
Bact—Bacteriology	PE—Physical Education
Bio—Biology	Phil—Philosophy
Bot—Botany	Pol Sc—Political Science
Bus—Business	PH—Poultry Husbandry
CF—Fruit Production	Phys—Physics
Chem—Chemistry	PI—Poultry Industries
CP—Crops Production	Pr—Printing
DH—Dairy Husbandry	PSc—Physical Science
DM—Dairy Manufacturing	Psy—Psychology
Ec—Economics	SI—Agricultural Services and Inspection
Ed—Education	SM—Sales Management
EE—Electrical Engineering	Soc—Sociology
EL—Electronic Engineering	Soc Sc—Social Science
Eng—English	Sp—Speech
Ent—Entomology	Span—Spanish
FI—Food Processing	SS—Soil Science
FM—Farm Management	TA—Technical Arts
FP—Deciduous Fruit Production	TC—Truck Crops
Geog—Geography	VS—Veterinary Science
IE—Industrial Engineering	Weld—Welding
HE—Home Economics	WM—Welding and Metallurgy
Hist—History	Zoo—Zoology
Jour—Journalism	

DEGREES AND CREDENTIALS

Curricula leading to graduation with the degree of bachelor of science are offered at both campuses of California State Polytechnic College. In addition there are offered at the San Luis Obispo Campus programs leading to the two-year technical certificate in agriculture, to the degrees of bachelor of education and master of arts in education, and to teaching credentials authorizing service in the public schools.

The occupational majors in agriculture, engineering, and arts and sciences are listed under the respective division in the two sections of this catalog. Requirements for teaching credentials are listed under the heading, "Preparation for Elementary and Secondary School Teaching."

APPLICATION FOR GRADUATION

Students shall make application for graduation in the Recorder's Office prior to the last date for filing such applications, as shown in the college calendar.

DOUBLE MAJORS

The student will normally meet graduation requirements for a degree in one of the major departments. It is permissible for a student to have two majors indicated on his degree if the complete requirements of both curricula have been met.

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

BACHELOR OF SCIENCE DEGREE

GENERAL REQUIREMENTS FOR GRADUATION

All candidates for the bachelor of science degree shall have completed the requirements in one of the listed four-year curricula, shall have spent not less than three quarters in residence (two quarters immediately preceding graduation), shall have earned not less than 50 quarter units in residence, and shall have earned a total number of grade points at least equal to twice the number of units attempted. Transfer students, in their work taken at this college, must earn a number of grade points at least equal to twice the number of units attempted at this college.

Candidates from the Engineering Division must present a minimum of 210 quarter units of credit for graduation. Candidates from the Agriculture Division (except agricultural engineering which requires 210 quarter units) and from the Arts and Sciences Division must present a minimum of 198 quarter units of credit for graduation.

REQUIRED GENERAL EDUCATION

All candidates for the bachelor of science degree shall have completed the following general education requirements:

Social Sciences (15 units)

- 9 units of Political Science and History: Pol Sc 301; Hist 304, 305
- 3 units of Economics: Ec 105 or Ec 201
- 3 units from Ec 105, 202, 413, 414; LMR 311, 312; Actg 121, 131; Geog 308; Hist 107; Pol Sc 401; Soc Sc 101; Bus 301

Natural Sciences (15 units)

3-12 units of Physical Science from PSc 101, 102, 103, 104, 206, 208, 209, 216; Phys 121, 122, 123, 131, 132, 133, 208; Chem 206, 321, 322, 323, 324, 325, 326
3-12 units of Life Science from Bact 221; Bio 101, 102, 103, 104, 110, 115, 116, 127, 128, 129, 145, 230; Bot 121, 122; Zoo 122, 131, 132, 238

Literature, Philosophy, or the Arts (9 units)

3 units of Literature: Eng 106
3-6 units of Literature or Philosophy from Eng 211, 212, 213, 311, 312, 313; Phil 201, 202, 204
Not more than 3 units from AE 121, 122, 124; AC 121, 129; MS 141, 142, 144; Weld 144, 145, 151, 152; Arch 244, 245; ME 121, 141, 151; Music or Art

Health and Physical Education (5 units)

3 units of Physical Education Activity; PE 141, 142, 143; PE 241, 242, 243
2 units of Health Education: PE 107

Oral and Written Expression (6 units)

6 units of English: Eng 104, 105

Psychology (3 units)

3 units of Psychology: Psy 206

Additional Units in General Education (15 units)

15 additional units in general education chosen from the above or from courses in the following list: Math 101, 102, 103, 106, 108, 109, 111, 112, 117, 121, 122; Sp 201; Eng 301; Actg 121; Psy 202; Art (6 units); Arch 141; Music (6 units); Senior Project

BACHELOR OF EDUCATION

Graduation requirements of 186 quarter units for the bachelor of education degree are listed later in this section with the requirements for the General Elementary Credential. See under Admissions for admission requirements to this program.

TWO-YEAR TECHNICAL CURRICULA

REQUIREMENTS FOR GRADUATION

All candidates for a technical certificate shall have completed 98 quarter units of courses approved by the department granting the certificate, shall have been in residence at least two quarters immediately preceding graduation, shall have earned not less than 32 quarter units in residence, and shall have earned a total number of grade points at least equal to twice the number of units attempted.

THE MASTER OF ARTS DEGREE

FIELDS OF CONCENTRATION

The California State Polytechnic College offers a master of arts degree in education with concentration in the fields listed below. The purpose of the graduate program is to serve teachers, or to prepare students for teaching. In making application for admission to a program leading to the master of arts degree the student indicates one of these fields of concentration, based on the undergraduate and teaching major:

1. Agriculture
2. Biological sciences
3. Education
4. Mathematics
5. Physical education
6. Physical sciences
7. Social sciences

ADMISSION TO GRADUATE STANDING

A graduate of this college or of another four-year institution having substantially the same requirements for the baccalaureate degree is eligible to apply to the Admissions Office for admission as a graduate student. Admission does not imply that the student is accepted as a candidate for the master's degree or for an institutional recommendation for a credential, but it does place him on graduate standing and authorizes him to take graduate work for which he is otherwise eligible.

EVALUATION FOR ADMISSION TO GRADUATE STANDING

For purposes of evaluation, applications must be accompanied by a copy of all official transcripts of previous college work. Such evaluation should be accomplished through correspondence prior to registration.

Applicants who wish to become candidates for the master's degree must, following admission to graduate standing, file an application for tentative candidacy for the degree. The form for this application may be obtained from the Co-ordinator of Graduate Studies. The Graduate Study Committee must have accepted the application for tentative candidacy for the master's degree before graduate work may be applied to degree requirements.

Admission to full graduate standing may be denied on the basis of: (1) undergraduate scholarship average below 2.0, (2) graduation from a nonaccredited college, (3) completion of a four-year program not considered comparable to the bachelor of science degree.

GRADUATE COURSES TAKEN BY UNDERGRADUATES

Undergraduates who are within 12 quarter units of graduation may petition to use up to 9 quarter units of work in 300, 400, or 500 series courses as graduate credit, when such courses are not required in order to receive the baccalaureate degree. These units may apply to graduate objectives, as appropriate, and may be used as part of the 45 unit requirement for the master's degree.

ADMISSION FROM A NONACCREDITED COLLEGE

Provisional admission to graduate study may be granted to one who holds a bachelor's degree from a nonaccredited college. Such a student will be eligible for full graduate standing when he has completed 12 units of upper division or graduate work with a grade point average of 3.0 and has removed such baccalaureate deficiencies as may have existed.

ADMISSION FOR THOSE NOT YET CLEARED FOR GRADUATE STANDING

Provisional graduate standing will be granted to those applicants for graduate standing who have not yet been cleared at the time the college opens and courses start. Such candidates enter graduate work at their own risk, since no candidate may use such work for the master's degree unless he is later placed on full graduate standing.

ADMISSION TO GRADUATE COURSES

To be admitted to graduate courses a student must have graduate standing (either provisional or full) and, unless he has an undergraduate major in the field, have permission of the instructor of the course. Candidates are referred to the specific course descriptions, since in some cases the permission of the department head or division dean may be specified.

ADMISSION TO CANDIDACY FOR THE MASTER OF ARTS DEGREE

To be admitted to candidacy for a master's degree a student shall have full graduate standing and shall have met the following criteria:

1. The candidate must possess an acceptable baccalaureate degree from an accredited college or have made up such deficiencies as may have existed. As indicated in the section on Admissions a copy of all transcripts of previous work must be filed in the Admissions Office.
2. The candidate shall have achieved a minimum grade point average of at least 2.5 in all undergraduate work and 3.0 in all courses taken subsequent to admission to graduate standing. A candidate with less than a 2.5 grade point average in undergraduate work may submit a request for special consideration by the Graduate Study Committee for admission to candidacy after he has completed in residence 12 units of graduate work with a grade point average of at least 3.0.
3. The candidate must possess a valid regular day school service California credential other than an emergency or a provisional credential, or complete by the time of receiving the master's degree the requirements for such a credential. Under certain circumstances the requirements for the credential may be waived:
 - a. For students who because of citizenship in a foreign country are ineligible for a California credential, but who are teachers or are preparing to teach in a foreign country.
 - b. For teachers with a minimum of one year of teaching experience who hold a license to teach in another state, or
 - c. For applicants preparing to teach in institutions not requiring teaching credentials provided that a minimum of 18 quarter units in professional education be included in their graduate year.
4. Applicants must complete 12 quarter units of work at the California State Polytechnic College with a minimum grade point average of 3.0 before being admitted to full candidacy. Applicants who fail to maintain this average will be warned and if the deficiency continues through a second quarter, will be rejected.
5. The applicant must receive the approval of the major department and of the Graduate Study Committee.
6. The candidate must meet such standards of character, emotional stability, and general competence as may be established by the Graduate Study Committee and evaluated by tests or other evidence.
7. The applicant must pass a health examination. The regular credential examination, if taken early enough and at this college, will satisfy this requirement.

GRADUATION REQUIREMENTS FOR THE MASTER OF ARTS DEGREE

1. There must be a satisfactory completion of the candidate's degree program as determined by the Graduate Study Committee and the candidate's committee.
2. The program of graduate work must be completed with a grade point average of 3.0. (Courses are acceptable for the master's degree program only if grades of "A," "B," or "C" have been received.)
3. There must be a total of 45 quarter units of work approved for graduate credit after the candidate has been accorded graduate standing. In general all 300, 400, or 500 series courses will be accepted for graduate credit except where 500 series courses are specifically required. The candidate should consult his adviser concerning exceptions.
 - a. At least 36 of the total 45 units must be taken at the California State Polytechnic College in residence. At least 18 of these units must be in 500 series (graduate) courses.
 - b. A minimum of 18 units must be in the candidate's area of concentration (major), including 3 units in curriculum and methods, and 9 additional units of graduate courses (500 series).
 - c. A minimum of 12 graduate units in Education is required, to be selected in conference with the student's adviser.

- d. The candidate's adviser and his committee will indicate such additional courses as may be required to complete the minimum program of 45 units and to meet the student's needs.
- e. Not more than 9 units of the graduate program shall be in directed teaching, extension courses, and transfer credit.
4. Candidates who are completing their credential pattern concurrently with the master's degree must complete the credential work before they will be granted the degree.
5. Comprehensive written and oral examinations are required of all candidates.
6. Candidates are required to complete one year of successful teaching before completing the work for the master's degree. Exception may be made to this requirement in the following situations: (1) a foreign student who cannot secure a credential; (2) students intending to teach on the college level, and who need the degree to enter the field; (3) other problem situations which may merit such an exception.

PREPARATION FOR ELEMENTARY AND SECONDARY SCHOOL TEACHING

CREDENTIALS OFFERED

California State Polytechnic College is accredited by the State Board of Education to recommend for the following credentials:

General Elementary Credential

General Secondary Credential with Majors in: Agriculture, Life Sciences and General Science, Mathematics, Physical Education, Physical Science and General Science, Social Sciences

Special Secondary Credential in Vocational Agriculture

Special Secondary Limited Credential in Agriculture

Special Secondary Credential in Physical Education

ADMISSION TO CANDIDACY FOR TEACHING CREDENTIAL

The selection of candidates to prepare for teaching is accomplished through a three-step process, involving teacher education committees. These committees determine policies for the teacher education program, review the qualifications of all candidates, and hear appeals where rejection of candidates has occurred. The three steps leading to the final completion of the credential are:

Step 1. Approval to enter the teacher education program

Step 2. Approval to participate in student teaching

Step 3. Final approval for a teaching credential

A student who enters the college with the intention of earning a teaching credential must be approved as a candidate for the particular credential which he is seeking. This procedure involves the filing of an application and completing certain steps as explained later in this section.

Admission to the college is not equivalent to being accepted for the teacher education program.

Requirements and procedures for qualifying for acceptance of candidacy may be secured in the Education Office. Prompt attention to the college's procedures is necessary since approval for candidacy is prerequisite to certain professional courses and student teaching.

Evaluation of the student's qualification is based on the following factors:

1. *Intelligence.* A satisfactory score on appropriate tests.
2. *Achievement.* Satisfactory performance in the areas of English usage, reading, spelling, arithmetic, science, handwriting, and the social studies as indicated by scores on achievement tests.
3. *Personal Adjustment.* Evidence of satisfactory personal adjustment, habits, interests and attitudes as shown by evaluation instruments, observations, interviews, and faculty ratings.
4. *Speech.* Demonstration of satisfactory speech quality and habits as indicated by a speech interview test or the satisfactory completion of a course in public speaking.

5. *Physical Fitness.* Evidence of good physical health must be shown before the time of student teaching.
6. *Scholarship.* Satisfactory scholarship on all work accepted by the college toward curriculum requirement must be in evidence before approval of candidacy for the teaching credential.
 - a. Elementary credential, grade point average of 2.25.
 - b. Secondary credential, grade point average of 2.50.
 - c. Graduate work, grade point average of 2.75.
7. *General Education Requirements.* All applicants must show satisfactory progress toward meeting specific and degree requirements in general education.
8. *Professional Aptitude.* Applicants must show evidence of ability and willingness to work with pupils, parents, and school officials.

TRANSFER STUDENTS

College transfers and graduate students are admitted to professional education courses on special arrangement after careful examination of the college transcripts. All students who enter the college with junior standing or above must expedite the completion of all procedures outlined in the foregoing paragraphs.

STUDENT TEACHING AND SUPERVISION

Before admission to student teaching, the committees recheck the student's record to ascertain continued standards in grade point average and completion of the essential program up to that point.

General Elementary Credential

Candidates for the General Elementary Credential will normally apply for admission to student teaching in the junior year after completion of certain prescribed professional education courses. Student teaching is done in the public schools on a full-time basis for a period of a quarter. The student teacher is expected to play an active part in all school activities that are considered part of the professional obligation of a certified teacher. No more than 15 quarter credits may be taken by a student during the time of student teaching.

General Secondary Credential and Special Secondary Credential in Physical Education

After the teacher candidate's application for student teaching has been approved, he is assigned to a public school for student teaching. Details may be obtained from the Education Department. Because all or a major portion of his credit for this quarter is for student teaching, he is to consider himself a staff member of the school to which he is assigned rather than a student on campus. It is, therefore, assumed that the student teacher will participate in as many activities as possible that are representative of the certified teacher's total professional obligation.

Co-ordination of the assignment of student teachers is the responsibility of the Co-ordinator of Student Teaching (Secondary). Supervising the student teacher and helping the supervising teacher are joint responsibilities of the Education Department and the subject matter departments, with the latter taking the major share of the responsibility.

The Special Secondary Credential in Physical Education authorizes service in both the elementary and secondary schools and student teaching assignments are made with this in mind.

Special Secondary Credential in Vocational Agriculture

Following the period of selection for candidates in vocational agriculture, the student teacher is enrolled for a full academic year of training on the graduate level. It is fully understood by student teachers that continuing evaluations will be made of their performance.

The fifth-year education program is divided into two parts: five months on campus completing methods and professional courses in education and emphasizing agricultural education, and five months in off-campus student teaching activities when the student teacher is assigned full-time to a school under the direction of a qualified supervising teacher.

The student teaching of the candidate consists of a period of observation and minor participation, followed by increasing responsibility in the actual teaching of classroom, shop, and field assignment. Full participation in the outside-of-class activity of the vocational agriculture teacher in supervising home projects, Future Farmers of America and Young Farmers activities, and adult class and community events is completed by the student teacher. Firsthand acquaintance with the utilization of community resources is achieved.

The fifth-year education program in vocational agriculture, including the off-campus student teaching, is under the direct supervision of the college agriculture teacher training staff.

Special Secondary Limited Credential in Agriculture

Candidates for this credential proceed through the same selection process as for other teacher candidates. Student teaching consists of assignment to a selected local student teaching center under a fully qualified supervising teacher for one-half day each day of the week for one quarter. Such assignments are usually made in the fall or spring quarter in the Los Angeles School System. Candidates for this credential are encouraged to meet the requirements for a General Secondary credential in order to be better qualified for employment.

The supervision of the student teaching for this credential is under the direction of the college agricultural teacher training staff.

SPECIFIC REQUIREMENTS FOR CREDENTIALS

Subject fields in which majors and minors are offered for the General Secondary Credential including the units of credit required for institutional recommendation are as follows:

Agriculture: Major, 90 units; minor, 33 units

English: Minor, 31 units

Life Sciences and General Science: Major, 72 units; minor, 36 units

Mathematics: Major, 56 units; minor, 30 units

Physical Education: Major, 60 units; minor, 30 units

Physical Science and General Science: Major, 70 units; minor, 37 units

Social Studies: Major, 57 units; minor, 30 units

For specific information concerning teaching majors and minors, consult the Education Department.

The General Elementary Credential

An applicant for a California State Polytechnic College recommendation for the General Elementary Credential may follow either of two programs, depending upon his qualifications.

A. Bachelor of Science Pattern

To qualify for recommendation under the Bachelor of Science pattern leading to the General Elementary Credential the candidate must:

- I. Qualify for admission as a freshman or a transfer student as specified in the catalog section on admissions.
- II. Submit an application for admission to the elementary teacher education program and be accepted as a candidate for the credential.
- III. Complete satisfactorily the major program for Elementary Education as described under the heading "Curriculum in Elementary Education."

B. Bachelor of Education Pattern

To qualify for the recommendation under the bachelor of education pattern leading to the General Elementary Credential the candidate must:

- I. Qualify in every respect for admission as a transfer student into the bachelor of education program as specified in the catalog section on admission.
- II. Submit an application for admission to the elementary teacher education program and be accepted by the teacher education committee.

- III. Complete satisfactorily a four-year college course leading to the bachelor of education degree, as specified in Title 5, California Administrative Code, Section 921, including a minimum of 48 units in Education as follows:
- | | |
|---|----|
| 1. Principles of Elementary Education or Elementary School Curriculum | 3 |
| 2. Child Growth and Development or Child Psychology | 3 |
| 3. Elementary School Methods | 6 |
| 4. Elementary School Directed Teaching | 12 |
| 5. Other professional Courses in Education | 24 |
- IV. Complete satisfactorily or present evidence of having completed a three-quarter unit course or its equivalent in the provisions and principles of the Constitution of the United States. (This requirement may be satisfied by examination.)

The General Secondary Credential

An applicant for a California State Polytechnic College recommendation for the General Secondary Credential must submit:

- I. An application for admission to the teacher education program.
- II. A four-year college course with a bachelor's degree, including:
 - A. Minimum of 14 quarter units in education as follows:

	<i>Quarter units</i>
1. Principles of Secondary Education	3
2. Educational Psychology	3
3. Human Growth and Development	3
4. Teaching Plans and Techniques	5

- B. Sixty quarter units of general education from those listed under the heading "Required General Education."
- III. A. Completion of a teaching major (54 quarter units minimum, of which at least 18 must be taken from junior, senior, and graduate courses) in the field of agriculture, biological sciences, physical education, mathematics, physical sciences, or social sciences; and completion of a teaching minor (minimum of 30 quarter units) in a field in which majors or minors are offered; or
- B. Completion of a major in a field not commonly taught in the secondary schools in California, such as engineering, and completion of two teaching minors (minimum of 30 units each) in fields in which teaching majors or minors are offered.
- IV. One full year of graduate work of not less than 36 quarter units, taken in residence after the student has been admitted to graduate standing at California State Polytechnic College. These units shall include:

	<i>Quarter units</i>
A. Student Teaching *	9
B. Audiovisual Aids (if not already taken)	3
C. Counseling and Guidance	3
D. Nine additional units selected from the following:	
1. Philosophy of Education	3
2. Teacher-Administrator Relationships	3
3. Evaluation in Secondary Education	3
4. Adult and Continuation Education in Agriculture	6
5. Educational Sociology	3
E. At least nine units in the major teaching field, including curriculum and methods in the major field.	
F. Other courses to complete minimum requirements in the teaching fields and for the graduate year.	

* An experimental program is being developed in which a few students, at the outset selected by major department heads in co-operation with the Education Department, will do all-day student teaching. These students must schedule Ed 540, Observation and Participation in Secondary Schools (five units) along with Student Teaching.

The Special Secondary Credential in Physical Education

An applicant for a California State Polytechnic College recommendation for the Special Secondary Credential in Physical Education must submit:

- I. An application for admission to the teacher education program.
- II. A bachelor's degree including:
 - A. A minimum of 63 quarter units in physical education.
 - B. Thirty-three quarter units of professional work in education, including:

	<i>Quarter units</i>
1. Principles of Secondary Education.....	3
2. Educational Psychology.....	3
3. Human Growth and Development.....	3
4. Teaching Plans and Techniques.....	5
5. Student Teaching in Physical Education.....	9
6. Curriculum and Methods in Health and Physical Education.....	3
7. Audiovisual Instruction—Methods and Materials.....	3
8. Electives	

- C. Other courses in education, health, and physical education, and electives approved by the adviser.

The Special Secondary Credential in Vocational Agriculture

An applicant for a California State Polytechnic College recommendation for a Special Secondary Credential in Vocational Agriculture must submit: †

- I. An application for admission to the teacher education program.
- II. Verification of three years of farm experience or its equivalent.
- III. A four-year college course with a bachelor's degree in agriculture including:

	<i>Minimum quarter units</i>
A. Plant Production.....	22½
B. Animal Husbandry.....	22½
C. Agricultural Mechanics.....	12
D. Agricultural Economics.....	9
E. Additional units in the above four fields.....	24
F. Eleven quarter units in education distributed as follows:	
1. Principles of Secondary Education.....	3
2. Educational Psychology.....	3
3. Teaching Plans and Techniques in Agriculture.....	5
G. Electives as approved by adviser	

- IV. Approval for cadet teaching must be granted by the college and State Bureau of Agricultural Education.

	<i>Minimum quarter units</i>
V. One year of graduate work including:	
On campus (1½ quarters)	
Audiovisual Instruction: Methods and Materials.....	3
Counseling and Guidance.....	3
Evaluation in Secondary Education.....	3
Methods in Teaching Farm Mechanics.....	5
Adult and Continuation Education in Agriculture.....	6
Problems in Supervising Farm Programs.....	5
	25
Off campus (1½ quarters)	
Student Teaching in Vocational Agriculture.....	12
Curriculum and Methods in Vocational Agriculture.....	5
Vocational Agriculture Department Organization.....	3
	20

† Students meeting the requirement for this credential may also be recommended for the General Secondary Credential by meeting general education requirements and the pattern for a teaching minor.

The Special Secondary Limited Credential in Agriculture

An applicant for a California State Polytechnic College recommendation for the Special Secondary Limited Credential in Agriculture must submit:

- I. An application for admission to the teacher education program.
- II. A Bachelor's Degree with not less than 36 quarter units in agriculture, including:
 - A. Twelve quarter units of work in each of the specified subjects to be named on the credential.* California State Polytechnic offers courses sufficient to meet these requirements in the fields of:
 - 1. Agricultural Services and Inspection
 - 2. Crops Production
 - 3. Dairy Husbandry and Manufacturing
 - 4. Fruit Production
 - 5. Farm Management
 - 6. Ornamental Horticulture
 - 7. Animal Husbandry
 - 8. Poultry Husbandry
 - 9. Agricultural Engineering (Mech)
 - 10. Soil Science
 - B. Twenty-six quarter units of professional work in education, including:

	<i>Quarter units</i>
1. Principles of Secondary Education.....	3
2. Educational Psychology.....	3
3. Teaching Plans and Techniques in Agriculture.....	5
4. Student Teaching in General Agriculture.....	9
5. Curriculum and Methods in General Agriculture.....	3
6. Elective in Education.....	

- C. Other courses in education, the major, or the minor fields as approved by the adviser or agricultural teacher trainer.

PLACEMENT OF TEACHERS

Every candidate for a credential must register with the Placement Office before or during the last quarter prior to completion of the credential requirements, but no later than March 1st. Registration includes the preparation of personal data, the submission of photos, and the listing of references for the confidential teacher placement folder which is sent by the Placement Office to school administrators who are considering the candidate for a teaching position. This folder is maintained permanently by the Placement Office for use whenever the teacher wishes to seek a new position. Co-operation of the candidate in keeping information in the folder up to date is necessary for most effective service.

ELEMENTARY CREDENTIAL CANDIDATES

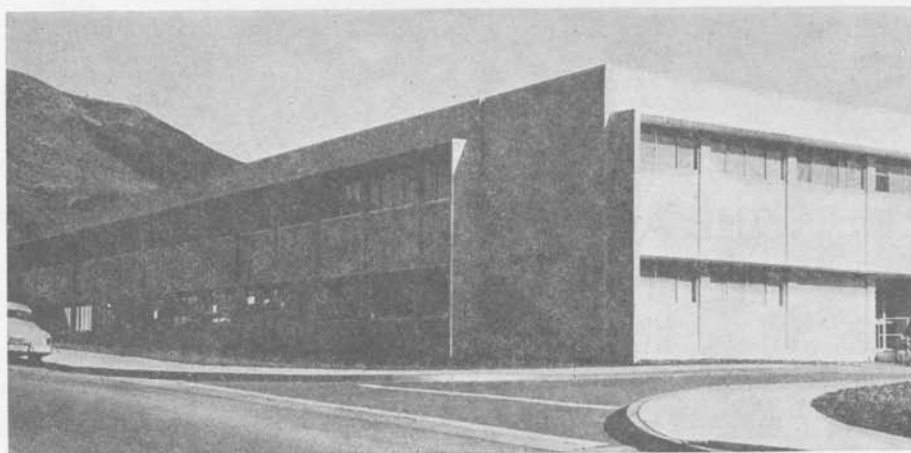
Candidates for the General Elementary Credential must make an initial visit to the Placement Office during the quarter when they are assigned to student teaching, normally in the third quarter of the junior year. In addition, these candidates must follow the placement procedure outlined above.

* Courses in Ornamental Horticulture are strongly recommended for candidates for this credential. In most instances, a minimum of 18 quarter units in such courses is a requirement for employment.

THE AGRICULTURAL DIVISION



Agricultural Engineering Unit



Agriculture Building



Beef Feeding Unit

THE AGRICULTURAL DIVISION

The Agricultural Division of the college prepares students in the field of agriculture with the main objective of giving them a full and broad understanding of basic factors involved in production, management, marketing, sales and services in the fields of related business, together with the necessary skills to make efficient operators and managers. While the division stresses production techniques and basic management to benefit to the fullest extent those returning to the farm or entering employment in agricultural fields upon leaving college, it also requires a core of basic sciences related to the production courses of the major and a substantial block of general education subjects necessary to prepare the student to take his rightful place in a democratic society.

Curricula in the Agricultural Division are arranged so that a student receives a maximum of production courses in his major field early in the program. This means that even if a student terminates his formal education at any time prior to his graduation, he has acquired a background of fundamentals and skills which makes him immediately employable in the occupational field of his choice. This system of taking production courses early in the curriculum makes it possible for the student to determine in a short time whether or not he is fitted for the curriculum he has selected. In addition, the early acquisition by the student of practical "doing" types of skills provides him with the incentive to learn the basic scientific explanations.

The Agricultural Division uses the California State Polytechnic College Foundation program of student projects to provide additional experience and practice to supplement regular production courses. This practical experience leads to the understanding of production and managerial problems that are important in the overall training of a student in agriculture.

Admission to the Agricultural Division requires high school graduation, with satisfactory grades, but does not require a specific pattern of courses taken in high school. However, a student who anticipates enrolling in the Agricultural Division of the college will find a strong background in mathematics and physical and biological sciences advantageous.

Curricula are offered in the following majors in the Agricultural Division at San Luis Obispo: agricultural business management, agricultural engineering, mechanized agriculture, animal husbandry, field crops production, truck crops production, fruit production, dairy husbandry, dairy manufacturing, farm management, food processing, ornamental horticulture, poultry husbandry, and soil sciences. The Veterinary Science Department offers courses which support the animal production majors.

The courses offered in each agricultural curriculum may be grouped into four areas as follows:

1. Major agriculture—The required sequence of courses offered by the department in which the student expects to graduate. These courses constitute the core instruction leading to specific preparation for the production field of the student's choice.
2. Related agriculture—Supporting courses in agriculture selected from closely allied fields. They supplement the major agriculture block in (1).
3. Science and mathematics—Courses selected from scientific fields which provide basic biological, physical and social science, and mathematical background and support to the agricultural block in (1) and (2) above.
4. Humanistic-social—Courses which provide cultural background for intelligent living in a complex world society.

The following chart illustrates the typical distribution of required units in the four areas indicating emphasis and balance through the four years. The entire program totals 198 quarter units including elective units which vary depending

upon the student's major. Electives in the freshman and sophomore years are frequently chosen from agricultural courses.

	Freshman	Sophomore	Junior	Senior
Major agriculture	12	12	12	6
Related agriculture	9	18	12	11
Science and mathematics	18	7	15	3
Humanistic-social	10½	8½	6	12

TECHNICAL CURRICULA IN AGRICULTURE

In keeping with the collegewide policy of offering major courses which lead to occupational competency from the beginning of the first year of the four-year sequence, it is essential to provide opportunity for students who may find it impossible to complete four-year programs, to obtain as early as possible a concentration of production courses with a minimum of supporting material.

A technical two-year curriculum is available in each of the following agricultural departments: agricultural business management, agricultural engineering, animal husbandry, dairy husbandry and manufacturing, farm management, field, fruit, and truck crops, food processing, ornamental horticulture, poultry husbandry, and soil science. These curricula include a smaller number of units of related and general education courses than are included in the degree programs. This permits the student to acquire the basic skills in the major of his selection and a greater freedom of choice of subjects in agricultural production courses. A student not wishing to enroll in a degree curriculum will find that a two-year curriculum offers a maximum opportunity to select courses which will greatly assist him in farming after graduation. For admission requirements see "Requirements for Admission as an Undergraduate Student."

Upon completion of 98 selected units, a student may receive a technical certificate in the field of his major.

The following is the two-year technical curriculum for animal husbandry. Other majors follow a similar pattern. Detailed curriculum information is available from the Dean of the Agricultural Division and department heads.

Freshman	F	W	S
Feeds and Feeding (AH 101, 102)	2	3	
Market Beef Production (AH 121)	4		
Elements of Swine Production (AH 122)		4	
Elements of Sheep Production (AH 123)			4
Agricultural Mechanics (AE 121, 122)		2	2
* Language Communication (Eng 100)	3		
Agricultural Math (Math 102)	3		
Agricultural Project Records (FM 100)		1	
Physical Education (PE 141, 142, 143)	½	½	½
* Agricultural Biology (Bio 100)		3	
Soils (SS 121)			4
Electives	4	3	6
	16½	16½	16½

* These courses are taken in place of the required courses in the same subject matter fields listed in the degree curricula in the first two years and may not be used as credit toward a degree. VS 100 is replaced by CP 100 for plant majors.

All two-year technical students are required to take Math 102. Students in Agricultural Engineering are required to take Math 102 and 103.

Sophomore	F	W	S
Sheep Husbandry (AH 221).....	4		
Commercial Beef Production (AH 222).....		4	
Market Swine (AH 223).....			4
Farm Machinery (AE 221, 222).....		3	2
* Prin. of Livestock Hygiene and San. (VS 100).....		5	
Forage Crops (CP 123).....			4
* Farm Records and Farm Mgt. Prac. (FM 101B).....	4		
Health Education (PE 107).....			2
Sports Education (PE 241, 242, 243).....	½	½	½
* U.S. Hist. and Government (Pol Sc 100).....		3	
Farm Tractors (AE 241).....	2		
Electives	6		4
	16½	15½	16½

A student enrolled in the technical program may transfer to a degree program by completing courses offered in the specific four-year degree curriculum.

HORSESHOEING

A short 12-week course in horseshoeing is offered in the spring and fall quarters. Those interested in this special course should write to the Dean of Agriculture for details.

- * These courses are taken in place of the required courses in the same subject matter fields listed in the degree curricula in the first two years and may not be used as credit toward a degree. VS 100 is replaced by CP 100 for plant majors.
 All two-year technical students are required to take Math 102. Students in Agricultural Engineering are required to take Math 102 and 103.

AGRICULTURAL BUSINESS MANAGEMENT DEPARTMENT

Department Head, Daniel C. Chase

The agricultural business management curriculum is designed to prepare students for employment in agricultural businesses and government agencies serving the farmer.

In contrast to the self-sufficient farm owner of 100 years ago, the modern farmer is primarily a specialist who confines his operations largely to producing crops and livestock. He depends upon farm related businesses for fertilizer, insecticides, machinery and equipment, commercial feeds, capital, and other production supplies. At the same time, he relies heavily on off farm businesses for processing and merchandising his products. He uses more commercial and public agency advisory and informational services.

As a result of such trends excellent career opportunities are available for those who are trained in the business principles and procedures necessary for organizing, managing and representing the expanding farm related businesses and industries.

While the Agricultural Business Management curriculum is based upon a firm foundation in production agriculture, the program brings together both the agricultural and business training required for success in farm related business careers.

Students majoring in agricultural business management have the opportunity of selecting electives to obtain a broad background in agriculture or technical skills in specialized agricultural fields according to their interests and needs.

CURRICULUM IN AGRICULTURAL BUSINESS MANAGEMENT

Freshman	F	W	S
Introduction to Agricultural Business Management (ABM 101)	3		
Agricultural Marketing Programs in California (ABM 103)			3
Agricultural Mathematics (Math 102, 103)		3	3
Agricultural Mechanics (AE 121, 122)	2	2	
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Health Education (PE 107)			2
General Botany (Bot 121)	4		
General Zoology (Zoo 131)		4	
* Electives	4	4	5
	16½	16½	16½
Sophomore			
Agricultural Business Organization (ABM 201)	3		
Agricultural Business Sales and Service (ABM 202)		3	
Basic Accounting (Actg 131, 132)		3	3
Principles of Economics (Ec 201, 202)	3	3	
Agricultural Marketing (FM 304)			3
Public Speaking (Sp 201)	2		
Literature	3		
Report Writing (Eng 301)			3
Family Relations (Psy 206)			3
Sports Education (PE 241, 242, 243)	½	½	½
* Electives	5	7	4
	16½	16½	16½

* At least 36 units shall be chosen with the approval of the adviser from other fields of agriculture. Twelve of the 36 units shall be in any one agricultural major.

	F	W	S
Junior			
Agricultural Business Credit and Finance (ABM 303)			3
Agricultural Property Management and Sales (ABM 302)		3	
Agricultural Business Sales Management (ABM 304)	3		
Agricultural Co-operative Management (ABM 322)		3	
Advanced Public Speaking (Sp 303)			2
General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
American Government (Pol Sc 301)	3		
Descriptive Statistics (Math 211)	3		
* Electives	4	7	7
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	17	17	16
Senior (Major courses not offered 1960-61)			
Advanced Agricultural Business Management (ABM 401)	3		
Agricultural Labor Relations and Personnel Management (ABM 402)		3	
Agricultural Business Management and Government Policy (ABM 403)			3
Business Law (Bus 301)	3		
Agricultural Business Communication (ABM 422)		4	
Field Studies in Agricultural Business Management (ABM 443)			2
Senior Project (ABM 461, 462)	2	2	
Undergraduate Seminar (ABM 463)			2
Agricultural Biochemistry (Chem 328)		4	
Growth of American Democracy (Hist 304)	3		
The U.S. in World Affairs (Hist 305)			3
Electives	5	4	6
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	16	17	16

**DESCRIPTIONS OF COURSES IN AGRICULTURAL
BUSINESS MANAGEMENT**

ABM 101 Introduction to Agricultural Business Management (3)

Changes occurring in agriculture, careers in commercial agricultural businesses and public agricultural service agencies, development and growth of farm related industries, kinds of agricultural businesses, operational characteristics of commercial agricultural industries. 3 lectures.

ABM 103 Agricultural Marketing Programs in California (3)

California marketing orders and agreements, integration and contract farming; their implications and effects on farming and marketing institutions. 3 lectures.

ABM 201 Agricultural Business Organization (3)

Study of farm technological advance, marketing, consumer demand and other such factors as determinants of growth, types and forms of agricultural business organization. Farm and farm related businesses considered from standpoint of primary functions, services and problems including investment, mortgage and working capital requirements, credit and collections, business with banks, failures and reorganization. Emphasis on California farm related industries. 3 lectures.

ABM 202 Agricultural Business Sales and Service (3)

Study of the farm organization including type of farming and farm enterprises. Estimating investment, production rates and costs, farm earnings and other such business factors involved in determining farm production needs and in developing sales programs for the farm operation. Application of successful selling principles and practices in providing farm operators with agricultural materials, supplies and services. Consideration given to sales and service for farm related businesses and nonagricultural customers. 3 lectures.

* At least 36 units shall be chosen with the approval of the adviser from other fields of agriculture. Twelve of the 36 units shall be in any one agricultural major.

ABM 230 General Agricultural Business Management (3)

Agricultural business growth, opportunities, functions and services, organization and operation. Emphasis on California agricultural businesses and industries. A general course for non-Agricultural Business Management majors. 3 lectures.

ABM 301 Agriculture-Consumer Relationships (2)

Study of basic facts, public opinion and ways of developing greater understanding of agriculture, its nature, characteristics, problems and relationship to nonfarm persons. Consumer education programs and procedures. 2 lectures.

ABM 302 Agricultural Property Management and Sales (3)

Land economic, legal, and real estate principles in the investment, development, management, leasing, mortgaging and transferring of agricultural properties. 3 lectures.

ABM 303 Agricultural Business Credit and Finance (3)

Study of agricultural business investment, financial and credit requirements as determined by production of farms and farm area served. Emphasis on financial principles, procedures and problems in establishing and managing the agricultural business and serving farm and farm related businesses. 3 lectures. Prerequisite: Ec 202

ABM 304 Agricultural Business Sales Management (3)

Organizing and co-ordinating agricultural machinery, crop, livestock, poultry, fertilizer, insecticide and other farm and farm related sales and service programs. Includes study of planning, policies, pricing, sales control records, training salesmen, advertising, supervising salesmen, and evaluating sales performance as related to needs and demands of farm and farm related agricultural businesses. 3 lectures. Prerequisite: ABM 202

ABM 306 Government Agricultural Service Agencies (2)

Study of programs and services performed by government agencies on behalf of farm and off-farm agricultural industries. Designed for students who may use services of, who may advise others of such services, or who may seek a career in such agencies. 2 lectures.

ABM 322 Agricultural Co-operative Management (3)

Purpose, types and organization of co-operatives. Emphasis on California agricultural co-operatives, their characteristics, operation and problems. 2 lectures, 1 two-hour laboratory. Prerequisite: Ec 202

ABM 400 Problems in Agricultural Business Management (1-3)

Special problems as planned and prepared by the student. Research, studies or surveys resulting in preparation of reports and materials of value to the student. Prerequisite: Permission of departmental head. Total credit limited to 3 units.

ABM 401 Advanced Agricultural Business Management (3)

Study of agricultural business management with primary emphasis on policy formation, financial, fiscal and material resources management. Also, agricultural business insurance, taxation, records and office management. Application of principles and case studies of specific farm related businesses and industries. Designed especially for students who are planning careers in agricultural business management. 3 lectures. Prerequisite: ABM 201

ABM 402 Agricultural Labor Relations and Personnel Management (3)

Study of agricultural labor trends and problems as determined by changes occurring in farming and farm related industries. Labor-management relations in agriculture; principles and procedures in organizing and managing the agricultural business personnel program. 3 lectures. Prerequisite: Ec 202

ABM 403 Agricultural Business Management and Government Policy (3)

Agricultural policy, objectives and formulation, resource allocation and production adjustments; government subsidies, acreage controls, storage, crop insurance, forward prices, consumer subsidies, economic, social and political influences. 3 lectures.

ABM 412 Wholesaling and Retailing Agricultural Commodities (3)

The field of wholesaling and retailing agricultural commodities including auctions, commission houses, commission merchants, food brokers, carlot receivers, jobbers, shippers and supply houses. Principles of buying and selling; terms and trade customs. 3 lectures.

ABM 422 Agricultural Business Communication (4)

Principles, methods and materials for communicating ideas, information and skills to management, staff members, stockholders, customers and general public. Includes organization and presentation of surveys, studies, correspondence, reports and publications. 3 lectures, 1 two-hour laboratory.

ABM 443 Field Studies in Agricultural Business Management (2)

Study of California commercial agricultural businesses through visitation to selected industries. Organization, operation, services and problems considered. One week in field and one week laboratory analysis and evaluation of data obtained on the trip. Prerequisite: Senior standing or permission of instructor.

ABM 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.

ABM 463 Undergraduate Seminar (2)

Student presentation and leadership; group participation under faculty supervision on new agricultural business developments. 2 lectures.

ABM 590 Graduate Seminar in Agricultural Business Management (1-3)

Current trends and characteristics of agricultural business and industry as related to the teaching of vocational agriculture. Vo-Ag graduate opportunities, problems in becoming established in farm related businesses. 1 to 3 lecture-discussions.

AGRICULTURAL ENGINEERING DEPARTMENT

Department Head, James F. Merson

Ralph O. Bille	E. Louis LeBay	Clive O. Remund
James H. Carrington	Willard H. Loper	Glenn W. Rich
Raymond E. Garza	Robert M. Matheny	Glenn W. Salo
E. Douglas Gerard	Vernon H. Meacham	Leo Sankoff
William M. Kirkpatrick	John L. Merriam	

A student majoring in this department may follow one of two curricula:

1. The Agricultural Engineering curriculum prepares students for engineering positions with farm machinery and equipment companies, manufacturers and distributors of irrigation equipment, government agencies such as the Soil Conservation Service and other positions requiring technical training in Agricultural Engineering.

2. The Mechanized Agriculture curriculum gives the student broad agricultural training with emphasis on the applied mechanical phases of agriculture. This curriculum is intended for the student who plans to own or manage a farm, teach vocational agriculture with emphasis on farm mechanics, or do sales and service work in the farm machinery and equipment field.

This department also gives training in the mechanical and engineering phases of agriculture to students majoring in other departments of the Agricultural Division.

Two new buildings containing eight shops and laboratories and two classrooms, together with a large modern farm machinery and equipment building provide excellent facilities. A wide variety of makes, models, and types of tractors and farm machinery is available for class use and students are provided with ample opportunity for the application of mechanical and engineering know-how to practical production problems in using the entire 2,850-acre college farm as a laboratory.

Students interested in the two-year technical certificate should refer to the introductory statement for the Agricultural Division which describes this program. Detailed curriculum information is available from the department head.

CURRICULUM IN AGRICULTURAL ENGINEERING

Freshman	F	W	S
Introduction to Agricultural Engineering (AE 100).....	1		
Agricultural Mechanics (AE 128).....	2		
Farm Tractors (AE 241).....	2		
Engineering Drafting (ME 151, 152, 153).....	1	1	1
Machine Shop (MS 141, 142, 144).....	1	1	1
Arc Welding (Weld 154, 155, 156).....	1	1	1
Soils (SS 121).....	4		
Animal Production		4	
Plant Production			4
Mathematics for Engineers (Math 117).....		5	
Analytic Geometry and Calculus (Math 118).....			5
Language Communication (Eng 104, 105, 106).....	3	3	3
Health Education (PE 107).....		2	
Physical Education (PE 141, 142, 143).....	½	½	½
* Elective			3
	15½	17½	18½

* 12 units of electives shall be selected from courses in the Agricultural Division.

	F	W	S
Sophomore			
Engineering Surveying (AE 237, 238).....	2	2	
Farm Machinery (AE 221, 223).....	3		2
Farm Structures (AE 231).....	2		
Principles of Irrigation (AE 236).....			4
Soil Conservation (SS 202).....		3	
Public Speaking (Sp 201).....		2	
Analytic Geometry and Calculus (Math 201, 202, 203).....	3	3	3
Physics (Phys 131, 132, 133).....	4	4	4
Principles of Economics (Ec 201, 202).....	3	3	
Sports Education (PE 241, 242, 243).....	½	½	½
* Elective			3
	17½	17½	16½
Junior			
Hydraulics (AE 312).....	4		
‡ Hydrology (AE 315).....		3	
Surface Irrigation Systems (AE 331).....	2		
Farm Power (AE 334, 335, 336).....	2	2	3
Rural Electrification (AE 324, 325).....		3	3
Engineering Statics, Dynamics (Phys 201, 202).....	3	3	
Strength of Materials (ME 202, 203) or (Arch 205, 206).....		3	3
Applied Biology (Bio 110).....	3		
Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
* Electives			4
	18	18	17
Senior			
Senior Project (AE 461, 462).....	2	2	
Undergraduate Seminar (AE 463).....			2
Farm Structures (AE 433).....	3		
‡ Irrigation Engineering (AE 414).....		3	
‡ Conservation Engineering (AE 437).....			3
Basic Accounting (Actg 131, 132).....	3	3	
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U.S. in World Affairs (Hist 305).....			3
Literature.....	3		
Family Relations (Psy 206).....			3
† Economic Electives			3
* Electives	4	7	4
	18	18	18

* 12 units of electives shall be selected from courses in the Agricultural Division.

† To be selected from Bus 301, LMR 311, 312, FM 310, 322.

‡ Students may substitute the following courses: AE 321, AE 421, AE 422.

CURRICULUM IN MECHANIZED AGRICULTURE

	F	W	S
Freshman			
Introduction to Agricultural Engineering (AE 100).....	1		
Agricultural Mechanics (AE 128).....		2	
Farm Construction and Maintenance (AE 129).....			2
Farm Tractors (AE 241).....			2
Agricultural Mathematics (Math 102, 103, 114).....	3	3	3
Language Communication (Eng 104, 105, 106).....	3	3	3
Engineering Drafting (ME 151, 152).....	1	1	
Machine Shop (MS 141, 142, 144).....	1	1	1
Arc Welding (Weld 154, 155, 156).....	1	1	1
Soils (SS 121).....	4		
Animal Production.....		4	
Plant Production.....			4
Health Education (PE 107).....	2		
Physical Education (PE 141, 142, 143).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/>	<hr/>	<hr/>
	16 $\frac{1}{2}$	15 $\frac{1}{2}$	16 $\frac{1}{2}$
Sophomore			
Engineering Surveying (AE 237, 238).....	2	2	
Farm Machinery (AE 221, 223).....	3		2
Farm Structures (AE 231, 232).....	2		2
Irrigation (AE 240).....			4
Public Speaking (Sp 201).....		2	
Welding (Weld 151, 152, 254).....	1	1	1
General Botany (Bot 121).....		4	
Agricultural Mathematics (Math 115).....	3		
Physics (Phys 121, 122, 123).....	4	4	4
Sports Education (PE 241, 242, 243).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
* Electives.....	2	3	3
	<hr/>	<hr/>	<hr/>
	17 $\frac{1}{2}$	16 $\frac{1}{2}$	16 $\frac{1}{2}$
Junior			
Farm Engines (AE 220).....	3		
Rural Electrification (AE 324, 325).....		3	3
Farm Equipment Projects (AE 344).....	3		
Farm Power (AE 335).....		2	
Report Writing (Eng 301).....			3
Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Soil Conservation (SS 202).....		3	
Principles of Economics (Ec 201, 202).....	3	3	
* Electives.....	3	2	7
	<hr/>	<hr/>	<hr/>
	16	17	17
Senior			
Senior Project (AE 461, 462).....	2	2	
Undergraduate Seminar (AE 463).....			2
Farm Equipment Management (AE 321).....			4
Family Relations (Psy 206).....			3
Literature.....	3		
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U.S. in World Affairs (Hist 305).....			3
Farm Records (FM 321).....	3		
Farm Management (FM 322).....		4	
Farm Credit (FM 310).....			3
* Electives.....	5	7	2
	<hr/>	<hr/>	<hr/>
	16	16	17

* 18 units of electives shall be selected from courses in the Agricultural Division.

DESCRIPTIONS OF COURSES IN AGRICULTURAL ENGINEERING**AE 100 Introduction to Agricultural Engineering (1)**

Agricultural Engineering as a profession. Technical areas and job opportunities. Departmental orientation. 1 lecture.

AE 121 Agricultural Mechanics (2)

Sketching, interpreting plans and blueprints, selection and grades of lumber, selection and use of tools and hardware, pipe fitting, plumbing and farm water supply, painting and wood preservatives, concrete, and repair of livestock equipment. For majors other than Agricultural Engineering. 1 lecture, 1 laboratory.

AE 122 Agricultural Mechanics (2)

Selection and evaluation of production equipment associated with the student's major. Study of specifications and plans. Construction of production equipment; fences, gates and mobile equipment. Students register for this course by sections according to their specific majors. 1 lecture, 1 laboratory. Prerequisite: AE 121

AE 128 Agricultural Mechanics (2)

Specifications, plans, and construction of general agricultural production equipment. Pipe fitting, plumbing, and farm water supply. Concrete. Selection and grades of lumber, bills of material. Painting and wood preservatives. 1 lecture, 1 laboratory.

AE 129 Farm Construction and Maintenance (2)

Maintenance, construction, modification, and repair of farm buildings and equipment. Cost estimates based on materials and methods of repair. Students will register for this course by sections according to their major. 1 lecture, 1 laboratory. Prerequisite: AE 122 or 128

AE 131 Agricultural Surveying (2)

Introduction to basic surveying techniques as applied to agriculture. Keeping field notes; land measurement by tape; differential and profile leveling; contour and plane table mapping. 1 lecture, 1 laboratory. Prerequisite: Math 102

AE 133 Farm Drafting (2)

Freehand lettering, dimensioning, use of drafting equipment. Orthographic projections. Isometric and cross section drawings. Exploded sections. Freehand sketching. 1 lecture, 1 laboratory.

AE 134 Farm Electrification (3)

A general course in the fundamentals of electric wiring and code regulations; selection, installation and maintenance of electric motors as used in agriculture. For Agricultural Division students other than degree majors in Agricultural Engineering. 2 lectures, 1 laboratory. Prerequisite: Math 103

AE 220 Farm Engines (3)

Fundamental principles of gasoline and diesel engines and their accessories. Tuneup, adjustment, minor overhaul, and servicing. Fuels and lubricants. For Agricultural Division students other than Agricultural Engineering. 2 lectures, 1 laboratory. Prerequisite: AE 241

AE 221 Farm Machinery (3)

Basic principles of machines. Materials of construction. Lubrication and maintenance. Selection, operation, and adjustment of primary and secondary tillage equipment. Seeding, planting, and fertilizing equipment. 2 lectures, 1 laboratory. Prerequisite: AE 121 or 128

AE 222 Farm Machinery (2)

Selection, operation, and adjustment of spraying and dusting equipment. Hay, forage, grain, cotton, and miscellaneous harvesting equipment. 1 lecture, 1 laboratory. Prerequisite: AE 221

AE 223 Farm Machinery (2)

Assembly of new equipment, quality factors, versatility factors. Hydraulic systems. Selection, operation, adjustment of haying, harvesting, spraying and dusting equipment. For students majoring in Agricultural Engineering and Mechanized Agriculture. 1 lecture, 1 laboratory. Prerequisite: AE 221

AE 230 Farm Blacksmithing (2)

Fundamentals of forging and its application to agriculture. New and repair work involving bending, shaping, hardening, tempering, and annealing. 1 lecture, 1 laboratory.

AE 231 Farm Structures (2)

Development of practical skills in farm carpentry and construction. Selection of lumber and materials. Concrete work. Foundation. Legal requirements. Farm buildings repaired or constructed during laboratory periods. 1 lecture, 1 laboratory. Prerequisite: AE 122 or AE 128

AE 232 Farm Structures (2)

Development of practical skills in carpentry and construction. Basic requirements of farm buildings. Selection of materials and equipment for farm buildings. Farm buildings repaired, constructed or modified during laboratory periods. 1 lecture, 1 laboratory. Prerequisite: AE 231

AE 236 Principles of Irrigation (4)

Plant-soil-water relationships. Measurement of water. Methods of application of irrigation water. Drainage. Water organizations and water law. For Agricultural Engineers. 3 lectures, 1 laboratory. Prerequisite: Math 118, AE 237

AE 237 Engineering Surveying (2)

Selection, care, testing, and use of tapes and levels. Keeping and calculating field notes; land measurement by tape; practice in differential, profile, and contour leveling, and the plotting of profiles. Earth volume by the borrow pit method. 1 lecture, 1 field period. Prerequisites: ME 151, Math 114 or 117

AE 238 Engineering Surveying (2)

Care and use of transit; measurement of horizontal and vertical angles, distance by stadia, straight line and distance by offset, area by tape and transit traverse and topographic mapping. 1 lecture, 1 field period. Prerequisite: AE 237

AE 239 Engineering Surveying (2)

Parabolic curves, circular curves, cross sectioning, setting slope stakes, measuring earth volume, cuts and fills as applied to road beds, public land surveys, photogrammetry. 1 lecture, 1 field period. Prerequisite: AE 238

AE 240 Irrigation (4)

Fundamental principles and practices of irrigation. Soil-moisture relationships, water measurement, methods of irrigation, crop requirements, farm irrigation structures, pumps and pumping, and problems of the irrigation farmer. 3 lectures, 1 laboratory. Prerequisites: AE 131 or AE 237, SS 121

AE 241 Farm Tractors (2)

Field and shop practice in the operation, service, and adjustment of the modern farm tractor; including both wheel and track types with gasoline and diesel engines. 1 lecture, 1 laboratory.

AE 312 Hydraulics (4)

Static and dynamic characteristics of liquids in open and closed channels. 3 lectures, 1 laboratory. Prerequisite: Phys 132, Math 202

AE 315 Hydrology (3)

Collection, organization, and use of precipitation, evaporation, and runoff data. Principles of flood routing, stream flow, and ground water conservation. The hydrograph. 3 lectures. Prerequisite: SS 121

AE 321 Farm Equipment Industry Management (4)

Management and operation of the farm equipment industry. Study of sales, service, parts and product education policies on manufacturer, distributor and dealer level. 2 lectures, 2 laboratories. Prerequisite: AE 223

AE 324 Rural Electrification (3)

Principles of wiring farm buildings and farmstead wiring layout. Materials, code regulations, electrical measurements and rates applicable to various farm uses. Power distribution and application of DC and AC circuit fundamentals to agricultural situations. 2 lectures, 1 laboratory. Prerequisite: Physics 123 or 133

AE 325 Rural Electrification (3)

Single-phase and three-phase electric motors and protective devices for agricultural use. Identification, selection, installation, and maintenance of various types. Operating characteristics and drives. Applications of electronic controls to agriculture. 2 lectures, 1 laboratory. Prerequisite: AE 324

AE 331 Surface Irrigation Systems (2)

The design of surface irrigation layouts involving land grading calculations for most desirable grades and minimum soil moving consistent with soil conditions and costs. 1 lecture, 1 laboratory. Prerequisite: AE 236

AE 334 Farm Power (2)

Fundamental principles of the gasoline engine and its application to agriculture. Troubleshooting, servicing, tuneup, and major overhaul of gasoline engines and their accessories. 1 lecture, 1 laboratory. Prerequisites: MS 142, AE 241

AE 335 Farm Power (2)

Fundamental principles of the diesel engine and its application to agriculture. Troubleshooting, servicing, tuneup, and major overhaul of high-speed diesel engines and their accessories. Liquefied petroleum equipment. Additional practice on gasoline engines. 1 lecture, 1 laboratory. Prerequisites: AE 220 or 334, or ME 103

AE 336 Farm Power (3)

Thermodynamic principles as applied to internal combustion engines. Theory of combustion. Fuels and lubricants. Power and its measurement. Factors affecting horsepower output and engine efficiency. Power transmission. Automotive electrical systems. 2 lectures, 1 laboratory. Prerequisites: AE 335, Phys 133

AE 344 Farm Equipment Projects (3)

Principles, materials and construction of specialized agricultural equipment. 1 lecture, 2 laboratories. Prerequisite: AE 122 or 128

AE 414 Irrigation Engineering (3)

Problems of irrigation water distribution and supply found in irrigation districts or large farms. The influence of soils and crops in determining water deliveries. Rates of water use, open and closed conduits, pumps, reservoirs, costs and economics of efficient water delivery and use. 2 lectures, 1 supervised computation period. Prerequisites: SS 202, AE 312, AE 331

AE 421 Equipment Engineering (3)

Design and construction of specialized farm equipment. 1 lecture, 2 laboratories. Prerequisites: ME 153, MS 143, Weld 156, Phys 202, ME 203

AE 422 Agricultural Machine Design (3)

Analysis and use of fundamental machine elements and their application to agricultural machinery. 2 lectures, 1 laboratory. Prerequisites: AE 221, 223, 421

AE 433 Farm Structures (3)

Farmstead planning and layout. Engineering factors to be considered in the design and construction of farm structures. Stresses and loads, ventilation, strength characteristics and thermal qualities of building materials. Reinforced concrete. 2 lectures, 1 laboratory. Prerequisites: AE 231, ME 203 or Arch 206

AE 435 Drainage (3)

The engineering factors in the design of drainage system for agricultural and urban areas. 2 lectures, 1 laboratory. Prerequisite: AE 312

AE 436 Advanced Hydrology (3)

The determination of design hydrographs for storage reservoirs, flood protection reservoirs, and channel improvement by the Rational, Unit Hydrograph, and Regional Flood Study methods. 2 lectures, 1 laboratory. Prerequisite: AE 315

AE 437 Conservation Engineering (3)

Principles of soil and water conservation including the fundamentals of soil mechanics used in the design of compacted earth fills. Practice in the design of important types of soil and water conservation structures. 2 lectures, 1 laboratory. Prerequisites: SS 202, AE 312, AE 315

AE 443 Internal Combustion Engine Diagnosis (2)

The use of modern engine testing equipment in the evaluation and analysis of performance variables such as: detonation, pre-ignition, air-fuel ratio, combustion efficiency and fuel economy. 1 lecture, 1 laboratory. Prerequisite: AE 335, senior standing

AE 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.

AE 463 Undergraduate Seminar (2)

Group discussion of current agricultural engineering topics presented by individual members of the class. Topics or papers presented by guest speakers. Placement opportunities and requirements. 2 lectures.

AE 581 Graduate Seminar in Agricultural Engineering (3)

Group study of current problems and recent developments in the field. Relationship of Agricultural Engineering to the teaching of vocational agriculture. 3 lectures.

ANIMAL HUSBANDRY DEPARTMENT

Department Head, Lyman L. Bennion

Russell Anderson	Spelman Collins	Ralph Hoover
Richard Birkett	James R. Flanagan	Richard Johnson
Emmett Bloom	Frank W. Fox, Jr.	Thomas Meyer
Thomas P. Brannum	William Gibford	W. Lamond Woods
LaVern Bucy	Roy M. Harris	

The objective of the Animal Husbandry Department is to train men for the occupation of farming where beef cattle, sheep, and swine enterprises are an important part of the industry. The majority of graduates from the department are engaged in the livestock and farming business or are employed as ranch foremen or managers.

Livestock feeding yards, feed mills, stockyard companies, meat packers, commission firms, and other organizations servicing the livestock industry are sources of employment for graduates. Other employment fields include agricultural teaching, agricultural extension work, and agricultural research.

Further aims and objectives of the Animal Husbandry Department are to give students practical training in livestock farming and range management. The department maintains herds of three breeds of beef cattle, four breeds of sheep, three breeds of swine, and Thoroughbred and quarter horses. These are used for laboratory and field study of management, feeding, breeding, and marketing.

Students are encouraged to carry on a project program of feeding, management, and marketing livestock through facilities furnished by the California State Polytechnic College Foundation. Approximately 900 hogs, 400 beef cattle, and 800 sheep are fed and marketed by students each year. An abattoir provides facilities for training in slaughtering of meat animals and cutting, curing, and grading of meats.

Students interested in the two-year technical certificates should refer to the introductory statement for the Agricultural Division which describes this program. Detailed curriculum information is available from the department head.

CURRICULUM IN ANIMAL HUSBANDRY

Freshman	F	W	S
Feeds and Feeding (AH 101, 102).....	2	3	
Market Beef Production (AH 121).....	4		
Elements of Swine Production (AH 122).....		4	
Elements of Sheep Production (AH 123).....			4
Agricultural Mechanics (AE 121, 122).....		2	2
Language Communication (Eng 104, 105, 106).....	3	3	3
Agricultural Mathematics (Math 102, 103).....	3		3
Physical Education (PE 141, 142, 143).....	½	½	½
General Zoology (Zoo 131, 132).....	4	4	
General Botany (Bot 121).....			4
	16½	16½	16½
Sophomore			
Sheep Husbandry (AH 221).....	4		
Commercial Beef Production (AH 222).....		4	
Market Swine (AH 223).....			4
Farm Machinery (AE 221, 222).....		3	2
Farm Tractors (AE 241).....	2		
Anatomy and Physiology (VS 123).....		3	
Forage Crops (CP 123).....			4
Soils (SS 121).....			4
Public Speaking (Sp 201).....		2	
Principles of Economics (Ec 201, 202).....	3	3	
Health Education (PE 107).....			2
Sports Education (PE 241, 242, 243).....	½	½	½
General Bacteriology (Bact 221).....	4		
Project Records (FM 100).....	1		
Electives.....	2		
	16½	15½	16½

	F	W	S
Junior			
* Swine Husbandry (AH 321)	3		
* Specialized Sheep Enterprises (AH 322).....		4	
* Beef Husbandry (AH 323).....			4
Animal Breeding (AH 304).....			3
Livestock Hygiene and Sanitation (VS 202).....	3		
Animal Parasitology (VS 203).....		2	
Range Management (SS 223).....			4
Farm Records (FM 321).....		3	
Genetics (Bio 303).....	3		
General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Electives	4	3	2
	<hr/>	<hr/>	<hr/>
	17	16	17
Senior			
Senior Project (AH 461, 462).....	2	2	
Undergraduate Seminar (AH 463).....			2
Animal Nutrition (AH 402).....		4	
Literature		3	
Farm Management I (FM 322).....	4		
† Economics Elective			3
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U.S. in World Affairs (Hist 305).....			3
Family Relations (Psy 206).....			3
Agricultural Biochemistry (Chem 328).....	4		
Electives	4	5	5
	<hr/>	<hr/>	<hr/>
	17	17	16

DESCRIPTIONS OF COURSES IN ANIMAL HUSBANDRY

AH 101 Feeds and Feeding (2)

Identification and classification of feeds; simple use of food nutrients, protein, fat, and carbohydrates; methods of preparing feeds; relative values of common feeds for each class of livestock; the use of byproduct feeds. 2 lectures.

AH 102 Feeds and Feeding (3)

The digestion and utilization of feeds; feeding standards and computation of standard rations for livestock; economy in feeding, and purchasing feeds by nutritive values; important vitamins and minerals and feed sources thereof. 2 lectures, 1 laboratory. Prerequisite: AH 101

AH 121 Market Beef Production (4)

Breeds, market classes, and grades of beef cattle. Selection of feeder cattle. Management practices in purchasing and fattening cattle using farm grown feeds. Study of cattle feeding operations carried on at the college. Marketing of beef cattle. 3 lectures, 1 laboratory.

AH 122 Elements of Swine Production (4)

Types, breeds, and market classes and grades of swine. Hog production under California and cornbelt conditions, nutritional requirements, rations utilizing common feeds, and parasites and diseases. 3 lectures, 1 laboratory.

AH 123 Elements of Sheep Production (4)

The background of successful sheep operations in the West. Selection of breeds and type in relation to location. Market classes and grade of sheep. The dry lot feeding of lambs. 3 lectures, 1 laboratory.

* With the approval of the adviser, the student may substitute for four of these units elective courses in animal husbandry and/or one dairy husbandry or one poultry husbandry course.

† Economics elective to be selected from FM 304, 310, 403, or 421 or 425.

AH 131 Basic Equitation (3)

Grooming, saddling, bridling, mounting, seat and hands. Horseback riding both bareback and under saddle. Designed to teach basic equitation to students with no previous experience. Students will be expected to provide for the maintenance of stock. 1 lecture, 2 laboratories.

AH 209 Meats (3)

Selection, identification, and cutting of meat. Physical and chemical composition of meat and its relationship to flavor, tenderness and nutritional value. 2 lectures, 1 laboratory.

AH 210 Meats (2)

Practice in the killing and processing of beef cattle, sheep, and hogs. A study of carcass grades, yield, and cut-out value. Comparison of live animals and carcasses from same animals. 1 lecture, 1 laboratory. Prerequisites: AH 121, 122, 123

AH 221 Sheep Husbandry (4)

Detailed management through a sheep year. Breeding season, preparation of ewes and rams. Gestation, summer care. Preparation for lambing, lambing and lamb growing seasons, selling lambs and wool, buying replacements, culling, controlling disease. Equipment and barn details. 3 lectures, 1 laboratory. Prerequisite: AH 102, 123

AH 222 Commercial Beef Production (4)

Care and management of a breeding herd of commercial cattle in California. Range and farm lands suited to beef production. Factors affecting cost of production. Improvement of breeding herd. Trends in the industry. 3 lectures, 1 laboratory. Prerequisites: AH 102, 121

AH 223 Market Swine (4)

Management of a commercial swine herd and care of pigs till marketing. Market channels and cycles, production cost analysis, hog slaughter and pork processing. Nutritional deficiency diseases and ration formulation utilizing garbage, cull and byproduct feeds. 3 lectures, 1 laboratory. Prerequisite: AH 102, 122

AH 230 General Animal Husbandry (4)

For non-animal husbandry majors. Selection, feeding, and management of sheep, swine, and cattle, and their uses on California farms. 3 lectures, 1 laboratory.

AH 232 Elements of Horse Production (3)

Status of the horse industry. Breeds of horses and their use. Anatomy, selection of horses, unsoundnesses. Breeding, feeding, and management of light horses. Fundamentals in equitation. 2 lectures, 1 laboratory. Prerequisite: AH 102

AH 234 Horseshoeing (2)

Fundamentals of horseshoeing, anatomy and physiology of the horse's foot, pastern, and legs. Trimming feet, fitting and nailing shoes. Normal shoeing, corrective shoeing. 1 lecture, 1 laboratory combined.

AH 304 Animal Breeding (3)

Physiology of reproduction, application of genetics to animal breeding. Systems of mating animals, the use of inbreeding, crossbreeding, and selection as it applies to farm animals. 3 lectures. Prerequisites: Bio 303, VS 123

AH 320 Meats (2)

Slaughter and cutting yields. Chemical and physical composition of meat in relation to nutrition. Processing methods. Pricing and merchandising in the meat industry. 1 lecture, 1 laboratory. Prerequisite: AH 210

AH 321 Swine Husbandry (3)

The purebred swine industry including selection of breeding stock, production registry and testing programs, meat-type certification programs, breeding systems, pedigrees, breed history, purebred shows and sales, and facilities and equipment. 2 lectures, 1 laboratory. Prerequisite: AH 223

AH 322 Specialized Sheep Enterprises (4)

The management of a purebred flock of sheep. Production of range and stud rams. Use of irrigated pastures by fattening lambs and ewes and lambs. 3 lectures, 1 laboratory. Prerequisite: AH 221

AH 323 Beef Husbandry (4)

Purebred cattle business including selection of foundation stock, herd bulls; breeding programs; pedigrees; facilities and equipment; feeding breeding herd, sale cattle, show cattle; marketing purebred cattle; and general management problems. 3 lectures, 1 laboratory. Prerequisite: AH 102, 121, 222

AH 326 Livestock Judging (3)

Selection of beef cattle, sheep, swine, and horses according to breed, type and use. 1 lecture, 2 laboratories.

AH 333 Horse Husbandry (3)

Horse breeding farm management. Care of stallion, mares, and offspring. Feeding and breeding schedules. Records and office procedure. Bloodlines, systems of mating. Extended equitation and fundamentals of horsemanship. 2 lectures, 1 laboratory. Prerequisite: AH 232

AH 334 Feed Mill Operation (3)

Study of general operation of a feed mill including a survey of the industry, buying, storing, grinding, weighing, mixing, packaging, handling, and delivery of formula feeds. Also a study of flow of materials, preventive maintenance and safety in a mill. 2 lectures, 1 laboratory. Prerequisites: AH 101 and 1 year production courses, or AH 230, PH 230 or DH 230

AH 402 Animal Nutrition (4)

The metabolism of proteins, carbohydrates, fats, minerals, and vitamins. Relationship of proper nutrition to livestock production. 3 lectures, 1 laboratory. Prerequisites: AH 102, Chem 328

AH 434 Specialized Horse Enterprises (3)

Training and gentling, driving and ground work with young horses. Training and advanced equitation on stock horse, high schooled horses, three-gaited saddle horses, and jumpers. 1 lecture, 2 laboratories. Prerequisites: AH 232 and AH 333 or the equivalent in experience.

AH 441 Advanced Livestock Judging (2)

Intensive practice in livestock judging in preparation for livestock judging team to compete in intercollegiate contests. 2 laboratories. Prerequisite: AH 326

AH 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.

AH 463 Undergraduate Seminar (2)

Major developments in the chosen field of the student. Discussion of new developments, policies, practices, and procedures. Each individual is responsible for the development and presentation of a topic in his chosen field. 2 lectures.

AH 580 Advanced Animal Nutrition (3)

Current findings and problems in the field of animal nutrition. Effects of new experimental research on the livestock industry. 3 lectures.

AH 581 Graduate Seminar in Animal Production (3)

Current findings and research problems in the field and their application to the industry. 3 lectures.

	F	W	S
Sophomore			
Milk Production (DH 221)	4		
Commercial Dairy Herd Management (DH 222)		4	
Advanced Dairy Cattle Judging (DH 243)			2
Dairy Refrigeration (AC 238)		2	
Farm Machinery (AE 221, 222)		3	2
Farm Tractors (AE 241)	2		
Soils (SS 121)			4
Anatomy and Physiology (VS 123)	3		
Forage Crops (CP 123)			4
Sports Education (PE 241, 242, 243)	½	½	½
General Bacteriology (Bact 221)	4		
Public Speaking (Sp 201)		2	
Principles of Economics (Ec 201, 202)	3	3	
Genetics (Bio 303)		3	
Electives			4
	16½	17½	16½
Junior			
Advanced Dairy Cattle Feeding (DH 301)	2		
History of Dairy Breeds and Pedigrees (DH 323)		4	
Purebred Dairy Herd Management (DH 326)			4
Animal Breeding (AH 304)	3		
Dairy Inspection (DM 332)		2	
Livestock Hygiene and Sanitation (VS 202)		3	
Animal Parasitology (VS 203)			2
Literature	3		
Farm Records (FM 321)		3	
General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Artificial Insemination (DH 330)	2		
Electives	3		6
	17	16	16
Senior			
Breeding and Selection of Dairy Cattle (DH 422)		2	
Senior Project (DH 461, 462)	2	2	
Undergraduate Seminar (DH 463)			2
Animal Nutrition (AH 402)		4	
Farm Management I (FM 322)	4		
Economics Elective			3
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
Agricultural Biochemistry (Chem 328)	4		
Family Relations (Psy 206)			3
Electives	4	5	5
	17	16	16

* To be selected from FM 304, 310, 403, 421, or 426.

CURRICULUM IN DAIRY MANUFACTURING

	F	W	S
Freshman			
Elements of Dairying (DH 121)	4		
Feeding Dairy Cattle (DH 102)		2	
Market Milk (DM 132)			4
Ice Cream Making (DM 133)		4	
Dairy Boilers and Steam Equipment (AC 237)			2
Dairy Feeds and Feeding (DH 101)	2		
Machine Shop (MS 141, 142, 144)	1	1	1
Language Communication (Eng 104, 105, 106)	3	3	3
Agricultural Mathematics (Math 102, 103)		3	3
Health Education (PE 107)	2		
Physical Education (PE 141, 142, 143)	½	½	½
General Zoology (Zoo 131, 132)	4	4	
Electives			4
	16½	17½	17½
Sophomore			
Butter Making (DM 231)			4
Cheese Making (DM 232)		4	
Dairy Products Judging (DM 233)			2
Milk Production (DH 221)	4		
Livestock Hygiene and Sanitation (VS 202)			3
Dairy Refrigeration (AC 238, 239)		2	2
Welding (Weld 151)			1
Public Speaking (Sp 201)	2		
Sports Education (PE 241, 242, 243)	½	½	½
General Bacteriology (Bact 221)	4		
Dairy Bacteriology (Bact 222)		4	
General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Electives	2	3	
	16½	17½	16½
Junior			
Condensed and Dry Milk (DM 331)	4		
Dairy Inspection (DM 332)		2	
Creamery Records (DM 336)		3	
Dairy Plant Management (DM 433)			4
Literature	3		
Principles of Economics (Ec 201, 202)	3	3	
Agricultural Marketing (FM 304)			3
Basic Accounting (Actg 131, 132)	3	3	
American Government (Pol Sc 301)		3	
Growth of American Democracy (Hist 304)			3
Agricultural Biochemistry (Chem 328)	4		
Electives		2	6
	17	16	16
Senior			
Senior Project (DM 461, 462)	2	2	
Undergraduate Seminar (DM 463)			2
Family Relations (Psy 206)	3		
Agricultural Prices and Government Control (FM 403)			3
Industrial Management (LMR 311)	3		
Industrial Relations (LMR 312)		3	
U. S. in World Affairs (Hist 305)		3	
Electives	8	7	11
	16	15	16

DESCRIPTIONS OF COURSES IN DAIRY HUSBANDRY**DH 101 Dairy Feeds and Feeding (2)**

Identification and classification of feeds; simple use of food nutrients, protein, fat, and carbohydrates; methods of preparing feeds; relative values of common feeds for each class of livestock with special attention to dairy cattle, the use of byproduct feeds. 2 lectures.

DH 102 Feeding Dairy Cattle (2)

Balancing dairy cattle rations. Feeding practices and nutritional requirements. 2 lectures. Prerequisite: DH 101

DH 121 Elements of Dairying (4)

General introductory dairy course. General information on statistics and opportunities in the dairy industry. Composition and food value of dairy products. Common tests to determine quality of products. Principles and practices of the feeding and management of dairy cattle. 3 lectures, 1 laboratory.

DH 133 Fitting and Showing Dairy Cattle (2)

Selection, preparation, presentation of dairy cattle for shows, sales, and photographing. 1 lecture, 1 laboratory.

DH 142 Dairy Cattle Judging (2)

Selection of dairy cattle with consideration to breed characteristics and conformation. Correlation between type and production. 2 laboratories.

DH 221 Milk Production (4)

Factors affecting milk production. Dairy production problems and methods. Practice in many of the frequently used dairy production skills. 3 lectures, 1 laboratory. Prerequisites: DH 102, 121, 142

DH 222 Commercial Dairy Herd Management (4)

Commercial dairy practices from the standpoint of cost of feeding and management. Visits are made to successful dairy farms. 3 lectures, 1 laboratory. Prerequisite: DH 221

DH 230 General Dairy Husbandry (4)

Selection, breeding, feeding, and management of dairy cattle. Composition and food value of dairy products. Dairy industry statistics and opportunities. Producing and handling products. A general course for other than dairy majors. 3 lectures, 1 laboratory.

DH 243 Advanced Dairy Cattle Judging (2)

Advanced practice in the comparative judging of dairy cattle. Detailed scoring and classifying cattle on conformation with extensive training on giving oral reasons. Visits to breeding establishments and shows. Judging teams may be selected in this class. 2 laboratories. Prerequisite: DH 142

DH 301 Advanced Dairy Cattle Feeding (2)

Nutrition requirements of dairy cattle. Successful, economical feeding practices. 2 lectures. Prerequisite: DH 102

DH 323 History of Breeds and Pedigrees (4)

Origin of modern dairy cattle breeds, organization of cattle clubs. Breed families and herds. Practice in compiling pedigrees. 3 lectures, 1 laboratory. Prerequisite: DH 221

DH 326 Purebred Dairy Herd Management (4)

Methods and problems in establishing, breeding, feeding, and management of a purebred dairy herd and farm. Visits are made to leading purebred dairy farms and to purebred cattle sales. 3 lectures, 1 laboratory. Prerequisites: DH 222, 243, 301, 323

DH 330 Artificial Insemination (2)

Techniques in the collection, evaluation, processing, storage and shipment of semen. Insemination procedures. Fertility problems. Record keeping. 1 lecture, 1 laboratory. Prerequisites: DH 121 or AH 121, VS 123 or VS 100

DH 422 Breeding and Selection of Dairy Cattle (2)

Evaluation of inherited characteristics in dairy cattle from an economic standpoint. Proving and selecting sires and dams. 2 lectures. Prerequisites: Bio 303, AH 304, DH 142

DH 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.

DH 463 Undergraduate Seminar (2)

Reports on student papers, bulletins, periodical articles, and dairy research experiments. Sources of dairy husbandry information. Practice in oral reporting. Late developments and research work in the dairy industry. 2 lectures.

DH 581 Graduate Seminar in Dairy Production (3)

Current findings and research problems in the field and their application to the industry. 3 lectures.

DESCRIPTIONS OF COURSES IN DAIRY MANUFACTURING**DM 132 Market Milk (4)**

Buildings, equipment, and methods used to handle, process, and distribute market milk. Judging and grading market milk. Practice in the college creamery and sales room as well as in commercial plants. 3 lectures, 1 laboratory.

DM 133 Ice Cream Making (4)

Calculating and processing ice cream mixes. Proper equipment and methods needed to manufacture, package, and distribute ice cream of numerous varieties. Practice in the college creamery and sales room as well as in commercial plants. 3 lectures, 1 laboratory.

DM 230 General Dairy Manufacturing (4)

Nontechnical presentation of the methods and problems involved in modern creamery operation. Testing, flavoring, and manufacturing butter, various cheeses, ice cream, market milk, and related products. Elective course for nondairy students. Survey course for dairy husbandry majors. 3 lectures, 1 laboratory.

DM 231 Butter Making (4)

Equipment and methods needed to handle and process manufacturing cream. Churning, packaging, storing, and marketing butter. Practice in college creamery and commercial plants. 3 lectures, 1 laboratory. Prerequisites: DH 121, DM 132

DM 232 Cheese Making (4)

Equipment and methods needed to manufacture, package, cure, and market cheese. Practice in the college creamery and commercial plants. 3 lectures, 1 laboratory. Prerequisites: DH 121, Bact 221, DM 132

DM 233 Dairy Products Judging (2)

Theory and practice in the score card grading of butter, cheese, ice cream, and market milk. 1 lecture, 1 laboratory. Prerequisite: DM 232

DM 331 Condensed and Dry Milk (4)

Processing, packaging, and marketing of evaporated and condensed milk and dry milk powder. Field trips are made to study commercial plants and methods. 3 lectures, 1 laboratory. Prerequisites: DH 121, DM 132, Bact 222

DM 332 Dairy Inspection (2)

State dairy codes and score cards used for dairy plants and farms. Quality tests of dairy products. Practice in inspecting and scoring dairy farms and factories. 1 lecture, 1 laboratory. Prerequisites: DH 121, DM 132, Bact 221

DM 333 Advanced Dairy Products Judging (2)

Advanced procedure in scoring and grading dairy products including milk, butter, ice cream, and cheese. 2 laboratories. Prerequisite: DM 233

DM 336 Creamery Records (3)

Product control within the plant. Department records, inventories, daily work sheets, load out and route return slips, checking, recapitulation, fat losses and their control and records on receipts, production and distribution as required by the State. 2 lectures, 1 laboratory. Prerequisites: DM 133, 231, 232

DM 433 Dairy Plant Management (4)

Creamery management methods, applied accounting, cost analysis of various operations, advertising, marketing, collections, analysis of financial and operating statements. 3 lectures, 1 laboratory. Prerequisites: Required DM major courses prior to senior year.

DM 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.

DM 463 Undergraduate Seminar (2)

Reports on student papers, bulletins, periodical articles, and dairy research experiments. Sources of dairy manufacturing information. Practice in oral reporting. Late developments and research work in the dairy industry. 2 lectures.

FARM MANAGEMENT DEPARTMENT

Department Head, Edgar A. Hyer

Carl G. Beck

J. Philip Bromley
Gaylord J. Chizek

John A. Rogalla

Few farmers today produce goods primarily for use on the farms. Agriculture involves large cash expenses and receipts and great sums of capital. Everything the farmer does has a bearing on the profits he may make.

The curriculum of this department places major emphasis on the management phases of agriculture. This does not mean production training is ignored since the student is required to take a liberal number of production courses which provide the essential foundation for management training. Production skills are emphasized in the first two years of the curriculum. At this time students are encouraged to participate in the project programs of production departments. The last two years bring a continuation of production training but primary emphasis is on management.

Actual ranch management problems are used liberally throughout the curriculum. Students participate in making, executing, and analyzing farm plans on the college farm during the senior year. The emphasis is on maximization of profits and not production skills which are obtained in the earlier years.

Students are prepared to operate and manage farms applying sound business principles. They are not prepared as institutional research workers although they take basic courses which will help them, should they choose to pursue this phase elsewhere.

Students interested in the two-year technical certificate should refer to the introductory statement for the Agricultural Division which describes this program. Detailed curriculum information is available from the department head.

CURRICULUM IN FARM MANAGEMENT

Freshman

	F	W	S
Introduction to Farm Management (FM 104, 105)	1	1	
Project Records (FM 100)			1
Agricultural Mechanics (AE 121, 122)	2	2	
Agricultural Mathematics (Math 102, 103)		3	3
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Health Education (PE 107)			2
General Botany (Bot 121)	4		
General Zoology (Zoo 131)		4	
* Other Agricultural courses and electives	6	3	7
	16½	16½	16½

Sophomore

Agricultural Marketing (FM 304)			3
Agricultural Resources (FM 305)		3	
Farm Records (FM 321)			3
Principles of Economics (Ec 201, 202)	3	3	
Agricultural Economic Analysis (FM 203)			3
Soils (SS 121)	4		
Soils Management (SS 122)		4	
Public Speaking (Sp 201)	2		
Literature			3
Report Writing (Eng 301)			3
Family Relations (Psy 206)		3	
Sports Education (PE 241, 242, 243)	½	½	½
* Other Agricultural courses and electives	7	3	1
	16½	16½	16½

* Of the total "other agricultural courses and electives" units at least 40 shall be chosen with the approval of the adviser from other fields of agriculture.

	F	W	S
Junior			
Principles of Farm Management (FM 322).....	4		
Types of Farm Operation in California (FM 325).....		3	
Farm Appraisal (FM 326).....			3
Farm Credit (FM 310).....			3
Basic Accounting (Actg 131, 132).....	3	3	
Business Organization and Management (Bus 205).....			3
General Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Descriptive Statistics (Math 211).....	3		
Statistical Methods (Math 212).....		3	
* Other Agricultural courses and electives.....	3	4	4
	17	17	17
Senior			
Agricultural Prices and Government Control (FM 403).....			3
Crop Farm Management Problems (FM 421).....	3		
Farm Management Problems (FM 424, or FM 425, or FM 426).....		3	
Large Farm Accounting (FM 431).....	3		
Management Participation on College Farm (FM 460).....	1	1	1
Senior Project (FM 461, 462).....	2	2	
Undergraduate Seminar (FM 463).....			2
Business Law (Bus 301).....		3	
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
United States in World Affairs (Hist 305).....			3
* Other Agricultural courses and electives.....	4	4	7
	16	16	16

DESCRIPTIONS OF COURSES IN FARM MANAGEMENT

FM 100 Project Records (1)

Organization of the foundation, records needed to conduct a project, methods of keeping records, and their analysis. Adapted to student conducting a project under the supervision of the college. 1 lecture.

FM 101A Introduction to Agricultural Economics (5)

Modern economic system, history of U.S. Agriculture, agriculture's role in the economy, prices of agricultural products, marketing agricultural products, agricultural credit and finance, agricultural resources and land use, the role of farm management, introduction to farm management analysis processes, agriculture and the government. May not be substituted for Ec 201, 202 or FM 305. 4 lectures, 1 2-hour laboratory. To be taken only by technical students.

FM 101B Farm Records and Farm Management Practices (4)

Farm recordkeeping for income tax purposes and study of farm business, measures of farm profits, factors affecting farm profits, reorganization of an actual farm. May not be substituted for FM 321 or 322. 3 lectures, 1 2-hour laboratory. To be taken only by technical students. Not open to degree students for degree credit.

FM 101C Farm Management Problems (5)

Crop and livestock enterprise costing, equipment costing and efficiency, determination of most profitable crop combinations, most profitable application of inputs, labor management, government price programs. May not be substituted for FM 421, 424, 425, or 426. 3 lectures, 2 2-hour laboratories. Prerequisite: FM 101B. To be taken only by technical students.

FM 104, 105 Introduction to Farm Management (1) (1)

Development of American agriculture, need for farm management in agriculture, training necessary for the farm manager. 1 lecture.

* Of the total "other agricultural courses and electives" units at least 40 shall be chosen with the approval of the adviser from other fields of agriculture.

FM 124 Agriculture (3)

Identification and use of major crops and livestock, types of farming in the United States, the place and function of the farm marketing system, broad classes of soil and their general management problems, the farm problem as it affects farmers and citizens, identification of plants for the home and their general care. 2 lectures, 1 2-hour laboratory. For nonagriculture majors only.

FM 203 Agricultural Economic Analysis (3)

Role of price in the economy, the firm as a decision-making unit, the production function, single input-output analysis, substitution relationships, products combinations, risk analysis, consumption and market demand influence, population and technological changes. 3 lectures. Prerequisite: Ec 202

FM 300 Successful California Farms (1)

Visits to successful California farms involving many types of farming. Study of farm resources and organization, techniques of operation, yields, problems. Different regions visited on different trips. Maximum credit is 3 units for three different trips. Prerequisite: Sophomore standing.

FM 304 Agricultural Marketing (3)

Principles of marketing agricultural products, market functions, channels, market institutions, introduction to co-operative marketing, cost of marketing, marketing problems by commodities, marketing policy, government regulation. 3 lectures. Prerequisite: Ec 202

FM 305 Agricultural Resources (3)

Survey of agricultural production areas of United States from standpoint of physical resource, markets, economic advantages, and problems. Appraisal of area problem from standpoint of land economic principles. 3 lectures.

FM 310 Farm Credit (3)

Finance principles for farmers, farm credit needs, types of credit, credit sources, requirements, farm finance planning, discussion with credit representatives. 3 lectures. Prerequisite: Actg 131 or FM 321

FM 321 Farm Records (3)

Fundamentals of record keeping, kinds of records, inventory, depreciation, cash and accrued basis of income tax reporting, balance sheet, operating statement, analysis of statements. 2 lectures, 1 2-hour laboratory. Prerequisite: Ec 202

FM 322 Principles of Farm Management (4)

The role of farm management, types of farming, problems of leasing and buying a farm, labor problems, measures of profits, factors affecting profits, budgeting of laboratory farms, independent analysis of farm for term report. 3 lectures, 1 2-hour laboratory. Prerequisite: FM 321 or Actg 131 and 132

FM 325 Types of Farm Operation in California (3)

Agricultural regions of California considered from standpoint of physical resources, crops and livestock, size, tenure, water problems, relation to urban areas, land development. 2 lectures, 1 2-hour laboratory. Prerequisite FM 322

FM 326 Farm Appraisal (3)

Methods of farm appraisal, use of county records, appraisal practice on different types of farms, discussions with professional appraisers. 2 lectures, 1 2-hour laboratory. Prerequisite: FM 322

FM 403 Agricultural Prices and Government Control (3)

Price making process, price variation and trends, reports and forecasting, governmental price control programs, price characteristics and problems of specific agricultural commodities. 3 lectures. Prerequisite: Ec 202

FM 421 Crop Farm Management Problems (3)

Crop enterprise costing procedure, analysis of rotation systems, labor problems, irrigation plans, determination of most profitable rates of fertilization and irrigation, marketing crops, land development costs, effect of shifting cropping plan. 2 lectures, 1 2-hour laboratory. Prerequisite: FM 322

FM 424 Poultry Husbandry Farm Management Problems (3)

Poultry enterprise costing procedure, economics of plant layout, analysis of labor saving equipment and procedure, determination of most profitable feed combination, credit for poultrymen, use of outlook reports, marketing methods. 2 lectures, 1 2-hour laboratory. Prerequisite: FM 322

FM 425 Animal Husbandry Farm Management Problems (3)

Costing procedure for animal enterprises, types of beef operations compared, feed lot management problems, determination of most profitable feed rations, livestock marketing procedure, effect of feed resource changes on organization and profits. 2 lectures, 1 2-hour laboratory. Prerequisite: FM 322

FM 426 Dairy Farm Management Problems (3)

Dairy enterprise costing procedure, relation of cropping plan to dairy organization, analysis of feed resource costs, determination of most profitable feed rations, costs and problems of shifting from grade B to grade A dairy, most profitable culling. 2 lectures, 1 two-hour laboratory. Prerequisite: FM 322

FM 430 Orientation to California Agriculture (6)

Study of California agriculture through visitation to major production areas of the State. Problems in connection with organization, management, production practices, marketing procedures, use of equipment, soils, climate, and irrigation are considered. Offered in summer only. Open only to agricultural majors. Prerequisite: Senior standing or permission of Dean of Agriculture.

FM 431 Large Farm Accounting (3)

Application of commercial accounting process to large farm accounting problems. Special emphasis will be given to the problem of devising and executing an accounting system that will give necessary details on specific enterprises for analysis and control. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 131, 132

FM 460 Management Participation on College Farm (1)

Limited management of college agricultural resources. Analysis of particular management problems on the college farms. Total credit limited to 3 units. 1 lecture. Prerequisite: Senior standing.

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

Analysis of a farm management problem selected by student with approval of adviser. Project results are presented in a formal report. Minimum 120 hours total time.

FM 463 Undergraduate Seminar (2)

Student presentation and description of developments and problems in farm management. 2 lectures.

FM 581 Graduate Seminar in Farm Management (3)

Group study of current problems; development and analysis methods in the field. Consideration given to the place of Farm Management in the teaching of vocational agriculture. 3 lectures.

FIELD, FRUIT, AND TRUCK CROPS DEPARTMENT

Acting Department Head, William Troutner

Reynold Lonborg

Howard Rhoads
Oscar Reece

Ralph Vorhies

The Crops Department curricula are designed to prepare students for field, fruit, and truck crop production. Instruction in field crops qualifies students for placement in specialized crop production and for general farming involving combinations of both crops and livestock; for placement in such related fields as service and sales in seeds, weed and pest control, and fertilizers, as fieldmen in sugar beets and other crops; and for government employment as agronomists.

The truck crop curriculum prepares for specialized truck crop farm production and for employment with vegetable shipping firms, processing plants, pest control and fertilizer companies, seed distributing companies, and governmental employment.

The curriculum in fruit production is designed to train majors to manage and operate orchards and for such other production jobs in deciduous fruits and grapes and related activities as fieldmen for canneries and shipping companies, and as fruit inspectors.

Graduates in all three crop fields have entered agricultural teaching and agricultural extension work.

The department also offers general courses in field crops, truck crops, and fruit growing for other agricultural majors in the college.

The department operates 25 acres of orchard and vineyard, producing more than 150 varieties of fruit. Fifteen acres of land are used in truck crop farming and 75 acres are planted to field crop projects. The 400 acres of cropland operated by the college farming program are also used extensively in the instructional program. Field trips are also taken to the major areas where crops not common to San Luis Obispo are grown. Students are encouraged to undertake production projects in their respective majors.

Students interested in the two-year technical certificate should refer to the introductory statement for the Agricultural Division which describes this program. Detailed curriculum information is available from the department head.

CURRICULUM IN FIELD CROPS

Freshman	F	W	S
Field Crops (CP 121).....	4		
Cereal Crops (CP 122).....		4	
Forage Crops (CP 123).....			4
Agricultural Mechanics (AE 121, 122).....		2	2
Farm Tractors (AE 241).....	2		
Language Communication (Eng 104, 105, 106).....	3	3	3
Agricultural Mathematics (Math 102, 103).....		3	3
Health Education (PE 107).....	2		
Physical Education (PE 141, 142, 143).....	½	½	½
Project Records (FM 100).....			1
Botany (Bot 121, 122).....	4	4	
General Entomology (Ent 126).....			4
Electives	2		
	<hr/> 17½	<hr/> 16½	<hr/> 17½

	F	W	S
Sophomore			
Weeds and Poisonous Plants (CP 221).....	4		
Field Crop Technology (CP 222).....		4	
General Truck Crops (TC 230).....			4
Farm Machinery (AE 221, 222).....	3	2	
Soils (SS 121).....	4		
Soil Management (SS 122).....		4	
Public Speaking (Sp 201).....	2		
Literature.....			3
Principles of Economics (Ec 201, 202).....		3	3
Sports Education (PE 241, 242, 243).....	½	½	½
General Bacteriology (Bact 221).....		4	
Plant Pathology (Bot 223).....			4
Agricultural Surveying (AE 131).....	2		
Electives.....	1		2
	<hr/> 16½	<hr/> 17½	<hr/> 16½
Junior			
Crop Pest Control (CP 321).....	3		
Irrigated Pastures (CP 330).....		3	
California Fruit Growing (FP 322).....		4	
Commercial Seed Production (CP 331).....	4		
Irrigation (AE 240).....			4
Farm Records (FM 321).....		3	
Farm Management I (FM 322).....			4
General Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Genetics (Bio 303).....	3		
Electives.....	3	2	4
	<hr/> 17	<hr/> 16	<hr/> 16
Senior			
Oil and Fiber Crops (CP 421).....	4		
Plant Breeding (CP 304).....	3		
Senior Project (CP 461, 462).....	2	2	
Undergraduate Seminar (CP 463).....			2
Fertilizers (SS 221).....		4	
* Economics Elective.....			3
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U. S. in World Affairs (Hist 305).....			3
Family Relations (Psy 206).....			3
Agricultural Biochemistry (Chem 328).....		4	
Electives.....	3	3	5
	<hr/> 15	<hr/> 16	<hr/> 16

CURRICULUM IN FRUIT PRODUCTION

Freshman			
Pomology (FP 131, 132).....	4	4	
Nut Crops and Small Fruits (FP 133).....			4
Agricultural Mechanics (AE 121, 122).....	2	2	
Farm Tractors (AE 241).....			2
Language Communication (Eng 104, 105, 106).....	3	3	3
Agricultural Mathematics (Math 102, 103).....		3	3
Project Records (FM 100).....			1
Health Education (PE 107).....	2		
Physical Education (PE 141, 142, 143).....	½	½	½
General Botany (Bot 121, 122).....	4	4	
Entomology (Ent 126).....			4
Electives.....	2		
	<hr/> 17½	<hr/> 16½	<hr/> 17½

* Economics elective to be selected from FM 304, 310, 403, or 421.

Agricultural Division

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	F	W	S
Sophomore			
Viticulture (FP 231)	4		
Fruit Plant Propagation (FP 232)		4	
Irrigation (AE 240)			4
Farm Machinery (AE 221, 222)	3	2	
Soils (SS 121)	4		
Soil Management (SS 122)		4	
Public Speaking (Sp 201)	2		
Literature			3
Principles of Economics (Ec 201, 202)		3	3
Sports Education (PE 241, 242, 243)	½	½	½
General Bacteriology (Bact 221)		4	
Plant Pathology (Bot 223)			4
Agricultural Surveying (AE 131)	2		
Electives	1		2
	16½	17½	16½
Junior			
Deciduous Disease and Pest Control (FP 234)	4		
Citrus and Avocado Fruit Production (FP 332)		4	
Orchard Management (FP 236)			4
Farm Records (FM 321)	3		
Farm Management I (FM 322)			4
Genetics (Bio 303)	3		
General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Agricultural Code of California (CP 303)			3
Electives	2	8	1
	16	16	16
Senior			
Advanced Pomology (FP 421)	3		
Senior Project (CP 461, 462)	2	2	
Undergraduate Seminar (CP 463)			2
Plant Breeding (CP 304)	3		
Fertilizers (SS 221)		4	
* Economics Elective			3
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
Family Relations (Psy 206)		3	
Agricultural Biochemistry (Chem 328)		4	
Electives	5		8
	16	16	16

CURRICULUM IN TRUCK CROPS

	F	W	S
Freshman			
Commercial Truck Crops Production (TC 124)	4		
Winter Truck Crops Production (TC 125)		4	
Warm Season Truck Crops Production (TC 126)			4
Agricultural Mechanics (AE 121, 122)		2	2
Language Communication (Eng 104, 105, 106)	3	3	3
Farm Tractors (AE 241)	2		
Agricultural Mathematics (Math 102, 103)		3	3
Project Records (FM 100)			1
Health Education (PE 107)	2		
Physical Education (PE 141, 142, 143)	½	½	½
General Botany (Bot 121, 122)	4	4	
General Entomology (Ent 126)			4
Electives	2		
	17½	16½	17½

* Economics elective to be selected from FM 304, 310, 403, or 421.

	F	W	S
Sophomore			
Harvesting and Packaging Truck Crops (TC 224).....	4		
Vegetable Plant Propagation (TC 232).....		3	
General Crop Production (FP 230 or CP 230).....			4
Farm Machinery (AE 221, 222).....	3	2	
Soils (SS 121).....	4		
Soil Management (SS 122).....		4	
Public Speaking (Sp 201).....	2		
Literature.....			3
Principles of Economics (Ec 201, 202).....		3	3
Sports Education (PE 241, 242, 243).....	½	½	½
General Bacteriology (Bact 221).....		4	
Plant Pathology (Bot 223).....			4
Agricultural Surveying (AE 131).....	2		
Electives.....	1		2
	16½	16½	16½
Junior			
Marketing Fresh Produce (TC 325).....		4	
Irrigation (AE 240).....			4
Crop Pest Control (CP 321).....	3		
Farm Records (FM 321).....	3		
Farm Management I (FM 322).....		4	
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....			3
Genetics (Bio 303).....			3
General Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Electives.....	3	4	2
	16	16	16
Senior			
Truck Crop Management (TC 424).....	4		
Senior Project (CP 461, 462).....	2	2	
Undergraduate Seminar (CP 463).....			2
Plant Breeding (CP 304).....	3		
Fertilizers (SS 221).....		4	
* Economics Elective.....			3
U. S. in World Affairs (Hist 305).....	3		
Family Relations (Psy 206).....			3
Agricultural Biochemistry (Chem 328).....		4	
Weeds and Poisonous Plants (CP 221).....			4
Electives.....	5	6	4
	17	16	16

DESCRIPTIONS OF COURSES IN CROPS PRODUCTION

CP 100 Principles of Crops, Pest and Disease Control (5)

Symptoms, identification, and methods of control for the principal diseases and pests of field, truck, fruit, and nursery crops and ornamentals. Field practice in operation of spray equipment and dust machines. 4 lectures, 1 laboratory. To be taken only by technical students. Not open to degree students for degree credit.

CP 121 Field Crops (4)

Production, distribution, adaptation, and utilization of the major field crops in California, including cotton, potatoes, large seeded legumes, sugar crops, flax, and safflower. 3 lectures, 1 laboratory.

CP 122 Cereal Crops (4)

Production, distribution, adaptation, and utilization of major cereal crops varieties; with field trips to major cereal producing areas of California. 3 lectures, 1 laboratory.

* Economics elective to be selected from FM 304, 310, 403, or 421.

CP 123 Forage Crops (4)

Production, harvesting, and utilization of principal California forage crops. Identification and utilization of range plants studied in the field. Two-day field trip required. 3 lectures, 1 laboratory. Prerequisite: Bot 121

CP 221 Weeds and Poisonous Plants (4)

Common and noxious weeds of California. Their identification, life histories, and control. Chemicals and equipment used for weed control in cultivated land and irrigation ditches, on the range and wasteland. Poisonous weeds, their effects and prevention. 3 lectures, 1 laboratory.

CP 222 Field Crop Technology (4)

Grades and qualities of California field crops as they affect market values. Effects of harvesting and storage. Technological processes, especially as they affect demand and determine processing. 3 lectures, 1 laboratory. Prerequisites: CP 121, 122, 123

CP 230 General Field Crops (4)

Production, harvesting, and use of important California cereal and field crops. Production areas, crop rotations, disease and pest control. 3 lectures, 1 laboratory.

CP 303 Agricultural Code of California (3)

Services and procedures of the Agricultural Code of California. Provisions of the Agricultural Code and other laws affecting industries serving agriculture, with emphasis on plant industries. Grain warehouse inspection, seed inspection, county departments of agriculture, plant quarantine, and standardization. 3 lectures.

CP 304 Plant Breeding (3)

Application of principles of plant improvement through selection, hybridization, and use of hybrid vigor. 2 lectures, 1 laboratory. Prerequisite: Bio 303

CP 321 Crop Disease and Pest Control (3)

Methods of combating disease, insect pests, and rodents attacking important California crop plants. Sprays, dusts, fumigants, poisons; cultural and sanitary controls. 2 lectures, 1 laboratory.

CP 330 Irrigated Pastures (3)

Culture, management, fertilization, composition, and costs of irrigated pastures. Plants composing the pasture. Their identification, adaptation, growth season, and utilization. 2 lectures, 1 laboratory. Prerequisite: CP 123

CP 331 Seed Production (4)

California field vegetable and flower industry production. Location, methods of growing, harvesting, storing. Economic outlook for principal kinds. Growing disease-free seed for other states. Certified seed production. Seed laws. 3 lectures, 1 laboratory. Prerequisites: CP 121, 122, 123

CP 410 Crops Physiology (3)

Practical studies in plant nutrition, soil and water relationships, seed physiology, modes of action of some herbicides, and systemic insecticides and practical applications of growth regulators; controlled environments. 3 lectures. Prerequisites: Bot 122, SS 221, Bot 126 or 223, Chem 328

CP 421 Oil and Fiber Crops (4)

Culture, fertilization, harvest, grading, and marketing of cotton, flax, safflower, castor beans, minor oil and fiber crops. Field trips to important centers of production. 3 lectures, 1 laboratory. Prerequisite: CP 121 or 230

CP 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.

CP 463 Undergraduate Seminar (2)

Student presentation and group leadership under faculty supervision on new developments in crop, fruit, and truck crop enterprises. 2 lectures.

CP 581 Graduate Seminar in Field Crop Production (3)

Group study of current problems of crop production; current experimental and research findings as applied to production and marketing. 3 lectures.

DESCRIPTIONS OF COURSES IN FRUIT PRODUCTION**FP 123 Beekeeping (3)**

Elementary beekeeping, possibilities and problems of home and commercial beekeeping in California. Sources of nectar. Honey processing and marketing. Bee diseases and equipment. Pollination problems. 2 lectures, 1 laboratory.

FP 131 Pomology (4)

History of fruit growing; outlook; apple, peach, pear, and prune production; cover crop management. Field laboratories in harvesting, grading and storing of college orchard products. 3 lectures, 1 laboratory.

FP 132 Pomology (4)

Apricot, cherry, fig, olive and plum production. Establishing the orchard, pruning principles of young and bearing trees. Planting of deciduous trees. Practice in pruning young and bearing deciduous fruit trees and grapevines. 3 lectures, 1 laboratory.

FP 133 Nut Crops and Small Fruits (4)

Almond, walnut, filbert, pecan, and miscellaneous nuts identification, culture, harvesting, and processing. Field practice in thinning of deciduous fruits, spring cultural problems. Field trips to nut orchards, hulling and processing plants. Culture and harvesting of bush berries and strawberries. 3 lectures, 1 laboratory.

FP 230 General Deciduous Fruit Production (4)

Common orchard practices in producing deciduous fruits, nuts, and grapes. Varieties, areas, propagation, planting, pruning, pollination, disease and insect control for home and commercial plantings. For students other than crops majors. 3 lectures, 1 laboratory.

FP 231 Viticulture (4)

Establishment of vineyards. Identification and uses of varieties of table, raisin, and wine grapes. Vineyard operations, disease and pest control, harvesting, packing grapes, making and processing raisins, wine making. Field practice in pruning, propagation, harvesting and variety identification in college vineyard. 3 lectures, 1 laboratory.

FP 232 Fruit Plant Propagation (4)

Propagation by seed, cuttings, layering, grafting, and budding. Rootstocks for deciduous fruits, commercial nursery practices. 3 lectures, 1 laboratory. Prerequisite: FP 131 or 132 or 133 or 230

FP 234 Deciduous Disease and Pest Control (4)

Studies and field identification of diseases and insect pests of deciduous fruit trees. Field application of control materials. Operation of modern spraying and dusting equipment. 3 lectures, 1 laboratory.

FP 236 Orchard Management (4)

Management problems in orchard and packing house operations. Job instruction training. 3 lectures, 1 laboratory.

FP 239 Home Fruit and Vegetable Production (3)

Growing and handling of fruits and vegetables common to backyard conditions. Practice in gardening. 2 lectures, 1 laboratory.

FP 322 California Fruit Growing (4)

Survey of citrus, deciduous, small fruit, and subtropical fruit production practices in California. Areas of production, propagation, harvesting, and marketing. 3 lectures, 1 laboratory.

FP 332 Citrus and Avocado Fruit Production (4)

Growing and marketing oranges, lemons, grapefruit, avocados and dates. Minor subtropical fruits also included. Orchard practice. For noncitrus majors. 3 lectures, 1 laboratory.

FP 421 Advanced Pomology (3)

Storage problems, postharvest physiology, environmental factors affecting fruit development. Two-day field trip required. 2 lectures, 1 laboratory.

FP 581 Graduate Seminar in Fruit Production (3)

Group study of current problems of fruit production; current experimental and research findings as applied to production and marketing. 3 lectures.

DESCRIPTIONS OF COURSES IN TRUCK CROPS PRODUCTION

TC 124 Commercial Truck Crops Production (4)

Principles involved in truck crops production. Soil preparation, seed and varieties, culture. Survey of industry, scope, value, and areas of production. 3 lectures, 1 laboratory.

TC 125 Winter Truck Crops Production (4)

Production principles and cultural practices applied to truck crops grown during cold weather periods. Scope, production costs, methods, varieties, for cauliflower, broccoli, etc. 3 lectures, 1 laboratory.

TC 126 Warm Season Truck Crops Production (4)

Production principles and cultural practices applied to tender vegetable crops. Scope, production costs, methods, varieties for lettuce, tomatoes, beans, carrots, etc. 3 lectures, 1 laboratory.

TC 224 Harvesting and Packaging Truck Crops (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 laboratory.

TC 230 General Truck Crops (4)

Principles involved in production, harvesting, packaging, and marketing of major truck crops grown in California; survey of vegetable industry. 3 lectures, 1 laboratory.

TC 232 Vegetable Plant Propagation (3)

Propagation of vegetable plants commonly developed in protected area before transplanting; cultural and management practices in open seed beds and protected plant growing structures. 2 lectures, 1 laboratory.

TC 325 Marketing Fresh Produce (4)

Marketing methods of vegetable and fruit crops, sources of information; market news service operation, transportation, storage requirements, distribution system for handling perishable products. 3 lectures, 1 laboratory.

TC 424 Truck Crops Management (4)

Organization, management, and operation of commercial size, vegetable production acreages; advanced work in production, harvesting, marketing operations, and the varied aspects of the entire commercial vegetable production industry. 3 lectures, 1 laboratory.

TC 581 Graduate Seminar in Truck Crop Production (3)

Group study of current problems of vegetable production; current experimental and research findings as applied to production and marketing. 3 lectures.

FOOD PROCESSING DEPARTMENT

The food processing curriculum is designed to prepare students for employment in the various phases of the food processing industry and related areas. Instruction in the field qualifies students for placement in the production phases, both field or plant, and the operating phases of the industry. This curriculum does not prepare students for the specialized field of food technology or research.

The curriculum specifically provides for training that will enable the graduate to accomplish doing and management jobs connected with the field and plant operations of the food processing industry. Skills achieved in the production aspects of the processing business are co-ordinated with theory study in science, humanity, and business courses.

The department when fully equipped will have a modern food processing laboratory with equipment for canning, freezing, and dehydrating food products. College products produced on campus will be processed in this model laboratory.

Two options are offered by the department. The Production Management option emphasizes preparation for the production and management aspects of the industry. The Processing Equipment option includes a concentration of related engineering and equipment skills courses applicable to the industry.

CURRICULUM IN FOOD PROCESSING EQUIPMENT

Freshman	F	W	S
Survey of Food Industry (FI 101).....	1		
Food Processing Machinery (FI 122).....		2	
General Deciduous Fruit Production (FP 230).....			4
Office Organization and Operation (Bus 104).....	3		
Mechanical Analysis (IE 121).....	2		
Engineering Drafting (ME 141, 142).....	2	2	
Oxyacetylene Welding (Weld 151).....	1		
Arc Welding (Weld 154).....		1	
Applied Biology (Bio 110).....			3
Mathematics for Engineers (Math 117).....	5		
Analytic Geometry and Calculus (Math 118).....		5	
Health Education (PE 107).....			2
Physical Education (PE 141, 142, 143).....	½	½	½
Language Communication (Eng 104, 105, 106).....	3	3	3
Electives.....		3	4
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	17½	16½	16½
Sophomore			
Food Processing (FI 221, 222).....	4	4	
General Truck Crops (TC 230).....			4
General Dairy Manufacturing (DM 230).....		4	
General Animal Husbandry (AH 230).....			4
Machine Shop (MS 141-142).....	2		
Sheet Metal Shop (FI 243).....			2
Descriptive Statistics (Math 211).....			3
Industrial Safety (IE 204).....	2		
College Physics (Phys 121, 122, 123).....	4	4	4
Analytic Geometry and Calculus (Math 201).....	3		
Sports Education (PE 241, 242, 243).....	½	½	½
Principles of Economics (Ec 201, 202).....	3	3	
Public Speaking (Sp 201).....		2	
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	18½	17½	17½

	F	W	S
Junior (Major courses not offered 1960-61)			
Principles and Techniques of Sanitation (FI 326).....			2
Food Plant Quality Control (FI 433).....			3
Basic Accounting (Actg 131, 132).....	3	3	
Farm Credit (FM 310).....			3
Electric Shop (EE 141).....			2
Dairy Refrigeration (AC 238, 239).....		2	2
Food Production Control (FI 321, 322).....	4	4	
Production Planning (IE 322, 323).....		3	3
Materials Handling (IE 331).....	2		
Production Control (IE 332).....		3	
Report Writing (Eng 301).....	3		
* Electives.....			4
	16	15	16
Senior (Major courses not offered 1960-61)			
Senior Project (FI 461, 462).....	2	2	
Undergraduate Seminar (FI 463).....			2
Packaging (FI 437).....	2		
Industrial Management (LMR 311).....			3
Sales Engineering (IE 424).....	2		
Family Relations (Psy 206).....		3	
Business Law (Bus 301).....			3
Literature.....	3		
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U. S. in World Affairs (Hist 305).....			3
* Electives.....	5	7	4
	17	15	15

CURRICULUM IN FOOD PRODUCTION MANAGEMENT

Freshman	F	W	S
Commercial Truck Crops Production (TC 124).....	4		
Survey of Food Industry (FI 101).....	1		
Food Processing Machinery (FI 122).....		2	
Agricultural Mathematics (Math 102, 103).....		3	3
Language Communication (Eng 104, 105, 106).....	3	3	3
Health Education (PE 107).....	2		
Physical Education (PE 141, 142, 143).....	½	½	½
General Botany (Bot 121).....		4	
General Bacteriology (Bact 221).....			4
Oxyacetylene Welding (Weld 151).....		1	
Arc Welding (Weld 154).....			1
Soils (SS 121).....	4		
Office Organization and Operation (Bus 104).....	3		
* Electives.....		2	5
	17½	15½	16½

* 7 units must be selected from the following courses: General Chemistry, General Inorganic Chemistry, Organic Chemistry, Plumbing and Building Sanitation, Kinematics, Mechanical Engineering Laboratory.

	F	W	S
Sophomore			
Food Processing (FI 221, 222).....	4	4	
Food Products (FI 223).....			3
Harvesting and Marketing Truck Crops (TC 224).....	4		
General Deciduous Fruit Production (FP 230).....		4	
Electric Shop (EE 141).....	2		
Sheet Metal Shop (FI 243).....			2
Steam Shop (FI 232).....		2	
Public Speaking (Sp 201).....			2
Literature.....	3		
Principles of Economics (Ec 201, 202).....		3	3
Family Relations (Psy 206).....			3
Agricultural Mechanics (AE 128).....	2		
Sports Education (PE 241, 242, 243).....	½	½	½
* Electives.....	1	3	3
	16½	16½	16½
Junior (Major courses not offered 1960-61)			
Food Production Control (FI 321, 322).....	4	4	
Principles and Techniques of Sanitation (FI 326).....			2
Food Plant Quality Control (FI 433).....			3
Crop Disease and Pest Control (CP 321).....	3		
Marketing Fresh Produce (TC 325).....		4	
Farm Machinery (AE 221).....			3
Dairy Refrigeration (AC 238, 239).....		2	2
General Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Report Writing (Eng 301).....	3		
Basic Accounting (Actg 131, 132).....	3	3	
* Electives.....			3
	17	17	17
Senior (Major courses not offered 1960-61)			
Food Plant Quality Control (FI 434).....	3		
Processed Food Inspection (FI 435).....		2	
Packaging (FI 437).....	2		
Senior Project (FI 461, 462).....	2	2	
Undergraduate Seminar (FI 463).....			2
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U. S. in World Affairs (Hist 305).....			3
Agricultural Biochemistry (Chem 328).....	4		
Business Law (Bus 301).....		3	
Industrial Management (LMR 311).....			3
* Electives.....	2	6	8
	16	16	16

DESCRIPTIONS OF COURSES IN FOOD PROCESSING

FI 101 Survey of Food Industry (1)

Introductory course including size, distribution, major production areas of the food processing industry. 1 lecture.

FI 122 Food Processing Machinery (2)

Processing equipment selection, use, maintenance and repair. 1 lecture, 1 laboratory.

FI 221, 222 Food Processing (4) (4)

Principles of food preservation involving canning, freezing, dehydrating and concentrating. Laboratory practice consists of problems in hauling, storage, grading, plant preparation of raw foods. 3 lectures, 1 laboratory.

* 16 units must be selected from the following courses: General Field Crops, Deciduous Disease and Pest Control, Fertilizers, Soil Fertility, Food Analysis, Agricultural Code of California, Production Planning.

FI 223 Food Products (3)

Principles and practices of commercial production of fruit and vegetable juices, jellies, preserves, beverages, pickles and other packaged products. 2 lectures, 1 laboratory.

FI 232 Steam Shop (2)

Principles of the modern steam generator. Operation, maintenance and care of steam generators. 1 lecture, 1 laboratory.

FI 243 Sheet Metal Shop (2)

Sheet metal materials and how to handle them. Use of hand tools, shop practice. 2 laboratories.

FI 321, 322 Food Production Control (4) (4)

Plant equipment construction, plant layout and flow lines, cost estimating, work simplification, automation and control systems. 3 lectures, 1 laboratory.

FI 326 Principles and Techniques of Sanitation (2)

The organization, management and operation of a food plant sanitation program. 1 lecture, 1 laboratory.

FI 433, 434 Food Plant Quality Control (3) (3)

Methods of organizing and operating field and plant quality control systems. Advanced work includes statistical quality control, laboratory food analysis techniques. 2 lectures, 1 laboratory.

FI 435 Processed Food Inspection (2)

Fundamentals, principles and procedures for inspecting processed foods based upon federal and state grades. Laboratory work in examining and grading various products. 1 lecture, 1 laboratory.

FI 437 Packaging (2)

Special problems in modern packaging equipment and methods. 1 lecture, 1 laboratory.

FI 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.

FI 463 Undergraduate Seminar (2)

Major developments in the chosen field of the student. Discussion of new developments, policies, practices, and procedures. Each individual is responsible for the development and presentation of a topic in his chosen field. 2 lectures.

ORNAMENTAL HORTICULTURE DEPARTMENT

Department Head, Howard C. Brown

Anthony J. Amato

Ernest R. Houston

The objective of this department is to prepare students for employment in the nursery, landscape and florist industries. This includes both the production and sales and service areas of these major fields. The training stresses production of nursery plants, flower production, the design and management of nurseries and greenhouses, landscape design, landscape planting, and landscape supervision.

Graduates of the Ornamental Horticulture Department qualify for managerial positions in nursery and florist establishments as well as supervisory positions in parks and grounds. Many of the graduates enter the field of teaching. Some of the most popular areas of employment include plant propagation, nursery sales, greenhouse management, landscape design, and field advising for fertilizer and insecticide companies.

The facilities of the department include a student-operated commercial nursery in which students carry on a project program involving wholesale and retail sales, 8,000 square feet of glasshouses, 3,000 square feet of lathhouses, a clothhouse, cold-frames, and extensive field growing areas. Large, modern, well-equipped laboratories adjoin the greenhouse range. The entire 100 acres of landscaped campus area serves as an outdoor laboratory. The campus is planted with many interesting and unusual trees and shrubs from all over the world. The campus also contains a large number of native California trees and shrubs.

Equipment includes the latest models of power equipment necessary in nurseries, greenhouses, parks and grounds, and landscaping. An extensive list of periodicals covering the field of ornamental horticulture is subscribed to and available to students. Through the staff, affiliation in several national horticultural organizations is maintained.

Students interested in the two-year technical certificate should refer to the introductory statement for the Agricultural Division which describes this program. Detailed curriculum information is available from the department head.

CURRICULUM IN ORNAMENTAL HORTICULTURE

	F	W	S
Freshman			
Nursery Practice (OH 121).....	4		
Ornamental Shrubs (OH 122).....		4	
Floriculture (OH 123).....			4
Landscape Drafting (OH 124).....	2		
Agricultural Mechanics (AE 121, 122).....	2		2
Language Communications (Eng 104, 105, 106).....	3	3	3
Project Records (FM 100).....	1		
Agricultural Mathematics (Math 102, 103).....		3	3
Health Education (PE 107).....		2	
Physical Education (PE 141, 142, 143).....	½	½	½
General Botany (Bot 121).....	4		
Families of Agricultural Plants (Bot 235).....		4	
General Entomology (Ent 126).....			4
	<hr/>	<hr/>	<hr/>
	16½	16½	16½
Sophomore			
Ornamental Trees (OH 221).....	4		
Suburban Home Planning (OH 223).....		4	
Plant Propagation (OH 233).....			4
Herbaceous Plants (OH 226).....			4
Soils (SS 121).....	4		
Agricultural Surveying (AE 131).....		2	
Public Speaking (Sp 201).....		2	
Principles of Economics (Ec 201, 202).....	3	3	
Sports Education (PE 141, 142, 143).....	½	½	½
Farm Tractors (AE 241).....			2
Literature.....	3		
Plant Pathology (Bot 223).....			4
General Bacteriology (Bact 221).....		4	
Electives.....	2	1	2
	<hr/>	<hr/>	<hr/>
	16½	16½	16½

	F	W	S
Junior			
* Landscape Management (OH 337).....	4		
* Advanced Plant Propagation (OH 338).....		4	
* Landscape Design (OH 322).....			4
Fertilizers (SS 221).....		4	
Basic Accounting (Actg 131, 132).....		3	3
American Government (Pol Sc 301).....	3		
Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Genetics (Bio 303).....	3		
Electives.....	3	2	5
	17	17	16
Senior			
Diseases and Pests (OH 327).....	3		
Arboriculture (OH 421).....	4		
Senior Project (OH 461, 462).....	2	2	
Undergraduate Seminar (OH 463).....			2
Business Law (Bus 301).....		3	
Agricultural Biochemistry (Chem 328).....		4	
Family Relations (Psy 206).....			3
Native Plants (OH 336).....			3
U. S. in World Affairs (Hist 305).....			3
Growth of American Democracy (Hist 304).....		3	
† Plant Breeding (CP 304).....	3		
‡ Fruit crops elective.....		4	
Electives.....	5		5
	17	16	16

DESCRIPTIONS OF COURSES IN ORNAMENTAL HORTICULTURE

OH 121 Nursery Practices (4)

Commercial nursery operations. Propagation, nursery layout, seed sowing, transplanting, potting, canning, fertilizing, irrigation, and pest control. Bedding plants, greenhouse plants, trees, and shrubs. 3 lectures, 1 laboratory.

OH 122 Ornamental Shrubs (4)

Shrubs and vines used in California. Identification, habits of growth, cultural requirements, and landscape use. 3 lectures, 1 laboratory.

OH 123 Floriculture (4)

The operating of greenhouses and other forcing structures. A study of the relationship of light, heat, temperature, and moisture to plant growth. 3 lectures, 1 laboratory. Prerequisite: OH 121

OH 124 Landscape Drafting (2)

Drafting techniques and standards progressing from tracings to light construction working drawings. 1 lecture, 1 laboratory.

OH 125 Flower Arrangement (4)

A study of the principles of flower arrangement and corsage making. 2 lectures, 2 laboratories.

OH 220 Home Landscaping (3)

Landscape design of urban and rural homes. Garden maintenance problems of landscaped properties. For non-horticulture majors. 2 lectures, 1 laboratory.

OH 221 Ornamental Trees (4)

Broadleaf trees grown and used in California. Identification, habits of growth, cultural requirements, and landscape use. 3 lectures, 1 laboratory.

* Beginning with Junior year, students may elect to specialize in Nursery Management or Floriculture. Students electing to specialize in Floriculture must substitute:

Cut Flower Production OH 334 (4)

Flower Arrangement OH 125 (4)

Greenhouse Management OH 323 (4)

† Plant Physiology (Bot 322) may substitute for this requirement.

‡ To be selected from FP 230, 322, or 332.

OH 223 Suburban Home Planning (4)

Principles of landscape design for residential properties. Designing of several small home properties. 2 lectures, 2 laboratories. Prerequisites: OH 122, 124, 221

OH 225 Flower Judging (2)

Procedure and practice in score card grading of cut flower and pot plant classes. 1 lecture, 1 laboratory. Prerequisites: OH 121, 123

OH 226 Herbaceous Landscape Plants (4)

The identification, habits of growth, and landscaping uses of ornamental annuals and herbaceous perennials commonly grown for California landscaping. 3 lectures, 1 laboratory. Prerequisites: OH 121, 122

OH 227 Flower Shop Management (4)

Practices and problems in the management of the retail flower shop with emphasis upon shop layout, window display, telegraph delivery services, buying, selling, and personnel relations. 2 lectures, 2 laboratories. Prerequisite: OH 125

OH 228 Advanced Flower Arrangement (4)

Advanced styling of floral designs including: wedding flowers, funeral designs, advanced corsages, hospital arrangements and baskets for all occasions. 2 lectures, 2 laboratories. Prerequisites: OH 125, 227

OH 230 Ornamental Gardening (3)

For non-horticulture majors. A general course in ornamental horticulture with emphasis upon plant production. Includes budding, potting, seed sowing, transplanting, pest control, and the planting of lawns, trees, shrubs, and flower beds. 2 lectures, 1 laboratory.

OH 233 Plant Propagation (4)

Principles of asexual propagation. Budding, cutting, layering, division, and separation. 3 lectures, 1 laboratory. Prerequisites: OH 121, 123

OH 322 Landscape Design (4)

Principles of landscape design of public properties and the application of these principles in solving of landscape design problems. 2 lectures, 2 laboratories. Prerequisites: OH 122, 124, 221, 223

OH 323 Greenhouse Management (4)

The production of major commercial potted plants under glass and lath. Preparation for sale and merchandising of greenhouse crops. 3 lectures, 1 laboratory. Prerequisites: OH 121, 123, 334, SS 121, 221

OH 327 Diseases and Pests of Ornamental Plants (3)

A detailed study of diseases and pests of ornamental plants, their effect on plants, their prevention and control. 2 lectures, 1 laboratory. Prerequisites: OH 122, Ent 126, Bot 223

OH 331 Landscape Contracting (4)

Practices in supervising men and applying approved techniques in landscape construction. Cost finding and estimating for landscape trades. 3 lectures, 1 laboratory. Prerequisite: OH 124

OH 334 Cut Flower Production (4)

The production of cut flowers in the field, under cloth, and under glass. Preparation of cut flowers for market. 3 lectures, 1 laboratory. Prerequisites: OH 121, 123, SS 121, 221

OH 336 Native Plants (3)

The identification, use, and culture of native California landscape plants. 2 lectures, 1 laboratory. Prerequisites: OH 122, 221

OH 337 Landscape Management (4)

The preparation and planting of lawns and flower beds. Planting and care of shrubs. Maintenance of established plantings. 3 lectures, 1 laboratory. Prerequisites: AE 122, OH 122, 221

OH 338 Advanced Plant Propagation (4)

Advanced nursery and plant propagation practices. Grafting, dormant budding, lining out, balling out, bare rooting, and making hardwood cuttings. Construction and operation of forcing structures. 3 lectures, 1 laboratory. Prerequisites: OH 121, 233

OH 421 Arboriculture (4)

The care and management of large ornamental trees. The use of ropes and other safety equipment in tree climbing. Cavity work, bracing, cabling, and pruning. 3 lectures, 1 laboratory. Prerequisites: OH 221, 337

OH 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.

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 581 Graduate Seminar in Ornamental Horticulture (3)

Group study of current problems of the ornamental horticulture industry; current experimental and research findings as applied to production and to the teaching of horticulture.

POULTRY HUSBANDRY DEPARTMENT

Department Head, Richard I. Leach

Roland Pautz

Leo Sankoff

The poultry industry is an important part of agriculture and food production in California. This industry offers an increasing demand for young men trained in modern techniques of the industry. The function of this department is to prepare students for various major fields of commercial poultry production and the many allied services of the industry. Opportunities in the allied industry services are many as shown by the fact that graduates have worked in more than fifty kinds of jobs within the industry.

In addition to typical ranch production opportunities for employment, graduates may find many openings in marketing organizations, processing plants, feed and supply services, hatcheries, governmental agencies or agriculture teaching.

The college plant has facilities for more than 6,000 birds in the 12-acre poultry plant which maintains a commercially productive unit with six breeds of chickens, in addition to the turkey flock. The plant includes a modern 15,000 egg hatchery, poultry-dressing plant, and egg-handling facilities as well as most of the types of poultry-raising equipment commonly used in California.

Each poultry major has an opportunity to conduct commercially productive projects in market eggs, hatching eggs or meat birds which gives him additional experiences in the field of his major interest and practice in many business transactions. Advanced students may have opportunities to conduct technical management or developmental problems.

Students interested in the two-year technical certificate should refer to the introductory statement for the Agricultural Division which describes this program. Detailed curriculum information is available from the department head.

CURRICULUM IN POULTRY HUSBANDRY

	F	W	S
Freshman			
Poultry Industry and Breeds (PH 121).....	4		
Poultry Brooding (PH 122).....		4	
Poultry Feeding (PH 123).....			4
Agricultural Mechanics (AE 121, 122).....		2	2
Feeds and Feeding (AH 101).....	2		
Language Communication (Eng 104, 105, 106).....	3	3	3
Agricultural Mathematics (Math 102, 103).....	3	3	
Project Records (FM 100).....	1		
Health Education (PE 107).....			2
Physical Education (PE 141, 142, 143).....	½	½	½
General Zoology (Zoo 131, 132).....	4	4	
General Botany (Bot 121).....			4
Electives			2
	<hr/>	<hr/>	<hr/>
	17½	16½	17½
Sophomore			
Poultry Selecting and Culling (PH 221).....	2		
Poultry Products (PH 222).....		3	
Poultry Incubation (PH 223).....			2
Poultry Anatomy and Physiology (VS 231).....	3		
Poultry Housing (PH 233).....			2
Farm Tractors (AE 241).....			2
Agricultural Surveying (AE 131).....	2		
Soils (SS 121).....			4
Public Speaking (Sp 201).....		2	
Principles of Economics (Ec 201, 202).....	3	3	
Sports Education (PE 241, 242, 243).....	½	½	½
General Bacteriology (Bact 221).....	4		
Genetics (Bio 303).....			3
Electives	2	8	2
	<hr/>	<hr/>	<hr/>
	16½	16½	15½

Junior	F	W	S
Poultry Breeding (PH 321).....	4		
Poultry Hygiene and Diseases (VS 303).....			3
Hatchery Management (PH 322).....		4	
Farm Structures (AE 231, 232).....	2		2
Literature.....	3		
Farm Records (FM 321).....	3		
Farm Management I (FM 322).....			4
American Government (Pol Sc 301).....		3	
Growth of American Democracy (Hist 304).....			3
General Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Electives.....		6	
	16	17	16
Senior			
Advanced Poultry Plant Management (PH 402).....		3	
Turkey Production (PH 421).....	3		
Senior Project (PH 461, 462).....	2	2	
Undergraduate Seminar (PH 463).....			2
Animal Nutrition (AH 402).....			4
* Economics Elective.....		3	
U. S. in World Affairs (Hist 305).....	3		
Family Relations (Psy 206).....			3
Agricultural Biochemistry (Chem 328).....		4	
Electives.....	8	5	7
	16	17	16

DESCRIPTIONS OF COURSES IN POULTRY HUSBANDRY

PH 121 Poultry Industry and Breeds (4)

Scope and importance of the poultry industry as a part of California agriculture. Poultry organizations, publications, employment opportunities. Breeds and varieties of poultry and their commercial adaptations. 3 lectures, 1 laboratory.

PH 122 Poultry Brooding (4)

Organization and planning of the replacement program on the commercial poultry ranch. Brooding and rearing techniques and practices, costs, and equipment. Growing stock care, feeding, diseases, and management. 3 lectures, 1 laboratory.

PH 123 Poultry Feeding (4)

Poultry feeds, nutritional requirements, feeding principles and practices. Feed deficiency diseases, formulation of rations for specific purposes, and commercial economy practices. 3 lectures, 1 laboratory. Prerequisite: AH 101

PH 221 Poultry Selection and Culling (2)

Biological and environmental factors that affect the number, size, and quality of eggs produced. Culling techniques, culling practices, and methods of selection for commercial purposes. 1 lecture, 1 laboratory.

PH 222 Poultry Products (3)

Packaging, grading, storing, and selling of poultry products. Market grade standards and laws. Dressing, drawing, cutting, and grading of poultry. Egg grading and candling. 2 lectures, 1 laboratory.

PH 223 Poultry Incubation (2)

Fundamentals of embryology and metabolism of the developing embryo. Principles and practices of artificial incubation. Environmental, nutritional, and breeding factors affecting the hatch. Selection and care of hatching eggs. 1 lecture, 1 laboratory.

* Economics elective to be selected from FM 304, 310, 403, or 424.

PH 230 General Poultry Production (4)

Problems of selecting stock, brooding, feeding, culling, judging, and marketing. Housing and equipment for general farm use. Not open to poultry majors. 3 lectures, 1 laboratory.

PH 233 Poultry Housing (2)

Planning and organizing the buildings and equipment for the poultry plant. Principles of construction, organization, and types of design. Balancing the brooding, growing, and laying house facilities. 1 lecture, 1 laboratory. Prerequisite: PH 122

PH 248 Hatchery Practice (1)

Care and operation of incubators, sanitation in the hatchery, grading and sorting chicks, wing banding and pedigreeing chicks, and hatchery records. 1 laboratory.

PH 321 Poultry Breeding (4)

Fundamental factors of genetics as applied to problems of poultry breeding, hereditary factors as applied to developing a strain. Sib testing, progeny testing, experimental mating, and pedigrees. Analysis of breeding records. 3 lectures, 1 laboratory. Prerequisites: PH 221, Bio 303

PH 322 Hatchery Management (4)

Organization and layout for the operation of a breeder or multiplier hatchery. Breeding program and interrelationship of the hatchery and co-operating egg producers. Advertising and selling program, financing, chick deliveries, and record keeping. 3 lectures, 1 laboratory. Prerequisite: PH 321

PH 402 Advanced Poultry Plant Management (3)

General organization and co-ordination of the commercial poultry plant. Trends in efficiency of operations. Replacement program, marketing, and health of the flock. 3 lectures. Prerequisites: All required freshman and sophomore poultry courses and PH 321

PH 421 Turkey Production (3)

Commercial turkey production in California and its relationship to other poultry meat products. Turkey varieties, breeding, judging, and selection. Feeding, housing, and disease control program. Market grades and standards. 2 lectures, 1 laboratory. Prerequisites: PH 123, 321, VS 231

PH 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.

PH 463 Undergraduate Seminar (2)

Preparing and presenting in an organized manner reports on new trends, research, and problems related to poultry husbandry. 2 lectures.

PH 581 Graduate Seminar in Poultry Production (3)

Current findings and research problems in the field and their application to the industry. 3 lectures.

SOIL SCIENCE DEPARTMENT

Department Head, Logan S. Carter

Arnold M. Dean

B. A. Dickson
Lisle R. Green

Raymond V. Leighty

The functions of this department are to provide training in soil science for students in the Agricultural Division enrolled in other graduation majors and to prepare students in the occupational fields of soils, conservation, range management, education, and farming. Courses in soil science have been developed with lecture, laboratory, and field coverage to provide fundamental knowledge of the subject and its application in agricultural production.

Completion of the four-year curriculum entitles the graduate to a bachelor of science degree in soil science. This curriculum has been designed to train individuals for employment in two major categories: namely, positions that require a wide knowledge of agriculture, such as vocational agricultural teachers, soil conservationists, land appraisers, fertilizer distributors, farm advisers, farm managers, or farm operators; and, secondly, highly specialized work, such as that of soil surveyors, laboratory technicians, college instructors, and soil specialists.

Students majoring in soil science may, by the proper selection of available courses in the junior year, specialize in one of two occupational areas: soils or soil conservation.

Facilities of the department have been expanded to provide sufficient laboratory and fieldhouse space and equipment to meet the needs of the programs. Demonstration plots and the application of soil management practices on the college farm are utilized to the fullest possible extent in the study of methods for putting soil knowledge to work. Work of outstanding value on nearby ranches and that being carried on by public agencies is also widely utilized.

Students interested in the two-year technical certificate should refer to the introductory statement for the Agricultural Division which describes this program. Detailed curriculum information is available from the department head.

CURRICULUM IN SOIL SCIENCE

	F	W	S
Freshman			
Soils (SS 121)	4		
Soil Management (SS 122)		4	
Soil Materials (SS 123)			3
General Field Crops (CP 230)	4		
Agricultural Mechanics (AE 121)		2	
Language Communication (Eng 104, 105, 106)	3	3	3
Agricultural Mathematics (Math 102, 103)		3	3
Physical Education (PE 141, 142, 143)	½	½	½
Health Education (PE 107)			2
General Botany (Bot 121, 122)	4	4	
General Nursery Practices (OH 230)			3
Electives			2
	<hr/> 15½	<hr/> 16½	<hr/> 16½
Sophomore			
Fertilizers (SS 221)	4		
Soil Conservation (SS 202)		3	
Range Management (SS 223)			4
General Fruit Production (FP 230)		4	
Agricultural Surveying (AE 131)			2
General Plant Pathology (Bot 223)	4		
Public Speaking (Sp 201)	2		
Mathematics (Math 114, 115)	3	3	
Sports Education (PE 241, 242, 243)	½	½	½
General Entomology (Ent 126)			4
General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Electives		2	2
	<hr/> 17½	<hr/> 16½	<hr/> 16½

	F	W	S
Junior			
Soil Classification (SS 321).....	4		
Soil Fertility (SS 322).....		3	
Range Technology (SS 332).....			3
Irrigation (AE 240).....			4
Literature.....	3		
Principles of Economics (Ec 201, 202).....	3	3	
Farm Records (FM 321).....			3
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
General Bacteriology (Bact 221).....		4	
Agricultural Biochemistry (Chem 328).....		4	
General Animal Husbandry (AH 230).....	4		
* Electives.....			7
	<hr/>	<hr/>	<hr/>
	17	17	17
Senior			
Farm Management I (FM 322).....	4		
† Economics electives.....		3	
U. S. in World Affairs (Hist 305).....		3	
Family Relations (Psy 206).....			3
Senior Project (SS 461, 462).....	2	2	
Undergraduate Seminar (SS 463).....			2
Soil Microbiology (SS 422).....			4
Soil Chemistry (SS 423).....		3	
Soil Physics (SS 432).....	4		
* Electives.....	6	6	6
	<hr/>	<hr/>	<hr/>
	16	17	15

DESCRIPTIONS OF COURSES IN SOIL SCIENCE

SS 121 Soils (4)

Physical, chemical, and biological properties of soils as related to agriculture. 3 lectures, 1 laboratory.

SS 122 Soil Management (4)

Effect of tillage, manuring, drainage, and irrigation practices on soil productivity. 3 lectures, 1 laboratory. Prerequisite: SS 121

SS 123 Soil Materials (3)

Origin, composition, and identification of rocks, minerals, and other materials important in the development of soils. Land forms as related to the nature and properties of soils. 2 lectures, 1 laboratory. Prerequisite: SS 122

SS 202 Soil Conservation (3)

Climate, topography, soils and land use in relation to soil and water losses. Evaluation of soil and water conservation programs and practices. 3 lectures. Prerequisite: SS 121

SS 221 Fertilizers (4)

Composition, value, and use of fertilizer materials and soil correctives. Methods employed in the manufacture, distribution, and application of fertilizers. 3 lectures, 1 laboratory. Prerequisite: SS 121

SS 223 Range Management (4)

Soil and plant characteristics of rangelands. Management practices used to maintain range resources and increase production of forage and livestock. 3 lectures, 1 laboratory. Prerequisite: SS 121

* Students electing to specialize in Soil Conservation must select 16 units from the following courses: AH 101, 102, Bot 322, CP 321, DH 230, Eng 301, PH 230, and SS 323, 433. Students electing to specialize in the more technical aspects of soils must select 16 units from the following courses: Bot 322, Chem 331, 332, Eng 301, Math 118, Phys 121, 122, and SS 433.

† Economics elective to be selected from FM 304, 305, 310, 403, Ec 213, and FM 421 or 425.

SS 230 General Soils (3)

Soil properties and general management practices for home and garden soils. For non-agricultural majors. 2 lectures, 1 laboratory.

SS 321 Soil Classification (4)

Systems used in soil and land classification. Methods employed in soil surveying. Mapping of assigned areas and the preparation of survey reports. 3 lectures, 1 laboratory. Prerequisites: AE 131, SS 123, 202

SS 322 Soil Fertility (3)

Plant nutrient requirements of crops. Effect of soil and climatic conditions on the availability of nutrients in the soil. Diagnostic techniques in soils and crops. 2 lectures, 1 laboratory. Prerequisites: SS 221, 321, Chem 325

SS 323 Range Ecology (3)

Identification of range plants, succession, environment, and the application of ecological factors to the use of rangeland. 2 lectures, 1 laboratory. Prerequisite: SS 223

SS 332 Range Technology (3)

Technical problems in range management. Development of plans for effective production and utilization of range forage. 2 lectures, 1 laboratory. Prerequisite: SS 223

SS 422 Soil Microbiology (4)

Biochemical activities of soil organisms. Effect of soil organisms on the formation, characteristics, and productivity of soils. Methods of studying soil organisms. 3 lectures, 1 laboratory. Prerequisites: SS 332, Bact 221

SS 423 Soil Chemistry (3)

Fundamental concepts and practices in soil chemistry. Methods of analysis and interpretation of significant investigations for the management of soils. 2 lectures, 1 laboratory. Prerequisites: Chem 328, SS 322

SS 432 Soil Physics (4)

Advanced study of the physical properties of soils. Application of physical-chemical soil relationships to farming and engineering practices. 2 lectures, 2 laboratories. Prerequisites: Chem 328, Math 115, SS 321

SS 433 Land Use Planning (3)

Evaluation of land use capabilities. Development of plans and practices for the management of crop, range, and forest land. 2 lectures, 1 laboratory. Prerequisites: SS 321

SS 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.

SS 463 Undergraduate Seminar (2)

Review of current research, experiments, and problems related to the students' major field of interest. Preparation and presentation of reports on problems or research activities. 2 lectures.

SS 581 Graduate Seminar in Soils (3)

A review of current research, experiments and problems related to soil science. Development of special demonstration and field plot trials for educational groups. 3 lectures.

SS 582 Graduate Seminar in Land Management (3)

Development of plans and practices for the management of crop, range, and wood land. 2 lectures, 1 laboratory.

VETERINARY SCIENCE DEPARTMENT

Chairman, John K. Allen

Harry H. Plymale

Veterinary science courses are offered to supplement the major work provided in the animal science departments of the Agricultural Division. Keeping the college herds and flocks healthy provides the student with valuable laboratory opportunities in basic veterinary hygiene. Veterinary science courses are open as elective courses to students who have the property prerequisites.

The department also supplies meat inspection service for the meats laboratory.

DESCRIPTIONS OF COURSES IN VETERINARY SCIENCE**VS 100 Principles of Veterinary Science (5)**

Structural aspects and functions of the principal systems of farm animals, control and prevention of common diseases causing economic losses in livestock. 4 lectures, 1 laboratory. To be taken by technical students only, in substitution for VS 123, 202 and 203. Not open to degree students for degree credit.

VS 123 Anatomy and Physiology (3)

Structural aspects and the normal functions of the principal systems of the various farm animals. 2 lectures, 1 laboratory. Prerequisites: Zoo 131, 132

VS 202 Livestock Hygiene and Sanitation (3)

Animal health problems encountered on the farm. The livestock producer's part in disease control and animal health improvement programs. 2 lectures, 1 laboratory. Prerequisite: Bact 221

VS 203 Animal Parasitology (2)

Identification, life cycles, prevention and control of the common external and internal parasites causing economic loss in livestock. 2 lectures. Prerequisites: Zoo 131, 132

VS 231 Poultry Anatomy and Physiology (3)

Structural aspects and normal functions of the principal systems of domestic poultry. 2 lectures, 1 laboratory. Prerequisite: Zoo 131 or Bio 100

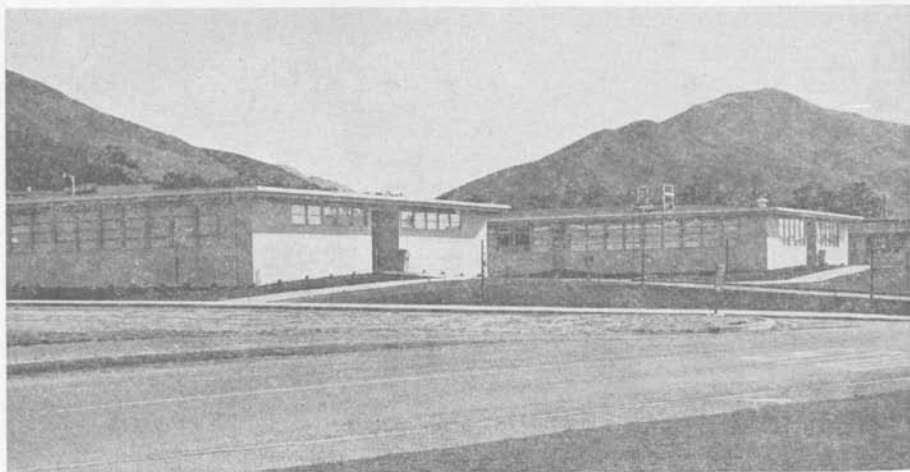
VS 303 Poultry Hygiene and Sanitation (3)

Flock health problems encountered by the poultryman. Control and prevention of common diseases and parasites. 3 lectures. Prerequisites: Bact 221, VS 231

THE ENGINEERING DIVISION



Mechanical Engineering Laboratory



Engineering Building



Air Conditioning Building

THE ENGINEERING DIVISION

Engineering may be defined as the application of the laws of physical science, mathematics, and economics to structures, machines, processes, circuits, and systems.

The objectives of the engineering program at California State Polytechnic College are:

1. To teach a thorough understanding of these laws.
2. To teach the application of these laws to engineering problems.
3. To teach good judgment in the application of these laws.

Emphasis is placed on the phases of engineering which are concerned with planning, product development, production, operation, management, service, and sales.*

There are four characteristics of the engineering program which help to meet the above objectives and to insure a well-rounded engineering graduate:

1. All freshmen have required courses in the shop and laboratory where they learn to use tools, instruments, and machines characteristic of their major. Initial emphasis is on skills and techniques which provide background for more advanced courses.
2. The student begins his major work early in his freshman year. Emphasis on the major continues throughout the entire four-year program together with the related work in mathematics, science, and general education courses.
3. Fundamentals and basic principles are taught in terms of typical problems encountered in industry. In this way, students learn general principles through practice in applying them to practical situations. Each student engages in constructive project work which results in an appreciation of the mechanical, analytical, and economic aspects of engineering.
4. All majors are required to take courses in economics and the social sciences because engineers work with men and money as well as materials and equipment.

Students completing the full four-year program are awarded a degree of bachelor of science in engineering. The college placement office, in close co-operation with all departments, assists the graduate in finding suitable and appropriate employment.

The engineering curriculum is divided into four areas. Each area has a specific objective which is characterized by its name:

1. Courses in the *technical* group train in the use of procedures and operations for the development of manipulative skills and understandings which are basic to engineering, such as machine shop, welding, and drafting.
2. Courses in the *engineering* group train in the application of basic physical laws to problems in engineering.
3. Courses in the *scientific* group provide a foundation of scientific fact and train in the use of basic mathematical and scientific tools used in the practice of engineering.
4. Courses of the *humanistic-social* group provide the cultural background for successful participation in society.

The following chart of a typical curriculum shows the distribution of credit units, indicating both the emphasis and the balance through the four years. The entire program totals 210 quarter units of which 12 to 16 units are elective.

<i>Area</i>	<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
Technical	27	4	0	0
Engineering	0	16	30	24
Scientific	21	19	13	0
Humanistic-Social	6	11	9	13
Elective	---	3	---	14

* Those students intending to specialize in engineering science and research may wish to plan to attend a school of engineering which emphasizes that type of program.

AERONAUTICAL ENGINEERING DEPARTMENT

Department Head, Joy O. Richardson

Lester W. Gustafson
Thornton K. Myers

Leo F. Philbin
Clifford J. Price
John B. Rapp

William J. Werback
Allen M. Zollars

The four-year curriculum in aeronautical engineering is offered to prepare students in the basic principles and skills required in the design, manufacture, and testing of airplanes, missiles, and their components. These basic skills have a solid foundation in mathematics, physics, chemistry, engineering mechanics, thermodynamics, and drafting.

Graduates of the Aeronautical Engineering Department find employment in many of the varied fields associated with the manufacture and flight of all types of aircraft—fields such as design, aerodynamics, stress analysis, service engineering, flight test engineering, and laboratory testing. These graduates are employed by the various aircraft and missile manufacturers, by makers of propulsion units, and by government test bases and research laboratories.

The Aeronautical Engineering Department has well-equipped shops, laboratories, and drafting rooms as well as a modern hangar and an airstrip.

Second, third, and fourth year aeronautical engineering students have the opportunity to join the student branch of the Institute of the Aeronautical Sciences, a national society organized for the advancement of aeronautical and astronautical knowledge.

CURRICULUM IN AERONAUTICAL ENGINEERING

Freshman	F	W	S
Aviation Orientation and History (Aero 108).....	1		
Aircraft Power Plants (Aero 121).....	4		
Airframe Construction (Aero 122).....		4	
Aeronautical Laboratory (Aero 123).....			4
Machine Shop (MS 141, 142, 144).....	1	1	1
Welding (Weld 151, 152, 153).....	1	1	1
Mathematics for Engineers (Math 117).....	5		
Analytic Geometry and Calculus (Math 118, 201).....		5	3
Engineering Drafting (ME 141, 142).....	2	2	
General Physics (Phys 131, 132).....		4	4
Biological Science (Bio 110).....	3		
Health Education (PE 107).....			2
Physical Education (PE 141, 142, 143).....	½	½	½
Electives			2
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	17½	17½	17½
Sophomore			
Aircraft Drafting (Aero 244, 245, 246).....	1	1	1
Aircraft Materials and Processes (Aero 211).....	3		
Gas Thermodynamics (Aero 202).....			3
Electrical Engineering (EE 207).....			3
Electrical Engineering Lab (EE 251).....			1
Aircraft Strength of Materials (Aero 205, 206).....		3	3
Aircraft Strength of Materials Laboratory (Aero 229).....			2
Language Communication (Eng 104, 105, 106).....	3	3	3
Analytic Geometry and Calculus (Math 202, 203).....	3	3	
General Physics (Phys 133).....	4		
Engineering Statics (Phys 201).....	3		
Engineering Dynamics (Phys 202).....		3	
Sports Education (PE 241, 242, 243).....	½	½	½
Principles of Economics (Ec 201).....		3	
Electives		2	2
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	17½	18½	18½

	F	W	S
Junior			
Aircraft Fluid Mechanics (Aero 301).....	3		
Elementary Aerodynamics (Aero 302, 303).....		3	3
Aircraft Stress Analysis (Aero 324, 325).....	4	4	
Aircraft Detail Design (Aero 344, 345, 346).....	2	2	2
Electrical Engineering (EE 208).....	3		
Electrical Engineering Lab (EE 252).....	1		
Electronics in Engineering (EL 321).....		3	
Electronic Engineering Laboratory (EL 354).....		1	
Chemistry (Chem 321, 322).....		4	4
American Government (Pol Sc 301).....			3
Family Relations (Psy 206).....			3
Literature.....			3
Electives.....	4		
	17	17	18
Senior			
Aircraft Propulsion Systems (Aero 401, 402).....	3	3	
Rocket Propulsion (Aero 403).....			3
Aerodynamics (Aero 404, 405, 406).....	3	3	3
Aircraft Design Layout (Aero 444, 445, 446).....	3	3	3
* Aeronautical Electives.....		3	3
Senior Project (Aero 461, 462).....	2	2	
Undergraduate Seminar (Aero 463).....			2
† Industrial Management (LMR 311).....	3		
U. S. in World Affairs (Hist 305).....		3	
Growth of American Democracy (Hist 304).....	3		
Electives.....			3
	17	17	17

DESCRIPTIONS OF COURSES IN AERONAUTICAL ENGINEERING

Aero 108 Aviation Orientation and History (1)

Familiarization with the aviation industry and the work of the aeronautical engineer. History of mechanical flight, historical flights, and personalities. All students participate in a field trip to one of the major aircraft and missile companies. 1 lecture.

Aero 121 Aircraft Powerplant Fundamentals (4)

Fundamentals of aircraft engine theory and operation. Nomenclature of piston and jet engine components and accessories. Familiarization with engine types and design features, as well as laboratory equipment, tools, procedures and techniques. 2 lectures, 2 laboratories.

Aero 122 Airframe Construction (4)

Tools, techniques, and procedures used in the manufacture and maintenance of aircraft structures. Practice in sheet metal riveting and forming and other manufacturing operations used in aircraft and missiles. Introduction to forces exerted on an airframe through flight. 2 lectures, 2 laboratories.

Aero 123 Aeronautical Laboratory (4)

Introduction to the graphical and analytical solution of aeronautical engineering problems. Tabulation of engineering data, slide rule computations, and methods and procedures used in testing aircraft and missile components. Familiarization with various types of instruments used for testing purposes. The student writes formal engineering reports on his laboratory work. 2 lectures, 2 laboratories. Prerequisite: Math 117

Aero 202 Gas Thermodynamics (3)

Fundamental thermodynamic relationships between gas pressure, temperature, specific volume, enthalpy and entropy. The thermodynamic laws governing energy and continuity of fluids. Ideal cycle applications to nozzles, compressors, engines and jets. 3 lectures. Prerequisite: Math 201, Phys 132

* A minimum of 6 units must be taken from the following aero courses: 408, 410, 411, 412, 413, 457, 458, 459.

† Industrial Relations (LMR 312) may be substituted.

Aero 205 Aircraft Strength of Materials (3)

Stress and strain in tension, compression and shear. Welded and riveted joints. Torsion. Relationship of shear, moment, slope and deflection. Bending and shear stresses in simple beams. Thermal stresses. 3 lectures. Prerequisite: Phys 201

Aero 206 Aircraft Strength of Materials (3)

Beam deflections. Restrained, continuous and curved beams. Columns. Failure under combined and fluctuating stresses. Fatigue and stress concentrations. 3 lectures. Prerequisite: Aero 205

Aero 211 Aircraft Materials and Processes (3)

Characteristics of metallic and nonmetallic materials used in aircraft and missile construction. Heat treatment, corrosion prevention, finishing, fabrication methods, manufacturing processes. 3 lectures. Prerequisite: Aero 122

Aero 229 Aircraft Strength of Materials Laboratory (2)

Physical properties of materials used in aircraft. Tension, compression, bending, shear, and torsion tests. Tests of riveted and bolted joints. Tests of long and short columns. Effect of heat treatment on material properties. Use of the SR-4 strain rosette for determining principal strains. Reporting of results in the form of written reports. 1 lecture, 1 laboratory. Concurrent: Aero 206

Aero 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 laboratories.

Aero 244, 245, 246 Aircraft Drafting (1) (1) (1)

Execution of detail and assembly drawings of typical aircraft parts; including dimensioning, manufacturing notes, bill of material, title block and call-out of materials. Standards and processes in accordance with methods and practices of the aircraft industry. Freehand sketching is included. 1 laboratory. Prerequisite: ME 142

Aero 301 Aircraft Fluid Mechanics (3)

Principles of fluid flow. Viscosity, friction loss, laminar and turbulent flow. Dimensional analysis and Reynolds number. Fluid meters, machinery, and control systems. Lubrication theory. 3 lectures. Prerequisite: Aero 202

Aero 302 Elementary Aerodynamics (3)

The atmosphere, dynamics and thermodynamics of air, airspeed determination, types of fluid flow, fluid friction, airfoil theory, wing theory, lift, induced drag, parasite drag, power. 3 lectures. Prerequisite: Aero 301

Aero 303 Elementary Aerodynamics (3)

Propeller theory, propeller selection methods, aircraft propulsion methods, basic airplane performance problems, special performance problems. 3 lectures. Prerequisite: Aero 302

Aero 324, 325 Aircraft Stress Analysis (4) (4)

Analysis of airplane and missile structural components; combined stress and failure theories; column and sheet-stringer panel analysis. Shear-resistant and tension-field beams; single and multi-cell box beams; unsymmetrical and tapered beams. Bulkhead and cutout analysis; analysis of indeterminate structures. Laboratory tests of typical aircraft structural components. Experimental methods of stress analysis. 3 lectures, 1 laboratory. Prerequisite: Math 203, Aero 206, 229

Aero 344, 345, 346 Aircraft Detail Design (2) (2) (2)

Detail and assembly drawings of the aircraft structure from layout drawings and sketches furnished by the designer. Practice given in advanced sheet metal problems, forging, casting and machining practices. Elementary strength calculations and use of aircraft industry manuals, handbooks, material specifications, standard parts catalogs. Graphical differentiation and integration and lofting procedure. 2 laboratories. Prerequisite: Aero 246, 206

Aero 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

Aero 401, 402 Aircraft Propulsion Systems (3) (3)

Aircraft power plant types, components, characteristics, and requirements. Principles of thrust and energy utilization. Thermodynamic processes and performance of the piston-type, turboprop, turbojet, and ramjet engines. 3 lectures. Prerequisite: Aero 401: Aero 121, 202, Phys 202. Aero 402: Aero 404.

Aero 403 Rocket Propulsion (3)

Classification of propulsion systems. Definitions of rocketry terms. Rocket history. Nozzle theory and thermodynamic relations. Rocket propellant performance calculations. Heat transfer in rocket thrust chambers. Liquid propellant rocket systems. Solid propellant rocket fundamentals. Design of solid propellant rockets. Flight performance. Rocket testing. 3 lectures. Prerequisite: Aero 402

Aero 404 Aerodynamics (3)

Two-dimensional analysis of supersonic flow, flow in a duct, normal shocks, Prandtl-Meyer expansion and oblique shock. Thin airfoils, transonic conditions. Supersonic wind tunnels, test methods. 3 lectures. Prerequisite: Aero 303

Aero 405 Aerodynamics (3)

Performance analysis of propeller driven and jet powered aircraft. Drag buildup from theory and experimental data. Variation in performance with change of aircraft configuration and propulsive units. 3 lectures. Prerequisite: Aero 404

Aero 406 Aerodynamics (3)

Longitudinal stability and control, static and dynamic stability, wing moments and balance. Factors influencing the stability of the complete airplane. Lateral and directional stability. Design and operation of control surfaces. Compressibility effects. 3 lectures. Prerequisite: Aero 405

Aero 408 Advanced Aircraft Structural Analysis (3)

Indeterminate structures, frame analysis, treatment of plates and shells, shear lag and deformation, effect of skin cutouts, application of structural theory to the design of aircraft components. 3 lectures. Prerequisite: Aero 325

Aero 410 Mechanical Vibrations in Aircraft (3)

Kinematics of harmonic motion, harmonic analysis, the linear single degree of freedom system, dynamic balancing, critical speed of shafts, seismic instruments, two degrees of freedom systems, dynamic vibration absorbers, self-excited vibrations, including an introduction to flutter theory. 3 lectures. Prerequisite: Math 316

Aero 411 Rotary Wing Aircraft (3)

Introduction to the analysis of rotating wing aircraft; hovering, vertical, and translational flights; types of flight control mechanisms; performance and stability of the complete aircraft. 3 lectures. Prerequisite: Aero 303

Aero 412 Missiles (3)

Extension of aeronautical engineering principles to rockets and missiles; theory of design; propulsion systems and controls; flight characteristics and guidance. 3 lectures. Prerequisite: Phys 202, Aero 404

Aero 413 Space Technology (3)

Basic principles of astronautics. Escape velocities and orbital speeds. Trajectories. Satellite vehicles. Descent from satellite orbits. Interorbital transport techniques. Physical factors of space environment. 3 lectures. Concurrent: Aero 403

Aero 444, 445, 446 Aircraft Design Layout (3) (3) (3)

Preliminary aircraft design and calculations; balance diagram and three-view layout drawing; aircraft lofting problems and layout of typical components; stress calculations for components and detail design of major fittings and attachments. 3 laboratories. Prerequisite: Aero 303, 346. Aero 324, if not completed, may be taken concurrently with Aero 444.

Aero 457, 458, 459 Aeronautical Engineering Laboratory (2) (2) (2)

Use of laboratory instruments to develop the technique of obtaining engineering measurements, special assigned problems in the field of aeronautics. 2 laboratories. Prerequisite: Aero 303

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

Selection and completion of a project which is 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.

Aero 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent engineering developments. 2 lectures. Prerequisite: Senior standing.

AIR CONDITIONING AND REFRIGERATION ENGINEERING DEPARTMENT

Department Head, James M. McGrath

Theodore G. Graves

J. A. Hayes

Norman Sharpe

The air conditioning and refrigeration engineering curriculum prepares students for engineering positions with mechanical consulting engineers, manufacturers, contractors, and governmental agencies. Air conditioning refrigeration is now, and will continue to be, a vital and growing need in man's modern society and in man's conquest of space.

The department has modern, well-equipped laboratories and classrooms. Laboratory work in the department is designed to develop skills and engineering techniques. The laboratory and classroom work is organized to parallel closely the type of work the young engineer is usually assigned during his first few years of employment.

Air conditioning and refrigeration engineers concern themselves with furnishing equipment which can produce proper environments for such diverse situations as cold storage plants, modern buildings, hypersonic aircraft and rockets. Maintenance of such environments is necessary either for human comfort or survival, or for material preservation or proper function.

Field trips are taken to the Los Angeles and San Francisco areas each year to inspect outstanding construction and engineering projects.

CURRICULUM IN AIR CONDITIONING AND REFRIGERATION ENGINEERING

Freshman	F	W	S
Air Conditioning Drafting (AC 121, 122, 123)	2	2	2
Plumbing System Design (AC 124, 125, 126)	2	2	2
Duct Construction (AC 127, 128)		2	2
Welding Survey (Weld 157)	2		
Mathematics for Engineers (Math 117)	5		
Analytic Geometry and Calculus (Math 118, 201)		5	3
General Physics (Phys 131, 132)		4	4
Language Communication (Eng 104, 105, 106)	3	3	3
Health Education (PE 107)			2
Physical Education (PE 141, 142, 143)	½	½	½
Electives	2		
	16½	18½	18½
Sophomore			
Heating and Ventilating (AC 201, 202, 203)	3	3	3
Thermal Laboratory (AC 231, 232, 233)	2	2	2
Strength of Materials (ME 202)			3
General Chemistry (Chem 321, 322, 323)	4	4	4
Analytic Geometry and Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
General Physics (Phys 133)	4		
Engineering Statics (Phys 201)		3	
Engineering Dynamics (Phys 202)			3
Public Speaking (Sp 201)	2		
Sports Education (PE 241, 242, 243)	½	½	½
Applied Biology (Bio 110)		3	
	18½	18½	18½

	F	W	S
Junior			
Thermodynamics of Refrigeration (AC 301, 302, 303)	3	4	4
Vibration and Control Engineering (AC 307, 308, 309)	2	2	2
Thermal and Fluid Laboratory (AC 331, 332, 333)	2	2	2
System Design (AC 341, 342, 343)	2	2	2
Electrical Engineering (EE 207, 208)	3	3	
Electrical Engineering Lab (EE 251, 252)	1	1	
Electronics in Engineering (EL 321)			3
Electronic Engineering Laboratory (EL 354)			1
Fluid Flow (ME 311)	4		
Heat Transfer (AC 313)			3
Principles of Economics (Ec 201)		3	
	<hr/>	<hr/>	<hr/>
	17	17	17
Senior			
Advanced Heat and Vapor Transfer (AC 401)	3		
Advanced Fluid Flow (AC 402)		3	
Air Conditioning System Design (AC 441, 442, 443)	3	3	3
Senior Project (AC 461, 462)	2	2	
Undergraduate Seminar (AC 463)			2
Family Psychology (Psy 206)			3
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
The U. S. in World Affairs (Hist 305)			3
Business Law (Bus 301)	3		
Literature or Philosophy		3	
Electives	4	4	4
	<hr/>	<hr/>	<hr/>
	18	18	15

DESCRIPTIONS OF COURSES IN AIR CONDITIONING

AC 118 Orientation (2)

A survey of the applications of refrigeration and air conditioning, and a study of the qualifications required for various positions in the industry. 2 lectures.

AC 121, 122, 123 Air Conditioning Drafting (2) (2) (2)

Principles and practice of mechanical and architectural drafting applied to the installation of equipment, piping, and sheet metal. 1 lecture, 1 laboratory.

AC 124, 125, 126 Plumbing System Design (2) (2) (2)

Material and techniques used in steam, brine refrigerant and water piping. Basic principles applying to the design of water and waste systems, fire protection, sprinkler systems, gas services for commercial and industrial buildings. 1 lecture, 1 laboratory, fall; 2 lectures, winter; 1 lecture, 1 laboratory, spring.

AC 127, 128 Duct Construction (2) (2)

Materials and techniques of low and high velocity duct construction. 1 lecture, 1 laboratory. Prerequisite: AC 121

AC 129 Sheet Metal Fabrication (2)

Familiarization with basic sheet metal techniques, selection of materials, use and care of sheet metal tools and equipment. Design and construction of radio chassis, hoods, and cabinets. Primarily for electronic students. 1 lecture, 1 laboratory.

AC 201, 202, 203 Heating and Ventilating (3) (3) (3)

The study of heating and ventilating equipment and its application to homes, industrial and public buildings. 3 lectures. Prerequisite: Phys 132. Concurrent: Chem 321, 322, 323

AC 231, 232, 233 Thermal Laboratory (2) (2) (2)

Operation and maintenance of refrigeration systems. Instrument familiarization and calibration. Fundamental tests related to the heating, refrigeration and air conditioning field. Performance tests. 1 lecture, 1 laboratory. Prerequisite: Phys 132. Concurrent: AC 201

AC 237 Dairy Boilers and Steam Equipment (2)

The operation and maintenance of steam equipment as applied to the agricultural industry. Course designed for dairy manufacturing, dairy husbandry and food processing majors. 2 lectures.

AC 238, 239 Dairy Refrigeration (2) (2)

The operation and maintenance of refrigeration equipment as applied to the dairy industry, and other agricultural industries. Course designed for dairy manufacturing, dairy husbandry and food processing majors. 2 lectures, winter; 1 lecture, 1 laboratory, spring.

AC 240 Additional Engineering Laboratory (1-2)

Elective project work. Total credit limited to 4 units with not more than 2 units in any one quarter. 1 or 2 laboratories. Prerequisite: AC 127, 128

AC 301, 302, 303 Thermodynamics of Refrigeration (3) (4) (4)

Basic thermodynamics. Equations of state, laws, processes, and cycles including Rankine, Brayton, Compressor, Otto, and Diesel. Thermodynamic analysis of the following refrigeration systems and their components: Single stage vapor, multiple stage cascade, multiple stage compound, air, steam jet, and absorption. Refrigeration controls. Low temperature refrigeration. 3 lectures, fall; 4 lectures, winter and spring. Prerequisite: AC 203, Phys 133, Chem 323. Concurrent: ME 311

AC 306 Survey of Heating and Air Conditioning (3)

Basic principles concerning comfort, health, load calculations and the space required for pipes, ducts and equipment. Course designed for engineering majors other than air conditioning and refrigeration majors. 3 lectures.

AC 307, 308, 309 Vibration and Control Engineering (2) (2) (2)

Vibration, harmonics, architectural acoustics, noise and vibration attenuation in machinery and systems; water treatment; control circuits. 2 lectures. Prerequisite: Phys 133

AC 313 Heat Transfer (3)

Basic principles of heat transfer, radiation, conduction during steady state conditions, convection with gases and liquids, boiling and condensing of fluids during forced and gravity flow conditions. 3 lectures. Prerequisite: ME 311

AC 331, 332, 333 Thermal and Fluid Laboratory (2) (2) (2)

Laboratory tests in controls, thermodynamics, fluid flow, heat transfer and vibration. Performance testing of refrigeration systems, evaporators, condensers, fans, air washers, boilers, grilles, etc. 1 lecture, 1 laboratory, fall and winter; 2 laboratories, spring. Prerequisites: AC 203, 233. Concurrent: AC 301, 302, 303

AC 341, 342, 343 System Design (2) (2) (2)

Individual project work in planning of commercial and industrial heating and refrigeration systems. 2 laboratories. Prerequisites: AC 203. Concurrent: AC 307, 308, 309

AC 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units with not more than 2 units in any one quarter. Individual project work for senior students. 1 or 2 laboratories.

AC 401 Advanced Heat and Vapor Transfer (3)

Transient heat flow, thermal storage, the cooling load, the mass transfer principle applied to combined heat and vapor transfer, selection of heat and vapor transfer equipment. 3 lectures. Prerequisite: AC 313

AC 402 Advanced Fluid Flow (3)

Centrifugal equipment design and performance loss coefficients for high velocity flow, the design of high velocity air conduits as applied to aeronautical, marine or public building air conditioning systems. 3 lectures. Prerequisite: ME 311

AC 441, 442, 443 Air Conditioning System Design (3) (3) (3)

Individual project work in planning of commercial and industrial air conditioning systems. 3 laboratories. Prerequisite: AC 401

AC 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.

AC 463 Undergraduate Seminar (2)

Special studies and technical developments in the field. Individual reports on important research in the refrigeration and air conditioning field. 2 lectures. Prerequisite: Senior standing.

ARCHITECTURAL ENGINEERING DEPARTMENT

Department Head, George J. Hasslein

William H. Brown
Gerald E. Ervin
R. L. Graves, Jr.
Anatol Helman

Kenneth R. Holmes
Hans Mager
William R. Phillips
Rudolph A. Polley

Kenneth E. Schwartz
Wesley S. Ward
Robert E. Williams

The practice of architecture, structural engineering, and the many fields of the building industry provide a wide occupational choice. The curriculum in architectural engineering develops the background and design skills to make graduates employable in these fields.

Emphasis in the early part of the curriculum is on elementary design, construction, working drawings, mathematics, and science. With this background, instruction progresses to more advanced work in architectural and structural design, planning, etc. In the senior year, the student may elect work in architectural or structural design. All student work and designs submitted for course credit become the property of the department.

The four-year curriculum leads to a bachelor of science degree in architectural engineering which the California State Board of Architectural Examiners recognizes as three of the seven years experience required for eligibility to take the examination for an architect's license.

Scarab, honorary professional fraternity, and the American Institute of Architects, sponsor chapters in the department. The Los Angeles chapter of the Producer's Council presents a yearlong lecture series designed to introduce building products to the student. Lectures are also provided by visiting architects and engineers.

Field trips are taken to the Los Angeles and Bay areas each year to inspect outstanding buildings and construction projects.

CURRICULUM IN ARCHITECTURAL ENGINEERING

	F	W	S
Freshman			
Architectural Drafting (Arch 141, 142, 143)	3	3	3
Materials of Construction (Arch 101)	3		
Descriptive Geometry (ME 125)			3
Applied Biology (Bio 110)		3	
Building Codes (Arch 103)			2
Mathematics for Engineers (Math 117)	5		
Analytic Geometry and Calculus (Math 118, 201)		5	3
General Physics (Phys 131, 132)		4	4
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Health Education (PE 107)	2		
Orientation (Arch 104)	1		
Freehand Drawing (Arch 351)			1
	<hr/>	<hr/>	<hr/>
	17½	18½	19½
Sophomore			
Construction and Working Drawings (Arch 241, 242)	3	3	
Architectural Delineation (Arch 245, 246)		2	2
Quantity Survey and Estimating (Arch 202)		2	
Engineering Surveying (AE 237, 238)		2	2
Perspective (Arch 244)	2		
Strength of Materials (Arch 205, 206)		3	3
Theory of Architectural Design (Arch 221, 222, 223)	3	3	3
Analytic Geometry and Calculus (Math 202, 203)	3	3	
General Physics (Phys 133)	4		
Principles of Economics (Ec 201)			3
Sports Education (PE 241, 242, 243)	½	½	½
Electives	2		3
	<hr/>	<hr/>	<hr/>
	17½	18½	16½

	F	W	S
Junior			
Heating and Air Conditioning (AC 306).....			3
Plumbing and Building Sanitation (ME 333).....		3	
Wiring and Codes for Architects (EE 223).....	3		
Architectural Design (Arch 341, 342, 343).....	5	5	5
Stress Analysis (Arch 314).....	3		
Steel and Timber Design (Arch 315).....		3	
Reinforced Concrete Design (Arch 316).....			3
History of Architecture (Arch 304, 305, 306).....	2	2	2
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U.S. in World Affairs (Hist 305).....			3
Business Law (Bus 301).....			3
Public Speaking (Sp 201).....		2	
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	16	18	19
Senior			
* Architectural Design (Arch 441, 442, 443).....	5	5	5
* Structural Design (Arch 401, 402, 403).....	2	2	2
Specifications and Contracts (Arch 404).....	3		
* Office Practice (Arch 454).....			2
Senior Project (Arch 461, 462).....	2	2	
Undergraduate Seminar (Arch 463).....			2
Family Relations (Psy 206).....			3
Literature.....		3	
Electives.....	4	4	3
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	16	16	17

DESCRIPTIONS OF COURSES IN ARCHITECTURAL ENGINEERING

Arch 101 Materials of Construction (3)

The use and application of building materials, structural makeup of buildings. 3 lectures.

Arch 103 Building Codes (2)

Theory and application of laws and codes as they affect architectural construction. 2 lectures.

Arch 104 Orientation (1)

Familiarization with the field of architectural engineering. Development of techniques useful to the student in his academic progress. 1 lecture.

Arch 141, 142, 143 Architectural Drafting (3) (3) (3)

Architectural drafting techniques and standards. Progress from fundamentals to completing light-construction working drawings including the solving of detailing problems. 3 laboratories.

Arch 153 Industrial Presentation Techniques (2)

Architectural symbols and techniques, including presentation. Study of building plans and layouts. Perspective and freehand drawing. 2 laboratories.

Arch 201 City Planning (2)

Familiarization with the principles of planning. Study in community organization, growth, and guidance. 2 lectures.

Arch 202 Quantity Survey and Estimating (2)

Methods and applications in estimating costs and quantities of materials, labor, and equipment. 2 lectures.

* Those students electing to concentrate in Structural Design shall make the following substitutions: General Engineering (Arch 407, 408, 409) for Structural Design (Arch 401, 402, 403); Soil Mechanics (Arch 421, 422) for Office Practice (Arch 454) and Structural Design (Arch 451, 452, 453) for Architectural Design (Arch 441, 442, 443).

Arch 205, 206 Strength of Materials (3) (3)

Physical properties of construction materials. Moment and shear diagrams; axial and eccentric loading; deflection. Sizing of structural members of homogeneous and compound materials. 3 lectures. Prerequisite: Phys 131, Math 201

Arch 221, 222, 223 Theory of Architectural Design (3) (3) (3)

Studies in form, space, color, and materials, and their relation to architectural problems. One designated field trip required. 2 lectures, 1 laboratory.

Arch 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 laboratories.

Arch 241, 242 Construction and Working Drawings (3) (3)

Development of architectural and structural working drawings of medium size buildings. Elementary member sizing. Simulated office conditions. 3 laboratories. Prerequisite: Arch 143

Arch 244 Perspective (2)

Mechanical perspective. 2 laboratories. Prerequisite: ME 125

Arch 245, 246 Delineation (2) (2)

Three-dimensional representation with various drawing media which enable a student to express his architectural ideas. 2 laboratories. Prerequisite: Arch 244

Arch 304, 305, 306 History of Architecture (2) (2) (2)

Periods of architecture, philosophies, and conditions that influenced them. 2 lectures. Prerequisite: Arch 223

Arch 312 Home Design (2)

For students not majoring in architectural engineering. Home planning fundamentals; relation of house to lot and community. Furniture grouping. Landscape and economic considerations. 2 lectures.

Arch 314 Stress Analysis (3)

Stress analysis of statically determinate and indeterminate structures. 3 lectures. Prerequisite: Arch 206

Arch 315 Steel and Timber Design (3)

Design of steel and wood members and their connections. Design of steel and wood buildings for vertical and lateral loads. 3 lectures. Prerequisite: Arch 314

Arch 316 Reinforced Concrete Design (3)

Elements and design of reinforced concrete buildings for vertical and lateral loading. 3 lectures. Prerequisite: Arch 315

Arch 341, 342, 343 Architectural Design (5) (5) (5)

The development of the student's logic and creative abilities in the application of skills to the solution of planning problems. One designated field trip required. 5 laboratories. Prerequisite: Arch 206, 223, 242, 246

Arch 351, 352, 353 Freehand Drawing (1) (1) (1)

Exercises in drawing without mechanical aids. 1 laboratory.

Arch 354, 355, 356 Water Color (1) (1) (1)

Outdoor sketching with water color. 1 laboratory.

Arch 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or two laboratories.

Arch 401 Structural Design (2)

Stress analysis of long-span structures. Haunched members. 2 lectures. Prerequisite: Arch 316, 343, Math 203, Phys 133

Arch 402 Structural Design (2)

Design of steel and wood structures continued. 2 lectures. Prerequisite: Arch 401

Arch 403 Structural Design (2)

Design of reinforced concrete structures continued. 2 lectures. Prerequisite: Arch 402

Arch 404 Specifications and Contracts (3)

The elements, structure, and writing of specifications. Legal aspects of architectural engineering. 3 lectures.

Arch 407, 408, 409 General Engineering (2) (2) (2)

Civil engineering applications of chemistry, hydraulics, and dynamics. 2 lectures. Prerequisite: Arch 316, Math 203, Phys 133

Arch 411 Advanced Structural Design (2)

Theory and design of nonrectangular frames and arches. Influence lines. Moving loads on framed structures. 2 lectures. Prerequisite: Arch 316

Arch 412 Advanced Structural Design (2)

Advanced study of welded structures. Prestressed concrete. Pools and tanks. Shell concrete structures. 2 lectures.

Arch 413 Advanced Structural Design (2)

Lightweight aggregates. Tilt-up and lift-slab construction. Light-gauge steel structures. Laminated glued wood arches. 2 lectures.

Arch 415 Current Practice in Related Fields (2)

Visiting practitioners provide instruction in topics related to the architectural engineering field: business methods; law; real estate; contracting; highway and bridge design; management, etc. 2 lectures.

Arch 421, 422 Soil Mechanics and Foundations (3) (3)

Principles and applications of soil mechanics; types of foundation construction; design of foundations for buildings and bridges. 2 lectures. 1 laboratory. Prerequisite: Arch 316, Math 203, Phys 133

Arch 441, 442, 443 Architectural Design (5) (5) (5)

Advanced problems relating the students' engineering skills with the social, economic, and esthetic aspects of architectural design. 5 laboratories. Prerequisite: Arch 316, 343

Arch 451, 452, 453 Structural Design (5) (5) (5)

Stress analysis of long-span structures, arches, influence lines, plate girders, multiple-storied rigid frame structures. Prestressed concrete, shells and domes. Introduction to dams and bridges. Theory and applications. 5 laboratories. Prerequisite: Arch 316, 343, Math 203

Arch 454 Office Practice (2)

Architectural office administration and procedures in the development of architectural and structural drawings. 2 laboratories. Prerequisite: Arch 316, 343

Arch 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. Prerequisite: Arch 343, 316

Arch 463 Undergraduate Seminar (2)

Discussion and lectures on problems of architectural firms and the building industry. Professional ethics. Students present organized material on some subject of interest in architectural engineering. 1 lecture, 1 laboratory. Prerequisite: Arch 462

ELECTRICAL ENGINEERING DEPARTMENT

Department Head, Fred W. Bowden

Warren R. Anderson
Richard K. Dickey

E. L. Fryberger
George S. Furimsky
Russell Korsmeyer

Alexander Landyshev
Jan T. van Asperen

The curriculum in electrical engineering provides instruction in the theory and practice of electrical engineering and in addition the necessary training in such closely related fields as thermal and mechanical engineering. Throughout the program stress is put on teaching the language of the engineer, visualization and physical concepts. The principles of mathematics and physical science are carefully integrated with the theory and practice of electrical engineering in order that the student may obtain a good theoretical understanding of his major. Practical engineering projects which combine ideas, equipment, and processes are encouraged in the design work and laboratory instruction.

Employers of graduates from the department include manufacturers, industrial laboratories, operating companies, construction organizations, and governmental agencies. Graduates serve in capacities such as those of product design and development engineers, sales engineers, and managers.

The laboratories are well equipped with apparatus and instruments. The shop facilities simulate conditions found in industry. Laboratory work is designed to develop self-confidence and technical ability as well as to illustrate theory.

CURRICULUM IN ELECTRICAL ENGINEERING

Freshman	F	W	S
Electric Technology (EE 101, 102, 103)	2	2	2
Electric Shop (EE 141, 142, 143)	2	2	2
Orientation (EE 151)	1		
Electric Laboratory (EE 152, 153)		1	1
Engineering Drafting (ME 151, 152)	1	1	
Electrical Drafting (EE 146)			1
Machine Shop (MS 142)			1
Mathematics for Engineers (Math 117)	5		
Analytic Geometry and Calculus (Math 118, 201)		5	3
General Physics (Phys 131, 132)		4	4
Language Communication (Eng 104, 105, 106)	3	3	3
Health Education (PE 107)	2		
Physical Education (PE 141, 142, 143)	½	½	½
	<u>16½</u>	<u>18½</u>	<u>17½</u>
Sophomore			
Fundamentals of Electrical Engineering (EE 211, 212, 213)	3	3	3
Electrical Laboratory (EE 241, 242, 243)	1	1	1
Machine Shop (MS 144)	1		
Welding (Weld 151, 154)	1	1	
Analytic Geometry and Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
Engineering Problems (Math 213)		2	
Introduction to Optics and Atomic Physics (Phys 211)	4		
Engineering Statics (Phys 201)	3		
Engineering Dynamics (Phys 202)		3	
Strength of Materials (ME 202, 203)		3	3
Strength of Materials Laboratory (ME 249)			1
Principles of Economics (Ec 201)			3
Applied Biology (Bio 110)			3
Public Speaking (Sp 201)		2	
Sports Education (PE 241, 242, 243)	½	½	½
	<u>16½</u>	<u>18½</u>	<u>17½</u>

	F	W	S
Junior			
Electric Circuits (EE 301, 302, 303)	3	3	3
Circuits Laboratory (EE 341, 342)	1	1	
Electric Machines (EE 304, 305, 306)	2	3	3
Electric Machine Laboratory (EE 344, 345, 346)	1	1	1
Electronics (EE 314, 315, 316)	3	3	3
Electronics Laboratory (EE 355, 356)		1	1
Differential Equations (Math 317)	2		
Mathematical Analysis of Engineering Problems (Math 319)			3
General Chemistry (Chem 321, 322)	4	4	
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
	<hr/>	<hr/>	<hr/>
	19	19	17
Senior			
Senior Project (EE 461, 462)	2	2	
Undergraduate Seminar (EE 463)			2
Control Systems (EE 401)	3		
Electrical Laboratory (EE 441)	1		
Electrical Engineering Design (EE 422)		5	
Ethics in Engineering (EE 466)			2
Heat (Phys 301)	3		
Heat Transfer (ME 411)		3	
Power Laboratory (ME 352)		1	
Fluid Flow (ME 311)	4		
Industrial Management (LMR 311)		3	
Family Relations (Psy 206)			3
Literature			3
Electives	4	4	5
	<hr/>	<hr/>	<hr/>
	17	18	15

DESCRIPTIONS OF COURSES IN ELECTRICAL ENGINEERING

EE 101, 102, 103 Electric Technology (2) (2) (2)

Elements of electricity and magnetism. Direct and alternating current circuits. 2 lectures.

EE 122 Electrical Analysis (2)

Elements of electricity; simple electric and magnetic circuits. Electric circuit drawings, codes, and wiring. DC and AC machine windings and construction. 1 lecture, 1 laboratory.

EE 131, 132 Electrical Technology (3) (3)

Wiring materials and how to use them; electric codes; simple electric and magnetic circuits; troubleshooting; repair of electrical equipment. 2 lectures, 1 laboratory.

EE 133 Electric Machines (3)

Construction, installation, service and repair of electric motors. 2 lectures, 1 laboratory.

EE 141, 142, 143 Electric Shop (2) (2) (2)

Wiring materials and wiring. Use of hand tools. Shop practice. Construction and operation of DC machines, AC machines and transformers. Sketching. 2 laboratories.

EE 146 Electrical Drafting (1)

Drawing of electric circuits and machines. Industry drawing standards. Graphs. 1 laboratory. Prerequisite: ME 152

EE 151 Orientation (1)

Familiarization with the field of electrical engineering. Development of techniques useful to the student in his academic progress. 1 laboratory.

EE 152, 153 Electric Laboratory (1) (1)

How to set up experiments, take laboratory notes and write reports. Elementary work with meters and circuit elements. 1 laboratory. Prerequisite: EE 101, 102

EE 207, 208 Electrical Engineering (3) (3)

Electrical principles. Electric and magnetic circuits. Electrical machines. Machine controls and applications. Industrial wiring systems. Control and measurements. For non-electrical engineering majors. 3 lectures. Prerequisite: Math 201, Phys 133

EE 211, 212, 213 Fundamentals of Electrical Engineering (3) (3) (3)

Magnetic circuits. Electric circuits and parameters. Networks and network theorems. Energy sources. Symbolic and vector treatment. Introduction to polyphase circuits. 3 lectures. Prerequisite: Math 201

EE 221 Electricity for Printers (2)

Fundamentals of operation, testing, and maintenance of electrical equipment used in small printing plants. Electrical machines and controls for slug and materials casting. 1 lecture, 1 laboratory.

EE 223 Wiring and Codes for Architects (3)

Elements of electricity. Electric circuits. Direct current voltage, current, and power. Alternating currents. Effective voltage and current. Power factor. Wiring installations. Code requirements. Devices used. Layout of electrical installations. Writing specifications. 3 lectures. Prerequisite: Phys 133

EE 240 Additional Engineering Laboratory (1-2)

Total credit limited to four units, with not more than two units in any one quarter. 1 or 2 laboratories.

EE 241, 242, 243 Electrical Laboratory (1) (1) (1)

Calibration and use of electrical measuring instruments. Selected laboratory exercises in electrical engineering. 1 laboratory. Concurrent: EE 211, 212, 213

EE 251, 252 Electrical Engineering Laboratory (1) (1)

Use of electric meters. Experiments and exercises involving direct and alternating current circuits, machines and their controls. 1 laboratory. Concurrent: EE 207, 208

EE 301, 302, 303 Electric Circuits (3) (3) (3)

The power transmission line. Power systems. Review of networks. Introduction of the complex variable. Poles and zeros of functions and networks. Numerical procedures. Introduction to synthesis. Transients. 3 lectures. Prerequisites: EE 213, Math 317

EE 304, 305, 306 Electric Machines (2) (3) (3)

Extension of circuit theory to machines. Transformers. Induction, synchronous, direct current and special machines. 2 lectures, fall; 3 lectures, winter and spring. Prerequisite: EE 213

EE 309 Rotating and Magnetic Amplifiers (3)

Characteristics of non-vacuum-tube amplifiers. Application and analysis. 3 lectures. Prerequisite: EE 213

EE 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. 3 lectures. Prerequisite: EL 206

EE 314, 315, 316 Electronics (3) (3) (3)

Electron tubes. Transistors. Active networks. 3 lectures. Prerequisite: EE 213

EE 327 Illumination (3)

Theory and practice of illumination. Mechanical and electrical problems in installation and control of lighting sources. Measurement of light. 2 lectures, 1 laboratory. Prerequisite: EE 213 or EE 208 or EE 223

EE 341, 342 Circuits Laboratory (1) (1)

Study of electric circuits in the laboratory. Distributed constant systems. 1 laboratory. Concurrent: EE 301, 302

EE 344, 345, 346 Electric Machine Laboratory (1) (1) (1)

Transformers and induction machines. Synchronous machines. Direct current and special machines. 1 laboratory. Concurrent: EE 304, 305, 306

EE 355, 356 Electronics Laboratory (1) (1)

Electron tube characteristics. Transistor characteristics. Study of active networks. 1 laboratory. Concurrent: EE 315, 316

EE 400 Special Problems for Advanced Undergraduates (1-2)

Arrangements to be made with department head. Limited to 4 units, with not more than 2 units in any one quarter.

EE 401 Control Systems (3)

Fundamentals of automatic feedback control systems. Analysis and introduction to design of linear systems. 3 lectures. Prerequisite: EE 303

EE 407 Power System Analysis (3)

Equivalent circuits. Sequence impedances. Symmetrical components. Faults and sudden loads. 3 lectures.

EE 422 Electrical Engineering Design (5)

Application of engineering analysis to design problems. Creative thinking emphasized. Group and individual assignments. 2 lectures, 3 laboratories. Prerequisite: senior standing in Electrical Engineering.

EE 428 Dynamic Instrumentation (3)

Electrical measurement of non-electrical phenomena. Transducers. Transmission systems. Recorders. Theory and operation. 2 lectures, 1 laboratory. Prerequisite: EE 303, 315

EE 431 Introduction to Analog Computers (4)

General background. Theory of operation. Fields of application. Laboratory work with typical computers. 2 lectures, 2 laboratories. Prerequisite: Math 317

EE 432 Digital Computers (4)

Field of useful applications. Theory of operation. Programming techniques. Laboratory experience in computer operation. 2 lectures, 2 laboratories. Prerequisite: Permission of the instructor.

EE 441 Electrical Laboratory (1)

Advanced servomechanisms laboratory arranged for individual study. 1 laboratory. Concurrent: EE 401

EE 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.

EE 463 Undergraduate Seminar (2)

Special studies and recent technical developments in the field. Student presentation of topics, class panel discussion. Survey of recent publications. 2 meetings.

EE 466 Ethics in Engineering (2)

Introduction to business and legal aspects of engineering. Ethics as applied to the practice of engineering. 2 seminars.

ELECTRONIC ENGINEERING DEPARTMENT

Department Head, Clarence Radius

Nathan Chaney	S. C. Gupta	Fred H. Steuck
Clifford B. Cloonan	Harold J. Hendriks	James R. Wills
Jerry L. Dillion	C. A. Herald	Harry K. Wolf
Clifford E. Fisher	Irvin J. Kogan	

The program of the Electronic Engineering Department prepares students for the new branch of engineering which is concerned primarily with the transmission, reception and utilization of electrical signals for all types of communication, automatic control and high speed computation.

The instructional program of the department is product-oriented, and is therefore concerned chiefly with engineering activity dealing with product development, design, manufacture, application, sales and service. This goal is achieved by integrating the science and art of engineering. The laboratory, shop, and engineering drawing room are of equal importance with the classroom lecture. The student works in an environment which conditions him to derive creative satisfaction from true engineering achievement which is essentially a learning-by-doing process.

The four-year program is planned so that the student starts with a series of freshman courses in electronic technology and related skills. Simultaneously he is preparing himself in mathematics and science for later engineering courses which follow the calculus. This plan provides (1) an opportunity to explore a chosen field upon entering college, (2) skills and techniques for summer or early full-time employment as a well-rounded technician, and (3) strong motivation for the study of mathematics and science. The core of the department's program consists of two six-quarter sequences in the sophomore and junior years: (1) a sequence in basic passive circuit theory including modern methods of analysis by poles-zeros in the complex frequency plane and linear transform theory, (2) a parallel sequence in the physics and circuitry of linear and non-linear electron devices. In the senior year the student explores such areas as microwave electronics, digital circuitry, and computer and control systems with treatments based on the level of analysis established in earlier courses. The engineering laboratory work is planned to prepare the student for the typical work of the young electronic engineer in industry, with special emphasis on the science of measurement and the technology of instrumentation.

The learning-process and the doing-process are brought into sharp focus in the senior year when the student engages in constructive project work which draws on all phases of his training. It is here that the student is impressed with the fundamental fact that engineers are paid to put ideas, hardware, and processes together to form something of technical and economic value. Here the goal is to synthesize the known and useful, rather than search for the unknown.

The department occupies a very modern facility which has been carefully designed for this type of engineering education. There are five large and extensively equipped laboratories, a project room with adjoining drafting and model shop, an instrument repair room and several small auxiliary rooms.

The department was established in 1946. Between 1949 and 1959 the department graduated over four hundred engineers who have established a distinctive reputation for this engineering program in manufacturing concerns, government laboratories and defense installations, broadcast stations, oil companies, utilities and sales organizations.

Two organized clubs sponsor a very active program of professional and co-curricular activities: the Student Branch of The Institute of Radio Engineers (one of the ten largest branches of this national engineering organization) and the Amateur Radio Club which operates a modern and well equipped station W6BHZ.

CURRICULUM IN ELECTRONIC ENGINEERING

	F	W	S
Freshman			
Electronic Technology (EL 101, 102)	3	3	
Electronic Instruments (EL 113)			3
Electronics Shop (EL 141, 142)	2	2	
Electronic Instrument Shop (EL 153)			2
Machine Shop (MS 142, 144)	1	1	
Welding (Weld 151, 158)	1	1	
Sheet Metal Fabrication (AC 129)			2
Engineering Drafting (ME 141, 142)	2	2	
Graphics in Electronics (EL 146)			2
Mathematics for Engineers (Math 117)	5		
Analytic Geometry and Calculus (Math 118, 201)		5	3
General Physics (Phys 131, 132)		4	4
Applied Biology (Bio 110)	3		
Health Education (PE 107)			2
Physical Education (PE 141, 142, 143)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<u>17$\frac{1}{2}$</u>	<u>18$\frac{1}{2}$</u>	<u>18$\frac{1}{2}$</u>
Sophomore			
Introductory Circuit Analysis (EL 204, 205, 206)	4	3	3
Introductory Circuits Laboratory (EL 245, 246)		1	1
Electron Devices (EL 207, 208, 209)	2	2	2
Physical Electronic Laboratory (EL 248, 249)		1	1
Analytic Geometry and Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
Introduction to Optics and Atomic Physics (Phys 211)	4		
Engineering Statics (Phys 201)		3	
Engineering Dynamics (Phys 202)			3
Language Communication (Eng 104, 105, 106)	3	3	3
Sports Education (PE 241, 242, 243)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives	2	2	2
	<u>18$\frac{1}{2}$</u>	<u>18$\frac{1}{2}$</u>	<u>18$\frac{1}{2}$</u>
Junior			
Transmission Networks (EL 301)	2		
Linear Transform Analysis (EL 302, 303)		2	2
Transmission Network Laboratory (EL 341, 342)	1	1	
Electronic Analog Computer Laboratory (EL 343)			1
Electronic Circuits (EL 304, 305)	3	3	
Introduction to Pulse Circuits (EL 306)			3
Electronic Circuits Laboratory (EL 344, 345)	1	1	
Pulse Circuits Laboratory (EL 346)			1
Design in Electronics Production (EL 309)			2
Electric Machines (EE 313)		3	
Engineering Materials (ME 314)			3
Differential Equations (Math 317)	2		
Chemistry (Chem 321, 322)	4	4	
Heat (Phys 301)	3		
Principles of Economics (Ec 201)		3	
Industrial Management (LMR 311)			3
Literature			3
Elective	1		
	<u>17</u>	<u>17</u>	<u>18</u>

Senior	F	W	S
Microwave Electronics (EL 401, 402).....	2	2	
Control Systems Engineering (EL 413).....			3
Pulse and Digital Circuitry (EL 404).....	2		
Pulse Systems (EL 405).....		2	
Electronic Systems Engineering (EL 441, 442, 443).....	1	1	1
Solid State Physics (Phys 412).....		3	
Restricted Electives (see note 1).....			6
Senior Project (EL 461, 462).....	2	2	
Undergraduate Seminar (EL 463).....			2
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U. S. in World Affairs (Hist 305).....			3
Family Psychology (Psy 206).....	3		
Business Statements (Bus 416).....			1
Electives.....	3	3	
	16	16	16

NOTE 1: Restricted electives: Vector Fields and Waves (EL 403), Principles of Digital Computers (EL 406), Principles of Analog Computers (EL 412), Network Synthesis (EL 411).

DESCRIPTIONS OF COURSES IN ELECTRONIC ENGINEERING

EL 101, 102 Electronic Technology (3) (3)

Fundamentals of electronic components and unit circuits. Application of components and unit circuits in electronic systems, specifically in radio and television receivers. 3 lectures.

EL 113 Electronic Instruments (3)

Survey of electronic instruments. Principles of operation and use of important electronic instruments. 3 lectures. Prerequisite: EL 102, 142. Concurrent: Math 118

EL 123 Electronic Analysis (2)

Elements and applications of electronic devices. Operation and testing of electronic components and units. 1 lecture, 1 laboratory. Not open to EL majors.

EL 131, 132, 133 Introduction to Electronics (3) (3) (3)

Fundamentals and application of electricity to radio. Emphasis is on basic circuits, instruments, construction, service and repair. 2 lectures, 1 laboratory. Not open to EL majors.

EL 141, 142 Electronics Shop (2) (2)

Directed jobs facilitating an understanding of electronic components, unit electronic circuits, and the radio and television receiver systems. Use of test equipment in the adjustment of these units. 2 laboratories.

EL 146 Graphics in Electronics (2)

Schematic drafting and delineation. Electronic and industrial symbols. Reproduction processes. Printed circuits. Technical sketching. Graphic integration. 1 lecture, 1 laboratory. Prerequisite: ME 142, EL 102

EL 153 Electronic Instrument Shop (2)

Directed projects investigating the more common electronic instruments and their use to measure voltage, current, wave form, frequency, phase, component values, etc. 2 laboratories. Concurrent: EL 113

EL 204, 205, 206 Introductory Circuit Analysis (4) (3) (3)

Magnetic and electric fields and circuits. Work, power and energy relationships. Direct and alternating current networks. Network theorems. Coupled circuits. Fourier analysis. Principally linear elements with sinusoidal driving functions. 4 lectures, fall; 3 lectures, winter and spring. Prerequisite: Math 201, Phys 132

EL 207 Electron Devices (2)

Graphic analytical study of electron tubes and solid state devices based upon volt-ampere characteristics. Definition and evaluation of parameters of these devices. 2 lectures. Concurrent: EL 204

EL 208 Electron Devices (2)

Physical analytical study of electron tubes and solid state devices based upon control of charged particles and laws of modern physics. 2 lectures. Prerequisite: Phys 211

EL 209 Electron Devices (2)

Equivalent circuit analysis of electron tubes and solid state devices based on four-terminal network theory. Small signal amplification. 2 lectures. Concurrent: EL 206

EL 240 Additional Engineering Laboratory (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter.

EL 245, 246 Introductory Circuits Laboratory (1) (1)

Selected laboratory experiments in the subject matter of EL 204, 205, 206. Emphasis placed on laboratory procedure in collecting, correlating, graphing, and evaluating laboratory data. 1 laboratory. Concurrent: EL 205, 206

EL 248, 249 Physical Electronic Laboratory (1) (1)

Fundamental experiments investigating the physical and electrical properties of the more common types of electron tubes, semiconductors, and transistors. Emphasis placed on collecting, correlating, graphing, and evaluating laboratory data. 1 laboratory. Concurrent: EL 208, 209

EL 301 Transmission Networks (2)

General two-port network theory and treatment of circuits with distributed parameters. Lines, matrices, impedance charts. 2 lectures. Prerequisite: EL 206, Math 316

EL 302, 303 Linear Transform Analysis (2) (2)

The Fourier integral, and the complex frequency plane. Response of networks to general driving functions by Laplace transform and pole-zero methods. Analysis and synthesis of frequency selective networks. 2 lectures. Prerequisite: EL 301, Math 317

EL 304 Electronic Circuits (3)

Analytical study of electron tube and transistor circuits for the amplification of voltage, current and power at audio and radio frequencies. Cascaded stages. Feedback. 3 lectures. Prerequisite: EL 206, 209, Math 316

EL 305 Electronic Circuits (3)

Analytical study of oscillator, modulator, frequency-changer and demodulator circuits for amplitude, frequency and phase modulation systems. Application to communication and instrumentation systems. 3 lectures. Prerequisite: EL 304

EL 306 Introduction to Pulse Circuits (3)

Graphical and quasi-analytical study of wave shaping, pulse forming and timing circuits; monostable, bistable and astable multivibrators. Equal consideration given to circuits employing electron tubes and transistors. 3 lectures. Prerequisite: EL 302, 305

EL 309 Design in Electronics Production (2)

Space planning. Chassis design, layout, and fabrication. Shielding. Potting and encapsulating. Wiring and soldering. Assembly methods. Environmental factors in equipment design. 2 lectures. Prerequisite: EL 304

EL 313 Analog Computer Techniques (3)

Course designed for mathematics, science and engineering majors other than electrical and electronic. Fundamental principles of analog computers, field of application in science, and engineering. Programming techniques. Output devices. 3 lectures. Prerequisite: Math 203

EL 314 Digital Computer Techniques (3)

Course designed for mathematics, science and engineering majors other than electrical and electronic. Fundamental principles of digital computers, fields of application in science and engineering. Programming techniques. Output devices. 3 lectures. Prerequisite: Math 203

EL 321 Electronics in Engineering (3)

Elements of electronics with emphasis on the theory, operation and application of some of the more common types of electronic instruments. Course designed for engineering majors other than electrical and electronic. 3 lectures. Prerequisite: EE 207, 208

EL 322 Applied Electronics (3)

Characteristics of electronic systems and instruments with emphasis on applications in measurement and control of industrial processes. Methods of control for sequential and continuous operations. Course designed for engineering majors other than electrical and electronic. 3 lectures. Prerequisite: EL 321, 354

EL 341, 342 Transmission Network Laboratory (1) (1)

Experimental study of alternating current network characteristics, filters and transmission lines. Use of transmission lines as circuit elements. Impedance charts. 1 laboratory. Concurrent: EL 301, 302

EL 343 Electronic Analog Computer Laboratory (1)

Laboratory study of analog computers and auxiliary equipment. Solution of engineering problems and simulation of physical systems on the analog computer. 1 laboratory. Prerequisite: EL 304

EL 344 Electronic Circuits Laboratory (1)

Experimental study of audio and radio frequency voltage, current and power amplifiers using electron tubes and transistors. Performance testing of amplifiers using EIA-IRE standard procedures. 1 laboratory. Concurrent: EL 304

EL 345 Electronic Circuits Laboratory (1)

Experimental study of oscillators, modulators, frequency changers and demodulators using electron tubes and transistors. Performance testing of typical circuits using EIA-IRE standard procedures. 1 laboratory. Concurrent: EL 305

EL 346 Pulse Circuits Laboratory (1)

Experimental study of wave shaping and pulse-forming circuits using electron tubes and transistors. Pulse measuring techniques. 1 laboratory. Concurrent: EL 306

EL 354 Electronic Engineering Laboratory (1)

Fundamental experiments designed to familiarize the student with amplification, oscillation, detection applied to noncommunication circuits. Emphasis placed on the use of electronic instruments. 1 laboratory. Concurrent: EL 321

EL 355 Applied Electronics Laboratory (1)

Fundamental experiments designed to familiarize the student with amplification, and control systems for automatic control of sequential and continuous processes. 1 laboratory. Concurrent: EL 322

EL 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories. Senior status required.

EL 401, 402 Microwave Electronics (2) (2)

Fundamentals of transit-time devices for the generation of microwaves. Development of Maxwell's equations and the wave equation in scalar form, with emphasis on physical concepts. Properties of microwave components and radiating structures. 2 lectures. Prerequisite: EL 301, 305

EL 403 Vector Fields and Waves (3)

Maxwell's equations in vector notation. Propagation of waves in dielectric, conducting and partially conducting media. Electromagnetic waves in rectangular and circular guides. Analysis of radiating systems. 3 lectures. Prerequisite: EL 401, 402

EL 404 Pulse and Digital Circuitry (2)

Design and analysis of amplifier networks using transform theory. Delay element. Synchronization. Voltage comparators. Digital computer circuits. 2 lectures. Prerequisite: EL 306, Math 317

EL 405 Pulse Systems (2)

Integration of pulse circuits into systems. Pulse modulation and its reliability in communications and telemetry. 2 lectures. Prerequisite: EL 404

EL 406 Principles of Digital Computers (3)

Study of computer logic. Types of functional elements in digital computers. Design of the complete digital computer. 3 lectures. Prerequisite: EL 405

EL 411 Network Synthesis (3)

Modern circuit synthesis concepts and methods as applied to typical communication and control systems. Treatment of the approximation problem and techniques of network realization. 3 lectures. Prerequisite: EL 303

EL 412 Principles of Analog Computers (3)

Principles of design and operation of the electronic analog computer. Application to problems in mathematics, science and engineering. Programming and scaling techniques. Output devices. 3 lectures. Prerequisite: EL 346

EL 413 Control Systems Engineering (3)

Analysis of dynamic electromechanical feedback control systems including root-locus and frequency response techniques. 3 lectures. Prerequisite: EL 303

EL 441, 442, 443 Electronic Systems Engineering (1) (1) (1)

Advanced laboratory study dealing with subject matter of the senior lecture courses. Work takes on the aspects of project engineering. 1 laboratory. Concurrent registration in a senior year lecture course.

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

Selection and completion of a project under a minimum of supervision. Project results are presented in a formal report. Minimum 120 hours total time.

EL 463 Undergraduate Seminar (2)

Discussion of new developments in the fields of communications and industrial electronics, with particular reference to fields of employment. Job analysis. 2 lectures.

INDUSTRIAL ENGINEERING DEPARTMENT

Department Head, Millard J. Fotter

Erling A. Breckan
George W. CockrielRobert P. Gerard
George E. Hoffman

Industrial Engineering is concerned with engineering systems and management control systems. With relation to engineering systems, industrial engineering is the science of utilizing and co-ordinating men, equipment and materials to attain a desired quantity and quality of output at a specified time and at the most favorable cost. With relation to management control systems, it is the science of effective utilization of the human resources of an enterprise, through design of organization structures and administrative techniques.

The curriculum, leading to the Bachelor of Science Degree, combines a thorough understanding of the fundamentals of engineering with a broad background in manufacturing processes, statistics, accounting, economics, social sciences, and management.

The industrial engineer has responsibility in matters of labor management, cost reduction and control, quality control, methods, planning, plant layout, and design of systems. He works closely with, and must understand the employee and operating problems of management. This curriculum qualifies graduates for positions in these areas of job activities.

Excellent facilities are available in the industrial engineering laboratories for development and preparation of the student in the above areas.

CURRICULUM IN INDUSTRIAL ENGINEERING

Freshman	F	W	S
Introduction to Industrial Engineering (IE 101).....	2		
Systems and Procedures (IE 132, 133).....		2	2
Mechanical Analysis (IE 121).....	2		
Electrical Analysis (EE 122).....		2	
Electronic Analysis (EL 123).....			2
Sheet Metal Fabrication (AC 129).....			2
Welding (Weld 151, 154, 155).....	1	1	1
Machine Shop (MS 141, 142, 144).....	1	1	1
Engineering Drafting (ME 141, 142).....	2	2	
Industrial Presentation Techniques (Arch 153).....			2
Mathematics for Engineers (Math 117).....	5		
Analytic Geometry and Calculus (Math 118, 201).....		5	3
Language Communication (Eng 104, 105, 106).....	3	3	3
Health Education (PE 107).....			2
Physical Education (PE 141, 142, 143).....	½	½	½
	16½	16½	18½
Sophomore			
Manufacturing Processes (IE 221, 222, 223).....	2	2	2
Production Tooling and Design (IE 231).....	2		
Industrial Inspection (IE 232).....		2	
Analytic Geometry and Calculus (Math 202, 203).....	3	3	
Differential Equations (Math 316).....			3
General Physics (Phys 131, 132, 133).....	4	4	4
Engineering Statics (Phys 201).....		3	
Engineering Dynamics (Phys 202).....			3
Technical Writing (Eng 219).....	3		
Principles of Economics (Ec 201).....	3		
Basic Accounting (Actg 131, 132).....		3	3
Sports Education (PE 241, 242, 243).....	½	½	½
Electives		1	2
	17½	18½	17½

	F	W	S
Junior			
Motion and Time Study (IE 321).....	3		
Production Planning: Operational Analysis (IE 322).....		3	
Production Planning: Plant Layout (IE 323).....			3
Materials Handling (IE 331).....	2		
Production Control (IE 332).....		3	
Linear Programming (IE 333).....			3
Strength of Materials (ME 202, 203).....	3	3	
Strength of Materials Laboratory (ME 249).....		1	
Elements of Machine Design (ME 423).....			4
Electrical Engineering (EE 207, 208).....	3	3	
Electrical Engineering Laboratory (EE 251, 252).....	1	1	
Electronics in Engineering (EL 321).....			3
Electronic Engineering Laboratory (EL 354).....			1
General Chemistry (Chem 321, 322).....	4	4	
Business Statements (Bus 416).....	1		
American Government (Pol Sc 301).....			3
Electives	1		1
	<hr/>	<hr/>	<hr/>
	18	18	18
Senior			
Sales Engineering (IE 424).....	2		
Supervision Fundamentals (IE 441, 442, 443).....	1	1	1
Production Management (IE 421, 422, 423).....	3	3	3
Statistical Quality Control (IE 431).....	3		
Senior Project (IE 461, 462).....	2	2	
Undergraduate Seminar (IE 463).....			2
* Thermodynamics (ME 301).....	3		
Applied Biology (Bio 110).....		3	
Commercial Law (Bus 301).....			3
Literature		3	
Family Relations (Psy 206).....			3
Growth of American Democracy (Hist 304).....	3		
U. S. in World Affairs (Hist 305).....		3	
Electives	1	2	4
	<hr/>	<hr/>	<hr/>
	18	17	16

DESCRIPTIONS OF COURSES IN INDUSTRIAL ENGINEERING

IE 101 Introduction to Industrial Engineering (2)

Historical development of the industrial economy. The role of industrial engineering in the business enterprise. Basic principles of industrial management and organization. Review and analysis of the components of an industrial organization such as sales, personnel, engineering, purchasing, and production control. Fundamentals of administration. 2 lectures.

IE 121 Mechanical Analysis (2)

Study of the techniques used in compiling and preparation of data for engineering reports. Engineering units and conversion factors. Fundamentals, principles, and applications of precision measurement. Laboratory exercises and demonstrations using engineering systems. 1 lecture, 1 laboratory.

IE 132, 133 Systems and Procedures (2) (2)

Fundamentals and analytical concepts of office systems and procedures. Industrial engineering techniques applied to the formulation of work systems; forms control, filing, working environment, office location, and layout. Principles of organization and administration of production control in records management. 1 lecture, 1 laboratory.

IE 143 Production Processes (2)

Study of mass production processes and tools with emphasis on metal and plastic forming and metal casting and finishing processes. For non-industrial engineering majors. 2 laboratories. Prerequisite: MS 144

* Heat (Phys 301) can be substituted.

IE 204 Industrial Safety (2)

History of industrial safety; fire prevention; personal protective equipment; health hazards; machinery safeguards; electrical hazards; plant inspection; accident insurance. 2 lectures.

IE 221, 222, 223 Manufacturing Processes (2) (2) (2)

A study of the manufacturing processes in industrial operations. Fundamental principles and application concepts of equipment and special tools used in mass production. Methods and equipment applications for machine-tool, punch-press, forging, casting, welding, plastics and powder metallurgy operations. Finishing processes consisting of heat treatment, surface conditioning including plating, degreasing and organic finishing materials. 1 lecture, 1 laboratory. Prerequisite: MS 144

IE 231 Production Tooling and Design (2)

Theory and fundamentals of metal cutting including selection and use of cutting tools. Principles and applications of tooling for production including basic design considerations. 1 lecture, 1 laboratory. Prerequisite: MS 144

IE 232 Industrial Inspection (2)

Fundamental theory of inspection including inspection tools, techniques and methods. Dimensional control concepts and methods of non-precision instruments and precision tools and instruments. Testing for physical and mechanical properties and superficial inspection methods. Organization and management of inspection functions. 1 lecture, 1 laboratory. Prerequisite: IE 231

IE 240 Additional Engineering Laboratory (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter.

IE 321 Motion and Time Study (3)

A study of motion and time study as a management tool. Principles of motion economy; work simplification; micromotion analysis; theory and practice of time study, performance rating, and allowances; standard data. 2 lectures, 1 laboratory. Prerequisite: IE 223

IE 322 Production Planning: Operation Analysis (3)

Research and product development; process and product analysis; operation process charts; equipment, material, and personnel requirements; standardization and diversification; cost control; plant location. 2 lectures, 1 laboratory. Prerequisite: IE 321

IE 323 Production Planning: Plant Layout (3)

Theory, principles, and techniques for effective plant layout; location and layout of production departments, service facilities, and offices; plot plan development. 2 lectures, 1 laboratory. Prerequisite: IE 322

IE 331 Materials Handling (2)

Organizing for materials handling analysis; principles of materials handling; study of the principal types of handling equipment; methods of selection of equipment. 2 lectures. Prerequisite: IE 223

IE 332 Production Control (3)

The role of production control in the industrial enterprise. Forecasting, estimating, purchasing, inventory procedures and their relationship to production control. Routing, scheduling, and dispatching. A review of typical production control systems in job shop and continuous industries. Laboratory consists of work on typical production control problems in all related phases. 2 lectures, 1 laboratory. Concurrent: IE 322

IE 333 Linear Programming (3)

The scope of mathematical programming. The use of programming in industrial problems with particular reference to production control. Review of the fundamentals and techniques of the basic types of programming such as the Simplex Method, the Distribution Method, the Modified Distribution Method and several approximation methods. The use of computers in handling programming equations. Laboratory work consists of practice in programming problems. 2 lectures, 1 laboratory. Prerequisites: IE 332, Math 203

IE 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

IE 421, 422, 423 Production Management (3) (3) (3)

An advanced course designed to co-ordinate the students' previous work in the several specialized areas within the general field of industrial engineering. Emphasis on job analysis and job evaluation; wage incentives for direct and indirect workers; production management theory and organization. Case studies on industrial engineering and production management problems. 2 lectures, 1 laboratory. Prerequisite: IE 333

IE 424 Sales Engineering (2)

Concepts and principles of sales in engineering, stressing service responsibilities related to the career of sales engineering. Indoctrination in qualities and attitudes essential to industrial engineering as well as sales engineering. Job qualifications, prime requisite factors, systems of distribution, the sales organization including its management and control, and fundamentals of salesmanship. 1 lecture, 1 two-hour laboratory period. Prerequisite: Senior standing in engineering.

IE 425 Industrial Procurement (2)

A study of procurement organization, policies, and procedures in industry and government. Description of quality; optimum quantity and price; selecting sources of supply; vendor relations; forward buying and speculation; procurement of major equipment, new and used; make or buy; procurement budgets. 1 lecture, 1 two-hour laboratory period. Prerequisite: Senior standing.

IE 431 Statistical Quality Control (3)

Theory and practice of statistical quality control as applied to industrial situations; control charts, acceptance sampling. 2 lectures, 1 laboratory. Prerequisite: IE 232, 333

IE 434 Advanced Motion and Time Study (3)

Elemental time data; basic motion-time systems; statistical time standards; work sampling; motion and time study training programs. 2 lectures, 1 laboratory. Prerequisite: IE 321

IE 441, 442, 443 Supervision Fundamentals (1) (1) (1)

Practical applications of elements of supervision. Laboratory conditions will be utilized to assist in providing situational cases for practice in applying the fundamental concepts and techniques of supervision. 1 laboratory. Prerequisite: Senior standing in IE.

IE 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 of total time.

IE 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent engineering developments and/or subject matter pertinent to industrial engineering. 2 lectures. Prerequisite: Senior standing.

MACHINE SHOP DEPARTMENT

Chairman, Francis F. Whiting

Ellard W. Betz
Richard E. Hall

Thomas D. Kay

C. C. Richards
Leo E. Rogers

Instruction in machine shop practice has two objectives: (1) to give the student a foundation in the basic skills and, (2) to give an understanding of the part machine tools play in present day engineering and manufacturing enterprises. It is not the intent of the machine shop department to teach machine shop courses on a vocational level, but rather to give the student a knowledge which will further his progress in the engineering fields. Operations, tools, and materials of the trade as well as shop safety are stressed in all departmental offerings.

The machine shop is unusually well-equipped with the latest machine tools and heat-treating equipment such as might be found in the best commercial toolroom. The shop is also equipped with all the necessary tools, attachments, and precision instruments for the construction of dies, tools, jigs, and fixtures such as are found in modern industry today. Punch presses, diecasting machines, plastics presses, and diesinking machines are provided for engineering students taking advanced courses.

DESCRIPTIONS OF COURSES IN MACHINE SHOP**MS 141 Machine Shop (1)**

Fundamentals of precision measurement, layout, and hand and drill press operations. 1 laboratory.

MS 142 Machine Shop (1)

Fundamentals of lathe operation including turning between centers, chuck work, and thread cutting. Also feeds, speeds, and tool grinding. 1 laboratory. Prerequisite: MS 141 or equivalent.

MS 143 Machine Shop (1)

Fundamentals of lathe operation including taper turning, internal thread cutting, precision boring, and other chucking operations. Tool grinding. 1 laboratory. Prerequisite: MS 142

MS 144 Machine Shop (1)

Fundamentals of milling machine and shaper operation including precision setup and plane surfacing operations. 1 laboratory. Prerequisite: MS 142

MS 145 Machine Shop (1)

Advanced lathe practice, lathe accessories, and elementary toolmaking. Elementary heat treatment of steels. 1 laboratory. Prerequisite: MS 143

MS 146 Machine Shop (1)

Advanced milling machine and shaper practice including contoured and angular surfacing operations, and rack and spur gear cutting. 1 laboratory. Prerequisite: MS 144

MS 240 Machine Shop (1-2)

Advanced individual instruction on all machine tools. Construction and repair of laboratory equipment. Total credit limited to 4 units. 1 or 2 laboratories. Prerequisite: MS 146

MS 241 Grinding Machines (1)

Fundamentals of grinding machine operation including the universal cylindrical grinder, surface grinder, tool and cutter grinder, and drill grinders. 1 laboratory. Prerequisite: MS 146

MS 249 Printers' Mechanics (1)

Advanced benchwork instruction for printers. Special printers' tools, gauges, and jigs are constructed. 1 laboratory. Prerequisite: MS 141 or equivalent.

MS 331, 332, 333 Tool Engineering (3) (3) (3)

Construction of production tools including jigs, fixtures, punch press tools, plastic molds, diecasting dies, and inspection devices. Field trips to manufacturing centers. 1 lecture, 2 laboratories. Prerequisite: MS 146

MS 421, 422, 423 Tool Design (3) (3) (3)

Design of manufacturing tools such as jigs, fixtures, and dies. Materials, tolerance balancing, and toolroom methods as design factors. Field trips to manufacturing centers. 2 lectures, 1 laboratory. Prerequisite: ME 203 or Aero 206

MECHANICAL ENGINEERING DEPARTMENT

Acting Department Head, Charles P. Davis

Robert W. Adamson	Robert P. Jensen	R. Wallace Reynolds
James G. Andresen	Robert M. Johnston	Edward O. Stoffel
George Bauer	Richard T. Kombrink	Lyman Stoker
Chester O. Bishop	Thomas B. Mixon	Morris P. Taylor
Franklin S. Crane	Derek John Price	George Whitney
Earl R. Hesch	R. Howell Reece	

Mechanical engineering concerns itself primarily with the design, construction, and use of a wide variety of equipment ranging from manufacturing machinery and power generation equipment to consumer goods. Of primary concern to the mechanical engineer is the proper application of rigid, fluid, and thermal mechanics in the design and use of this equipment.

Graduates obtain employment with manufacturers, contractors, public utilities, and governmental agencies. Types of work performed by graduates include design, engineering sales, engineering test, supervision of manufacture and erection.

The curriculum gives the student a thorough founding in mechanical design and a choice of courses such as machine design, turbomachinery, and piping design, available in his senior year, that will augment and strengthen his background for such design.

Laboratories are an important part of the student's education. He is enrolled in mechanical engineering laboratories from the beginning of his freshman year until his graduation. These labs include work in power generation, fuel study, fluid flow, heat transfer, vibration, and strength of materials.

There are two organized student clubs in the Mechanical Engineering Department: a student branch of the Society of Automotive Engineers and the Mechanical Engineering Society.

CURRICULUM IN MECHANICAL ENGINEERING

Freshman	F	W	S
Systems and Machines (ME 131)	3		
Steam Powerplants (ME 132)		3	
Internal Combustion Engines (ME 133)			3
Engineering Drafting (ME 141, 142, 143)	2	2	2
Mechanical Engineering Lab (ME 144, 145, 146)	1	1	1
Oxyacetylene Welding (Weld 151)	1		
Metallic Arc Welding (Weld 154, 155, 156)	1	1	1
Mathematics for Engineers (Math 117)	5		
Analytic Geometry and Calculus (Math 118, 201)		5	3
General Physics (Phys 131, 132)		4	4
Language Communication (Eng 104, 105, 106)	3	3	3
Health Education (PE 107)	2		
Physical Education (PE 141, 142, 143)	½	½	½
	18½	19½	17½
Sophomore			
Engineering Surveying (AE 237)	2		
Machine Shop (MS 141-142, 143-144, 145-146)	2	2	2
Electrical Engineering (EE 207, 208)		3	3
Electrical Engineering Laboratory (EE 251, 252)		1	1
Analytic Geometry and Calculus (Math 202, 203)	3	3	
General Physics (Phys 133)	4		
Engineering Statics (Phys 201)	3		
Engineering Dynamics (Phys 202)			3
Applied Biology (Bio 110)		3	
Strength of Materials (ME 202)			3
Sports Education (PE 241, 242, 243)	½	½	½
Chemistry (Chem 321, 322, 323)	4	4	4
	18½	16½	16½

Engineering Division

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Junior	F	W	S
Mechanical Equipment of Buildings (ME 331).....			3
Differential Equations (Math 316, 317).....	3	2	
Strength of Materials (ME 203).....	3		
Strength of Materials Laboratory (ME 249).....		1	
Mechanical Design (ME 427, 428).....		3	3
Kinematics (ME 324).....	4		
Fluid Flow (ME 311, 312).....	4	3	
Fluid Flow Laboratory (ME 345).....			1
Thermodynamics (ME 301, 302).....		4	4
Electronics in Engineering (EL 321).....	3		
Electronics Laboratory (EL 354).....	1		
Principles of Economics (Ec 201).....		3	
American Government (Pol Sc 301).....			3
Metallurgy for Engineers (WM 306).....			3
	18	16	17
Senior			
Growth of American Democracy (Hist 304).....	3		
U. S. in World Affairs (Hist 305).....		3	
Family Relations (Psy 206).....			3
† Industrial Management (LMR 311).....		3	
Senior Project (ME 461, 462).....	2	2	
Undergraduate Seminar (ME 463).....			2
Literature or Philosophy.....			3
Mechanical Vibrations (ME 316).....			4
Mechanical Design (ME 429).....	3		
Contracts and Specifications (ME 406).....			1
* Electives	9	9	5
	17	17	18

DESCRIPTIONS OF COURSES IN MECHANICAL ENGINEERING

ME 125 Descriptive Geometry (3)

Principles of multiview projection. Fundamental views. Perpendicular, parallel and skew lines. Relationships of points, lines and planes. Intersections and developments of geometric surfaces and solids including planes, ruled surfaces and warped surfaces. Solution of typical drafting room problems by application of multiview projection. 1 lecture, 2 laboratories.

ME 131 Systems and Machines (3)

Analysis of engineering systems, machines, and machine parts from the viewpoint of design criteria and performance. 2 lectures, 1 2-hour laboratory.

ME 132 Steam Powerplants (3)

Principles of the conversion of thermal energy to mechanical work applied to the modern steam plant. Problems involving turbines, engines, condensers, and heat balance. 2 lectures, 1 2-hour laboratory. Prerequisite: ME 131.

ME 133 Internal Combustion Engines (3)

Construction and performance of diesel and gasoline engines and gas turbines. Problems in efficiencies, horsepower, and economy. 2 lectures, 1 2-hour laboratory. Prerequisite: ME 132.

ME 134, 135 Mechanical Technology (3) (3)

A study of the materials and components of machines, mechanisms, and structures. Emphasis is on assembly methods and mechanical skills. 2 lectures, 1 laboratory.

† Industrial Relations (LMR 312) may be substituted.

* One of the following sequences must be included among electives: Tool Design (MS 421, 422, 423), Fabrication Methods and Design (Weld 434, 435, 436), Design of Piping Systems (ME 424, 425), Machine Design (ME 401, 402), Heat Transfer, Nuclear Power Plants, and Turbo Machinery (ME 411, 412, 413).

ME 141 Engineering Drafting (2)

Basic principles and practices of axonometric projection. Oblique projection. Multiview projection. Single and auxiliary views. Drafting methods for geometric constructions. Point line and plane applications. 2 laboratories.

ME 142 Engineering Drafting (2)

Intersections and developments of geometric surfaces and solids. Section views and conventional practices. Elementary methods of graphical mathematics. Nomograms. Charts and graphs. 2 laboratories. Prerequisite: ME 141

ME 143 Engineering Drafting (2)

Technique and theory of dimensioning. Detail drawing. Assembly drawing. Fasteners and screw thread representation. Welding symbols. Piping drawings. 2 laboratories. Prerequisite: ME 142 or ME 152

ME 144, 145, 146 Mechanical Engineering Laboratory (1) (1) (1)

Basic mechanical engineering experiments. Pressure, temperature, weight, rotative speed, area, specific gravity, specific weight, density, steam quality, boiler flue gas analysis, boiler feed water analysis, boiler efficiency, diesel and gasoline engine performance, engine economy, and engine indicator cards. Maintenance work on the engines, boilers, and related equipment. 1 laboratory.

ME 151 Engineering Drafting (1)

Basic principles of axonometric and oblique projection. Drafting methods for geometric constructions. Multiview projection including single and auxiliary views. 1 laboratory.

ME 152 Engineering Drafting (1)

Intersections and developments of geometric surfaces and solids. Section views. Elements of graphical mathematics, nomograms, charts and graphs. 1 laboratory. Prerequisite: ME 151 or ME 141

ME 153 Engineering Drafting (1)

Techniques and theory of dimensioning. Detail drawing. Assembly drawing. Fasteners and screw threads. 1 laboratory. Prerequisite: ME 152 or ME 142

ME 202, 203 Strength of Materials (3) (3)

Relation between physical properties of materials and their use in engineering structures. Calculation of deflection and required size of basic structural and machine elements. 3 lectures. Prerequisite: Phys 201

ME 207 Simplified Drafting Methods (1)

Present trends in industrial drafting relative to simplification of drafting methods. Application of freehand techniques. Reduction of views and delineation. Ordinate dimensioning. Mechanical aids. Standardization of conventions and symbols. 1 lecture. Prerequisite: ME 143 or ME 153

ME 209 Creative Engineering (2)

Understanding the creative process. Recognizing and solving new problems. Developing ability to think and work in new areas. Acquiring a fresh point of view. Down-to-earth problem-solving techniques for engineers and others. Designing creatively simple mechanisms and new products. 2 lectures. Prerequisite: Sophomore standing.

ME 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 laboratories.

ME 249 Strength of Materials Laboratory (1)

Commercial tests of materials. Familiarity with physical properties of industrially useful materials. Elements of heat treatment. 1 laboratory. Prerequisite: ME 202

ME 301, 302 Thermodynamics (4) (4)

Fundamentals of the First and Second Laws of Thermodynamics. Applications to steady and transient processes and cycles of ideal and real fluids. Combustion, gas and vapor power cycles, psychrometrics, refrigeration, and heat transfer. 4 lectures. Prerequisite: Math 203, Phys 132, Chem 323

ME 311, 312 Fluid Flow (4) (3)

Study of the principles that underlie the flow of various fluids. Fluid statics, viscosity, dynamic similarity, and fluid friction. Dimensional analysis, Reynolds number, steady flow energy transformation of compressible and incompressible fluids. Fluid resistance, dynamic lift and propeller action, propulsion theory, compressible flow. Pumps, turbine, fluid power transmission systems, and fluid film lubrication. 4 lectures, fall; 3 lectures, winter. Prerequisite: Phys 202

ME 314 Engineering Materials (3)

Structure, composition, and physical properties of commercially useful materials. Brief study of mechanics of materials. Selection of materials for specific applications. Heat treatment. Corrosion of metals and alloys; protective coatings. 3 lectures.

ME 316 Mechanical Vibrations (2)

Free vibrations. Damping. Forced vibrations. Critical speeds of shafts. Energy methods. Numerical analysis of complex systems. Transient vibrations. 2 lectures. Prerequisite: Math 317, ME 324, Phys 202

ME 324 Kinematics (4)

The study of motion in machine parts. Displacements, velocities, and accelerations in linkage, cams, gears, and other mechanisms. 3 lectures, 1 laboratory. Prerequisite: Phys 131, ME 143

ME 331 Mechanical Equipment of Buildings (3)

Application of fluid mechanics and building code requirements in the design of building systems for handling water supplies, liquid wastes, fuel gas and ventilation. Related systems connecting groups of buildings and health and accident hazards involved. 2 lectures, 1 laboratory. Prerequisite: Phys 132, ME 143

ME 333 Plumbing and Building Sanitation (3)

For architectural engineering students. Calculation of water supply and consumption. Fire protection and sprinkler systems. Plumbing and drainage. Gas services. Application of principles to specific elements of engineering structures. 3 lectures.

ME 345 Fluid Flow Laboratory (1)

Experimental determination of operating characteristics and performance criteria for industrial flow equipment, including pumps, pipes, motors and others. 1 laboratory. Prerequisite: ME 311

ME 349 Advanced Materials Testing Laboratory (1)

Advanced laboratory work in testing of materials and structures. Column and beam tests, fatigue tests, static and dynamic experimental stress analysis techniques with electric resistance strain gages and brittle lacquer coatings. 1 laboratory. Prerequisite: ME 249

ME 352, 353 Powerplant Laboratory (1) (1)

An introduction to heat power apparatus for engineering students other than mechanical. Mechanical mensuration. Lubricants, fuels, combustion. Boiler water treatment. Properties of steam. Steam generation. Turbines, compressors, pumps. Internal combustion engines. 1 laboratory. Prerequisite: Phys 301 or equivalent.

ME 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

ME 401, 402 Machine Design (4) (4)

Nonlinear and nonmetallic springs. Thick wall cylinders, force and shrink fits. Stresses in high speed rotors. Hydraulic actuators, buffers, and controls. Hydrodynamic torque convertors. Instability of thin sections. Dynamics of high speed cams. 3 lectures, 1 laboratory. Prerequisite: Math 316. Concurrent: ME 427, 428

ME 406 Contracts and Specifications (1)

A study of the legal requirements of contracts, the technical and legal requirements of specifications, and the legal relations of the technical man. 1 lecture. Prerequisite: Junior standing.

ME 411 Heat Transfer (3)

Basic principles of heat transfer. Steady state and transient conduction problems using analytical and numerical methods. Free and forced convection. Transfer of radiant energy. 3 lectures. Prerequisite: Math 317, ME 311

ME 412 Nuclear Power Plants (3)

Engineering applications of nuclear energy, nuclear reactor design and operation, instrumentation and control. Nuclear power plants; materials, equipment and economics. 3 lectures. Prerequisite: Chem 323, Math 316

ME 413 Turbomachinery (4)

Mechanical aspects of turbine design. Steam turbine control and performance. Centrifugal compressor. Axial flow compressor. Combustion. The regenerator. The gas turbine powerplant. 4 lectures. Prerequisite: ME 412

ME 422 Instruments and Controls (3)

Fundamentals of control system design and a study of basic electro-mechanical sensing elements used in control systems. Computation and study of various basic instruments used in control work. 2 lectures, 1 laboratory. Prerequisite: EE 208, Math 316

ME 423 Elements of Machine Design (4)

Fundamentals of machine design for engineering students other than mechanical. Stresses and deflections in machine parts. Engineering materials. Design of springs, bearings, gears, chains, belts, clutches and brakes. Course is oriented to stress philosophy of design, application and comparative advantage rather than basic design. 3 lectures, 1 laboratory. Prerequisite: ME 203, or equivalent, Math 203, Phys 202

ME 424, 425 Design of Piping Systems (4) (4)

Functions, requirements, and design of piping systems, including safety and economic considerations for power, chemical, and process plants. Welding and other forms of joint construction, materials specifications, sizing, layout, flexibility, support, insulation, and cost estimation of water, steam, air, gas, and corrosive and viscous fluid systems. Philosophy, background, and requirements of principal governing National Codes. 3 lectures, 1 laboratory. Prerequisite: ME 203, 311

ME 427, 428, 429 Mechanical Design (3) (3) (3)

Design of machine parts as determined by stress and deflection. Effect of varying stresses and stress concentrations. Design of shafts, springs, cranks, axles, and other machine parts. Bearings and lubrication. Mechanical and hydraulic power transmission. Balancing of rotating parts. Overall design of machine assemblies. 2 lectures, 1 laboratory. Prerequisite: ME 203, 324

ME 434 Fundamentals of Petroleum Production (2)

Survey of the production of crude petroleum covering exploration, drilling, pumping, transportation, and storage. Observation of actual field operations and installations of major oil companies and oil equipment companies. Nomenclature, methods, and mechanical equipment. 2 lectures. Prerequisite: ME 144, 145, 146, 311

ME 435 Petroleum Production Development (3)

Mechanical engineering aspects of rotary drilling. Problems attendant to the rotary rig and its auxiliary equipment. Practical problems dealing with drilling mud, casing, cementing, directional drilling, and well completion operations. 2 lectures, 1 laboratory. Prerequisite: Phys 201, ME 133, 203

ME 441, 442, 443 Advanced Mechanical Engineering Laboratory (1) (1) (1)

Vibrations experiments: multiple degree of freedom, damping effect, linear and nonlinear coefficients, dynamic balance. Power experiments: gas compression and gas expansion, combustion investigations, steam turbine tests, fuel tests. Heat transfer experiments: steady state plane surface, steady state cylindrical surface, investigation of film effects, transient heat flow phenomenon, radiation. 1 laboratory. Prerequisite: Senior standing.

ME 451 Advanced Graphical and Numerical Methods (2)

Graphical and numerical determination of centroids, moments of inertia, moments and deflections. Graphical integration and differentiation problems. Harmonic analysis. Variable force and acceleration. Energy and mass flow diagrams. Alignment charts and nomography. 2 lectures. Prerequisite: ME 427

ME 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. 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 presentation of a topic in his chosen field. 2 meetings.

PRINTING DEPARTMENT

Department Head, A. M. Fellows

James H. Babb
Wesley T. Dunn

Lawrence H. Eckrote
C. Herold Gregory

H. E. Howe
Joseph W. Truex

The Printing Department offers a four-year curriculum in printing, leading to the bachelor of science degree. The curriculum is designed to prepare men for positions of responsibility in the allied trades of the printing industry, as well as to prepare them to be owners and operators of newspapers and printing plants. Majors not only must complete satisfactorily the printing curriculum requirements, but must show proper aptitude and progress to indicate they will become competent and skilled craftsmen in the printing industry.

A student successfully completing the four-year curriculum is qualified to hold a responsible position in most branches of the printing industry. A graduate has sufficient skill in all phases of printing and an adequate knowledge of management and production practices so that he may accept positions of responsibility in production control, management, and sales and service. A graduate is qualified to operate his own printshop, or to publish a newspaper in connection with a job printing plant. A student who terminates his formal education prior to graduation will have sufficient training to qualify him for a less responsible position in the printing industry.

The department is completely equipped with Intertype and Linotype typesetting machines, Elrod, Ludlow, platen presses, automatic job presses, cylinder presses, folding machines, hand and power paper cutters, perforator, punching machine, foot and power stitchers, a wide assortment of new and modern type, stereotype equipment, bindery equipment, process camera, plate-making equipment, and offset presses.

Practical instruction in management, cost finding, plant organization, and layout are included in the senior year.

CURRICULUM IN PRINTING

Freshman	F	W	S
History of Printing (Pr 101).....	2		
Proofreading (Pr 102).....		2	
Elementary Typography (Pr 121).....	3		
Elementary Display (Pr 122).....			3
Stereotyping (Pr 123).....		3	
Hand-fed Platen Presswork (Pr 131).....	2		
Automatic Platen Presswork (Pr 132).....		3	
Introduction to Cylinder Press (Pr 133).....			2
Journalism (Jour 201, 202).....	3	3	
Language Communication (Eng 104, 105, 106).....	3	3	3
Printers' Mathematics (Math 105).....			3
Machine Shop (MS 141).....			1
Applied Biology (Bio 110).....		3	
Health Education (PE 107).....	2		
Physical Education (PE 141, 142, 143).....	½	½	½
Electives	2		5
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	17½	17½	17½

	F	W	S
Sophomore			
Advanced Composition and Layout (Pr 221).....		3	
Imposition and Lockup (Pr 231).....		2	
Automatic Cylinder Presswork (Pr 232).....	3		
Advanced Automatic Cylinder Presswork (Pr 233).....		3	
Composing Machine Operation (Pr 241, 242, 243).....	3	3	3
Bindery Operations (Pr 251).....			2
Report Writing (Eng 301).....	3		
Electricity for Printers (EE 221).....	2		
Oxyacetylene Welding (Weld 151).....			1
Public Speaking (Sp 201).....			2
Principles of Economics (Ec 201).....			3
Mathematics for Engineers (Math 117).....	5		
General Psychology (Psy 202).....		3	
Family Relations (Psy 206).....			3
Sports Education (PE 241, 242, 243).....	½	½	½
Electives.....	1	3	3
	<u>17½</u>	<u>17½</u>	<u>17½</u>
Junior			
Ludlow Operation and Maintenance (Pr 301).....	1		
Elrod Operation and Maintenance (Pr 302).....		1	
Advanced Comp. Mach. Operation (Pr 321, 322, 323).....	3	3	3
Comp. Mach. Maintenance (Pr 335, 336).....		2	2
Advanced Typography and Layout (Pr 331).....	3		
Newspaper Makeup and Markup (Pr 332).....			3
Printers' Mechanics (MS 249).....		1	
Literature.....	3	3	3
* General Chemistry (Chem 321, 322, 323).....	4	4	4
American Government (Pol Sc 301).....	3		
Psychology of Business and Industry (Psy 302).....		3	
Electives.....			2
	<u>17</u>	<u>17</u>	<u>17</u>
Senior			
Printing Office Management (Pr 401).....		2	
Cost and Estimating (Pr 411, 412, 413).....	2	1	1
Production Problems (Pr 421, 422, 423).....	3	3	3
Commercial Job Composition (Pr 431).....			3
Plant Organization and Layout (Pr 433).....			2
Offset Camera Work (Pr 434).....	3		
Offset Platemaking (Pr 435).....		3	
Offset Presswork (Pr 436).....			3
Senior Project (Pr 461, 462).....	2	2	
Undergraduate Seminar (Pr 463).....			2
Industrial Management (LMR 311).....	3		
Industrial Relations (LMR 312).....		3	
Growth of American Democracy (Hist 304).....		3	
U.S. in World Affairs (Hist 305).....			3
Electives.....	5	1	1
	<u>18</u>	<u>18</u>	<u>18</u>

DESCRIPTIONS OF COURSES IN PRINTING

Pr 101 History of Printing (2)

Development of the historical background of printing from its origin to the time of Gutenberg, continuing through changes in materials and equipment to the highly developed industry of today. Analysis of trade requirements and job opportunities. 2 lectures.

* Phys 131, 132, 133 may be substituted. Note prerequisites for these courses.

Pr 102 Proofreading (2)

Printshop English, proofreading, spelling, punctuation, division of words, compounding, style. Practical experience on college paper. 2 2-hour laboratories.

Pr 121 Elementary Typography (3)

Elementary training in fundamentals of typesetting, spacing, ornamentation, typographic styles, composing room procedures, and practices. 1 lecture, 2 laboratories.

Pr 122 Elementary Display (3)

Principles of display, study of various type classifications and their adaptation to typography, proper use of spacing and copyfitting. 1 lecture, 2 laboratories. Prerequisite: Pr 121

Pr 123 Stereotyping (3)

Care and operation of stereotype equipment, including routers, saws, and production from mats, shell casts and type-high cuts, mortising. Proper use and operation of all printshop equipment, safety and accident prevention. Familiarization with cost and laborsaving devices. Metal content and care. 1 lecture, 2 laboratories. Prerequisite: Pr 121

Pr 131 Hand-fed Platen Presswork (2)

Introduction to platen press. Instruction in care and maintenance, lockup of forms, makeready, and nomenclature of all types of platen presses. Practical experience in feeding and operation. 1 lecture, 1 laboratory.

Pr 132 Automatic Platen Presswork (3)

Operation and maintenance of automatic fed platen presses, proper positioning and lockup of type forms, makeready, and correct use of ink. 1 lecture, 2 laboratories. Prerequisite: Pr 131

Pr 133 Introduction to Cylinder Press (2)

Study of development and advantages of the cylinder press. Practical hand feeding and care of press, ink, and rollers in actual production of college newspapers and other projects. 1 lecture, 1 laboratory.

Pr 221 Advanced Composition and Layout (3)

Proper methods of newspaper display and makeup. Practical application of principles of hand display and layout. Appreciation of importance of markup, designing and preparation of harmonious and balanced ads, with emphasis on good typography. 1 lecture, 2 laboratories. Prerequisite: Pr 122

Pr 231 Imposition and Lockup (2)

Planning and layout of type forms and locking them up for press. Planning of dummies and proper spacing of pages and forms for presses and folding machines. 1 lecture, 1 laboratory.

Pr 232 Automatic Cylinder Presswork (3)

Operation of automatic cylinder presses, with investigation of makeready, ink, paper, and other press problems. Study of color and process printing. 1 lecture, 2 laboratories. Prerequisite: Pr 132, 133, 231, 251

Pr 233 Advanced Automatic Cylinder Presswork (3)

Continuation of Pr 232 with emphasis on production and maintenance. 1 lecture, 2 laboratories. Prerequisite: Pr 232

Pr 240 Additional Printing Laboratory (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter.

Pr 241 Composing Machine Operation (3)

Introduction to operation of Intertype and Linotype composing machines. Touch system and proper keyboard operation. Operational adjustments and care of machine. 1 lecture, 2 laboratories. Prerequisite: Pr 102, 122

Pr 242 Composing Machine Operation (3)

Advanced operation and care of the composing machine. Use of italics, caps and small caps, ligatures, and logotypes. Typography, proper established styles of market ads, classified ads, radio logs, etc. 3 laboratories. Prerequisite: Pr 241

Pr 243 Composing Machine Operation (3)

Bookwork, magazine, and commercial composition. 3 laboratories. Prerequisite: Pr 242

Pr 251 Bindery Operation (2)

Binding equipment, its maintenance and repair, manual operations, paper specifications, and handling. Actual practice on commercial binding work, publications, and books. 1 lecture, 1 laboratory.

Pr 301 Ludlow Operation and Maintenance (1)

Operation, maintenance, and repair of Ludlow slugcasting machine, surfacing machine, and special equipment. Use of type sticks, logotypes, special spacing material, and market composition. 1 laboratory.

Pr 302 Elrod Operation and Maintenance (1)

Operation, maintenance, and repair of Elrod material-making and strip-casting machine. Care of molds, pressure oiler, packing of diffusion tubes, maintenance of special equipment. 1 laboratory.

Pr 321, 322, 323 Advanced Composing Machine Operation (3) (3) (3)

Advanced mechanism, repair, maintenance, and operation of quadders and mixers. Field trips, use of visual aids, and lectures by men from industry. 1 lecture, 2 laboratories. Prerequisite: Pr 241, 242, 243

Pr 331 Advanced Typography and Layout (3)

Layout, designing, and composing of newspapers, magazines, and special advertising display. Designing good typography and harmonious use of types, borders, and ornaments in advertising production. 1 lecture, 2 laboratories. Prerequisite: Pr 221

Pr 332 Newspaper Makeup and Markup (3)

Study of styles in advertising and page makeup. Use of markup code system for markup of ads and commercial work. Practical experience in makeup of front pages, editorial, and classified, to enhance sales and reader interest. 1 lecture, 2 laboratories. Prerequisite: Pr 331

Pr 335 Composing Machine Maintenance (2)

Introduction to mechanism, maintenance, and repair of composing room equipment. Linotype, Intertype, Elrod, Ludlow, saws, surfacing machine, and mitering equipment. Development of maintenance and service charts. Field trips, pictures, and study of plant methods of maintenance. 1 lecture, 1 laboratory. Prerequisite: Pr 243

Pr 336 Composing Machine Maintenance (2)

Advanced methods of maintenance and repair. Lockup and pot adjustments. Intertype and Linotype quadders and mixers. 1 lecture, 1 laboratory. Prerequisite: Pr 335

Pr 400 Special Problems for Advanced Undergraduates (1-2)

Arrangements to be made with department head. Limited to 4 units, with not more than 2 units in any one quarter.

Pr 401 Printing Office Management (2)

Office problems, methods and procedures. Job tickets, time systems, inventory control, cost accounting, page costs, circulation systems. Correlation of management and production. 2 lectures. Prerequisite: Senior standing.

Pr 411 Cost and Estimating (2)

Fundamentals of pricing and estimating. Composition, presswork, binding, paper, ink, halftones, line cuts, electros. Comparison and use of pricing systems. Trade customs and regulations. 1 lecture, 1 laboratory. Prerequisite: Senior standing.

Pr 412, 413 Cost and Estimating (1) (1)

Estimating and pricing all types of printing, office procedures, purchasing, writing instructions. 1 laboratory. Prerequisite: Pr 411

Pr 421, 422, 423 Production Problems (3) (3) (3)

Analysis of methods of co-ordinating all factors of production. Methods of promoting interdepartmental harmony and understanding. Review of all plant and shop skills. Pr 421, 422: 1 lecture, 2 laboratories. Pr 423: 3 laboratories.

Pr 431 Commercial Job Composition (3)

Composition and design of letterheads, business cards, invoices, labels, blotters, direct mail advertising, and other representative business forms. Study of color, display, and efficiency of office forms. 1 lecture, 2 laboratories. Prerequisite: Senior standing.

Pr 433 Plant Organization and Layout (2)

Planning, designing, and layout of printing equipment. Proper use of materials and equipment to cut costs and increase production, Emphasis on engineering skill and review of departmental management. 1 lecture, 1 laboratory. Prerequisite: Senior standing.

Pr 434 Offset Camera Work (3)

Scaling copy for line and halftone negatives. Function of a process camera. Dark-room techniques, mixing chemicals, and developing film. 1 lecture, 2 laboratories. Prerequisite: Jour 221 or equivalent.

Pr 435 Offset Platemaking (3)

Exposing and developing various types of plates used in offset printing. Stripping, opaquing, and laying out of flats. 1 lecture, 2 laboratories. Prerequisite: Pr 434

Pr 436 Offset Presswork (3)

Operation and maintenance of offset presses, blankets, rollers, and plates. Study of fountain solutions, offset papers and ink. 1 lecture, 2 laboratories. Prerequisite: Pr 435

Pr 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. Prerequisite: Senior standing.

Pr 463 Undergraduate Seminar (2)

Senior students become familiar with data gathered by other seniors in preparation of senior project. Each student is required to conduct the seminar class, under supervision of instructor, at least twice during quarter. 2 lectures. Prerequisite: Senior standing.

WELDING AND METALLURGICAL ENGINEERING DEPARTMENT

Department Head, Richard C. Wiley

Ray Allen
Enrico P. Bongio
Mel D. Compton

Edward P. Cook
Glenn E. Seeber

C. W. Shoop
Robert L. Sysum
George Whitney

The Welding and Metallurgical Engineering Department prepares students for employment as metallurgical engineers, and also provides service courses in welding and metallurgy to students in other departments of the college.

Students who graduate as metallurgical engineers are employed by private industry and government agencies to deal with problems of design and manufacture of metals and alloys, corrosion protection, nondestructive testing, application of codes and specifications, weldability of metals and alloys, and application of metals to specific needs and requirements. Typical position titles are metallurgist, materials engineer, welding engineer, nondestructive test engineer, and inspection and quality control specialist.

The curriculum offers opportunity to pursue specialized metallurgical areas on an elective basis in the senior year.

The Welding and Metallurgical Engineering Department is well equipped with various laboratories and shops. The welding shop facilities include general arc and oxyacetylene equipment, as well as production prototypes of automatic and inert-gas shielded welding machines. A special engineering laboratory is provided for welding design problems and is equipped with apparatus for the study of physical properties and chemical analysis of steels and deposited weld metals; X-ray and gamma ray equipment are also available for inspection and analysis purposes.

CURRICULUM IN METALLURGICAL ENGINEERING

Freshman	F	W	S
Properties of Materials (WM 121, 122, 123)	2	2	2
Welding Survey (WM 124, 125, 126)	2	2	2
Machine Shop (MS 141-142, 143-144, 145)	2	2	1
Engineering Drafting (ME 141, 142, 143)	2	2	2
Mathematics for Engineers (Math 117)	5		
Analytic Geometry and Calculus (Math 118, 201)		5	3
Language Communication (Eng 104, 105, 106)	3	3	3
Health Education (PE 107)		2	
General Chemistry (Chem 321)			4
Physical Education (PE 141, 142, 143)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	16 $\frac{1}{2}$	18 $\frac{1}{2}$	17 $\frac{1}{2}$
Sophomore			
Physical Metallurgy (WM 221, 222, 223)	4	4	4
General Chemistry (Chem 322, 323)	4	4	
Analytic Geometry and Calculus (Math 202, 203)	3	3	
General Physics (Phys 131, 132, 133)	4	4	4
Applied Biology (Bio 110)			3
Engineering Statics (Phys 201)		3	
Engineering Dynamics (Phys 202)			3
Technical Writing (Eng 219)	3		
Principles of Economics (Ec 201)			3
Sports Education (PE 241, 242, 243)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives			1
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	18 $\frac{1}{2}$	18 $\frac{1}{2}$	18 $\frac{1}{2}$

	F	W	S
Junior			
Theory of Materials (WM 301, 302, 303).....	3	3	3
Metallurgy of Light Metals (WM 321, 322).....	2	2	
Heat Treatment of Metals (WM 323).....	2		
Fabrication Metallurgy (WM 324, 325, 326).....	3	3	3
Electrical Engineering (EE 207, 208).....	3	3	
Electronics in Engineering (EL 321).....			3
Electrical Engineering Laboratory (EE 251, 252).....	1	1	
Electronic Engineering Laboratory (EL 354).....			1
Strength of Materials (ME 202, 203).....	3	3	
Heat (Phys 301).....		3	
American Government (Pol Sc 301).....			3
Literature.....			3
Electives.....			1
	<hr/>	<hr/>	<hr/>
	17	18	17
Senior (Major courses not offered in 1960-61)			
New Developments in Metals (WM 401).....			2
Metallography (WM 421, 422, 423).....	2	2	2
Metallurgy of Stainless and Heat Resisting Steels (WM 431).....	2		
Senior Project (WM 461, 462).....	2	2	
Undergraduate Seminar (WM 463).....			2
Growth of American Democracy (Hist 304).....		3	
U. S. in World Affairs (Hist 305).....			3
Family Relations (Psy 206).....			3
Industrial Relations (LMR 312).....	3		
* Senior Electives.....	4	4	4
Electives.....	4	5	1
	<hr/>	<hr/>	<hr/>
	17	16	17

DESCRIPTIONS OF COURSES IN WELDING

Weld 151 Fundamentals of Oxyacetylene Welding (1)
Introduction to oxyacetylene welding. Requirements for safe and competent welding of light-gauge steel sheet. 1 laboratory.

Weld 152 Fundamentals of Oxyacetylene Welding (1)
Familiarization with the commonly used welded joints. Use of the oxyacetylene flame in brazing and flame cutting. Procedures used for welding tubing and heavy-gauge steel. 1 laboratory. Prerequisite: Weld 151

Weld 153 Fundamentals of Oxyacetylene Welding (1)
Introduction to welding processes and techniques for aircraft metals. Welding chrome-nickel steels and chrome-moly steels, aluminum and magnesium alloys. Introduction to nondestructive testing methods. 1 laboratory. Prerequisite: Weld 152

Weld 154 Fundamentals of Metallic Arc Welding (1)
Fundamentals of shielded metallic arc welding, flat and horizontal positions. Types, uses, and classifications of electrodes and equipment. Flame cutting of steel. 1 laboratory.

Weld 155 Fundamentals of Metallic Arc Welding (1)
Shielded metallic arc welding including vertical position. Lecture on expansion, contraction, distortion, and residual stresses as applied to welded structures. Various joint types including lap, fillets, and butt joints. 1 laboratory. Prerequisite: Weld 154

* Senior Electives: Completion of one of the following series of three courses will be required for graduation:

- Application Metallurgy Laboratory (WM 424, 425, 426)
- Welding Engineering (WM 434, 435, 436)
- Welding Metallurgy Laboratory (WM 437, 438, 439)
- Advanced Fabrication Metallurgy (WM 441, 442, 443)

Weld 156 Fundamentals of Metallic Arc Welding (1)

Shielded metallic arc welding of heavy steel plates. Includes butt weld types, uses of backing materials, hard facing, cast iron, and overhead fillets. Basic weld tests. Arc welding of light-gauge steel sheets. 1 laboratory. Prerequisite: Weld 155

Weld 157 Welding Survey (2)

Fundamental oxyacetylene and metallic arc welding, designed for air conditioning and refrigeration students. Equipment used, safety, basic technique, applications, and limitations of these important phases of welding. 1 lecture, 1 laboratory.

Weld 158 Welding Survey (1)

Theory and application of resistance welding, and further use of the oxyacetylene flame, including silver brazing, and flame cutting. For students in electronic engineering. 1 laboratory. Prerequisite: Weld 151

Weld 254 Advanced Welding (1)

Types and uses of various welding machines, their operating costs. The use of structural steel shapes for building machinery and farm equipment. Welding symbols, strength of welded joints, and basic cost estimating problems. 1 laboratory. Prerequisite: Weld 156

Weld 341 Special Problems in Welding by Arrangement (1-3)

Fundamentals of welding metallurgy, weldability of steels, steels and alloys for welded construction. Codes for construction of welded unfired pressure vessels. Design of pressure vessels according to the code used. 1, 2, or 3 laboratories. Prerequisite: Weld 156

Weld 359 Advanced Welding (1)

The application of the inert-gas shielded arc welding process to the hard-to-weld metals, including aluminum and stainless steel. Argon and helium as gas shields. 1 laboratory. Prerequisite: Weld 153

Weld 434 Fabrication Methods and Design (3)

Methods of forming, cutting, and joining steel and alloy plates and shapes as applied to structures and machinery. Jig and fixture design for mass-production fabrication. 3 laboratories. Prerequisite: Weld 156

Weld 435 Fabrication Methods and Design (3)

Pressure vessel design and fabrication in accordance with governing codes, using steel, stainless steel, and aluminum. Cost estimating of steel fabrication and erection. 3 laboratories. Prerequisite: Weld 434

Weld 436 Fabrication Methods and Design (3)

Inspection and quality control methods used in the metal working industry. Weldability of steels and metallurgical aspects of welded fabrication. Problems in the design and fabrication of large diameter transmission line pipe. 3 laboratories. Prerequisite: Weld 435

DESCRIPTIONS OF COURSES IN WELDING AND METALLURGY

WM 121, 122, 123 Properties of Materials (2) (2) (2)

Production of metals from their ores. Nature and identification of metals. Costs and availability. Casting and casting processes, nomenclature. Hot working, cold working. 1 lecture, 1 laboratory.

WM 124, 125, 126 Welding Survey (2) (2) (2)

Basic oxyacetylene and arc welding techniques; includes brazing, flame-cutting, hard surfacing. Welding equipment and cost of welding and allied processes. 1 lecture, 1 laboratory.

WM 221, 222, 223 Physical Metallurgy (4) (4) (4)

Principles of physical metallurgy. The iron-iron carbon system. The structure of metals. Cast iron and carbon steel and alloy steels as engineering materials. Constitution diagrams of ferrous and non-ferrous metals and alloys. 3 lectures, 1 laboratory.

WM 301, 302, 303 Theory of Materials (3) (3) (3)

Fundamentals of corrosion and corrosion protective finishes. Study and interpretation of equilibrium diagrams. Metals in equilibrium and non-equilibrium conditions. Conditions of plastic deformation. Fatigue and creep problems. Application of metals to high temperature conditions. 3 lectures.

WM 306 Metallurgy for Engineers (3)

Properties, engineering applications, and constitutional phase diagrams and relation of structure to properties of cast iron, steel, stainless steels, nonferrous metals. Alloys for high temperature service. Heat treatment of steels and aluminum and principles of welding metallurgy. For all engineering majors except metallurgical engineering. 3 lectures. Prerequisite: Weld 156, Chem 322

WM 321, 322 Metallurgy of Light Metals (2) (2)

Physical properties and structure of aluminum and its alloys. Magnesium and its alloys, titanium and its alloys. Commercial products available and applications of these materials. Refining, melting, forming, and casting. 1 lecture, 1 laboratory. Prerequisite: WM 223, Chem 321, 322

WM 323 Heat Treatment of Metals (2)

Theory and application of heat treatment of metals. Annealing, solution treatments, hardening, tempering and various methods of surface hardening steel. Controlled atmosphere furnaces for heat treatment. 1 lecture, 1 laboratory. Prerequisite: WM 223

WM 324, 325, 326 Fabrication Metallurgy (3) (3) (3)

Weldability of ferrous and non-ferrous metals and alloys. Theory and application of castings to metal product manufacturing. Rolling, forging, and extruding of metals. Elements of powder metallurgy. Testing and inspection methods, destructive and non-destructive. 2 lectures, 1 laboratory. Prerequisite: WM 223

WM 401 New Developments in Metals (2)

Recitation, discussion, and investigation of the latest developments in the production and use of metals. Material for this course is taken from current technical metals publications. 2 lectures. Prerequisite: WM 303

WM 421, 422, 423 Metallography (2) (2) (2)

Microscopic examination of the structure of ferrous and non-ferrous metals. The metallurgical microscope. Etching reagents. Mounting and polishing. Techniques of making photomicrographs. 1 lecture, 1 laboratory. Prerequisite: WM 223

WM 424, 425, 426 Application Metallurgy Laboratory (4) (4) (4)

Problems and investigations in metal applications to products. Quality control methods in casting, forging, and forming. Codes and specifications. Advanced work in metallography and photomicrography. Metals for nuclear power. 2 lectures, 2 laboratories. Prerequisite: WM 322

WM 427 Problems in Electrical Welding Machines and Circuits (2)

Basic electrical problems in the design and application of welding transformers and rectifiers. Automatic welding equipment. Design of electronic control circuits for automatic welding machines. 1 lecture, 1 laboratory. Prerequisite: EL 321, EL 354

WM 431 Metallurgy of Stainless and Heat Resisting Steels (2)

The metallurgical constitution of stainless and heat resisting steels. Martensitic, ferritic, and austenitic types. The super alloys and ceramic coatings of metals. 1 lecture, 1 laboratory. Prerequisite: WM 303

WM 434, 435, 436 Welding Engineering (4) (4) (4)

Welding design according to governing codes. Fabrication cost estimating. Jigs and fixture design for mass production. Inspection and testing. Welding production processes. Problems in weldability of steels and alloys. 2 lectures, 2 laboratories. Prerequisite: WM 326

WM 437, 438, 439 Welding Metallurgy Laboratory (4) (4) (4)

Welding problems and investigation into weldability of all weldable metals including titanium, zirconium, and others. Weld and base metal analysis. Theory of bonding. Application of adhesives to metal joining. Quality control. 2 lectures, 2 laboratories. Prerequisite: ME 203, Math 203, Phys 306

WM 441, 442, 443 Advanced Fabrication Metallurgy (4) (4) (4)

Problems in weldability of steels and non-ferrous metals. Production of metal powders. Sintering, pressing and product design. Problems in corrosion and protection. Chemical and electro-chemical coatings. Codes, specifications, and quality control. 2 lectures, 2 laboratories. Prerequisite: WM 303

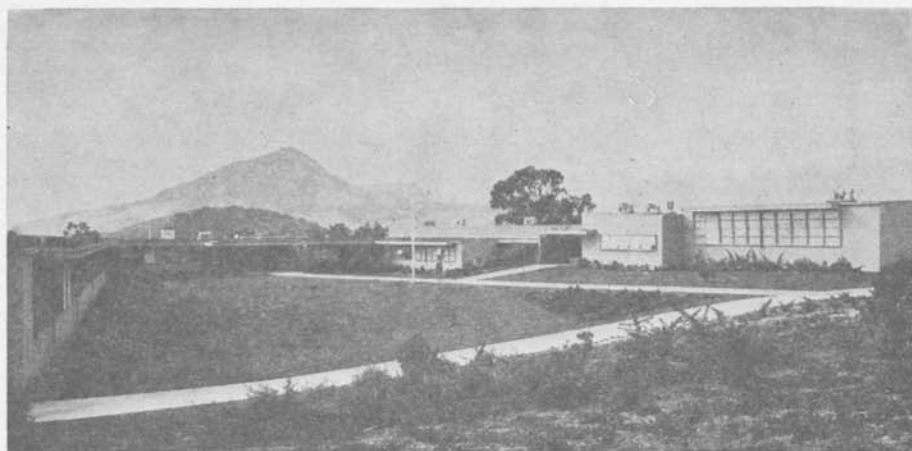
WM 461, 462 Senior Project (2) (2)

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.

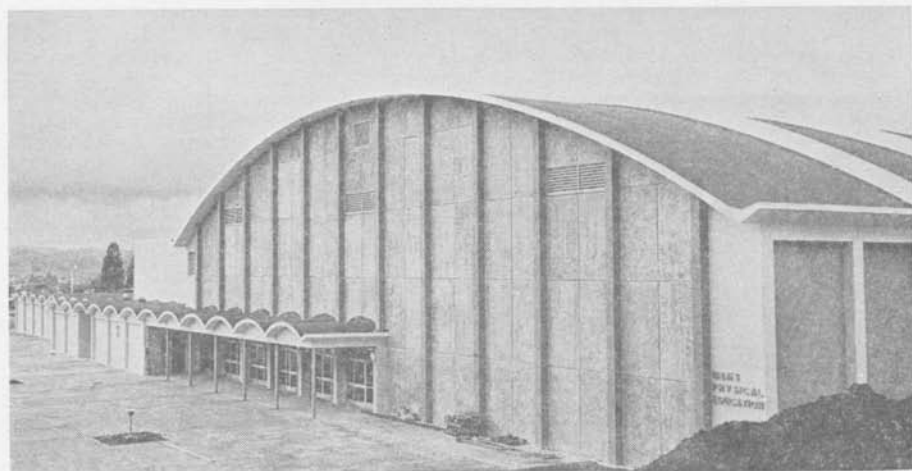
WM 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent engineering developments. 2 lectures. Prerequisite: Senior standing.

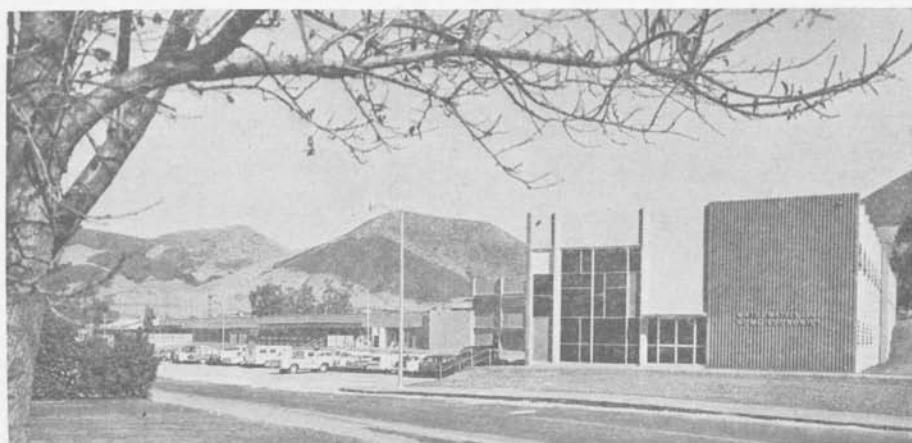
THE ARTS AND SCIENCES DIVISION



Science Building



Men's Physical Education Building



Home Economics and Mathematics Building

THE ARTS AND SCIENCES DIVISION

The Arts and Sciences Division differs from the other instructional divisions in having as its main function the support of major curricula other than its own. It is a service division providing for students in agriculture and engineering those courses closely related to and directly complementing the areas of their majors. It also provides courses that are supplemental and broadening in the area of general education. These courses are planned both to meet requirements in general education and to educate all students of the college in their role as active citizens of their state and nation. In addition to these functions, the division also prepares candidates for California teaching credentials and its own students who are working toward the bachelor of science degree in majors in arts and sciences.

In close co-operation with the Agricultural Division there is a program of teacher training leading to the Special Secondary Credential in Vocational Agriculture and the Special Secondary Limited Credential in Agriculture. The faculty of the Arts and Sciences Division recommends candidates for the Special Secondary Credential in Physical Education, the General Elementary Credential, and the General Secondary Credential with teaching majors and minors in Life Science and General Science, Mathematics, Physical Education, Physical Science and General Science, and Social Studies. Students enrolled in the division may earn the bachelor of science degree from any major department or the Master of Arts in Education with concentrations in most of the teaching fields in which a credential may be earned.

The major departments of the Arts and Sciences Division are Technical Journalism, Biological Sciences, Business Education, Home Economics, Mathematics, Physical Education, Physical Sciences, Social Sciences, and Technical Arts. Three additional departments which provide services to the entire student body are English and Speech, Military Science and Tactics, and Music. The Library and the Audiovisual Department provide services to the entire college.

AGRICULTURAL CHEMISTRY

(See Physical Sciences)

AGRICULTURAL EDUCATION

(See Education)

BIOLOGICAL SCIENCES DEPARTMENT

Department Head, Glenn A. Noble

John H. Applegarth	C. Dennis Hynes	Aryan I. Roest
Frederick M. Essig	David H. Montgomery	David H. Thomson
R. C. Hatfield	Richard A. Pimentel	William Thurmond
Robert F. Hoover	Robert J. Rodin	Philip V. Wells

The department offers a complete program of college work leading to the bachelor of science degree in biological sciences. Students majoring in agriculture are given the necessary bacteriological, botanical, and zoological background to enable them to appreciate and understand the basic biological principles underlying the more applied courses, and more advanced work is offered in certain technical fields such as plant pathology, and dairy bacteriology. Courses are offered to fulfill the general education requirement in biology for other arts and sciences departments and for engineers. Majors in the department may concentrate in botany, bacteriology, zoology, and other areas and still maintain a broad background in biology.

Graduates generally enter the fields of college and high school teaching, medical and biological laboratory technology, public health and sanitation, fish and game management, state and national park service and pest control. In addition, graduates have entered veterinary, medical, dental, and graduate schools.

The department laboratories are supplied with the most modern equipment. Classes are organized to make biology as meaningful as possible. San Luis Obispo County offers unusual opportunities for the study of a wide variety of plants and animals since in this county are found flora and fauna representative of both Southern and Northern California.

CURRICULUM IN BIOLOGICAL SCIENCES

	F	W	S
Freshman			
Physical Education (PE 141, 142, 143).....	½	½	½
Language Communication (Eng 104, 105, 106).....	3	3	3
Health Education (PE 107).....	2		
¹ Basic Mathematics for General Education (Math 111, 112).....		3	3
General Botany (Bot 121, 122, 123) or General Zoology.....	4	4	4
² General Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Public Speaking (Sp 201).....			2
* Electives	3	2	
	16½	16½	16½
Sophomore			
Sports Education (PE 241, 242, 243).....	½	½	½
Principles of Economics (Ec 201, 202).....	3	3	
General Zoology (Zoo 131, 132, 133) or General Botany.....	4	4	4
General Bacteriology (Bact 221).....	4		
Microtechnique (Bio 225).....		3	
General Entomology (Ent 126).....			4
³ College Physics (Phys 121, 122, 123).....	4	4	4
* Electives	1	2	4
	16½	16½	16½

* Of the total "elective" units, a minimum of 23 shall be chosen in a field of specialization with the approval of the adviser.

¹ Math 102, 103 or Math 117, 118 will substitute.

² Chem 321, 322, 323 will substitute for Chem 324, 325.

³ Phys 131, 132, 133 will substitute.

	F	W	S
Junior			
Genetics (Bio 303).....	3		
General Psychology (Psy 202).....		3	
Family Relations (Psy 206).....			3
American Government (Pol Sc 301).....	3		
Literature or Philosophy.....	3		
Literature, Art, or Music.....		3	3
Senior Project (Bio 461).....			2
* Electives	8	11	9
	<hr/>	<hr/>	<hr/>
	17	17	17
Senior			
Ecology (Bio 325).....	3		
Senior Project (Bio 462).....		2	
Undergraduate Seminar (Bio 463).....			2
Agricultural Biochemistry (Chem 328).....	4		
Report Writing (Eng 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U. S. in World Affairs (Hist 305).....			3
* Electives	6	11	11
	<hr/>	<hr/>	<hr/>
	16	16	16

DESCRIPTIONS OF COURSES IN BACTERIOLOGY

Bact 221 General Bacteriology (4)

Morphology, metabolism, classification and identification; bacteriology of air, soil, water, and foods with applications to industry, agriculture, medicine, and public health. 2 lectures, 2 laboratories. Prerequisite: One quarter of college chemistry or Bot 121 or Zoo 131

Bact 222 Dairy Bacteriology (4)

Advanced course for practical work demonstrating the domestic and industrial importance of micro-organisms involved in milk and dairy products: milk, milk powders, fermented milks, evaporated and condensed milks, butter, cheese, cheese starters, and ice cream. 2 lectures, 2 laboratories. Prerequisite: Bact 221

Bact 333 Sanitary and Industrial Bacteriology (3)

Sanitary and industrial application of microbiology stressing food, dairy, water, air and sewage; practical aspects of environmental sanitation emphasized. 2 lectures, 1 laboratory. Prerequisite: Bio 110

Bact 342 Sanitary Inspection and Control (2)

Domestic and commercial contamination, epidemiology, stressing practical applications of hygienic practices and methods of correcting and eliminating health hazards. 2 laboratories. Prerequisite: Bact 221 or Bact 333

Bact 423 Public Health Microbiology (4)

Detailed study of pathogenic yeasts, molds, viruses, and bacteria in relation to public health. 2 lectures, 2 laboratories. Prerequisite: Bact 221

Bact 590 Seminar in Bacteriology (1-3)

Problems and topics in advanced bacteriology selected according to the interest and needs of the students enrolled. 1 to 3 units in one quarter, maximum of 6 units. Prerequisite: Graduate standing and evidence of satisfactory preparation in bacteriology.

DESCRIPTIONS OF COURSES IN BIOLOGY

Bio 100 Agricultural Biology (3)

Basic biological principles applied to agriculture. This course may not be substituted for General Zoology or General Botany. 2 lectures, 1 demonstration and discussion hour. Not open to degree students for degree credit.

* Of the total "elective" units, a minimum of 23 shall be chosen in a field of specialization with the approval of the adviser.

Bio 101 General Biology (3)

Characteristics of living things; cellular composition and organization; functional approach to organ systems of man. 3 lectures.

Bio 102 General Biology (3)

Endocrine system; reproduction; heredity and environment; social implications of biological principles. 3 lectures. Prerequisite: Bio 101

Bio 103 General Biology (3)

Disease; plants, animals and man; balance of nature, conservation of resources; history of man. 3 lectures. Prerequisite: Bio 102

Bio 110 Applied Biology (3)

Biology of man with applications to engineering and industry. 3 lectures.

Bio 127 Nature Study (3)

Introduction to the basic principles of astronomy, geology, biological classification, paleontology and conservation. Field trips and laboratory emphasizing materials for elementary science. 1 lecture, 2 laboratories.

Bio 128 Nature Study (3)

Identification, structure, adaptations, life history, habits, habitat, economic status and conservation of marine and fresh-water organisms, land invertebrates, trees and shrubs. 1 lecture, 2 laboratories.

Bio 129 Nature Study (3)

Identification, structure, adaptations, life history, habits, habitat, economic status and conservation of terrestrial plants and vertebrates. Local and California plant and animal communities. 1 lecture, 2 laboratories.

Bio 141 Biological Techniques (3)

Preparation of plant and animal specimens for display or study purposes. 1 lecture, 2 laboratories. Prerequisite: Bot 121 or Zoo 131

Bio 225 Microtechnique (3)

Methods of preparing plant and animal tissues for microscopic study. 1 lecture, 2 laboratories. Prerequisite: Bot 121 or Zoo 131

Bio 303 Genetics (3)

Principles of heredity and variation. 3 lectures. Prerequisite: one quarter of college biology and two quarters of college mathematics.

Bio 325 Ecology (3)

The interrelationships between plants, animals and their environment; structure and dynamics of aquatic and terrestrial communities. 2 lectures, 1 laboratory. Prerequisite: Bot 122 or Zoo 132

Bio 328 Marine Biology (3)

Biological and environmental studies of marine organisms, with emphasis on their economic importance. 2 lectures, 1 laboratory. Prerequisite: Zoo 132 and Bot 122 or consent of instructor.

Bio 400 Special Problems (1-2)

Total credit limited to 4 units with no more than 2 units in any one quarter. Individual or group investigations for advanced students. 1 or 2 laboratories.

Bio 423 General Cytology (4)

Detailed study of the structure and function of animal and plant cells. 3 lectures, 1 laboratory. Prerequisite: Zoo 133 or Bot 123

Bio 433 Wildlife Management (4)

General principles, problems, and techniques of wildlife management. Identification, distribution, and life histories of important species. 3 lectures, 1 laboratory. Prerequisite: Zoo 226 or SS 223

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

Projects are selected from typical problems which graduates may meet in areas of their future employment. Results are presented in both oral and written reports. Minimum 120 hours total time.

Bio 463 Undergraduate Seminar (2)

Study and discussion of recent developments in the field of biology. 2 meetings.
Prerequisite: Bio 462

Bio 521 Curriculum and Methods in Teaching Biological Sciences (3)

Objectives, content, techniques, materials, and recent trends of successful instruction in secondary school biology. 3 lectures. Prerequisite: Graduate standing; evidence of satisfactory preparation in biology, botany, and zoology; Ed 430 completed or concurrent.

Bio 590 Seminar in Biology (1-3)

Problems and topics in advanced biology selected according to the interest and needs of the students enrolled. 1 to 3 units in one quarter, maximum of 6 units.
Prerequisite: Graduate standing and evidence of satisfactory preparation in biology.

DESCRIPTIONS OF COURSES IN BOTANY

Bot 121 General Botany (4)

Introduction to structures and functions of seedbearing plants. 2 lectures, 2 laboratories.

Bot 122 General Botany (4)

Nature and relationships of plant groups from bacteria to angiosperms, emphasis on nonseedbearing plants of economic importance. 2 lectures, 2 laboratories. Prerequisite: Bot 121

Bot 123 General Botany (4)

Elementary plant genetics, paleobotany, organic evolution, plant ecology, and plant geography. 2 lectures, 2 laboratories. Prerequisite: Bot 122

Bot 223 Plant Pathology (4)

Principal diseases of plants; symptoms, field identification, and control methods. 3 lectures, 1 laboratory. Prerequisite: Bot 122 or 235

Bot 235 Families of Agricultural Plants (4)

Recognition of the families of flowering plants which are of major agricultural importance in California. 2 lectures, 2 laboratories. Prerequisite: Bot 121

Bot 322 Plant Physiology (4)

Functions and growth of plants and plant organs. 3 lectures, 1 laboratory. Prerequisite: Bot 121 and Chem 321 or 324

Bot 343 Taxonomy of Higher Plants (3)

General principles of classification of plants; procedure for identification of unknown plants; preparation and use of specimens. 2 lectures, 1 laboratory. Prerequisite: Bot 122 or Bot 235

Bot 426 Mycology (3)

Morphological, cultural and pathological characteristics of fungi. 2 lectures, 1 laboratory. Prerequisite: Bot 123 or consent of instructor.

Bot 590 Seminar in Botany (1-3)

Problems and topics in advanced botany selected according to the interest and needs of the students enrolled. 1-3 units in one quarter, maximum of 6 units. Prerequisite: Graduate standing and evidence of satisfactory preparation in botany.

DESCRIPTIONS OF COURSES IN ENTOMOLOGY

Ent 126 General Entomology (4)

Introduction to the study of insects. Structure, major orders and families of insects, life histories, economic importance and control. Insect collection required. 3 lectures, 1 laboratory.

Ent 331 Taxonomy (3)

Major principles of classification, taxonomy, speciation and nomenclature, particularly as they apply to insects. Designed primarily for biology majors. Term report required. 2 lectures, 1 laboratory. Prerequisite: Ent 126

Ent 590 Seminar in Entomology (1-3)

Problems and topics in advanced entomology selected according to the interest and needs of the students enrolled. 1-3 units in one quarter, maximum of 6 units. Prerequisite: Graduate standing and evidence of satisfactory preparation in entomology.

DESCRIPTIONS OF COURSES IN ZOOLOGY**Zoo 122 Elementary Human Physiology (4)**

Basic patterns of body function and structure. For Home Economics majors. 3 lectures, 1 laboratory.

Zoo 131 General Zoology (4)

Cells, tissues, and organ systems of vertebrates; emphasis on man and domestic animals. 2 lectures, 2 laboratories.

Zoo 132 General Zoology (4)

Embryology, genetics, taxonomy, economic zoology, ecology and evolution. 2 lectures, 2 laboratories. Prerequisite: Zoo 131

Zoo 133 General Zoology (4)

The variety, structure and distribution of animals. 2 lectures, 2 laboratories. Prerequisite: Zoo 132

Zoo 226 Vertebrate Field Zoology (4)

Identification, life histories, and economic importance of vertebrates, especially birds and mammals. Fieldwork emphasized. 2 lectures, 2 laboratories. Prerequisite: Zoo 132 or Bio 129

Zoo 236 Invertebrate Zoology (4)

Study of invertebrate groups of animals with emphasis on taxonomy, morphology, distribution and economic importance. 2 lectures, 2 laboratories, and field work. Prerequisite: Zoo 133

Zoo 237 Human Anatomy (3)

Morphology of the organ systems of man. 2 lectures, 1 laboratory. Prerequisite: Zoo 132. Recommended: knowledge of elementary chemistry.

Zoo 238 Human Physiology (3)

Cellular metabolism. Functions of respiratory, circulatory, digestive, and excretory systems. 2 lectures, 1 laboratory. Prerequisite: Zoo 237

Zoo 239 Human Physiology (3)

Functions of skeletal, muscular, nervous, endocrine, and reproductive systems. 2 lectures, 1 laboratory. Prerequisite: Zoo 238

Zoo 323 Embryology (4)

Embryonic development of the vertebrate body with particular emphasis on the frog, chick, pig, and man. 2 lectures, 2 laboratories. Prerequisite: Zoo 133 or permission of the instructor.

Zoo 326 Comparative Anatomy of Vertebrates (4)

Comparative structure of vertebrate organ systems. 2 lectures, 2 laboratories. Prerequisite: Zoo 132. Recommended: Zoo 323

Zoo 422 Histology (4)

Tissues, microscopic organology, and correlation of form with function. 2 lectures, 2 laboratories. Prerequisite: Zoo 132. Recommended: Zoo 133

Zoo 425 Parasitology (4)

External and internal parasites of man and animals; life history; control, distribution, and ecology. 2 lectures, 2 laboratories. Prerequisite: Zoo 132. Recommended: Zoo 133

Zoo 590 Seminar in Zoology (1-3)

Problems and topics in advanced zoology selected according to the interest and needs of the students enrolled. 1 to 3 units in one quarter, maximum of 6 units. Prerequisite: Graduate standing and evidence of satisfactory preparation in zoology.

BUSINESS DEPARTMENT

Joseph C. Cardani
Dorothy McLinn

Howard R. O'Daniels
Phillip Overmeyer

Calvin Strother
Owen Servatius

The business program prepares students for employment in the administrative and technical functions of both small and large business. The training, first of all, provides an opportunity for employment in the business community. Specialized course work is designed to shorten the essential period of apprenticeship all executives must serve. Correlated theory and practice are provided early in the program so that the student will know the why and how of business operation.

The program provides courses in general education together with a core of basic business courses upon which to build a specialized field in business. Examples of these specializations, which are worked out in conjunction with the adviser, are in the following fields: Accounting, General Business, Sales and Sales Management, and Labor and Management Relations.

The opportunity afforded the student in the business program is unique in that the offerings of the Agricultural and Engineering Divisions are available to the student. This course work, together with the foundations in business, will provide a background of training which will permit the student to go into the field of his choice.

CURRICULUM IN BUSINESS

	F	W	S
Freshman			
English Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Health Education (PE 107)	2		
Mathematics for Business (Math 108, 109)		5	5
Accounting Principles (Actg 121, 122, 123)	3	3	3
Business Machines (Bus 151)	1		
Typewriting (Jour 140, 141)	1	1	
Office Organization and Operation (Bus 104)	3		
The Labor Movement in California and U. S. (LMR 111)			3
Insurance Principles (Bus 105)		4	
Applied Biology (Bio 110)	3		
*Electives			2
	16½	16½	16½
Sophomore			
Sports Education (PE 241, 242, 243)	½	½	½
Principles of Economics (Ec 201, 202, 203)	3	3	3
Literature			3
Public Speaking (Sp 201)	2		
Advanced Public Speaking (Sp 303)		2	
General Psychology (Psy 202)	3		
Psychology for Business and Industry (Psy 302)		3	
College Physics (Phys 121, 122, 123)	4	4	4
Descriptive Statistics (Math 211)			3
*Electives	4	4	3
	16½	16½	16½
Junior			
Introduction to Philosophy (Phil 201)		3	
Logic (Phil 202)			3
Statistical Method (Math 212)	3		
Business Fluctuations and Forecasting (Bus 315)		4	
Report Writing (Eng 301)			3
Business Law (Bus 301, 302, 303)	3	3	3
American Government (Pol Sc 301)	3		
Family Relations (Psy 206)	3		
*Electives	5	7	8
	17	17	17

* Of the total "elective" units, a minimum of 41 shall be chosen in a field of specialization with the approval of the adviser.

Senior	F	W	S
Government and Business (Bus 409)			3
Growth of American Democracy (Hist 304)		3	
The U. S. in World Affairs (Hist 305)			3
Senior Project (Bus 461, 462)	2	2	
Undergraduate Seminar (Bus 463)			2
Political and Economic Geography (Geog 402)	3		
*Electives	11	11	8
	16	16	16

DESCRIPTIONS OF COURSES IN ACCOUNTING

Actg 121, 122, 123 Accounting Principles (3) (3) (3)

Principles and practices of fundamental accounting theory. Problem approach to the subject with illustrations taken from real business situations. Provides information for analysis and allocation purposes. 2 lectures, 1 two-hour laboratory.

Actg 131, 132 Basic Accounting (3) (3)

A review of accounting to show how records are kept. Accounting reports, uses, and limitations. For the student who needs a general knowledge of accounting. Not applicable for credit toward major in business. 2 lectures, 1 two-hour laboratory.

Actg 219 Analysis of Financial Statements (3)

Form, analysis and interpretation of financial statements from the viewpoint of management, creditor, and investor. 3 lectures. Prerequisite: Actg 132 or equivalent.

Actg 221, 222 Intermediate Accounting (3) (3)

Fundamentals of accounting, including depreciation and depletion. Problems of valuation and income determination relating especially to cash, accounts receivable, inventories, and installment sales. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 123

Actg 239 Government Accounting (3)

Budgetary controls, systems, theory, and application of principles of fund accounting and reporting for the governmental unit. Emphasis is placed upon the municipality. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 123

Actg 304, 305 Tax Accounting (3) (3)

Analysis of the federal and state tax laws and their application to taxpayers. Series of practical problems. Estate and other succession taxation, gift taxation, and income taxation of fiduciaries. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 222

Actg 321, 322 Advanced Accounting (2) (2)

Advanced accounting theory and practice including consolidated financial statements; financial statements of estates and trusts and other specialized subjects. 1 lecture, 1 two-hour laboratory. Prerequisite: Actg 222

Actg 331 Cost Accounting (3)

Cost control applicable to production, distribution, and service enterprises. Procedures for finding unit costs. Process and production order accounting; standard costs. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 123 or 132

Actg 332 Advanced Cost Accounting (2)

Advanced study of process and standard costs; overhead costs, budgeting, use of cost accounting data in economic analysis and managerial control. 1 lecture, 1 two-hour laboratory. Prerequisite: Actg 331

Actg 334 Budgets and Inventory Control (3)

Principles and practices in methods of business financial planning and control of sales, production inventories, and co-ordination of business functions as embraced in a budget system. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 132 or equivalent.

* Of the total "elective" units, a minimum of 23 shall be chosen in a field of specialization with the approval of the adviser.

Actg 346 Auditing (3)

Principles and procedures of the verification of accounts and the preparation of working papers and the completed audit report. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 331

Actg 401 Accounting Systems (3)

The installation and operation of accounting systems in business with special attention to internal control. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 222

Actg 413 Machine Accounting (2)

The managerial aspects of machine accounting, and the planning, production, interpretation, recording, and auditing of machine-produced data as applied to such procedures as cash, accounts receivable and payable, payrolls, cost, inventory controls and accounting statistics. 2 lectures. Prerequisite: Actg 132 or equivalent.

Actg 442 Data Processing Methods (3)

Application of the latest techniques in the use of modern methods of handling numbers, with special reference to accounting and statistical methods. Includes principles of punchcard machines and electronic data process. 2 lectures, 1 laboratory. Prerequisite: Actg 123

Actg 452 CPA Problems (3)

Intensive study of advanced accounting problems. Emphasis on problems of the type found in the C.P.A. examinations. Designed for those wishing to prepare for the C.P.A. examination, and for those planning to enter the field of private business accounting. 1 lecture, 2 two-hour laboratories. Prerequisite: Actg 322

DESCRIPTIONS OF COURSES IN BUSINESS**Bus 104 Office Organization and Operation (3)**

Basic office procedures and practices. Knowledges and techniques necessary to work in or manage a business office. 3 lectures.

Bus 105 Insurance Principles (4)

Principles of insurance as they affect the conduct of a business. Coverage of risks on materials and merchandise, transportation, and business interruption. 4 lectures.

Bus 151 Business Machines (1)

Experience in the use of various business and accounting machines. 3 one-hour periods.

Bus 205 Business Organization and Management (3)

Fundamentals of management and the application of principles required to organize for business operations. Emphasis on management's ability to analyze, plan, co-ordinate, and control the varied activities of production, personnel, finance, engineering, purchasing, and marketing. 3 lectures. Prerequisite: Ec 202

Bus 301 Business Law (3)

American law sources, courts, contracts, sales, and business torts. 3 lectures. Prerequisite: Ec 201

Bus 302 Business Law (3)

Legal organization creation, site acquisition, credit devices, negotiable instruments, bailments, and agency. 3 lectures. Prerequisite: Bus 301

Bus 303 Business Law (3)

Business insurance, competitive co-operation, taxation incidents, patents, copy-rights, trademarks, trade names, insolvency, and business terminations. 3 lectures. Prerequisite: Bus 302

Bus 304 Transportation and Traffic Management (3)

Purchase and sale of transportation. Rate structure and controls. Rate claims and Interstate Commerce Commission proceedings. Study of uses of bills of lading and claims. Storage locations and routing considerations. 3 lectures.

Bus 312 Credit Administration (3)

Principles and problems of mercantile credits and collections. Emphasis upon practical application of credit and collection principles. 3 lectures.

Bus 314 Business Finance (3)

Monetary and banking principles as they apply to the problems of financing business including promotion, types of organization, long- and short-term capital, dividends, involvements, and expansion. 3 lectures.

Bus 315 Business Fluctuations and Forecasting (4)

Causes of business fluctuations and proposals for avoiding or moderating depressions. Techniques of forecasting business fluctuations. Interrelationships of economic activity. 3 lectures, 1 two-hour laboratory. Prerequisite: Ec 203

Bus 400 Special Problems for Advanced Undergraduates (1-2)

Individual or group investigation of special areas in the field of business. Total credit limited to four units with not more than two units in any one quarter. Prerequisite: Senior standing or consent of instructor.

Bus 404 Investment Principles (3)

Principles of determining most desirable channels for investments of business funds. 3 lectures.

Bus 409 Government and Business (3)

Government implementation, regulation, and control of business enterprises. 3 lectures.

Bus 416 Business Statements (1)

Business statements examined from the standpoint of their use as a managerial tool in the operation of a business enterprise in industry or agriculture. Interpretation of the balance sheet; the profit and loss statement; supplementary financial statements. 1 lecture.

Bus 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. Formal report is required. Required minimum of 120 hours.

Bus 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the students' major fields. Prerequisite: Senior standing or special permission.

DESCRIPTIONS OF COURSES IN LABOR AND MANAGEMENT RELATIONS

LMR 111 The Labor Movement in California and United States (3)

Labor movement theories; American trade-union development; union management; labor and economic and political power; variations in labor movements. 3 lectures.

LMR 118 Human Relations (3)

The interest of business, industry and government in human relations; the development of that interest in terms of research and practice; the contributions to an emerging study of human relations by social scientists and practitioners; union relationships and executive leadership from a human relations point of view. 3 lectures.

LMR 213 Personnel Administration (3)

Understanding of the basic objectives, viewpoints, principles and methods that distinguish personnel administration and personnel functions. 3 lectures.

LMR 216 Job Evaluations and Wage Incentive (3)

Job description and specifications. Relationship of wages and salaries to types of jobs. 3 lectures.

LMR 219 Social Security (3)

The social security system of the federal and state governments and its application to business. 3 lectures.

LMR 311 Industrial Management (3)

Organization and functioning of management in industry. Planning, direction, and control of the business enterprise in terms of problems of policy formation, organizational structure, finance, sales, procurement, plant location, facilities, and production processes. 3 lectures.

LMR 312 Industrial Relations (3)

Employer-employee relationships in the area of labor relations and personnel administration; the foreman, employee, and "human relations" in industry. Background of U. S. labor movement; current labor legislation. The employment process; job application techniques; personal adjustment to job situations. 3 lectures.

LMR 316 Collective Bargaining (3)

Collective bargaining and the relationship between management and labor. The bargaining unit, recognition, the labor agreement, strikes, picketing, boycotts, unfair labor practices, and mediation and arbitration. 3 lectures.

LMR 336 Union Management and Organization (3)

Policies and methods of management and organization of union groups of various types and sizes. 3 lectures.

LMR 412 Labor Law (3)

Federal and state labor laws and their effects upon labor and management. 3 lectures. Prerequisite: Bus 303

LMR 413 Contract Administration (3)

Designed to equip representatives of labor, management, and government agencies to cope with problems involving contracts between unions and companies. 3 lectures.

DESCRIPTIONS OF COURSES IN SALES MANAGEMENT**SM 204 Marketing Principles (3)**

The major institutions and basic theoretical concepts in the field of marketing. The various levels of the marketing system, the types of organizations operating at each level, and the functions they perform. 3 lectures.

SM 205 Salesmanship (3)

Basic principles that underlie all selling and the practical application of these principles. Selling as a career, preparing a sales talk, meeting objections, closing the sale, building goodwill, winning back lost accounts, self-improvement; practice in preparation and delivery of sales presentations. 3 lectures.

SM 206 Purchasing (3)

The purchasing function as it applies primarily to manufacturers, utilities, and institutions. Representative cases in each major area are studied and emphasis is given to the function of the purchasing department of the company in relation to and in co-operation with other major divisions of the enterprise. 3 lectures.

SM 304 Sales Management (3)

The selling functions of a business organization and the problems of cooperation between selling and other divisions. Understanding of management problems encountered in the sale and distribution of products and of the means for dealing with these problems. 3 lectures. Prerequisite: SM 205

SM 321 Price and Sales Policy (3)

Price analysis and its relation and effect on sales policy. 3 lectures. Prerequisite: Ec 203

SM 432 Market Research (3)

Principles and techniques used in surveys of consumer and industrial markets. Considers basic planning, questionnaire design, preliminary testing, field interviewing, and sampling. Special techniques are evaluated. Tabulating and reporting are included, with practice in preparing reports. Covers organization of a market research service or department. 2 lectures, 1 laboratory. Prerequisite: Math 211

EDUCATION DEPARTMENT

Department Head, Walter P. Schroeder

Dale W. Andrews	Ralph C. Collins	Lewis W. Lewellyn
William W. Armentrout	Edward J. Ernatt	Bernice B. Loughran
Herbert H. Burlingham	J. Cordner Gibson	Harry H. Scales
Arthur G. Butzbach	Norman S. Gould	J. Barron Wiley
Marjorie Cass	Yvonne E. Hickenbottom	Erwin A. Willson
	James A. Langford	

The courses and curricular offerings in education are planned to meet a wide variety of student needs. To direct students into learning experiences that will develop in them skills and techniques of basic value in the vocation of teaching there is a well-rounded program in education. To provide students with the ability to apply basic principles of human behavior in the areas of mental health, human relations, and learning methods, there are offerings in psychology. Work is offered in art and audiovisual methods and materials for all students who have need of skills in these areas.

Special emphasis is placed on preparing persons to teach vocational subjects in the schools. Instruction is also given in the administrative phases of vocational education.

The teacher education program in agricultural education provides for the preparation of teachers for two agriculture credentials, the Special Secondary Credential in Vocational Agriculture and the Special Secondary Limited Credential in Agriculture. Candidates for these credentials may also meet the requirements for a General Secondary Credential.

The preparation of secondary school teachers in the various sciences and arts fields is a co-operative enterprise of the Education Department and the subject matter departments. The student is provided with a sound background in both major and minor teaching fields for the General Secondary Credential. The solution of immediate community, occupational, and personal problems receives major emphasis.

Instructors in teacher education courses have had extensive public school teaching experience, and the curricular offerings are organized for practical and direct service in the classroom. Many opportunities for the observation of public school classrooms are provided before the student enters student teaching. In the high school classroom as a student teacher, the student works under superior high school teachers and is supervised by college faculty members for the major and minor subject departments and by the co-ordinator of student teaching.

The curriculum for those who wish to work toward the General Elementary Credential is planned with the practical aim of producing competent teachers and good citizens the same as in other credential areas. The beginning student has the opportunity to observe classes during his first year in college to help him decide whether he is suited to elementary teaching. During his second year he experiences additional supervised observation in the public schools and observes and participates in such groups as recreational organizations, the Boy Scouts, and Campfire Girls so that he may become acquainted with children on an informal basis and learn what their interests and needs are plus developing leadership ability. In his third year, after having taken some basic courses in psychology and teaching methods, he does his student teaching. Laboratory experience is carried out under the best supervision and conditions that the college and public schools can provide. The student is expected not only to render professional service to the community but to use his laboratory experience as a means of determining the many skills and competencies that teachers need. The fourth year is devoted to a concentrated study of the methods and materials in the various areas of the elementary curriculum.

Required courses in other departments have the aim of informing the student as specifically as possible in the subjects taught in the elementary schools. These include the language arts, humanities, social studies, arithmetic, physical and life sciences, physical education, music, and arts and crafts. The course content in these areas, however, goes beyond that to be taught in the elementary school to give the student the background he needs as a contributing member of society. Rather than to pursue a minor in some field of general education, the student is expected to broaden his interests and background in several of the general education areas.

The student who is interested in teaching as a career should consult the section of this catalog which describes requirements and programs leading to the Special Secondary Credential in Vocational Agriculture, the Special Secondary Limited Credential in Agriculture, the Special Secondary Credential in Physical Education, the General Secondary Credential with majors and minors in Agriculture, Health

and Physical Education, Life Science and General Science, Mathematics, Physical Science and General Science, and Social Studies, and the General Elementary Credential.

CURRICULUM IN ELEMENTARY EDUCATION

Freshman	F	W	S
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Nature Study (Bio 127, 128, 129)	3	3	3
Historical Survey of Civilization (Hist 107)	3		
Health Education (PE 107)		2	
Orientation to Crafts (Art 233)			3
* Agriculture	3		
History of California (Hist 112)		3	
Arithmetic for Elementary Teachers (Math 121, 122)		3	3
Introduction to the Teaching Profession (Ed 101)			2
† Electives	3	2	3
	15½	16½	17½
Sophomore			
Sports Education (PE 241, 242, 243)	½	½	½
General Psychology (Psy 202)	3		
Principles of Economics (Ec 201)	3		
Public Speaking (Sp 201)	2		
Music for Classroom Teachers (Mu 201)	3		
Orientation to Art Materials (Art 232)		3	
Family Relations (Psy 206)		3	
Physical Science (PSc 206, PSc 208 or other approved courses)		3	3
Elements of Geography (Geog 221)		3	
Children's Literature (Eng 205)		3	
Philosophy or Art or Music Appreciation			3
School and Community Health Education (PE 203)			2
School Observation (Ed 300)	2		
Fieldwork With Youth Groups (Ed 353)			2
† Electives	3	3	7
	16½	18½	17½
Junior			
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
Senior Project (Ed 461)			2
Audiovisual Instruction (AV 431)	3		
Educational Psychology (Ed 312)	3		
Principles of Elementary Education (Ed 302)	3		
Human Growth and Development (Ed 304)		3	
Survey of Elementary School Methods (Ed 330)		5	
Student Teaching (Ed 430)			12
† Electives	5	5	
	17	16	14

* A general course in agriculture to be approved by adviser.

† Of the 46 units of electives, 21 will require approval of the adviser.

Senior	F	W	S
United States in World Affairs (Hist 305).....	3		
Senior Project (Ed 462).....	2		
American Literature (Eng 311 or 312 or 313).....		3	
Elementary School Reading and Language Arts (Ed 434).....	6		
Teaching Social Studies in the Elementary School (Ed 435A).....	3		
Teaching Arithmetic in the Elementary School (Ed 435B).....		3	
Teaching Science in the Elementary School (Ed 435C).....			3
Safety and First Aid (PE 121).....		2	
‡ Elementary School Teaching Methods.....		3	3
Undergraduate Seminar (Ed 463).....			2
† Electives.....	2	6	8
	16	17	16

DESCRIPTIONS OF COURSES IN EDUCATION

*** Ed 1 Remedial Penmanship (1)**

Development of skills in handwriting for education majors showing a deficiency. Cursive and manuscript styles. 1 laboratory.

Ed 101 Introduction to the Teaching Profession (2)

Qualifications of successful teachers; analysis of duties and amenities of elementary and secondary teaching; school law and certification requirements; opportunities in the teaching profession; observation of teaching. 2 lectures.

Ed 300 School Observation (2)

Preparation for observation of child behavior and teaching methods in the classroom; principles of child behavior; use of classroom equipment; techniques of observing; California public school child accounting system. 1 lecture, 1 observation period.

Ed 301 Principles of Secondary Education (3)

Introduction to the profession of secondary school teaching; analysis of teaching as a vocation; orientation in what is required of a good teacher; objectives, functions, and curricula of secondary schools. 3 lectures.

Ed 302 Principles of Elementary Education (3)

Brief history of elementary education; some philosophies of elementary education; aims and objectives of education for a democracy; elementary program in the California schools. 3 lectures.

Ed 304 Human Growth and Development (3)

Physical, social, emotional, and intellectual development during childhood and adolescence, with particular applications to the school situation. Problems of mental hygiene. 3 lectures.

Ed 305 Guidance Techniques for Teachers and Parents (3)

Counseling and guidance as an integral part of good education; parent-child relationships; teacher-child relationships; some diagnostic techniques; techniques of parent conference; the community and mental hygiene; community and state resources available to parents and teachers. 3 lectures. Prerequisite: Ed 304

Ed 312 Educational Psychology (3)

Pupil-teacher relationships; promotion of learning, mental health, and motivation. Individual differences and group interaction. Group methods and classroom observation. 3 lectures. Prerequisite: Psy 202

* Required for elementary education students if penmanship test indicates need for remedial work.

† Of the 46 units of electives, 21 will require approval of the adviser.

‡ Two courses to be selected from:

Teaching Physical Education in the Elementary School (PE 332)

Teaching Music in the Elementary School (Ed 436)

Teaching Art in the Elementary School (Ed 437)

Ed 330 Survey of Elementary School Methods (5)

Introduction to techniques and procedures used in elementary school teaching; observation in elementary schools at all levels; methods of teaching basic elementary school subjects with emphasis on reading, language, arithmetic, science, and social studies; preparation for student teaching. 5 activity periods. Prerequisite: Ed 312

Ed 353 Fieldwork With Youth Groups (2)

Work with groups of children such as Boy Scouts, Camp Fire Girls, recreational groups. Leadership, human relations, adjusting to different personalities, skills in group management. Serves to appraise professional aptitude. 1 lecture, 1 activity period. Prerequisite: Ed 300

Ed 400 Special Problems in Education (1-2)

Total credit limited to four units, with not more than 2 units in any one quarter. Prerequisite: Permission of the department head.

Ed 403 Secondary School Teaching Plans and Techniques (5)

Planning lessons, unit development, specific teaching skills, class management, and utilization of community resources and relationships. Demonstrations and observations in secondary schools. Classroom planning co-ordinated with public school practice. 5 lectures. Prerequisite: Ed 312

Ed 406 Evaluation in the Elementary School (3)

Appraising the results of instruction in terms of educational objectives. Pupil growth as a product of environment, health, attitudes, and mental ability. Value of cumulative records, reports to parents, and teacher-made tests as evaluation devices. 3 lectures. Prerequisite: Student teaching experience or approval of instructor.

Ed 415 Early Childhood Education (3)

Brief history of the kindergarten and nursery school program. Study of the needs, behavior and development of young children and how they affect readiness for learning. Techniques of parent-teacher conferences, and current trends in reporting pupil progress. Some observation in the public schools. 3 lectures.

Ed 417 The Junior College (3)

The purpose, history, organization and curriculum of the junior and community college. For persons teaching and planning to teach in the junior college. 3 lectures.

Ed 418 Principles of Adult Education (3)

Purposes, significance, scope and methods of teaching as applied to adult education. 3 lectures.

Ed 419 Administration of Vocational and Practical Arts Education (3)

A study of methods of inaugurating and administering programs of vocational and practical arts education including agriculture, business, diversified co-operative, distributive, homemaking, industrial arts, and trade and industrial education. 3 lectures.

Ed 430 Student Teaching (3-12)

Student teaching includes participation, teaching, and allied activities under the direction of a selected regular teacher in a public secondary school with consultation from college supervisors. The application for student teaching must be approved prior to registration for Ed 430. A grade of C or below is unacceptable for recommendation for a credential.

Ed 433 Methods and Materials in Kindergarten-primary Education (3)

A study of the activities and curriculum of the kindergarten-primary program, including teaching methods and materials. Considerable emphasis is given to the construction of materials used at the kindergarten-primary levels. 2 lectures, 1 activity period. Prerequisite: Ed 304, 312, 415

Ed 434 Elementary School Reading and Language Arts (6)

Methods and materials of teaching language arts, including reading, language, spelling, writing, speaking, and listening; includes the use of audiovisual aids and evaluation in these areas. 2 lectures, 4 activity periods. Prerequisite: Ed 304 and 330

Ed 434A Teaching Language Arts in the Elementary School (3)

Methods and materials for teaching language usage, spelling, dramatics, handwriting, listening and speaking. Includes instructional materials, audiovisual aids and evaluation. Prerequisite: Ed 304. 3 lectures. Offered only in summer quarter and evening classes.

Ed 434B Teaching Reading in the Elementary School (3)

Teaching reading; reading readiness; psychology of learning to read; instructional materials; evaluating growth; developing independent reading skills; recreational reading. Prerequisite: Ed 304. 3 lectures. Offered only in summer quarter and evening classes.

Ed 435A Teaching Social Studies in the Elementary School (3)

Emphasizes the nature of social growth of children in a democracy; methods and materials; unit planning; child development approach to content; use of audiovisual aids; evaluation. Prerequisite: Ed 304. 3 lectures. Offered only in summer quarter and evening classes.

Ed 435B Teaching Arithmetic in the Elementary School (3)

Developing readiness for arithmetic; teaching number concepts; developing skills, appreciation, and understandings for arithmetical problems; evaluation. 3 lectures. Prerequisite: Ed 304. Offered only in summer quarter and evening classes.

Ed 435C Teaching Science in the Elementary School (3)

Methods of organizing the science program; teaching procedures; how to do experiments, make field trips, and prepare collections. Use of audiovisual aids. Prerequisite: Courses in natural science. 3 lectures. Offered only in summer quarter and evening classes.

Ed 436 Teaching Music in the Elementary School (3)

Principles and techniques of conducting the teacher's own program. A study of activities suitable for elementary children; includes both skills and appreciation. Assumes a knowledge of music fundamentals. 3 lectures.

Ed 437 Teaching Art in the Elementary School (3)

Development of the creative artistic abilities of children; integration of art skills and appreciation in the total school curriculum. Use of audiovisual aids. Prerequisite: Art 232 or permission of the instructor. 2 lectures, 1 activity.

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

Selection and completion of a project in elementary education under a minimum of supervision. Projects typical of problems which graduates must solve as professional elementary teachers. Results presented in a formal report. Minimum 120 hours total time.

Ed 463 Undergraduate Seminar (2)

Study and discussion of recent and current developments in the field of elementary education; analysis of current literature in the field. 2 lecture-discussions.

Ed 478 Elementary Curriculum Construction (3)

Advanced approach to the problems of elementary curriculum development. Public relations; people involved in building the curriculum; implementing the purposes of education through the curriculum; child development and the curriculum. 3 lectures. Prerequisite: Ed 331

Ed 501 Philosophy of Education (3)

The function of philosophy; the meaning of education; significance of present philosophical points of view; education aims and values; democracy and education; the relationship of various philosophical outlooks to educational methods and subject matter. 3 lectures.

Ed 503 Counseling and Guidance (3)

The philosophy, techniques, and administration of individual and group guidance programs. Individual counseling. The assessment of students' interests, abilities, and achievement with respect to educational and vocational choice, and school and life orientation. 3 lectures.

Ed 504 Evaluation in Secondary Education (3)

Preparation and use of tests; new objective tests; check lists and rating scales. Supplementary observational techniques. The use of all such devices in evaluation. Assigning grades and reporting results. 3 lectures.

Ed 507 Teacher-administrator Relationships (3)

Administrative problems associated with the operations of schools and school systems as they affect the teacher. Individual school, city, and state school systems, the Federal Government in education, and the California Education Code. Evaluation of administrative principles and practices. 3 lectures.

Ed 508 Educational Sociology (3)

Sociological backgrounds of school children; effects of social, economic, and political trends and issues on education; problems of leisure, recreation, and occupations; modern interpretations of democratic ideology. Sociological problems are utilized to define the social objectives of the school. 3 lectures.

Ed 510 School Finance and Business Management (3)

A consideration of the sources of public school support in California and the formulas by which funds are distributed to educational agencies. Budgets, audits, accounting, financial statements, salaries and retirement, purchasing and managing of plants, equipment, and supplies. 3 lectures. Prerequisite: valid general credential.

Ed 511 School Law (3)

The legal problems affecting schools, using as sources the California Administrative Code, Title 5, the Education Code, the Attorney General's opinions, and interpretations of the state and federal courts. 3 lectures. Prerequisite: valid general credential.

Ed 512 Secondary School Administration (3)

The three major phases of the work of the secondary administrator; his function as a leader of people, his duties as a director of education, and his techniques as an organizer and manager. 3 lectures. Prerequisite: valid general credential.

Ed 513 Federal, State, County, and City School Administration (3)

Objectives of public school administration and an overview of all levels of organization; problems in state, county, and city school organization, particularly as related to California; federal government and education; issues involved in federal support. 3 lectures. Prerequisite: valid general credential.

Ed 514 School Housing (3)

Designing school plants to serve educational purposes; procedures involved in planning school construction; selection and use of school sites; functions of architects, engineers, and contractors; financing school building programs; the law related to school housing; community participation in building programs; the services of the State Department of Education. 3 lectures. Prerequisite: valid general credential.

Ed 515 Secondary School Curriculum (3)

The basis of sound administration in the secondary schools of California. The administrator's role in curriculum development. The upgrading of secondary school instruction through administrative guidance and leadership. 3 lectures. Prerequisite: valid general credential.

Ed 516 Secondary School Supervision (3)

The administrative organization of supervision. City and county supervisory methods and procedures in secondary schools. Evaluation of present practices. In-service improvement of instruction through supervision. 3 lectures. Prerequisite: valid general credential.

Ed 517 School-community Relationships (3)

The school and public relations. The administrator's relationship with community groups and organizations. The effect upon the public schools of community and patrons. Public administration as it affects the community's educational program. The operation of urban and rural schools, vocational education, education for adults, special school programs and auxiliary agencies. 3 lectures. Prerequisite: valid general credential.

Ed 518 Problems in Teaching Reading (3)

For teachers and supervisors who need information on latest methods of diagnosing individual reading problems. Problems of individuals, classes and schools analyzed. Formulation of plans for improved reading instruction and total school programs based on research information. 3 lectures. Prerequisite: graduate standing.

Ed 519 Teaching the Gifted Child (3)

The nature of the growth and development of gifted children, including physical, social, and achievement aspects. Methods of identifying giftedness, gifted children, and children with special abilities. A study of selected programs for teaching gifted children in California and other states. 3 lectures. Prerequisite: graduate standing.

Ed 531 Elementary School Supervision (3)

Principles and techniques of educational leadership in curriculum development. Curriculum improvement, working effectively with the staff, evaluation of instruction. 3 lectures. Prerequisite: valid general credential.

Ed 532 Elementary School Administration (3)

Principles and practices of organizing and administering the elementary school, including teacher and pupil personnel management, leadership techniques, instructional problems, special services, school plant, local school finances. Practical applications to elementary schools. 3 lectures. Prerequisite: valid general credential.

Ed 540 Observation and Participation in Secondary Schools (5)

Observation and reporting in all subject matter areas; assisting advisors, the principal, attendance officer; various specific duties in the cafeteria, study hall and playground; assisting extra-class advisers with their activities; weekly discussion with co-ordinator of student teaching. Ed 540 taken concurrently with Ed 430, the two courses constituting a full load for the quarter.

Ed 581 Graduate Seminar in Education (3)

Group study of contemporary teaching problems. Trends, developments, individual problems. 3 lectures.

Ed 588 School Administration Field Work (3-6)

Supervised field work in school administration at the elementary or secondary level; specific assignments made to cover important aspects of school administration; periodic reports and final report required. Prerequisite: valid general credential.

Ed 590 Seminar in Supervision of Student Teachers (3)

Organization, responsibilities, problems, and procedures in supervising, directing, and evaluating student teachers and student teaching activities. 3 lecture-discussions.

Ed 591 Seminar in School Administration (3)

Current problems in school administration; study of recent and current literature bearing on administration; development of problem-solving techniques for administrators. 3 discussion meetings. Prerequisite: valid general credential.

DESCRIPTIONS OF COURSES IN AGRICULTURAL EDUCATION**Ag Ed 203 The Teaching of Agriculture (2)**

Agriculture teaching opportunities and problems; kinds of agriculture classes and purposes of each; qualifications essential to teaching agriculture. Method includes visitation of high school departments of agriculture. 2 lectures—school visits by arrangement.

Ag Ed 403 Teaching Plans and Techniques in Agricultural Education (5)

Planning daily lessons, teaching units and source units. Class demonstrations and practice in specific teaching skills and techniques. Planning and practice co-ordinated with better practices of the secondary school. Observations in secondary agriculture classes. 5 lectures. Prerequisite: Ed 312

Ag Ed 423 Curriculum and Methods in General Agriculture (3)

Survey methods; principles and practices in determining course objectives, content, and teaching calendar. Methods, devices, and materials particularly adapted for use by the beginning teacher in general agriculture classes on secondary level. 3 lectures.

Ag Ed 521A-B Curriculum and Methods in Vocational Agriculture (3) (2)

Community and pupil surveys; principles and methods in determining course objectives, content, and calendar. Methods, devices, and materials adaptable for use by the beginning teacher in classroom, shop, and field instruction and in organization of community activities. Concurrent with student teaching. 3 lectures.

Ag Ed 522 Methods in Teaching Farm Mechanics (5)

Farm mechanics in vocational agriculture program. Organizing a course of study. What to teach; how to teach it. Practice in developing lesson plans and materials. Demonstration teaching and analysis of teaching techniques. 6 lectures, 4 laboratories offered each half of winter quarter.

Ag Ed 523A-B Adult and Continuation Education in Agriculture (4) (2)

Organization, history, philosophy, administration, and teaching of public school classes for "out-of-school" youth and adults. Contributions of helpful agencies. Teaching of adult classes in agriculture under supervision. California urban and rural adult education programs. 4 lectures for 18 weeks.

Ag Ed 524 Problems in Supervising Farm Programs (5)

Practices, methods, and skills in supervising agricultural projects and farming programs in vocational agriculture. Required of all cadet teachers in vocational agriculture. 5 laboratories.

Ag Ed 525A-B Student Teaching in Vocational Agriculture (8) (4)

Observation and teaching under direction of selected regular teacher of vocational agriculture in a secondary school. Future Farmer, Young Farmer, adult class, and community activities. Five months off-campus assignment supervised by agriculture teacher-training staff. Prerequisite: Approval by the Teacher Education Committee and the State Bureau of Agricultural Education.

Ag Ed 526A-B Vocational Agriculture Department Organization (2) (1)

Principles and practices in organizing and providing facilities and materials for operating a secondary program in vocational agriculture. Part of the participating experience for cadet teachers during the student teaching period.

Ag Ed 580 Special Problems in Agricultural Education (1-3)

Specific problems as planned, designed and prepared by the student, and approved by the instructor. Research, studies, or surveys resulting in preparation of materials of use and value to the student and the professional field. Total credit limited to three units.

Ag Ed 621 Agricultural and Professional Skills (1½)

Various agricultural and professional skills. Offered during a one-week summer period for teachers of agriculture. Designed to meet needs of teachers of vocational agriculture as determined by soliciting opinions of teachers in the field.

Ag Ed 631 Conference, Agriculture Teaching Problems (1½)

A series of lectures, seminars, demonstrations, and discussions of agriculture education teaching problems and developments in agriculture, led by specialists in the field. For professional improvement of teachers of vocational agriculture. Offered in a one-week summer period.

DESCRIPTIONS OF COURSES IN ART

Art 231 Art in Everyday Life (3)

Principles of art as expressed in our contemporary culture. Evaluating community planning, home design, industrial design, furnishing and decorating, and objects of everyday use. The influence of art expression in developing and expressing the personality of the individual. 3 lectures.

Art 232 Orientation to Art Materials (3)

The contribution which art can make to the democratic way of life. Consideration of the development of appreciative and creative skills. Emphasis on drawing and graphic work. The development of units and procedures. Problems in developing creative skills in selecting, organizing, guiding, and evaluating individual and group activities. 3 activity periods.

Art 233 Orientation to Crafts (3)

Basic projects with various craft materials such as ceramics, metalwork, textile design, woodwork, and leatherwork. Emphasis on design as presented through materials and their properties. Lectures, discussion, demonstration projects, and evaluative criteria applied to craft materials. 3 activity periods.

Art 238 Art in the Home (3)

Principles of art applied to the home, its furnishings and to personal attire. Laboratory problems in the arrangement, selection and evaluation of useful and well designed objects; study of line, color in relation to personal grooming. 2 lectures, 1 activity period.

Art 321 Applied Color and Design (3)

Study of lines, planes, masses, textures, color, and aspects of space as elements in the structure of the plastic arts. Balance, rhythm, and proportion of any two or more of these elements as utilized in the fine and applied arts. Experience in simple media. 2 lectures, 1 activity period. Prerequisite: Art 231 or permission of instructor.

Art 324 Materials and Methods (2)

Applied principles of general design and color theory in ceramics, metal work, textile design, and simple woodworking. Emphasis on skill development, material handling, and current methods of applied design. Lecture-discussion, investigation, laboratory projects. 1 lecture, 1 laboratory. Prerequisite: Art 233, or 321, or permission of the instructor.

DESCRIPTIONS OF COURSES IN AUDIOVISUAL EDUCATION**AV 329 Commercial Illustration (3)**

Preparation and evaluation of original art copy for commercial use. Laboratory problems in drawing, layout, lettering for single and multiple color runs. Study of various approaches to registration; uses of color and texture in art copy. 1 lecture, 2 activity periods.

AV 400 Special Problems in Audiovisual Production (1-2)

Experience in production of models, mockups, and other audiovisual devices in the student's field. Total of credit limited to four units, with not more than two units in any quarter. 1 or 2 laboratories. Prerequisite: AV 431 or consent of instructor.

AV 431 Audiovisual Instruction: Methods and Materials (3)

Visual and auditory methods and materials of value in classroom teaching in elementary and secondary schools. Lecture, lecture-demonstration, discussion, previewing, and laboratory work. Planning and correlating use of audiovisual techniques in the classroom. 2 lectures, 1 laboratory. Prerequisite: Ed 312 or permission of the instructor.

AV 432 Audiovisual Methods in Agriculture and Engineering (3)

Industrial uses of visual and auditory materials in planning training aids, mass communication materials, demonstrations, mockups, models, and conference leading techniques. Planning, previewing, and skill development for business and industry. 2 lectures, 1 laboratory. Prerequisite: Psy 302 or permission of the instructor.

AV 433 Audiovisual Production Workshop (3)

Analysis of advanced problems of instruction, production of materials in relation to these problems, using audiovisual materials and methods. Skill development in problem-solving through contact with materials, equipment, and methods employed in audiovisual communication. 2 lectures, 1 laboratory. Prerequisite: AV 431 or 432, or permission of the instructor.

DESCRIPTIONS OF COURSES IN PSYCHOLOGY

Psy 1, 2 Reading Improvement (2) (2)

Improvement of basic reading skills. Training in quick, accurate visual and auditory perception. Vocabulary development. Improvement of comprehension through analysis of author's purpose and techniques. 2 lectures.

Psy 104 Effective Study Techniques (2)

Designed to acquaint students with basic aims and objectives of going to college, and to provide adequate instruction and practice in specific study skills; effective study methods, note-taking, time-planning, memory, concentration, etc. 1 lecture, 1 quiz section.

Psy 202 General Psychology (3)

Biological individuality; heredity and environment; motives; emotions; sensory activity and its use by the individual; learning and remembering; thinking and creating; intelligence; abilities; personality; culture and the individual; oneself and others. 3 lectures.

Psy 206 Family Relations (3)

Family life education. Economic, psychological, and biological understanding necessary for successful family life and child rearing. Techniques for happy marriage. Interrelationships of marriage, family living, democratic life, and sound mental health. 3 lectures.

Psy 301 Personality and Mental Health (3)

Factors of mental health; achieving efficiency; personality development; emotional control; social adaptation; improvement of thinking; religion; program for mental health. 3 lectures.

Psy 302 Psychology of Business and Industry (3)

Psychological factors involved in employer-employee relationships, an analysis of the current practices of business and industry relative to personnel procurement, placement, training, conditions of work and productivity, human relations, human engineering, wages, and job evaluation. 3 lectures.

Psy 401 Social Psychology (3)

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 controls, leadership. 3 lectures. Prerequisite: Psy 202 or permission of instructor.

ENGLISH AND SPEECH DEPARTMENT

Department Chairman, David M. Grant

Elizabeth B. Anderson
 Paul B. Anderson
 Robert L. Andreini
 Stanley Barr
 Robert O. Boothe

Marvin D. Brown
 Evelyn K. de Voros
 G. Alvin Foote
 Mead R. Johnson
 Miles B. Johnson
 Charles H. Lindamood

Ena Marston
 Keith Nielsen
 Byrd Price
 John P. Riebel
 Robert K. Yeaton

Courses in English are designed to serve three purposes: first, to help the student develop habits of sound thinking and logical organization of material; second, to provide opportunities for the student to use language accurately, clearly, and interestingly, both in speaking and in writing; and third, to develop the technique of reading to the point of understanding others' ideas and using those ideas in the solution of one's own problems. The sole objective of the department is to provide service courses in the fields of English and speech and to offer appropriate courses in these fields to meet the general education needs of students in the majors offered by the college.

The English 104, 105, 106 course sequence is required of all students except those who enter with credit in freshman composition. In addition, one of the following courses is required: English 211, 212, 213, 311, 312, 313. Other courses are offered for department patterns and as electives.

For the purpose of assigning students to the appropriate level of training in language communication, a placement test is given. The test measures acceptable proficiency in language communication as revealed in sentence structure, appropriate usage, spelling, and paragraph unity. Students who demonstrate considerable deficiency will be assigned to English 4, a preparatory course without credit toward a degree. A passing grade in this course entitles the student to advance to English 104.

DESCRIPTIONS OF COURSES IN ENGLISH**Eng 4 Preparatory English (3)**

For the student who needs additional work before entering English 104. The organization of ideas into logical, clear sentences and paragraphs, taught primarily through intensive writing based on the student's interests and experience. 3 lectures.

Eng 100 Applied English Composition (3)

Concentrated work in English composition, letter writing, reports, and language uses. May not be substituted for Eng 104, 105, or 106. 3 lectures. Prerequisite: passing grade on placement examination or Eng 4. Not open to degree students for degree credit.

Eng 104 Language Communication (3)

Use of reference materials. Review of language skills. Organization of material, paragraphs, and sentence structure. Business letters. 3 lectures. Prerequisite: Satisfactory score on placement examination or Eng 4

Eng 105 Language Communication (3)

Forms of exposition and argumentation. Development of effective and forceful style. Preparation of term papers or project reports. 3 lectures. Prerequisite: Eng 104

Eng 106 Language Communication (3)

Continuation of basic skills in written composition. Introduction to forms of literature such as poetry, essays, plays, short stories, and novels. 3 lectures. Prerequisite: Eng 105

Eng 205 Children's Literature (3)

Survey of available stories, plays, and poems which are suitable for language instruction in the elementary grades. 3 lectures. Prerequisite: Eng 106 or permission of instructor.

Eng 211 Modern Literature (3)

Study of modern literature—essays, short stories, poetry, plays—as the expression both of the common experiences of mankind and of the specific experiences of twentieth century man as he views his social world. 3 lectures. Prerequisite: Eng 106

Eng 212 Modern Literature (3)

Study of modern literature—essays, short stories, poetry, plays—as the expression both of the common experiences of mankind and of the specific experiences of twentieth century man as he views his physical world. 3 lectures. Prerequisite: Eng 106

Eng 213 Modern literature (3)

Study of modern literature—essays, short stories, poetry, plays—as the expression both of the common experiences of mankind and of the specific experiences of twentieth century man as he views his inner and personal world. 3 lectures. Prerequisite: Eng 106

Eng 219 Technical Writing (3)

Preparation of training materials; popular presentation of technical data and results; technical communication within industries; extensive experience in technical writing. 3 lectures. Prerequisite: Eng 106

Eng 301 Report Writing (3)

Study of the engineering and research paper; extensive writing experience. 3 lectures. Prerequisite: Eng 106

Eng 311 American Literature (3)

Readings from American literature to achieve a better understanding of democratic ideals and of the written forms in which they are presented. 3 lectures. Prerequisite: Eng 106

Eng 312 American Literature (3)

Selections from American literature to reflect the ways that man looks at his physical and social environment. Study of the literary forms by which these ideas may be expressed. 3 lectures. Prerequisite: Eng 106

Eng 313 American Literature (3)

Romanticism and realism in American literature. Study of the forms by which these movements and ideas have been expressed. 3 lectures. Prerequisite: Eng 106

Eng 314 Advanced Composition (3)

Intensive study of modern English usage. Assignments and practice in written composition. 3 lectures. Prerequisite: Eng 106

Eng 315 Shakespeare (3)

Intensive study of important plays with other plays assigned for more rapid reading. 3 lectures. Prerequisite: Eng 106

Eng 402 Advanced Letterwriting (2)

Advanced letterwriting problems; letters of application, inquiries, questionnaires, and the psychology of modern business letters. 2 lectures. Prerequisite: Eng 106

Eng 411 English Literature (3)

Selected readings in English literature from the beginnings to the seventeenth century. 3 lectures. Prerequisite: Eng 106

Eng 412 English Literature (3)

Selected readings in English literature of the seventeenth and eighteenth centuries. 3 lectures. Prerequisite: Eng 411

Eng 413 English Literature (3)

Selected readings in English literature from the nineteenth century to the present. 3 lectures. Prerequisite: Eng 412

Eng 414 The Drama (3)

Readings in representative dramas from the Greek and Latin through English, American, and Continental literature. 3 lectures. Prerequisite: Eng 106

Eng 415 The Modern Novel (3)

Readings in representative contemporary novels with special emphasis on their origins, content, form, and style. 3 lectures. Prerequisite: 6 units of Modern, American, or English literature.

Eng 433 The Short Story (4)

Selected short stories to demonstrate characteristics of form, content, style, and plot. Assignments in the writing of the short story. 3 lectures, 1 2-hour laboratory. Prerequisite: 6 units of Modern, American, or English literature.

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

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

Eng 463 Undergraduate Seminar (2)

Reports of senior projects, discussions of professional articles of an appropriate level. 2 lectures. Prerequisite: Completion of Senior Project.

Eng 521 Curriculum and Methods in English (3)

Curricula, methods, devices, and procedures that may be used effectively in organizing and conducting secondary school courses in English, speech and journalism. 2 lectures, 1 laboratory. Prerequisite: Graduate Standing.

Eng 590 Graduate Seminar in English (1-3)

Special problems in selected areas of literature and language. Maximum of six units credit may be earned. 1 to 3 lecture-discussions.

DESCRIPTIONS OF COURSES IN SPEECH**Sp 201 Public Speaking (2)**

Training and giving speeches before audiences. Experiences in practical speaking situations, such as business reports, sales talks, interviews, and parliamentary meetings. 2 lectures. Prerequisite: Eng 105

Sp 302 Speech for the Classroom Teacher (2)

Common and typical speech deviations usually found in the elementary grades; classroom procedures for the improvement and correction of speech; speech activities for the elementary grades. 2 lectures. Prerequisite: Sp 201

Sp 303 Advanced Public Speaking (2)

Problems in parliamentary law and formal discussion. Specialized speaking situations in business, engineering, and agriculture; attention will be given to individual problems and interests. 2 lectures. Prerequisite: Sp 201

Sp 304 Argumentation and Persuasion (2)

Argumentation and persuasion as forms of oral discourse. Introduction to forensics, such as persuasive oratory and debate. 2 lectures. Prerequisite: Sp 201

Sp 305 Techniques of Oral Reading (2)

Selection, preparation, and presentation of materials for oral reading. Individual instruction in problems of voice and diction. 2 lectures. Prerequisite: Sp 201

Sp 306 Introduction to Radio and Television Programming (3)

Fundamentals of adapting materials for presentation on radio and television. Production of special types of programs. 3 lectures. Prerequisite: Sp 201

Sp 347 Creative Dramatics (2)

The preparation, casting, and presentation of simple dramatic forms using minimal staging. May be repeated for not more than 6 units. 2 laboratories. Prerequisite: Sp 201

Sp 403 Speech Techniques in Society (2)

Role of spoken discourse in the solution of social problems. Special concern with forms of discussion such as panels, forums, and symposia. 2 lectures. Prerequisite: Sp 201

Sp 451, 452, 453 Radio and Television Laboratory (2) (2) (2)

Practical instruction and experience in the presentation of material on radio and television. 2 laboratories. Prerequisite: Sp 306

Sp 590 Graduate Seminar in Speech (1-3)

Special problems in selected areas of speech. Maximum of 6 units credit may be earned. 1 to 3 lecture-discussions.

DESCRIPTION OF COURSES IN SPANISH**Span 221, 222, 223 Conversational Spanish (3) (3) (3)**

Oral drill and conversational practice. Class drill in pronunciation, sentence structure, vocabulary, and basic conversation in relation to Latin-American usage. Listening and responding to recorded materials. 2 lectures, 1 2-hour laboratory.

HOME ECONOMICS DEPARTMENT

Department Head: Marjory M. Elliott

John L. Jenkins
Gretchen C. Streichert

Ann Westsmith
Sarah L. Walsh

The objectives of the Home Economics Department are to provide training for persons interested in homemaking, in teaching homemaking in secondary schools, or in occupations closely related to homemaking, and to contribute to the general education of students.

For those who wish to broaden their general education the Home Economics Department offers courses which enrich personal and family life through the development of basic concepts and skills. Students are invited to consult with the department about their special interests in homemaking and family life education.

Considerable emphasis is placed upon practical courses in the first two years. These courses are designed to increase the employability of the student after the first two years of study and also to afford a substantial basis for successful marriage and family life.

In addition to preparing individuals for homemaking and teaching, the curriculum provides opportunity for education in occupational fields related to homemaking; such as, home economics journalism, experimental foods, home equipment demonstration, nursery school supervision, extension service, consumer education, public health and social service, consultation in home furnishings, and insitutional management. Any one of these fields or any combination of them may be emphasized by careful choice of electives.

Since studies show that there will be a shortage of homemaking teachers in secondary schools for some time, the graduate who holds a teaching credential in homemaking education will have numerous employment opportunities. The student preparing for teaching should refer to the section of the catalog which gives information regarding preparation for credentials for public school service.

CURRICULUM IN HOME ECONOMICS

	F	W	S
Freshman			
Language Communication (Eng 104, 105, 106).....	3	3	3
Introduction to the Social Sciences (Soc Sc 101).....	3		
Physical Education (PE 141, 142, 143).....	½	½	½
Health Education (PE 107).....	2		
General Household Physics (Phys 208).....		3	
General Household Chemistry (Chem 206).....			4
Art in the Home (Art 238).....		3	
Family Meals (HE 121).....		3	
Clothing Selection and Construction (HE 131).....	3		
Home Furnishings (HE 142).....		2	
Personal and Home Management (HE 123).....			3
Problems of the Beginning Family (HE 103).....	2		
Electives.....	3	2	7
	<hr/> 16½	<hr/> 16½	<hr/> 17½
Sophomore			
General Psychology (Psy 202).....	3		
Sports Education (PE 241, 242, 243).....	½	½	½
Principles of Economics (Ec 201).....			3
Elementary Human Physiology (Zoo 122).....		4	
General Bacteriology (Bact 221).....			4
Meals for Special Occasions (HE 221).....	2		
Family Clothing (HE 241).....		2	
Household Equipment (HE 231).....	3		
Family Relations (Psy 206).....		3	
Home Nursing (HE 222).....		2	
Consumer Economics (Ec 105).....		3	
The Child and the Family (HE 233).....			4
Electives.....	8	3	5
	<hr/> 16½	<hr/> 17½	<hr/> 16½

	F	W	S
Junior			
Literature	3	3	3
American Government (Pol Sc 301).....	3		
Applied Color and Design (Art 321).....	3		
Family Nutrition (HE 321).....			2
Growth of American Democracy (Hist 304).....		3	
Public Speaking (Sp 201).....		2	
Textiles (HE 322).....	2		
Home Design (Arch 312).....	2		
Home Decoration (HE 323).....		2	
United States in World Affairs (Hist 305).....			3
Costume Design and Construction (HE 333).....			3
Senior Project (HE 461).....			2
Electives	4	7	4
	<hr/>	<hr/>	<hr/>
	17	17	17
Senior			
Senior Project (HE 462).....	2		
Undergraduate Seminar (HE 463).....			2
Home Management (HE 423).....			4
Public Relations (Jour 412).....			3
Meal Management (HE 421).....	3		
Electives	12	12	8
	<hr/>	<hr/>	<hr/>
	17	12	17

DESCRIPTIONS OF COURSES IN HOME ECONOMICS

HE 103 Problems of the Beginning Family (2)

Problems of the beginning family. Development and growth of the child during prenatal life and infancy; care and health of the mother; psychological and economic implications involved in adding children to the family. For both men and women. 2 lectures.

HE 121 Family Meals (3)

Preparation of economical, nutritious, and appetizing family meals with particular emphasis on time management for employed homemakers. Study of the association between family meals and family relationships. For both men and women. 2 lectures, 3 1-hour laboratories.

HE 123 Personal and Home Management (3)

Practical home management as it is affected by housing and family situations. Utilizes actual living arrangements of students. 2 lectures, 1 2-hour laboratory.

HE 131 Clothing Selection and Construction (3)

Personality expression through clothing selection. Fitting commercial patterns to figure problems; modern speed techniques of clothing construction. 1 lecture, 2 laboratories.

HE 142 Home Furnishings (2)

Constructing home furnishings. Individual problems. Related to actual living situations of students. For both men and women. 2 laboratories.

HE 221 Meals for Special Occasions (2)

Planning, preparing, and serving meals for large family groups, community groups, or special occasions involving groups of medium size. Etiquette of proper table setting and service. 1 lecture, 1 laboratory.

HE 222 Home Nursing (2)

Care of the sick in the home as related to the welfare of the entire family. For both men and women. 1 lecture, 1 2-hour laboratory.

HE 225 Demonstration Techniques (2)

Instruction in the technique of demonstrations; planning and giving demonstrations for different groups; lecture-demonstrations by specialists from commercial field. 1 lecture, 1 2-hour laboratory.

HE 231 Household Equipment (3)

Efficient selection, use, and maintenance of common types of household equipment. Simple repairs and adjustments. 2 lectures, 1 2-hour laboratory. Prerequisite: Phys 208, HE 123

HE 233 The Child and the Family (4)

Study of children in the family-centered home including observation and participation in the child care laboratory and conferences with parents for gaining insight into child development and competency in care of children. For both men and women. 2 lectures, 2 laboratories. Prerequisite: Psy 202 or 206 or HE 103

HE 241 Family Clothing (2)

Selection and construction of clothing for adults and children. 2 laboratories. Prerequisite: HE 131 or permission of instructor.

HE 321 Family Nutrition (2)

Chemical composition of foods and their utilization in the body. Relation of adequate diet to physical and mental health of various family members. 1 lecture, 1 laboratory. Prerequisite: HE 121

HE 322 Textiles (2)

Sources and characteristics of natural and synthetic fibers. Fabrics, weaves, and textile finishes. Design and production of modern textiles. Consumer approach to textile fabrics—selection, use, and care. 1 lecture, 1 laboratory.

HE 323 Home Decoration (2)

Selection and arrangement of furnishings as they relate to family income, expression of personality, architectural design and setting. 1 lecture, 1 laboratory. Prerequisite: HE 142, Art 321, Arch 312

HE 325 Home Food Conservation (2)

Conservation of food for the family, using all of the practical current methods. 1 lecture, 1 laboratory. Prerequisite: HE 121 or 221

HE 332 Finishing Techniques (2)

Finishing old furniture and finishing unpainted furniture and built-ins. Repairing, finishing walls and woodwork in a home. Individual problems. 2 laboratories.

HE 333 Costume Design and Construction (3)

Fundamentals of designing by flat pattern and French draping. Relation of current fashions to previous styles. Designing for the individual and the fabric. Advanced construction techniques. 1 lecture, 2 laboratories. Prerequisite: Art 321, HE 241, 322

HE 411 Methods and Materials for Homemaking Instruction (4)

Development of a timely philosophy in homemaking education. Classroom management, procedures, curriculum development, teaching aids and evaluating techniques for teaching homemaking in junior and senior high schools provided for by the Vocational Acts. 4 lectures. Prerequisite: Ed 312

HE 413 Adult Homemaking Education (2)

Curriculum materials, procedures, teaching aids and evaluative techniques for teaching adult homemaking. 2 lectures. Prerequisite: HE 411

HE 421 Meal Management (3)

Practical experience in menu planning and meal service for small groups with emphasis on food buying, management, and catering. 1 lecture, 2 laboratories. Prerequisite: HE 221

HE 423 Home Management (4)

The application of homemaking courses in a family-type house emphasizing experiences in decision making, group relationships, and family living. 1 lecture, 3 laboratories. Prerequisite: Senior standing.

HE 425 Quantity Cookery (3)

Economic principles and problems involved in planning, preparing and serving foods to large groups. 1 lecture, 2 laboratories. Prerequisite or concurrent: HE 421

HE 428 Dietetics (3)

Qualitative and quantitative laboratory studies of the normal diets for persons of various ages and occupations. 1 lecture, 2 laboratories. Prerequisite: HE 321, Chem 206

HE 442 Tailoring (2)

Selection and construction of garments requiring tailoring techniques. 2 laboratories. Prerequisite: HE 333 or permission of instructor.

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

Selection and completion of a project with a minimum of supervision, the project to be related to a probable field of employment. Results of the study to be presented in a formal report. Minimum of 120 hours to be used in making the study.

HE 463 Undergraduate Seminar (2)

Study and discussion of current developments in the field of home economics. 2 lectures.

DESCRIPTIONS OF PROFESSIONAL COURSES FOR SCHOOL LUNCH PERSONNEL

HE 631 Nutrition (1½)

Role of nutrition in the diets of school-age children. For school lunch personnel. One-week summer course.

HE 632 Beginning Menu Planning (1½)

Planning, developing, and serving the type A lunch. For school lunch personnel. One-week summer course.

HE 633 Food Purchasing (1½)

Food characteristics and quantity purchasing procedures. For school lunch personnel. One-week summer course.

HE 634 Lunchroom Sanitation, Storage, and Safety (1½)

Personal hygiene for food handlers; kitchen sanitation; storage and handling of foodstuffs and equipment. Safety measures. For school lunch personnel. One-week summer course.

HE 635 Quantity Food Preparation and Service (3)

Preparing and serving foods in large quantities in the school lunch program. For school lunch personnel. Two-week summer course.

HE 636 Advanced Menu Planning (1½)

Nutritional standards for the type A lunch; the Commodity Guide Sheet; budgeting, variety, and special meals. For school lunch personnel. One-week summer course.

HE 637 Food Cost Accounting and Recordkeeping (1½)

School lunch costs and their sources; budgeting and recordkeeping; statements. For school lunch personnel. One-week summer course.

HE 638 Institution Organization and Management (1½)

Federal, state, and local laws related to the school lunch program; time and space management; supervision of personnel and equipment; the role of the school lunch manager. For school lunch personnel. One-week summer course.

MATHEMATICS DEPARTMENT

Department Head, Milo E. Whitson

Olive M. Andersen	Thomas E. Gartland	George R. Mach
William D. Bandes	Jesse B. Goode	John A. Manning
William O. Buschman	Charles J. Hanks	David E. Moe
James T. Culbertson	Ross Higbee	Chester H. Scott
Charles A. Elston	Wilbur Hogan	Joseph B. Stefanac
Oswald J. Falkenstern	W. Boyd Judd	Ralph E. Weston
Volmar A. Folsom	George C. Laumann	Arthur D. Wirshup
	Harold T. Lawrence	John A. Woodworth

The objectives of the Mathematics Department are to offer courses needed in the engineering and agricultural divisions for the purpose of developing vocational proficiency; to contribute to the general education of all students; to prepare secondary school mathematics teachers who are conscious of the uses of mathematics; and to prepare mathematicians for industrial and civil service employment.

It is recommended that the high school student planning a mathematics major include in his high school program three semesters of algebra, one of trigonometry, two of geometry, two of physics, and two of chemistry.

Tests are given to entering students to determine their facility and preparation in mathematics. The results of these tests are used to help in placing the new student in courses where he will most likely succeed. Students in mathematics, physical science, and engineering who have had adequate preparation will normally begin their college work in mathematics with Math 117. Other students in the Arts and Sciences Division will normally begin with Math 111. Students in the Agricultural Division will normally begin with Math 102.

CURRICULUM IN MATHEMATICS

	F	W	S
Freshman			
Mathematics for Engineers (Math 117)	5		
Analytic Geometry and Calculus (Math 118, 201)		5	3
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Health Education (PE 107)			2
Biological Science (Bio 101, Bio 110, Bot 121, or Zoo 131)	3		
Biological Science		3	
General Physics (Phys 131, 132)		4	4
* Electives	6	2	5
	<hr/>	<hr/>	<hr/>
	17½	17½	17½
Sophomore			
Analytic Geometry and Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
General Psychology (Psy 202)		3	
General Physics (Phys 133, 204, or 211)	4		
Principles of Economics (Ec 201)	3		
Economics		3	3
Sports Education (PE 241, 242, 243)	½	½	½
Literature	3		
Literature, Philosophy or Art		3	3
Family Relations (Psy 206)		3	
† Mathematics Electives			2
* Electives	4	2	5
	<hr/>	<hr/>	<hr/>
	17½	17½	16½

* Fifteen units must be selected from approved skills courses.

† Fifteen of these mathematics electives and restricted electives must be selected from approved applied mathematics courses.

	F	W	S
Junior			
Differential Equations (Math 317).....	2		
Math. Analysis of Engineering Problems (Math 318 or 319)....		3	
Theory of Equations (Math 307).....	3		
American Government (Pol Sc 301).....	3		
General Chemistry (Chem 321).....	4		
Senior Project (Math 461).....			2
† Restricted Electives (300 or 400 courses in Math)		3	3
* Electives	5	10	11
	17	16	16
Senior			
Senior Project (Math 462).....	2		
Undergraduate Seminar (Math 463).....			2
Growth of American Democracy (Hist 304).....		3	
U.S. in World Affairs (Hist 305).....			3
† Restricted Electives (400 courses in Math).....		3	2
† Mathematics Electives	6	3	2
* Electives	7	6	6
	15	15	15

DESCRIPTIONS OF COURSES IN MATHEMATICS

Math 1 Preparatory Mathematics (3)

Fundamentals of fractions, ratios, decimals, percentage, linear measures, areas, volumes, and first principles of algebra, including linear equations. 3 lectures.

Math 7 Preparatory Algebra (5)

Signed numbers, linear equations, literal equations, formula evaluation, functional relationships, graphing linear and quadratic equations, factoring algebraic functions, fractional equations. 5 lectures. Prerequisite: Satisfactory score on placement examination.

Math 102 Agricultural Mathematics (3)

Percentage problems in soils, dairy, horticulture, poultry, feeds; discounts, and interest. Pearson's square, equations, formulas, linear measurements, areas, volumes, and proportion. Concrete, lumber, silo measurements. 3 lectures. Prerequisite: Satisfactory score on placement examination or Math 1.

Math 103 Agricultural Mathematics (3)

Use of exponents, logarithms and elementary slide rule, trigonometric functions, basic land descriptions, and elementary statistics with agricultural applications. 3 lectures. Prerequisite: Math 102

Math 104 Computations and Slide Rule (1)

Operation of the slide rule and methods of computation used in engineering. 1 lecture. Prerequisite: Math 103 or 117

Math 105 Printer's Mathematics (3)

Special fractions, percentage, compound numbers, point systems, spacing, ratio and proportion, margins, estimating, and slide rule. 3 lectures. Prerequisite: Math 1 or satisfactory score on placement examination.

Math 108 Mathematics for Business (5)

Algebraic techniques and processes, commercial applications of percentage and simple interest, exponents and logarithms, tabular interpolation, equations of time and of value, partial payments and installment buying, quadratic equations, graphical representation of linear and quadratic functions, progressions, and binomial theorem. 5 lectures. Prerequisite: Satisfactory score on placement examination or Math 7

* Fifteen units must be selected from approved skills courses.

† Fifteen of these mathematics electives and restricted electives must be selected from approved applied mathematics courses.

Math 109 Mathematics for Business (5)

Permutations, combinations, and probability in mathematical expectation. Basic statistics, compound interest and discount, annuities, amortization and sinking funds, depreciation, bonds and reinvestments, life insurance and policy reserves. 5 lectures. Prerequisite: Math 108

Math 111 Basic Mathematics for General Education (3)

Graphs and charts, ratio, proportion, variation, linear and quadratic equations, verbal problems, trigonometry for general education. 3 lectures. Prerequisite: Satisfactory score on the placement examination or Math 1 or Math 7

Math 112 Basic Mathematics for General Education (3)

Simple and compound interest, present value of deferred payments, amortization; logarithms; law of continuous growth and decay; probability; elementary statistics including measures of central tendency, standard deviation, frequency distributions, and graphic representation of data; basis of our number system. 3 lectures. Prerequisite: Math 111

Math 114 Agricultural Mathematics (3)

An abridged course covering selected topics from algebra designed for those students who are majoring in soils, mechanized agriculture, and agricultural chemistry who plan to take no mathematics beyond Math 118. 3 lectures. Prerequisite: Math 103

Math 115 Agricultural Mathematics (3)

An abridged course covering selected topics from trigonometry designed for those students who are majoring in soils, mechanized agriculture and agricultural chemistry and who plan to take no mathematics beyond Math 118. 3 lectures. Prerequisite: Math 114

Math 117 Mathematics for Engineers (5)

An integrated course in college algebra and trigonometry covering function concept and symbols, rectangular co-ordinates, trigonometric function, linear and quadratic functions, inequalities, analysis of trigonometric functions, inverse trigonometric functions, exponential and logarithmic functions, systems of equations, binomial formula, and complex numbers. 5 lectures. Prerequisite: Math 7 or satisfactory score on placement examination.

Math 118 Analytic Geometry and Calculus (5)

Introductory course in analytic geometry and calculus. Topics include: rectangular co-ordinates, geometry of the straight line and conic sections, functions, limits, continuity, differentiation of algebraic functions, differentials, parametric equations, maxima and minima, and simple applications of the derivative. 5 lectures. Prerequisite: Math 117, Math 115 or satisfactory score on placement examination.

Math 121 Arithmetic for Elementary Teachers (3)

The idea of numbers, our number system, and number concept; the four fundamental operations with whole numbers and common fractions. Achievement and remedial tests are used. 2 lectures, 1 activity period. Prerequisite: Satisfactory score on placement examination or Math 1

Math 122 Arithmetic for Elementary Teachers (3)

Decimal fractions; the meaning of percent and its application; universal arithmetic and formulas; measurement of length, scale drawings, and straight line graphs. 2 lectures, 1 activity period. Prerequisite: Math 121 or instructor's permission.

Math 123 Arithmetic for Elementary Teachers (3)

Measurement of angles, areas, and volumes; the study of plane figures and geometrical solids; liquid and dry measures; units of weight and time; the metric system. The actual use of these measurements. 2 lectures, 1 activity period. Prerequisite: Math 122 or instructor's permission.

Math 201 Analytic Geometry and Calculus (3)

Continuation of Math 118. Curve tracing, mean value theorem, definite integrals of algebraic functions with applications to area, volume, work, and centroids, differentiation of transcendental functions with such applications as Newton's Method for solving equations and L'Hospital's Rule. 3 lectures. Prerequisite: Math 118

Math 202 Analytic Geometry and Calculus (3)

Continuation of Math 201. Polar co-ordinates, integration by formula, trigonometric substitution, and parts. Applications in area, volume, work, and centroids. 3 lectures. Prerequisite: Math 201

Math 203 Analytic Geometry and Calculus (3)

Continuation of Math 202. Integration by partial fractions, approximate integration, length of arc, introductory topics in solid analytic geometry, partial differentiation, double integrals, centroids, moments, and infinite series. 3 lectures. Prerequisite: Math 202

Math 211 Descriptive Statistics (3)

Graphical representation of statistical data, calculation and uses of various averages, measures of variability, elementary probability and the normal curve, sampling and estimation. 3 lectures. Prerequisite: Math 103 or 112 or 117 or 122

Math 212 Statistical Methods (3)

Tests of hypotheses, sampling theory, linear regression, linear correlation, index numbers, time-series analysis, quality control, and analysis of variance. 2 lectures, 1 activity period. Prerequisite: Math 211

Math 213 Elementary Engineering Problems (2)

Selected problems from engineering fields which are solvable by methods of elementary mathematics. Selection of topics from the following: complex numbers, hyperbolic functions, introduction to functions of a complex variable, infinite series. 2 lectures. Prerequisite: Math 203

Math 217 Mathematics of Digital Computers (3)

Algorithms and iterative computer methods. Neurons and nerve nets. Permutations, combinations and probability. Number systems and traditional logic. 3 lectures. Prerequisite: Math 117

Math 218 Mathematics of Digital Computers (3)

Types of relations. Boolean algebra of classes and propositions. Deductive systems. Simplification of Boolean functions and reduction to normal forms. 3 lectures. Prerequisite: Math 217

Math 304 Programming of Digital Computers (3)

Coding of general purpose and special purpose digital computers. Preparation of programs for general purpose computers. Subroutines. 3 lectures. Prerequisite: Math 217

Math 307 Theory of Equations (3)

Complex number system, theorems for algebraic polynomials and equations, transformations, general and trigonometric solutions of cubic equations, solutions by iterative processes; linear systems, determinants and matrices. 3 lectures. Prerequisite: Math 202

Math 312 Linear Systems and Matrices (3)

Linear substitutions and their composition. Representation by matrices. Arithmetical properties of matrices. Matrices, vector spaces and determinants; characteristic vectors and characteristic numbers. Basic methods of solving systems of linear equations. Applications to differential equations. 3 lectures. Prerequisite: Math 317

Math 316 Differential Equations (3)

An introduction to first order differential equations and simple linear equations with constant coefficients. Applications to dynamics, electric circuits, and heat flow. 3 lectures. Prerequisite: Math 203

Math 317 Differential Equations (2)

Linear differential equations with constant coefficients. Operational methods including an introduction to the Laplace transform and their applications. 2 lectures. Prerequisite: Math 316

Math 318 Mathematical Analysis of Engineering Problems (3)

Gamma functions, Laplace transforms, the Heaviside operator, Taylor's series, Frobenius series, Bessel functions and series solutions of ordinary differential equations. 3 lectures. Prerequisite: Math 317

Math 319 Mathematical Analysis of Engineering Problems (3)

Elliptic integrals, differentiation under the integral sign, Fourier series, harmonic analysis and solution of partial differential equations. 3 lectures. Prerequisite: Math 317

Math 332 Numerical Methods in Analysis (3)

Numerical solution of algebraic and transcendental equations and systems of equations, finite differences, interpolation, numerical integration, and numerical solution of ordinary differential equations. 3 lectures. Prerequisite: Math 316

Math 400 Topics in Applied Mathematics (1-2)

Individual or group investigations of selected topics in applied mathematics. Total credit limited to 4 units. 1 or 2 lecture-conferences. Prerequisite: Permission of the instructor.

Math 402 Secondary School Mathematics (3)

Evaluation of content, texts, and supplementary material for seventh and eighth grade arithmetic, ninth and twelfth grade mathematics, and remedial mathematics with techniques for developing concepts. 3 lectures, 1 practice period. Prerequisite: Math 203

Math 403 Secondary School Mathematics (3)

Evaluation of content, texts, and supplementary materials for first- and second-year algebra, plane geometry, and trigonometry with techniques for developing the concepts. 3 lectures, 1 practice period. Prerequisite: Math 203

Math 404 Vector Analysis (2)

Algebra of free vectors with applications. Introduction to differential and integral calculus of vectors. 2 lectures. Prerequisite: Math 316

Math 405 Vector Analysis (2)

Calculus of scalar and vector functions. Derivation and properties of gradient, divergence, and curl. Applications of analytic vector methods to problems of physics and engineering. 2 lectures. Prerequisite: Math 404

Math 408 Functions of a Complex Variable (2)

Fundamental properties of a complex variable. Conformal mapping and its applications to heat transfer, electric potential theory, and hydrostatics. 2 lectures. Prerequisite: Math 317

Math 409 Functions of a Complex Variable (2)

Analysis of two-dimensional fields by use of conformal mapping and contour integration. 2 lectures. Prerequisite: Math 408

Math 412 Advanced Calculus (3)

Real numbers system, Dedekind cuts, sequences, limits, continuity, derivatives and differentials, Riemann integration. 3 lectures. Prerequisite: Math 203

Math 432 Numerical Methods in Analysis (3)

Expansion and continuation of Math 332. Interpolation and numerical differentiation and integration by formulas of Lagrange, Gauss, Bessel, and Stirling. Numerical solution of ordinary, difference, and partial differential equations. 2 lectures, 1 activity period. Prerequisite: Math 332

Math 441 Theory of Numbers (3)

Properties of integers, Euclid's algorithm, Diophantine equations, prime numbers, congruences, residues of powers and quadratic residues, with applications to computers and the teaching of secondary mathematics. 3 lectures. Prerequisite: At least junior standing and Math 118

Math 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.

Math 463 Undergraduate Seminar (2)

Reports and discussions by students, through seminar methods, based on their senior projects and on other topics in mathematics which are of interest to them.

Math 506 Fundamental Concepts and Structure of Arithmetic and Algebra (3)

The axiomatic method, operations with real numbers, order relations, formation of integers and rational numbers, properties and laws of integers and rational numbers. 3 lectures. Prerequisite: Math 307 and instructor's approval.

Math 509 Development of Mathematics (3)

Correlation between the development of our society and the development of mathematics. Designed to aid the teacher of secondary mathematics to enrich the courses taught in secondary schools. 3 lectures. Prerequisite: Graduate standing.

Math 510 Survey of Modern Mathematics (3)

Selected topics from the field of modern mathematics: projective and synthetic geometry, topology, logic, matrices, vectors, theory of games, probability, linear and modern algebra and convex sets. 3 lectures. Prerequisite: Graduate standing or instructor's approval.

Math 521 Curriculum and Methods in Mathematics (3)

Modern tendencies and general aims of secondary school mathematics. Objectives of, and methods for effective teaching in general mathematics, algebra, geometry, and trigonometry. 3 lectures. Prerequisite: Graduate standing.

Math 580 Seminar (1-2-3)

Built around topics in advanced mathematics chosen according to the common interests and needs of the students enrolled. Each seminar will have a subtitle according to the nature of the content. 1, 2, or 3 lectures. Prerequisite: Instructor's approval.

MILITARY SCIENCE AND TACTICS DEPARTMENT

Department Head, Col. Wilford E. H. Voehl

Major Alexander F. Mariconda

Capt. Dewey E. Brown

1st Lt. Walter Yewdall, Jr.

The purpose of the Reserve Officers' Training Corps (ROTC) is the training of students for officer positions in the Army in times of national emergency. Successful completion of the four-year course entitles the student to a commission as a second lieutenant, United States Army Reserve, under terms of the Reserve Forces Act of 1955. In addition, the program provides for selection of distinguished military graduates of college ROTC units for direct appointment as second lieutenants in the Regular Army or in the Marine Corps. The four-year program is divided into the basic course and the advanced course, each course covering a two-year period. Basic course students receive three class-hours instruction per week. Advanced course students receive five hours. As in any other course, credits count toward college graduation. To be eligible for enrollment in ROTC a student must be:

- a. A male citizen of the United States.
- b. Qualified for appointment as a second lieutenant prior to reaching 28 years of age.
- c. A regularly enrolled student of this institution.
- d. Physically, mentally, and morally qualified.

ARMS, EQUIPMENT, AND UNIFORMS

The United States Government furnishes arms, equipment, uniforms, and textbooks for cadets. This property belongs to the United States Government and must be returned at the end of each school year or when a student ceases to be enrolled in the course.

DEFERMENTS

Under the provisions of the Universal Military Training and Service Act—June, 1951 (Public Law 51, 82d Congress), regularly enrolled ROTC students may be deferred from induction through the Selective Service System if qualified and selected for deferment. No student is deferred automatically by virtue of the fact that he is enrolled as an ROTC student, but must meet all of the following special criteria:

1. Have sufficient time remaining as a college student to permit completion of the ROTC course.
2. Meet the physical, mental, moral, and leadership qualities required for a commission in the Army.
3. Meet the college's minimum academic standards.
4. Apply to the head of the Department of Military Science and Tactics for deferment.
5. Sign a deferment agreement.

In signing the deferment agreement, a student pledges that he will complete the four-year ROTC course, that he will accept a commission if offered, that he will serve not less than two years if called and that he will remain a member of the Regular or Reserve component of the Army until the sixth anniversary of the receipt of his commission unless sooner terminated. If his services are not needed by the Army, he may be called for a six-month period. In this case, he then agrees to remain a member of the Regular or Reserve component of the Army until the eighth anniversary of his commission.

Generally, students may apply for deferment, if otherwise eligible, during any quarter of college studies except the first quarter of the freshman year. Deferment agreements remain in effect until the student ceases to be qualified, completes his college program, or withdraws from the college.

BASIC COURSE

The purpose of the basic course is to qualify the student as a citizen-leader in peace or in war.

Enrollment in the basic course is voluntary. After a student has enrolled in the course, he must complete the two-year sequence of this course in consecutive years. Completion of the course (two years) becomes a prerequisite for graduation, unless relieved by regulations prescribed by the Secretary of the Army. ROTC is scheduled so as not to interfere with student participation in sports or other college activities.

Veterans with one year or more of active service in the armed forces may, upon proper certification, receive credit for the basic course and enroll directly in the advanced course. Veterans with less service will receive such credit as the president of the college and the head of the Department of Military Science and Tactics may jointly determine.

A student with previous training in ROTC, either junior or senior division, at another institution may be granted advanced standing in the course. A student who desires credit for previous ROTC training should secure from the high school or other institution concerned a transcript of such training. This transcript should be presented by the student at the time he enrolls or be filed with the college registrar.

ADVANCED COURSE

The major purpose of the advanced course is to produce college-trained junior officers to meet active Army and reserve requirements. Advanced course students are eligible for selection for a commission in the Regular Army through the Distinguished Military Graduate program upon fulfilling the following requirements: outstanding qualities of military leadership, high moral character, and definite aptitudes for the military service; distinguished academic accomplishment or demonstrated leadership in recognized campus activities; successful completion of all military science subjects or their equivalents; and completion of the full four-year curriculum at the college with a degree.

Enrollment in the advanced course is limited to selected students who are less than 26 years of age, have passed a qualifying examination, and have completed the basic course or received credit therefor. Upon entering the advanced course, a student must sign an agreement with the United States Government that he will complete the advanced course, that he will attend ROTC summer camp, that he will accept an appointment as a second lieutenant in the Army of the United States and that he will serve on active duty for two years or for six months, as ordered. When a student enrolls in the advanced course, completion thereof becomes a prerequisite for graduation from the college unless relieved by competent authority. The government agrees to defer the student from induction into the armed services until the student should normally graduate. In addition the student receives about \$27 per month during the course, plus pay at summer camp. This amounts to over \$600 for the two-year period.

ROTC SUMMER CAMP

Advanced course students are required to attend one course of summer camp training for six weeks during the summer vacation period normally following completion of the first year of the advanced course. The United States Government furnishes uniforms, equipment, transportation expenses to and from camp, pays the student while at camp at the rate of pay of an Army private (now \$78 per month). Five quarter units of credit are granted for successful completion of this camp.

DESCRIPTIONS OF COURSES IN MILITARY SCIENCE AND TACTICS

* MS&T 101-102-103 (MS I) Basic Course (2) (2) (2)

American military history; organization of the Army and ROTC; individual weapons and marksmanship; leadership, drill and command (drill). May be substituted for PE 141, 142, 143. Two lectures. One hour and 20 minutes field instruction.

* MS&T 201-202-203 (MS II) Basic Course (2) (2) (2)

Map and aerial photograph reading; role of the Army in national defense; crew-served weapons and gunnery; leadership, drill and command (drill). May be substituted for PE 241, 242, 243. Two lectures. One hour and 20 minutes field instruction. Prerequisite: MS I or equivalent.

† MS&T 301-302-303 (MS III) Advanced Course (3) (3) (3)

Leadership; military teaching principles; branches of the Army; precamp orientation; small unit tactics and communication; leadership, drill and command (drill). 4 lectures. One hour and 20 minutes field instruction. Prerequisite: MS II or equivalent.

MS&T 400 ROTC Summer Camp (5)

A concentrated laboratory course in military science and tactics. An application of the military theory learned in the classroom. Technical operation, maintenance, and tactical employment of the latest weapons and equipment. Required for a six-week period during the period normally following completion of MS&T 303

MS&T 401-402-403 (MS IV) Advanced Course (3) (3) (3)

Operations; logistics; Army administration and military justice, service orientation; leadership, drill and command (drill). Four lectures. One hour and 20 minutes field instruction. Prerequisite: MS III or equivalent.

* Enrollment in the basic course makes completion thereof a prerequisite to graduation from the college unless the student is sooner discharged by appropriate authority.

† Enrollment in the advanced course makes completion thereof a prerequisite to graduation from the college unless the student is sooner discharged by appropriate authority.

MUSIC DEPARTMENT

Chairman, Harold P. Davidson

George C. Beatie

The purposes of the courses in the Music Department are to give all musically inclined students the opportunity to participate in college musical organizations and to further their proficiency both in singing and in playing instruments; to give all students interested in music a broader insight into the general field of music through courses in appreciation, theory, and harmony; and to provide the prospective teacher with basic skills and instructional techniques in music required for the general elementary credential.

It is necessary that the student have some previous experience with a musical instrument in order to try out for band, symphony orchestra, brass, string, and woodwind choirs, and dance orchestra. While previous experience in choral singing is helpful, it is not mandatory for the student trying out for the men's glee club, women's glee club, and a cappella choir.

It is not possible for a student to major in Music, but there is ample opportunity for students to contribute to their own enjoyment and the enjoyment of others through solo work, and through participation in the many musical organizations.

DESCRIPTIONS OF COURSES IN MUSIC**Mu 141, 142, 143 Dance Orchestra (2) (2) (2)**

Limited to those who have had considerable experience playing musical instruments. Students in the dance orchestra have an opportunity to play for various college entertainments, dances, community programs, radio broadcasts, and the annual spring tour and Home Concert. 2 laboratories. Total credit limited to 24 units.

Mu 144, 145, 146 Symphony Orchestra (1) (1) (1)

Open to any college student whose technique is adequate. Standard orchestral repertory. Several informal, public concerts each season. 1 laboratory. Prerequisite: Permission of the instructor. Total credit limited to 12 units.

Mu 147, 148, 149 Brass, String or Woodwind Choir (1) (1) (1)

Open to qualified players. Rehearsal and public performances in trios, quartets, and quintets. 1 laboratory. Prerequisite: Permission of the instructor. Total credit limited to 12 units.

Mu 151, 152, 153 Band (1) (1) (1)

Limited to those students who have had experience with band instruments. The band plays for many college functions, assemblies, athletic games, and rallies, and makes at least one trip each year. Smaller groups are organized from the band for special functions. 1 laboratory. Total credit limited to 12 units.

Mu 154, 155, 156 Men's Glee Club (1-2) (1-2) (1-2)

Four to eight-part vocal compositions; fundamentals of breathing, tone production, diction, and interpretation. Quartets, small groups, and soloists are developed, for which additional credit may be given. The club sponsors an annual tour and Home Concert. Tryouts in fall only. 1 or 2 laboratories. Total credit limited to 24 units.

Mu 157, 158, 159 Women's Glee Club (1-2) (1-2) (1-2)

Choral literature for women's voices; independence and skill in part singing; care and development of the voice; choral interpretation; performances in public concerts and campus functions. Small groups and soloists may earn additional credit. 1 or 2 laboratories. Prerequisite: Permission of the instructor. Total credit limited to 24 units.

Mu 161, 162, 163 Choir (1) (1) (1)

Largely a cappella singing for both men and women. Standard choir repertory. Several formal concerts each season. 1 laboratory. Prerequisite: Permission of the instructor. Total credit limited to 12 units.

Mu 201 Basic Music for Classroom Teachers (3)

Introduction to basic music skills necessary for the elementary school teacher; singing, theory, conducting, playing an instrument, listening, and creating music. 3 lectures.

Mu 202 Music Theory (3)

Elements of music theory; construction of major and minor scales, intervals, rhythms, sight singing, musical terms, syllable work. 3 lectures.

Mu 203 Elementary Harmony (3)

Melodic form; recognition, construction, and use of primary chords and inversions; cadences, enharmonic change, harmonization of simple melodies, and arranging for four-part men's voices. 3 lectures. Prerequisite: Mu 202

Mu 204, 205, 206 Appreciation (2) (2) (2)

Survey of forms, materials, and composers found in modern radio and concert programs presented through lectures and recordings. Study of choirs and instruments of symphony orchestra; development of folk songs into symphonic themes and treatment; study of contemporary artists. 2 lectures.

Mu 231, 232, 233 Elementary Instruments (1) (1) (1)

Mu 331, 332, 333 Intermediate Instruments (1) (1) (1)

Mu 431, 432, 433 Advanced Instruments (1) (1) (1)

Study of the fundamentals of playing and teaching woodwind, brass, string, and percussion instruments. Separate sections arranged with instructor. 1 laboratory.

Mu 237, 238, 239 Elementary Voice (1) (1) (1)

Mu 337, 338, 339 Intermediate Voice (1) (1) (1)

Mu 437, 438, 439 Advanced Voice (1) (1) (1)

Study of the fundamentals of singing: breathing, posture, diction, development of voice, and vocal interpretation. 1 laboratory.

PHYSICAL EDUCATION DEPARTMENT

Department Head, Robert A. Mott

Richard Anderson	Sheldon Harden	Edward J. Jorgensen
Nancy Baldwin	William R. Hicks	Thomas J. Lee
Ann P. Boukidis	LeRoy B. Hughes	Howard O'Daniels
	James J. Jensen	

The major function of the Department of Physical Education is to provide both required and elective courses in physical education and health to meet the general education needs of all students. To supplement this general education, the department administers an extensive intramural sports program for all students of the college. A second function of the department is to prepare both men and women as secondary teachers in the fields of physical education, health, safety education, and driver training. By proper selection of elective courses, the student can prepare for work in the recreation area.

Because of an ideal geographical location and outstanding physical education facilities, the college has become a center for workshops held by the health and physical education organizations of the State.

Extensive outdoor facilities include large turfed areas for physical education classes, intramural activities and varsity practice field. A modern football stadium, regulation baseball diamond, and quarter-mile track with a 220-yard straightaway provide complete facilities for intercollegiate athletic teams. Basketball, volleyball, handball, and tennis courts are also available for student use.

Indoor facilities include a regulation basketball court, areas for boxing, wrestling, gymnastics, adaptive physical education activities, and a 75-foot 5-lane competitive swimming pool.

CURRICULUM IN PHYSICAL EDUCATION

	F	W	S
Freshman			
Language Communication (Eng 104, 105, 106).....	3	3	3
Basic Mathematics for General Education (Math 111, 112).....		3	3
Health Education (PE 107).....			2
Physical Education (PE 141, 142, 143).....	½	½	½
Safety and First Aid (PE 121).....	2		
Introduction to Recreation (PE 126).....			3
Swimming and Water Sports (PE 123).....			2
Intramural Sports (PE 232).....		3	
General Zoology (Zoo 131, 132).....	4	4	
Public Speaking (Sp 201).....			2
Electives.....	7	3	1
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	16½	16½	16½
Sophomore			
Principles of Economics (Ec 201, 202).....	3	3	
Economic Problems (Ec 213).....			3
General Psychology (Psy 202).....		3	
General Physical Science (PSc 101, 102, 103) or equivalent.....	4	4	4
Sports Education (PE 241, 242, 243).....	½	½	½
Human Anatomy (Zoo 237).....	3		
Human Physiology (Zoo 238, 239).....		3	3
Principles of Physical Education (PE 201).....	3		
Apparatus and Gymnastics (PE 255M or PE 255W).....		2	
Health Education (PE 203).....	2		
Public Speaking (Sp 303).....	2		
Family Relations (Psy 206).....			3
Electives.....		2	2
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	17½	17½	15½

	F	W	S
Junior			
American Government (Pol Sc 301).....	3		
* Growth of American Democracy (Hist 304).....			3
Literature.....	3		
Literature, Art, or Music.....		3	3
Educational Psychology (Ed 312).....		3	
† Football Coaching Theory and Practice (PE 321).....	2		
† Track and Field Theory and Practice (PE 333).....			2
† Baseball Theory and Practice (PE 323).....			2
or			
† Teaching Progression in Girls' Sports (PE 324W, 325W, 326W).....	2	2	2
Teaching Physical Education in the Elementary Schools (PE 332).....		3	
Physiology of Exercise (PE 303).....			2
Techniques of Officiating (PE 331).....	2		
Physical Education Activity (PE 341, 342, 343).....	1	1	1
Kinesiology (PE 302).....		2	
Senior Project (PE 461).....			2
‡ Electives (Men).....	6	4	2
‡ Electives (Women).....	6	2	4
	17	16	17
Senior			
State and Local Government (Pol Sc 401).....			3
Senior Project (PE 462).....	2		
Undergraduate Seminar (PE 463).....		2	
United States in World Affairs (Hist 305).....	3		
† Basketball Theory and Practice (PE 422).....		2	
or			
† Introduction to Dance (PE 334).....		3	
† Minor Sports Theory and Practice (PE 441, 442, 443).....	1	1	1
or			
† Teaching Progression in Dance (PE 446W, 447W, 448W).....	2	2	2
Organization and Administration of Physical Education (PE 401).....	3		
Tests and Measurements in Physical Education (PE 425).....		3	
Administration of School Health Education (PE 405).....		2	
Athletic Training and Massage (PE 432M) (Men majors only).....		1	
Corrective Physical Education (PE 406).....			2
Methods of Physical Education (PE 403).....	3		
‡ Electives (Men).....	4	5	10
‡ Electives (Women).....	3	4	9
	16	16	16

DESCRIPTIONS OF COURSES IN PHYSICAL EDUCATION

PE 107 Health Education (2)

Personal hygiene and health education; relation of exercise and nutrition; and application of the rules of hygiene in maintaining physical and mental health. Fire prevention and public safety; alcohol and other drugs. Required for freshmen and sophomores. 2 lectures.

PE 121 Safety and First Aid (2)

A standard American Red Cross first aid course. Instruction and practice in the immediate and temporary care of injuries and sudden illness. 1 lecture, 1 2-hour laboratory.

PE 123 Swimming and Water Sports Theory and Practice (2)

Supervision of pool activities. Swimming instruction and safety. 1 lecture, 1 2-hour laboratory.

* Social Science teaching minors should take History 301, 302, 303 in lieu of this course.

† Alternative requirements for men and women majoring in Physical Education.

‡ Teaching majors should elect the following courses: Art, Music, PE 300, PE 320, Ed 403, AV 431.

PE 126 Introduction to Recreation (3)

Games and activities suitable for a community recreation program. 1 lecture, 2 two-hour laboratories.

PE 141 Physical Education (½)

Fundamentals of sports and games. 2 one-hour periods.

PE 142 Physical Education (½)

Tumbling and apparatus work; basic sports; gymnastics and calisthenics. 2 one-hour periods.

PE 143 Physical Education (½)

Sports activities; physical test; progressive activities. 2 one-hour periods.

PE 144, 145 Beginning Swimming (½) (½)

Beginning swimming for all who do not pass college swimming test. 2 one-hour periods.

PE 147, 148, 149 Adaptive Activities (½) (½) (½)

Group and individual exercise based upon individual needs in posture, body mechanics, nutrition, post injury and illness, and cardiac cases. Students take these courses in lieu of PE 141, 142, 143 upon recommendation of the college physician. 2 one-hour periods.

PE 151M, 152M, 153M Competitive Athletics (½) (½) (½)

May be substituted for required physical training by those qualified to compete in intercollegiate sports program. 10 hours activity.

PE 201 Principles of Physical Education (3)

History of physical education and the concept of physical education as a profession. Correlation between principles and methods. 3 lectures.

PE 203 School and Community Health Education (2)

General school and community health problems of interest to students of physical education, teachers in service, and others. 2 lectures.

PE 224 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 laboratory.

PE 232 Intramural Sports (3)

Sports adapted to intramural use. Organization of intramural programs. 2 lectures, 1 laboratory.

PE 241 Sports Education (½)

Training and competition in seasonal sports such as speedball, touch football, golf, swimming, and tennis. 2 one-hour periods.

PE 242 Sports Education (½)

Training and competition in seasonal sports such as basketball, badminton, volleyball, boxing, and wrestling. 2 one-hour periods.

PE 243 Sports Education (½)

Training and competition in seasonal sports such as tennis, track, cross-country running, softball, archery, and soccer. 2 one-hour periods.

PE 245 Advanced Swimming and Lifesaving (1)

Lifesaving techniques. Qualified students may obtain Red Cross Water Safety Instructor's cards. 3 one-hour periods.

PE 247, 248, 249 Adaptive Activities (½) (½) (½)

Group and individual exercise based upon individual needs in posture, body mechanics, nutrition, post injury and illness, and cardiac cases. Students take these courses in lieu of PE 241, 242, 243 upon recommendation of the college physician. 2 one-hour periods.

PE 251M, 252M, 253M Competitive Athletics (½) (½) (½)

May be substituted for required physical training by those qualified to compete in intercollegiate sports program. 10 hours activity.

PE 255M Apparatus and Gymnastics (2)

Theoretical and practical work on light and heavy apparatus. Acquisition of proficiency in the performance of tumbling and gymnastic stunts. Progression and teaching technique. 2 two-hour laboratories.

PE 255W Apparatus and Gymnastics (2)

Progression and teaching techniques in tumbling and gymnastic stunts. 1 lecture, 1 two-hour laboratory.

PE 300 Safety Education (3)

Problems in home, fire, industrial, and traffic safety. Accident prevention. 3 lectures.

PE 302 Kinesiology (2)

Energy, leverage, angle positions, sequence, and efficiency applied to body movements in sports and working conditions. 2 lectures.

PE 303 Physiology of Exercise (2)

Effects of various forms of physical activity on the circulatory, respiratory, and other physiological processes; physiological problems in athletic competition. 2 lectures.

PE 320 Driver Education and Driver Training (3)

Recommended procedures used in training drivers of high school ages. Attitudes and practices; behind-the-wheel teaching techniques. 2 lectures, 1 laboratory.

PE 321M Football Coaching Theory and Practice (2)

Fundamentals and systems of offense and defense, rules of the game. 1 lecture, 1 two-hour laboratory.

PE 323M Baseball Coaching Theory and Practice (2)

Fundamentals of the sport; methods of teaching team play in these activities. 1 lecture, 1 two-hour laboratory.

PE 324W, 325W, 326W Teaching Progression in Girls' Sports (2) (2) (2)

Fundamentals and techniques of the following sports: Basketball, badminton, archery, tennis, soccer, speedball, hockey, volleyball, golf. 1 lecture, 1 two-hour laboratory.

PE 331M Techniques of Officiating (2)

Techniques of officiating men's sports. 1 lecture, 1 two-hour laboratory.

PE 331W Techniques of Officiating (2)

Techniques of officiating girls' sports. 1 lecture, 1 two-hour laboratory.

PE 332 Teaching Physical Education in the Elementary School (3)

Modern trend in materials and methods for the elementary school program in physical education. The place of rhythms and dances, games, calisthenics, self-testing activities, marching tactics, and miscellaneous activities. 1 lecture, 2 two-hour laboratories.

PE 333M Track and Field Coaching Theory and Practice (2)

Coaching techniques for various track and field events. Problems of team balance; study of rules. 1 lecture, 1 two-hour laboratory.

PE 334 Introduction to Dance (3)

Basic elements of music as applied to movement. 1 lecture, 2 laboratories.

PE 341, 342, 343 Physical Education Activity (1) (1) (1)

Required of all majors in physical education. Students conduct regular physical education classes under supervision of staff. 2 1-hour periods.

PE 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units with not more than 2 units in any one quarter. Prerequisite: Senior standing or permission of the instructor.

PE 401 Organization and Administration of Health and Physical Education (3)

Management and control of physical education and health education. Organizing programs in classwork and athletics. Problems of control and maintenance of fields, floors, and locker rooms. 3 lectures.

PE 403 Curriculum and Methods in Health and Physical Education (3)

Methods of obtaining desirable objectives in physical education; motivation, class management, choice of activities, selection of teaching devices, and the measurement of results. 3 lectures.

PE 405 Administration of School Health Education (2)

Current procedures and practices in the administration of the school health program. Problems analyzed and recommended procedures stressed. 2 lectures.

PE 406 Adaptive Physical Education (2)

Group procedure in the administration of individual exercise for the correction of various defects in body mechanics. 2 lectures.

PE 422M Basketball Coaching Theory and Practice (2)

Fundamental individual basketball skills. Theories of offensive and defensive team play. 1 lecture, 1 2-hour laboratory.

PE 425 Tests and Measurements in Physical Education (3)

Physical tests and measurements of skill, strength, speed, and endurance as a basis for grading and as a measure of progress in activities. 3 lectures.

PE 432M Athletic Training and Massage (1)

Modern principles and practice in conditioning and care of athletes. Theory and practice in the scientific manipulation of the muscles as related to therapeutic exercise. 1 combined lecture and laboratory.

PE 441M, 442M, 443M Minor Sports Theory and Practice (1) (1) (1)

Fundamentals and techniques of the following minor sports: boxing, wrestling, tennis, golf, gymnastics, badminton, and six-man football. 1 2-hour laboratory.

PE 446W, 447W, 448W Teaching Progression in Dance (2) (2) (2)

Teaching progression in dance: folk, contemporary, and social. 2 2-hour laboratories. Prerequisite: PE 334

PE 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.

PE 463 Undergraduate Seminar (2)

Discussion of new developments in recreation, health, and physical education. 2 lectures.

PE 501 Advanced Adaptive Physical Education (3)

Advanced techniques in the detection of defective body mechanics and establishment of class procedures for prevention and elimination of these defects. 3 lectures.

PE 502 Advanced Seminar in Problems of Physical Education (3)

Practical problems in physical education and their solution in terms of desired objectives in this field. 3 lectures.

PE 511 Supervision in Physical Education (3)

Principles and techniques in supervision of physical education on the elementary and secondary school levels. 3 lectures.

PE 512 Advanced Seminar in Health Education (3)

Rules of hygiene; problems of healthful living, and school hygiene. 3 lectures.

PE 513 Investigational Techniques in Physical Education (4)

Tools of research as applied to the field of physical education; measurement, surveys, job analysis, and testing. 4 lectures.

PHYSICAL SCIENCES DEPARTMENT

Department Head, Woodford E. Bowls

Athol J. D. Brunk	Jerome F. Houlis	Arthur Z. Rosen
Paul R. Bryson	Herbert R. Kabat	Alfred W. Simon
Robert H. Frost	George P. Karch	Howard Walker
Lewis E. Hammitt	Bruce Kennelly	Omer K. Whipple
Noel R. Hayman	Vance D. Lewis	Lester V. Whitney
Robert E. Holmquist	Leon W. Magur	Hewitt G. Wight
Ray J. Holt	Theodore Matthew	Lloyd J. Work
A. L. Houk	T. M. Rickansrud	Frank E. Young

The Department of Physical Sciences serves all divisions of the college by offering courses which help provide scientific explanations for work taken by students in the agricultural, engineering and arts and sciences divisions. The department also contributes to the general education of all students by giving them a thorough foundation in the method and factual content of the physical sciences and the roles which they play in society. The two major curricula of the department lead to the bachelor of science degree in physical sciences or in agricultural chemistry.

The occupational objectives of the curriculum in physical sciences are to qualify students for entry at the bachelor's level into positions in civil service, industry and agriculture, and to help prepare secondary teachers of the physical sciences. The curriculum is so set up that a student may concentrate in either physics or chemistry according to his own wishes.

Graduate courses are offered which help to complete the requirements for the general secondary credential and for the master of arts degree in education with a field of concentration in the physical sciences.

It is suggested that the high school student planning to major in physical sciences include in his high school program as much as possible of the following: three semesters of algebra, one of trigonometry, two of geometry, two of physics, and two of chemistry.

Proper selection of electives in the curriculum in agricultural chemistry permits specialization in nutritional, food, feed, pesticide, or fertilizer chemistry. Students find employment in the laboratories of those companies devoted to the processing of agricultural products and the production of agricultural chemicals.

Positions for which the student may qualify include vitamin assay biochemist, food and drug chemist, feed analyst, meat technologist, fertilizer chemist, insecticide formulator, insecticide residue analyst, and public health chemist. It is recommended that the high school student planning to major in agricultural chemistry include two semesters of chemistry in his high school program.

Students enrolling in General Chemistry or General Inorganic Chemistry are required to pass a placement test, or Chem 4, or the equivalent.

CURRICULUM IN PHYSICAL SCIENCES

Freshman	F	W	S
Biological Science (Bio 101, 110, Bot 121, or Zoo 131).....	3		
Language Communication (Eng 104, 105, 106).....	3	3	3
Machine Shop (MS 142, 144).....	1	1	
Health Education (PE 107).....			2
Physical Education (PE 141, 142, 143).....	½	½	½
Mathematics for Engineers (Math 117).....	5		
Analytic Geometry and Calculus (Math 118, 201).....		5	3
General Chemistry (Chem 321, 322, 323).....	4	4	4
General Physics (Phys 131, 132).....		4	4
	16½	17½	16½

	F	W	S
Sophomore			
Principles of Economics (Ec 201).....	3		
Literature or Philosophy.....			3
Engineering Drafting (ME 141) or elective.....		2	
Sports Education (PE 241, 242, 243).....	½	½	½
Family Relations (Psy 206).....		3	
Analytic Geometry and Calculus (Math 202, 203).....	3	3	
Quantitative Analysis (Chem 331).....	4		
Organic Chemistry (Chem 326).....			4
Construction of Laboratory Glassware (Chem 342).....		1	
General Physics (Phys 133).....	4		
Engineering Statics (Phys 201).....	3		
Electrical Circuits (Phys 206).....			3
Electrical Measurements Laboratory (Phys 256).....			1
Light (Phys 223).....			4
* Electives.....		7	2
	17½	16½	17½
Junior			
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U. S. in World Affairs (Hist 305).....			3
Literature, Philosophy, Art, or Music.....	3		
Geology or Astronomy (PSc 209 or 216).....			3
Physical Chemistry (Chem 432).....		4	
* Electives.....	10	9	10
	16	16	16
Senior			
Econ, Hist, Pol Sc, or Soc Sc.....	3		
Geology or Astronomy (PSc 209 or 216).....			3
Modern Physics (Phys 401, 402).....	3	3	
Senior Project (Phys or Chem 461, 462).....	2	2	
Undergraduate Seminar (Phys or Chem 463).....			2
* Electives.....	8	11	11
	16	16	16

CURRICULUM IN AGRICULTURAL CHEMISTRY

Freshman			
General Chemistry (Chem 324, 325, 323, or 321, 322, 323).....	4	4	4
¹ Machine Shop (MS 142, 144).....	1	1	
Language Communications (Eng 104, 105, 106).....	3	3	3
Agricultural Mathematics (Math 102, 103).....		3	3
Physical Education (PE 141, 142, 143).....	½	½	½
Health Education (PE 107).....			2
General Zoology (Zoo 131, 132) or General Botany (Bot 121, 122).....	4	4	
Electives.....	4	1	4
	16½	16½	16½

* Twenty units must be selected from Physics 202, 204, 212, 257, 301, 303, 403, 412, Math 316, 404, 405, Chem 327, 328, 332, 343, 433.

¹ Agricultural Mechanics (AE 121) will substitute.

	F	W	S
Sophomore			
Quantitative Analysis (Chem 331, 332).....	4	4	
Organic Chemistry (Chem 326).....			4
Physics (Phys 121, 122 or Phys 131, 132).....		4	4
Construction of Laboratory Glassware (Chem 342).....		1	
Mathematics (Math 114, 115, 118).....	3	3	5
³ Engineering Drafting (ME 141).....	2		
Sports Education (PE 241, 242, 243).....	½	½	½
⁴ Restricted Electives.....	4	4	3
Electives.....	3		
	16½	16½	16½
Junior			
Physics (Phys 123 or Phys 133).....	4		
Agricultural Biochemistry (Chem 328, 329).....		4	4
Organic Chemistry (Chem 327).....	4		
Physical Chemistry (Chem 432, 433).....		4	4
Qualitative Organic Analysis (Chem 343).....			4
Report Writing (Eng 301).....		3	
Principles of Economics (Ec 201).....	3		
American Government (Pol Sc 301).....	3		
⁵ Social Sciences.....		3	
⁶ Literature.....			3
Family Relations (Psy 206).....	3		
⁴ Restricted Electives.....		3	
Electives.....			2
	17	17	17
Senior			
Advanced Agricultural Biochemistry (Chem 434).....	4		
Food Analysis (Chem 435).....		4	
Agricultural Chemicals (Chem 436).....			4
Senior Project (Chem 461, 462).....	2	2	
Undergraduate Seminar (Chem 463).....			2
Special Problems for Advanced Undergraduates (Chem 400)		2	2
Growth of American Democracy (Hist 304).....	3		
U.S. in World Affairs (Hist 305).....		3	
⁴ Restricted Electives.....	3	3	4
Electives.....	4	2	4
	16	16	16

AGRICULTURAL CHEMISTRY RESTRICTED ELECTIVES

Students will elect courses, upon consultation with their adviser, for specialization in one of the general areas of agricultural chemistry. At least 24 units of electives must be selected from the following courses.

Foods, Feeds, and Nutrition

General Zoology (Zoo 133)
 General Bacteriology (Bact 221)
 Human Anatomy (Zoo 237)
 Human Physiology (Zoo 238, 239)
 Sanitary and Industrial Bacteriology
 (Bact 333)
 Histology (Zoo 422)
 Anatomy and Physiology (VS 123)
 Feeds and Feeding (AH 101, 102)
 Animal Nutrition (AH 402)
 Advanced Animal Nutrition (AH
 580)

Pesticides

General Botany (Bot 123)
 General Entomology (Ent 126)
 Plant Pathology (Bot 223)
 Taxonomy (Ent 331)
 Plant Physiology (Bot 322)
 Weeds and Poisonous Plants (CP 221)
 Crop Disease and Pest Control (CP
 321)
 Deciduous Disease and Pest Control
 (FP 234)
 Special Problems for Advanced Un-
 dergraduates (Bio 400)

³ May be substituted by Lit., Phil., Art, or Music.

⁴ See list of restricted electives.

⁵ To be selected from Ec 202, Pol Sc 401, Bus 301, LMR 311, 312.

⁶ To be selected from Eng 211, 212, 213, 311, 312, 313, Phil 201.

Fertilizers

Soils (SS 121)
 Fertilizers (SS 221)
 Range Management (SS 223)
 Soil Classification (SS 321)
 Soil Fertility (SS 322)
 Soil Technology (SS 323)
 Soil Chemistry (SS 423)

Soil Physics (SS 432)
 Soil Microbiology (SS 422)

Mathematics

Descriptive Statistics (Math 211)
 Statistical Method (Math 212)
 Analytic Geometry and Calculus
 (Math 201, 202, 203)

DESCRIPTIONS OF COURSES IN CHEMISTRY

Chem 4 Preparatory Chemistry (3)

For students whose background is deficient in chemistry and mathematics. Symbols, nomenclature, molecular theory, problems dealing with the metric system, density, formulas, percentage composition, and chemical equations. 3 lectures. Prerequisite: Math 103 or equivalent.

Chem 206 General Household Chemistry (4)

For Home Economics majors. Principles of chemistry with applications to the home and everyday living, including some organic chemistry as applied to foods, fabrics, and other common materials. 3 lectures, 1 recitation. Prerequisite: Satisfactory score on mathematics placement examination or Math 1

Chem 321 General Chemistry (4)

General principles including atomic structure, acids and bases, ions, solutions, types of chemical reactions, properties of gases, liquids, and solids, and elementary equilibria. For engineering, physical sciences, and mathematics majors. 3 lectures, 1 laboratory. Prerequisite: Chem 4 or the passing of a placement test.

Chem 322 General Chemistry (4)

The more common nonmetals and their compounds, properties of metals, metallurgy, electrochemistry and corrosion. 3 lectures, 1 laboratory. Prerequisite: Chem 321

Chem 323 General Chemistry (4)

The compounds of the metals, nuclear chemistry, fuels including the hydrocarbons, and some of the important hydrocarbon derivatives. Qualitative analysis in the laboratory. 3 lectures, 1 laboratory. Prerequisite: Chem 322

Chem 324 General Inorganic Chemistry (4)

Fundamental principles including atomic structure, periodic classification of the elements, valence, equations, gas laws, electrochemistry, and chemical calculations. For agricultural majors. 3 lectures, 1 laboratory. Prerequisite: Chem 4 or the passing of a placement test.

Chem 325 General Inorganic Chemistry (4)

Basic principles of equilibrium, nuclear processes, solution, and colloids. Properties of the common elements and their compounds with applications to agriculture. 3 lectures, 1 laboratory. Prerequisite: Chem 324

Chem 326 Organic Chemistry (4)

The fundamental concepts of organic chemistry with applications to agricultural and industrial processes. 3 lectures, 1 laboratory. Prerequisite: Chem 322 or 325

Chem 327 Organic Chemistry (4)

Continuation of Chem 326 to include a further study of the types of compounds important to agricultural and industrial processes. 3 lectures, 1 laboratory. Prerequisite: Chem 326

Chem 328 Agricultural Biochemistry (4)

Fundamental chemistry of carbohydrates, proteins, fats, vitamins, enzymes, and hormones as applied to their function in plant and animal metabolism. Special reference to the chemistry involved in the use, analysis, and manufacture of feeds, foods, and other agricultural products. 3 lectures, 1 laboratory. Prerequisite: Chem 326

Chem 329 Agricultural Biochemistry (4)

Chemistry and physiology of the vitamins as applied to their function in plant and animal metabolism. Manufacture, stabilization, effect of food processing operations, laboratory animal technique, feed and food enrichment. 3 lectures, 1 laboratory. Prerequisite: Chem 328

Chem 331 Quantitative Analysis (4)

Volumetric industrial analytical procedures based upon precipitometry, redoximetry, alkalimetry, and acidimetry. Laboratory work is the focal point, with class discussion supplying supporting theory. Emphasis on applications of chemical equilibrium and methods of problem solving. 2 lectures, 2 laboratories. Prerequisite: Chem 323 or 325

Chem 332 Quantitative Analysis (4)

Principles of gravimetric analysis applied to industrial methods with emphasis on metals. Basic theory of laboratory work in class discussion. Properties of precipitates and colloids as applied to analytical procedures. Topics in instrumental analysis. 2 lectures, 2 laboratories. Prerequisite: Chem 331

Chem 342 Construction of Laboratory Glassware (1)

Techniques of glassblowing applied to the making of simple laboratory apparatus. 1 laboratory. Prerequisite: Chem 321 or 324

Chem 343 Qualitative Organic Analysis (4)

The experimental determination of the identity of organic compounds. Special reference to those compounds used in agriculture. 1 lecture, 3 laboratories. Prerequisite: Chem 327

Chem 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units in Chem 400 and Phys 400 with not more than 2 units in any one quarter. Individual or group investigations for advanced students. 1 or 2 laboratories.

Chem 432 Physical Chemistry (4)

Physical properties and molecular constitution of gases, liquids, and solids. Elementary chemical thermodynamics and thermochemistry. Homogeneous and heterogeneous equilibria; phase rule; solutions; distillation theory. 3 lectures, 1 laboratory. Prerequisite: Chem 323. Recommended: Chem 326, 331, Phys 123 or 133, Math 118

Chem 433 Physical Chemistry (4)

Colloids; electrochemistry, applications to analytical procedures. Reaction rates, applications to commercial processes; physical properties and molecular structure; photochemistry; radioactivity. 3 lectures, 1 laboratory. Prerequisite: Chem 432

Chem 434 Advanced Agricultural Biochemistry (4)

Intermediary metabolism in plants and animals. Special reference to enzymes, hormones, pigments, biological oxidation, and their relationship to agricultural production. 3 lectures, 1 laboratory. Prerequisite: Chem 329

Chem 435 Food Analysis (4)

Techniques used commercially in the chemical analysis of seed and cereal crops, fruit and vegetable crops, forage crops, meat and meat products, milk and dairy products, eggs and poultry products. Vitamin determinations, microbiological assay, quality control, taste testing, legal specifications, grading and labeling. 3 lectures, 1 laboratory. Prerequisite: Chem 328

Chem 436 Agricultural Chemicals (4)

Chemistry of fungicides, insecticides, rodenticides, plant growth regulators, soil conditioners, and fertilizers. Special reference to the analysis, manufacture, toxicology, legal specification, and regulations. 3 lectures, 1 laboratory. Prerequisite: Chem 328

Chem 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.

Chem 463 Undergraduate Seminar (2)

A study of current developments in chemistry and a discussion of periodical literature at an appropriate level. 2 meetings.

Chem 513 Advanced Inorganic Chemistry (3)

Selected topics concerning the structures and related properties of inorganic compounds. 3 lectures. Prerequisite: Graduate standing.

DESCRIPTIONS OF COURSES IN PHYSICS**Phys 121, 122, 123 College Physics (4) (4) (4)**

Fundamental principles of mechanics; hydraulics, heat, light and sound; magneto-statics, electrostatics, and current electricity. 3 lectures, 1 recitation, 1 laboratory. Prerequisite: Math 108, 111, 114, or 117

Phys 131 General Physics (4)

Fundamental principles of mechanics. Vectors, statics, uniform motion, accelerated motion, work and energy, rotational motion, elasticity, impact, and harmonic motion. 3 lectures, 1 recitation, 1 laboratory. Prerequisite: Concurrent Math 115 or 118, or higher.

Phys 132 General Physics (4)

Fundamental principles of hydraulics, heat, sound, and light. Fluids at rest and in motion, temperature, expansion, quantity of heat, heat transfer, thermodynamics, thermal properties of matter, wave motion, vibrating bodies, acoustical phenomena, nature and propagation of light, geometric optics. 3 lectures, 1 recitation, 1 laboratory. Prerequisite: Phys 131

Phys 133 General Physics (4)

Fundamental principles of magnetostatics, electrostatics, and current electricity. Coulomb's law, electric field, potential, properties of dielectrics, capacitance, Ohm's law, electrochemistry, magnetism and magnetic fields, measuring instruments, magnetic field of a moving charge, induced e.m.f., a.c. circuits, electronics. 3 lectures, 1 recitation, 1 laboratory. Prerequisite: Phys 132, Math 201

Phys 201 Engineering Statics (3)

Resolution and composition of forces. Equilibrium. Stresses and reactions in simple structures. Friction. Centroids and centers of gravity. Moments of inertia of area and mass. Introduction to dynamics. 3 lectures. Prerequisite: Phys 131, Math 201

Phys 202 Engineering Dynamics (3)

Rectilinear and curvilinear motion and the forces involved. Rotation. Work, energy, and power. Plane motion. Impulse, momentum, and impact. 3 lectures. Prerequisite: Phys 201

Phys 204 Physics of Electricity and Magnetism (4)

Coulomb's law, the electrostatic field, potential, properties of dielectrics, capacitance and capacitors, the magnetostatic field, the magnetic field of a current, induced electromotive force, inductance, magnetic properties of matter. 4 lectures. Prerequisite: Phys 131, Math 201

Phys 206 Electrical Circuits (3)

Direct current, alternating current, and electronic circuits. 3 lectures. Prerequisite: Phys 133, Math 202

Phys 208 General Household Physics (3)

For Home Economics majors. Basic principles of physics in the field of mechanics, heat, electricity, and light. Applications and practical problems closely related to situations in the experience of the student. 3 lectures. Prerequisite: Satisfactory score on mathematics placement examination or Math 1

Phys 211 Introduction to Optics and Atomic Physics (4)

Basic geometrical and physical optics and applications. Introduction to the fundamental particles, interpretation of spectra, radioactivity, atomic structure and basic nuclear reactions. 4 lectures. Prerequisite or concurrent: Phys 133 or equivalent.

Phys 212 Sound (3)

Vibratory motion. Transverse waves, longitudinal waves, vibration of bars. Velocity of sound, vibrating air columns. Interference. Intensity and intensity level, loudness and loudness level. 3 lectures. Prerequisite: Phys 133 or 204

Phys 223 Light (4)

The physical nature of light. Reflection, refraction, diffraction, interference, polarization, and absorption of light. 3 lectures, 1 laboratory. Prerequisite: Phys 133 or 204

Phys 256, 257 Electrical Measurements Laboratory (1) (1)

Electrical measurements using direct current, alternating current, and electronic methods. 1 laboratory. Concurrent: Phys 206

Phys 301 Heat (3)

Kinetic theory and elementary thermodynamics. Expansion of solids and liquids. Fusion, evaporation, and sublimation of pure substances. Observable behavior of gases. Molecular motion in pure gases. Thermodynamic processes and cycles. Entropy. Thermal conduction and radiation. 3 lectures. Prerequisite: Phys 133 or 204, Math 203

Phys 303 Analytic Mechanics (3)

Statics and dynamics of particles and rigid bodies including an introduction to Lagrange's and Hamilton's equations. 3 lectures. Prerequisite: Phys 202, Math 316

Phys 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units in Phys 400 and Chem 400 with not more than 2 units in any one quarter. Individual or group investigations for advanced students. 1 or 2 laboratories.

Phys 401 Modern Physics (3)

Foundations of atomic theory, fundamental atomic particles, atomic and nuclear structure, elementary quantum theory, electromagnetic radiation effects, X-ray phenomena, special theory of relativity, wave-particle duality. 3 lectures. Prerequisite: Phys 133 or 204, Math 203

Phys 402 Modern Physics (3)

Natural and induced radioactivity, induced nuclear disintegration and nuclear reactions, interactions with matter of charged particles and gamma rays, nuclear energy levels. 3 lectures. Prerequisite: Phys 401

Phys 403 Applied Nuclear Physics (4)

Detection instruments and techniques of measurement, neutron physics, nuclear fission, nuclear reactors, and selected applications in engineering, chemistry, and biology. 3 lectures, 1 demonstration-recitation period. Prerequisite: Phys 402

Phys 412 Solid State Physics (3)

The crystalline structure of matter, the metallic state, semi-conductors, and the mechanical, thermal, electrical, and magnetic properties of solids. 3 lectures.

Phys 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.

Phys 463 Undergraduate Seminar (2)

Study of current developments in physics and discussion of periodicals of an appropriate level. 2 meetings.

Phys 501 Selected Topics in Advanced Physics (3)

Electromagnetic theory of radiation, and special theory of relativity. 3 lectures. Prerequisite: Graduate standing.

Phys 502 Nuclear Physics (3)

Instrumentation, methods, and results of experiments. Systematics and theory of nuclear structure. 3 lectures. Prerequisite: Graduate standing.

DESCRIPTIONS OF COURSES IN PHYSICAL SCIENCE

PSc 101 General Physical Science (4)

Geological features and processes. Astronomical phenomena and concepts. The development of a better understanding of man's physical environment. The scientific method of working and thinking. Not for students majoring in mathematics or physical science. 3 lectures, 1 recitation. Prerequisite: Math 103 or 112

PSc 102 General Physical Science (4)

Fundamental principles of physics. Various theories of matter and energy and the principles and laws that describe their behavior and application. Some special knowledge of modern science that will function in a socially desirable manner in the lives of students. 3 lectures, 1 recitation. Prerequisite: PSc 101

PSc 103 General Physical Science (4)

Fundamental principles of chemistry. Chemical changes and their uses. A number of recent advances. Objective observation and experimentation in the solution of problems relating to natural phenomena. 3 lectures, 1 recitation. Prerequisite: PSc 102

PSc 206 Chemistry for Elementary School Teachers (3)

Elementary principles of chemistry having applications in science teaching at the elementary school level. Applications of chemistry in industry and daily living. Development of simple, low-cost experiments to illustrate the basic principles and applications of chemistry. 3 lectures. Prerequisite: Satisfactory score on mathematics placement examination or Mathematics 1

PSc 208 Physics for Elementary School Teachers (3)

Elementary principles of physics having applications in science teaching at the elementary school level. Laws of physics as applied in common, everyday experiences. Development of simple experiments to illustrate basic physical principles. 3 lectures. Prerequisite: satisfactory score on mathematics placement examination or Mathematics 1

PSc 209 Geology (3)

Fundamental geologic processes. General surface features of the earth. Rocks and minerals. 3 lectures.

PSc 216 Astronomy (3)

Astronomical properties of the earth, solar system, stars, and galaxies. Principles and methods of astronomical investigation. 3 lectures.

PSc 512 Philosophy of Science (3)

The relationship of philosophy and science. A presentation of problems in the logic of science and in the analysis of the concepts of science. 3 lectures. Prerequisite: Graduate standing.

PSc 521 Curriculum and Methods in the Physical Sciences (3)

Techniques, aims and objectives in the teaching of physics, chemistry, physical science, and general science at the secondary school level. Selection and organization of teaching material. Evaluation of results. 3 lectures. Prerequisite: Graduate standing.

SOCIAL SCIENCES DEPARTMENT

Department Head, A. Norman Cruikshanks

William M. Alexander	Michel N. Franck	Phillip W. Payton
J. D. Avary	Hugh E. Law	Dominic B. Perello
Ralph W. Dilts	Thomas F. Nolan	M. Eugene Smith
	Michael J. O'Leary	

The Department of Social Sciences serves the three divisions of the college in the area of general education for citizenship. Stated in terms of general objectives, the department seeks to provide the student with an understanding of the society in which he lives; to develop in the student those skills which are prerequisite for effective citizenship in a democracy; and to prepare and encourage the individual toward intelligent social action.

The occupational objectives of the department are: to train students for those numerous entry jobs in civil service which require a bachelor's degree with a major in the social sciences; to train those who expect to teach the social studies in the secondary schools; and to provide those students with majors in other fields sufficient background to allow them to qualify for a variety of civil service positions.

Additional graduate courses are offered which will permit the student to qualify for a master of arts degree in education, with concentration in the field of the social sciences.

There are no special requirements for entrance in this major. Prerequisites for certain courses are stated in the catalog description of courses.

CURRICULUM IN SOCIAL SCIENCES

	F	W	S
Freshman			
Language Communication (Eng 104, 105, 106).....	3	3	3
Physical Education (PE 141, 142, 143).....	½	½	½
Health Education (PE 107).....		2	
Basic Mathematics for General Education (Math 111, 112).....		3	3
General Biology (Bio 101, 102, 103) or equivalent.....	3	3	3
History of Civilization (Hist 101, 102, 103).....	3	3	3
Typing (Jour 140, 141).....	1	1	
* Electives.....	6	2	4
	<hr/>	<hr/>	<hr/>
	16½	17½	16½
Sophomore			
Principles of Economics (Ec 201, 202).....	3	3	
Economic Problems (Ec 213).....			3
Sports Education (PE 241, 242, 243).....	½	½	½
General Psychology (Psy 202).....		3	
General Physical Science (PSc 101, 102, 103) or equivalent.....	4	4	4
Principles of Sociology (Soc 201, 202, 203).....	3	3	3
American Government (Pol Sc 301).....	3		
Public Speaking (Sp 201, 303).....		2	2
* Electives.....	3	2	3
	<hr/>	<hr/>	<hr/>
	16½	17½	15½
Junior			
‡ History of the United States (Hist 301, 302, 303).....	3	3	3
Inter-American Relations (Pol Sc 311).....	3		
U. S. in World Affairs (Hist 305).....	3		
International Relations (Pol Sc 312).....		3	
Comparative Government (Pol Sc 313).....			3
Family Relations (Psy 206).....	3		
Literature.....		3	3
Global Geography (Geog 308).....		3	
Business Law (Bus 301).....			3
Descriptive Statistics (Math 211).....	3		
Senior Project (Soc Sc 461).....			2
† Electives.....	2	3	1
	<hr/>	<hr/>	<hr/>
	17	15	15

* Of the total number of electives, a minimum of 24 shall be chosen with the approval of the adviser.

† Of the 52 units of electives, 24 will require approval of department head.

‡ Hist 304 will not substitute for any part of this requirement.

Senior	F	W	S
History of Pacific Area (Hist 411, 412).....	3	3	
State and Local Government (Pol Sc 401).....			3
Senior Project (Soc Sc 462).....	2		
Undergraduate Seminar (Soc Sc 463).....		2	
Literature.....	3		
Social Psychology (Psy 401).....			3
Basic Accounting (Actg 131, 132) or equivalent.....	3	3	
† Electives.....	6	9	11
	17	17	17

DESCRIPTIONS OF COURSES IN ECONOMICS

Ec 105 Consumer Economics (3)

Consumer-producer relationships; money management, buying methods; investments, insurance, and housing; agencies that help the consumer. 3 lectures.

Ec 201 Principles of Economics (3)

Basic institutional arrangements in the American economy. 3 lectures. Prerequisite: Sophomore standing. Successful completion of freshman English recommended.

Ec 202 Principles of Economics (3)

Introductory analytical economics. Principles and applications in the allocation of scarce resources; the pricing and output problems of the firm; distribution of factor income, and their effects in the national economy. 3 lectures. Prerequisite: Ec 201

Ec 203 Principles of Economics (3)

Application of economic principles to business problems. 3 lectures. Prerequisite: Ec 201, 202

Ec 213 Economic Problems (3)

Specific current economic problems selected with reference to the needs of the students. 3 lectures. Prerequisite: Ec 201. Ec 202 recommended.

Ec 304 Comparative Economic Systems (3)

Analysis of economic principles and institutions applicable to capitalism, socialism, and communism. 3 lectures. Prerequisite: Ec 201, 202

Ec 582 Seminar in Economic Problems (1-3)

Selected problems at an advanced level; distribution of income, private and public finance, economic mobilization, and international trade. 1 to 3 meetings. Prerequisite: 9 units of economics and graduate standing. Maximum of 6 units credit may be earned.

DESCRIPTIONS OF COURSES IN HISTORY

Hist 101, 102, 103 History of Civilization (3) (3) (3)

Development of civilization from earliest times to the present. Political, economic, social, intellectual, and religious contributions of the various peoples to contemporary life. 3 lectures.

Hist 107 Historical Survey of Civilization (3)

Study of civilizations which have made significant contributions to the development of various aspects of contemporary life. 3 lectures.

Hist 112 History of California (3)

Development of California; early explorations, colonization; organization, government, and economy from beginning to the present; development of culture, industry, agriculture, government, and population. 3 lectures.

Hist 117 History of American Labor (3)

Origin and development of trade unionism in the United States; legal status of unionism; role of government; influence of labor leaders; current scene and outlook. 3 lectures.

† Of the 52 units of electives, 24 will require approval of department head.

Hist 301, 302, 303 United States History (3) (3) (3)

A comprehensive survey of the development of the United States from the 15th century to the present. 3 lectures.

Hist 304 Growth of American Democracy (3)

The historic backgrounds of present-day economic, political, and social problems. Development of American institutions and ideals. 3 lectures. Prerequisite: Pol Sc 301

Hist 305 The United States in World Affairs (3)

The origin, forms, and forces of international relations. Current problems of security since World War II. American ideals. Development of United States influence in world affairs. Finding and evaluating authoritative source material on world affairs. 3 lectures. Prerequisite: Eng 105, Pol Sc 301, Hist 304

Hist 411, 412 History of the Pacific Area (3) (3)

General survey of internal policies and international relations of lands of Pacific Basin from 1750 to present. Development of Japan and China and their present-day problems. Growth of United States interests and responsibilities in Pacific area. 3 lectures.

Hist 583 Contemporary Problems of the Pacific Area (1-3)

Internal and international problems of the countries of the Pacific area since 1945. Conducted as seminar. 1 to 3 lectures. Prerequisite: Graduate standing; social science major. Maximum of 6 units may be earned.

DESCRIPTIONS OF COURSES IN POLITICAL SCIENCE**Pol Sc 100 U.S. History and Government (3)**

Basic structure and operation of the federal government. The Constitution as a modern regulatory instrument; bases of American ideals. Function of state and local government. This course may not be substituted for Hist 304, 305, Pol Sc 301 or 401. 3 lectures. Not open to degree students for degree credit.

Pol Sc 301 American Government (3)

The origin, nature, and distribution of political power. Declaration of Independence. The Constitution of the United States. Function and current problems of national, state and local government. Finding and evaluating authoritative source materials on political affairs. 3 lectures. Prerequisite: sophomore standing.

Pol Sc 311 Inter-American Relations (3)

Inter-American affairs. Political, economic, and social problems; forces motivating cultural behavior, industrial development, trade techniques, agriculture methods. Opportunities for employment in agriculture, engineering, and business. Finding and evaluating authoritative source materials on Latin American affairs. 3 lectures. Prerequisite: Pol Sc 301, Hist 304

Pol Sc 312 International Relations (3)

Analysis of international organizations, including political and economic types. Problems of security, the League of Nations, the United Nations and its special agencies. 3 lectures. Prerequisite: Pol Sc 301 and Hist 304 or equivalent.

Pol Sc 313 Comparative Government (3)

Contemporary political situation in Britain, France, Soviet Union, Germany, Italy, and Japan. Policies and problems; forces making for conflict and adjustment. Constitutional, economic, communal, and sovereignty bases. 3 lectures. Prerequisite: Pol Sc 312 or permission of instructor.

Pol Sc 401 State and Local Government (3)

The structure, function, and problems of state, county, and city governments. 3 lectures. Prerequisite: Pol Sc 301, Hist 304

Pol Sc 586 Contemporary Problems in International Relations (1-3)

Intensive study of selected current problems in international relations. Geopolitical factors; contributory causes of international conflict, and analyses of proposed solutions. 1 to 3 meetings. Prerequisite: graduate standing and major in social sciences. Maximum of 6 units may be earned.

DESCRIPTIONS OF COURSES IN GEOGRAPHY

Geog 221 Elements of Geography (3)

Elements of geography primarily for the elementary school teacher; map reading and making; the effect of geography upon industry and agriculture. 3 lectures.

Geog 308 Global Geography (3)

Survey of man's utilization and occupation of the earth. Interrelations of human life and elements of natural dependence of nations, and world trade. Supporting power of geographical environment. 3 lectures.

Geog 402 Political and Economic Geography (3)

Survey of world resources, mineral and agricultural, and of the geographical factors affecting their production and distribution. An analysis of economic geographic factors in current international affairs. 3 lectures.

DESCRIPTIONS OF COURSES IN PHILOSOPHY

Phil 201 Introduction to Philosophy (3)

The relationships among the sciences and between science and philosophy. The principal types of philosophy in their relation to science. How philosophy has influenced the growth of ideas in the sciences and how present scientific developments are related to basic philosophical ideas. 3 lectures.

Phil 202 Logic (3)

Brief survey of classical deductive logic. Methods of clear thinking in English prose sentences. Modern symbolic logic including Boolean algebra of classes and propositions, with applications. 3 lectures. Prerequisite: Phil 201. Cannot be taken for credit by students who have taken Math 217-218

DESCRIPTIONS OF COURSES IN SOCIOLOGY

Soc 105 Introduction to Sociology (3)

Orientation to the nature of the study of society; survey of approaches to social analysis. Emphasis upon primary concepts describing environment, social structure, and social change for increased understanding of human relations. An overview of the systems of social relationships. 3 lectures.

Soc 201, 202, 203 Principles of Sociology (3) (3) (3)

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. 3 lectures. Prerequisite: Social science major or permission of instructor.

Soc 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 2-hour laboratory.

DESCRIPTIONS OF COURSES IN THE SOCIAL SCIENCES

Soc Sc 101 Introduction to the Social Sciences (3)

The social sciences in their relationship to modern living; an overview of the contributions of social sciences to cultural, social, and economic development. 3 lectures.

Soc Sc 400 Special Problems for Advanced Undergraduates (1-2)

Independent and group study of selected problems in the social sciences. Total credit limited to 4 units. 1 or 2 meetings. Prerequisite: Permission of the department head and junior standing.

Soc Sc 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.

Soc Sc 463 Undergraduate Seminar (2)

Intensive study of selected social problems with application of techniques for analysis. 2 meetings. Prerequisite: Completion of thesis.

Soc Sc 511 Sources in Social Science (3)

Methods of finding and adapting authoritative source materials in the social sciences to the elementary, junior, and senior classroom situation. 3 lectures. Prerequisite: Graduate standing.

Soc Sc 521 Curriculum and Methods in Secondary Social Studies (3)

Content, organization, and scope of social science curriculum in secondary schools. Methods of teaching. Evaluation of procedures. Observation of classroom practices in local schools. 3 meetings. Prerequisite: Admission to teacher education program and graduate standing.

SPEECH
(See English)

TECHNICAL ARTS DEPARTMENT

Department Head, Carl C. Cummins

A student majoring in this department may elect one of two concentrations in the technical arts:

1. The industrial sales and service curriculum offers preparation for positions in industrial and business operations, and the student may plan for a career in manufacturing and production processes, personnel and management, technical writing, or sales and field representative work depending upon his interests and aptitudes. Emphasis is placed on product knowledge, systems knowledge, personal relationships, and economics. The curriculum is designed to blend modern skills and technology with a general cultural background to produce a well-rounded graduate and to meet the needs of industry for a bachelor of science degree program.
2. The industrial arts curriculum prepares students for the teaching profession, and is designed to meet the degree requirements for a secondary credential in California. The student may secure the Special Secondary Credential in Industrial Arts upon direct application to the Credentials Office, State Department of Education, after completing the general requirements shown in the section on degrees and credentials in this catalogue and the department sequence of courses shown for the industrial arts teaching option. Students are required to take some courses in all the areas of industrial arts in preparation for teaching comprehensive general shop and to obtain knowledge of correlated skills and information needed for teaching in selected areas of concentration. Areas of concentration in metal (general) and electricity-radio (electronics) are required. Electives may be selected to cover additional areas of concentration in drafting (industrial drawing) or in handicrafts.

The technical arts curriculum is unique in that the first two years in each of the options is identical and is designed to give the student a broad, yet intensive, background in technology. It further affords the student the opportunity to utilize the outstanding facilities provided by the machine shop, welding, mechanical engineering, electrical engineering, electronic engineering, and air conditioning departments.

CURRICULUM IN TECHNICAL ARTS

Freshman	F	W	S
Language Communication (Eng 104, 105, 106).....	3	3	3
Applied Biology (Bio 110).....	3		
Mathematics for Engineers (Math 117).....		5	
Analytic Geometry and Calculus (Math 118).....			5
Machine Shop (MS 141, 142, 143-144).....	1	1	2
Oxyacetylene Welding (Weld 151, 152).....	1	1	
Metallic Arc Welding (Weld 154).....	1		
Sheet Metal Fabrication (AC 129).....	2		
Engineering Drafting (ME 141, 142, 143).....	2	2	2
Mechanical Technology (ME 134, 135).....		3	3
Health Education (PE 107).....	2		
Business Procedures (IE 132, 133).....		2	2
Physical Education (PE 141, 142, 143).....	½	½	½
Elective	1		
	16½	17½	17½

Arts and Sciences Division

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Sophomore	F	W	S
Public Speaking (Sp 201).....	2		
Technical Writing (Eng 219).....		3	
Literature			3
College Physics (Phys 121, 122, 123).....	4	4	4
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U.S. in World Affairs (Hist 305).....			3
Electrical Technology (EE 131, 132).....	3	3	
Electric Machines (EE 133).....			3
Introduction to Electronics (EL 131, 132, 133).....	3	3	3
Technical Sketching (TA 244).....	2		
Sports Education (PE 241, 242, 243).....	½	½	½
	17½	16½	16½

Industrial Sales and Service Option

Junior			
Principles of Economics (Ec 201).....	3		
Basic Accounting (Actg 131, 132).....		3	3
General Chemistry (Chem 321, 322).....	4	4	
Engineering Materials (ME 314).....			3
Family Relations (Psy 206).....			3
Psychology of Business and Industry (Psy 302).....		3	
Mechanical Systems (TA 321, 322, 323).....	3	3	3
Electrical Systems (TA 331, 332, 333).....	3	3	3
Elective	3		
	16	16	15

Senior			
Business Law (Bus 301).....	3		
Industrial Management (LMR 311).....		3	
Industrial Relations (LMR 312).....			3
Senior Project (TA 461, 462).....	2	2	
Undergraduate Seminar (TA 463).....			2
Industrial Sales (TA 401).....	3		
Customer Relations (TA 402).....		3	
Audiovisual Methods (AV 432).....			3
* Electives	8	8	9
	16	16	17

Industrial Arts Teaching Option

Junior			
Survey of the Industrial Arts Teaching Profession (TA 301).....	2		
Graphic Arts (TA 147).....	3		
Woodworking--Fundamentals (TA 341).....	3		
Machine Woodworking and Cabinet Construction (TA 342).....		3	
General Chemistry (Chem 321, 322).....	4	4	
General Psychology (Psy 202).....		3	
General Craftwork (TA 241, 242).....	3		3
Principles of Secondary Education (Ed 301).....		3	
Materials and Techniques for Teaching Electricity-Radio (TA 435E).....			3
General Metalworking (TA 345).....	3		
Principles of Economics (Ec 201).....			3
Senior Project (TA 461).....			2
Electives		5	7
	18	18	18

* Of the total number of electives, a minimum of 17 shall be chosen with the approval of the adviser.

Senior	F	W	S
Student Teaching (Ed 430).....		9	
Audiovisual Instruction (AV 431).....	3		
Senior Project (TA 462).....	2		
Undergraduate Seminar (TA 463).....			2
Applied Design for Metalwork (TA 421).....	3		
Materials and Techniques for Teaching General Metalwork (TA 435M).....	3		
Guidance Techniques for Teachers and Parents (Ed 305).....	3		
Family Relations (Psy 206).....			3
State and Local Government (Pol Sc 401).....	3		
Electives		3	8
	17	12	13

DESCRIPTIONS OF COURSES IN TECHNICAL ARTS

TA 147, 148, 149 Graphic Arts (3) (3) (3)

Introduction to graphic arts; hand composition, platen presswork, bookbinding, linoleum block cutting, silk screen and other reproduction methods. 3 laboratories.

TA 241, 242, 243 General Craftwork (3) (3) (3)

Introduction to tools, machines and materials in woodcraft, metalcraft, leatherwork, plastics, lapidary, ceramics and other handicrafts. Advanced work in lapidary and ceramics. 3 laboratories.

TA 244 Technical Sketching (2)

Sketches of industrial products and mechanical parts using perspective, isometric, and oblique projection. Shading. Basic design. 2 laboratories. Prerequisite: ME 141, 142

TA 249 Elementary School Industrial Arts (3)

Introduction to tools, materials and processes in the general shop field of industrial arts for the elementary school teacher. Craftwork type projects for minimum tool use. Project selection for correlated subject application. 3 laboratories.

TA 301 Survey of the Industrial Arts Teaching Profession (2)

An overview of the industrial arts teaching profession; history, philosophy, requirements, and opportunities. 2 lectures.

TA 321 Mechanical Systems (3)

Case study of powerplants from an operational and service engineering viewpoint. Scope of powerplant operation. Steam boilers, prime movers, and condensers. Applications of internal combustion and diesel engine power. Piping systems. 2 lectures, 1 laboratory.

TA 322 Mechanical Systems (3)

Case study of industrial and commercial plant design, layout, and maintenance from an operational and service engineering viewpoint. Water supply and treatment, plumbing, and drainage. Heating and air conditioning systems. 2 lectures, 1 laboratory.

TA 323 Mechanical Systems (3)

Case study of industrial manufacturing processes from an operational and service engineering viewpoint. Materials handling. Production equipment and systems. 2 lectures, 1 laboratory.

TA 331 Electrical Systems (3)

Case study of industrial plant electrification from an operational and service engineering viewpoint. Independent power supply. The application of electric machines and devices to manufacturing processes. General requirements for electrical installation. 2 lectures, 1 laboratory.

TA 332 Electrical Systems (3)

Case study of industrial plant electrical systems from an operational and service engineering viewpoint. Wiring system design. Lighting systems, signal and communication systems. The electrical elements of heating, ventilation, and air conditioning systems. 2 lectures, 1 laboratory.

TA 333 Electrical Systems (3)

Case study of automated control devices from an operational and service engineering viewpoint. Fundamentals of control systems, analog computers, electronic data processing machines, and digital control of machine tools. Applications to manufacturing processes. 2 lectures, 1 laboratory.

TA 341 Woodworking—Fundamentals (3)

Introduction to tools, machines and materials in the field of woodworking. 3 laboratories.

TA 342 Machine Woodworking and Cabinet Construction (3)

Cabinetwork and furniture construction. Operation and care of woodworking machines. Painting, finishing and refinishing. 3 laboratories. Prerequisite: TA 341

TA 343 Carpentry (3)

Fundamentals of carpentry including blueprint reading, study of building code requirements, practice on basic framing procedures and observation of demonstrations on related trades. 3 laboratories. Prerequisite: TA 342

TA 345 General Metalworking (3)

Advanced and correlated skills from unit shop fields. Art metal, foundry and other units not covered in previous courses. 3 laboratories. Prerequisite: MS 144, Weld 152, 154, AC 129

TA 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

TA 401 Industrial Sales (3)

Fundamentals and principles of industrial sales; basic salesmanship, sales training, budgets, costs and quotas. 3 lectures.

TA 402 Customer Relations (3)

Customer contacts; personal relationships, ethics, legal relationships, service contracts, communication channels. 3 lectures.

TA 421 Applied Design for Metalwork (3)

The design and construction of objects in metal with special emphasis upon contemporary appreciation and utilization. 3 laboratories.

TA 435D Materials and Techniques for Teaching General Drafting (3)

Organization and correlation of materials and techniques in general drafting. Selection, shop practice and demonstration on projects selected for particular teaching levels. Organization of course outlines, teaching units and instruction sheets. Class management. 1 lecture, 2 laboratories. Prerequisite: ME 143, TA 244

TA 435E Materials and Techniques for Teaching Electricity-radio (3)

Organization and correlation of materials and techniques in electricity-radio. Selection, shop practice and demonstration on projects selected for particular teaching levels. Organization of course outlines, teaching units and instruction sheets. Class management. 1 lecture, 2 laboratories. Prerequisite: EL 133, EE 132, 133

TA 435M Materials and Techniques for Teaching General Metalworking (3)

Organization and correlation of materials and techniques in general metalworking. Selection, shop practice and demonstration on projects selected for particular teaching levels. Organization of course outlines, teaching units and instruction sheets. Class management. 1 lecture, 2 laboratories. Prerequisite: TA 345. Concurrent: TA 421

TA 435W Materials and Techniques for Teaching General Woodworking (3)

Organization and correlation of materials and techniques in general woodworking. Selection, shop practice and demonstration on projects selected for particular teaching levels. Organization of course outlines, teaching units and instruction sheets. Class management. 1 lecture, 2 laboratories. Prerequisite: TA 342

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

Selection and completion of a project under a minimum of supervision. Project results are presented in a formal report. Minimum 120 hours total time.

TA 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of professional papers on technical arts. 2 lectures.

TECHNICAL JOURNALISM DEPARTMENT

Department Head, Kenneth Kitch

Vincent J. Gates
John R. Healey

Clyde H. Hostetter

Douglass W. Miller
Loren L. Nicholson

Modern journalism places a premium on specialists who have acquired familiarity with a specific field in addition to basic professional training. This college has trained "specialized journalists" exclusively. The Journalism Department offers a program leading to the bachelor of science degree in journalism with specialties in different occupational areas of journalism—agricultural, community, industrial, and home economics.

All journalism majors must complete the basic curriculum which deals with fundamental journalistic aspects and supplementary courses in arts and sciences. Each major also must complete a certain number of required and elective courses in his particular specialty field.

Regardless of specialty all journalism majors will be expected to serve as staff members on the school publications and news media and on journalism field teams. In addition to the 198 units required for a degree, the journalism major must complete an eight weeks' noncredit internship in a publishing, radio, advertising, public relations, business or industrial organization under an approved and supervised program. Such internships will take place normally during summers. Credit toward the internship requirement may be granted for journalism field team participation.

Enrollment in journalism courses is open to qualified students of all other departments who wish to gain skills in the techniques and methods of advertising, public relations, publicity, publications, and photography.

Occupational Objectives in Journalism

Agricultural Journalism: Farm or farm-city careers in reporting, editing, radio and television news; publication production; advertising copywriting, layout, selling; public relations and publicity; photography; information specialist.

Community Journalism: Community newspaper operation and production; suburban news, advertising and business operation with emphasis on management and ownership; printing and publishing of small daily, weekly and semiweekly publications; community radio station operation and management.

Industrial Journalism: Editorial, advertising and promotion employment on trade and business publications and house organs; sales promotion, industrial relations and industrial publicity; production and management of specialized industrial publications and printing; internal and external public relations programming; trade association secretary-manager positions; advertising agency and radio advertising with industrial emphasis; photography and graphic arts for industrial operations.

Home Economics Journalism: Women's publications' editorial, advertising and promotion; consumer organization public relations and sales promotion; community publications staff writing and editing with emphasis on women's home and family features; public utilities promotion and advertising of interest to home making and family interest groups; photography and radio newscasting designed especially for women's special activities.

CURRICULUM IN TECHNICAL JOURNALISM

* Freshman	F	W	S
Orientation (Jour 118).....	2		
Language Communication (Eng 104, 105, 106).....	3	3	3
Physical Education (PE 141, 142, 143).....	½	½	½
Mathematics (Math 102, 103 or Math 111, 112).....		3	3
General Biology (Bio 101, 102, 103) or equivalent.....	3	3	3
Elementary Typography (Pr 121).....	3		
Elementary Display (Pr 122).....		3	
† Electives	6	5	7
	17½	17½	16½

* Unless already acceptable typists, majors will be required to take Jour 140 and/or 141 during their freshman year.

† Of the total "elective" units, a minimum of 45 shall be chosen in a field of specialization with the approval of the adviser.

	F	W	S
Sophomore			
Principles of Economics (Ec 201, 202).....	3	3	
Sports Education (PE 241, 242, 243).....	½	½	½
General Psychology (Psy 202).....		3	
Health Education (PE 107).....	2		
General Physical Science (PSc 101, 102, 103) or equivalent.....	4	4	4
Public Speaking (Sp 201).....			2
Introductory Journalism (Jour 201).....	3		
Reporting (Jour 202).....		3	
Editing and Copy Desk (Jour 233).....			3
† Electives	4	4	7
	<hr/>	<hr/>	<hr/>
	16½	17½	16½
Junior			
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
United States in World Affairs (Hist 305).....			3
Family Relations (Psy 206).....			3
Senior Project (Jour 461).....			2
American Literature (Eng 311, 312, 313).....	3	3	3
Elementary Photography (Jour 221).....	3		
Press Photography (Jour 322).....		3	
Editorial and Feature Writing (Jour 302).....		3	
Radio News (Jour 333).....			3
† Electives	6	4	4
	<hr/>	<hr/>	<hr/>
	15	16	18
Senior			
State and Local Government (Pol Sc 401).....	3		
Senior Project (Jour 462).....	2		
Undergraduate Seminar (Jour 463).....		2	
Newspaper and Magazine Advertising (Jour 421).....	3		
Advertising Layout and Copywriting (Jour 425).....		2	
Radio Advertising (Jour 432).....		3	
Newspaper Management (Jour 403).....			3
Public Relations (Jour 412).....		3	
Publicity Methods (Jour 405).....			3
† Electives	8	5	10
	<hr/>	<hr/>	<hr/>
	16	15	16

DESCRIPTIONS OF COURSES IN TECHNICAL JOURNALISM

Jour 118 Orientation (2)

Explores career opportunities in Technical Journalism, examines specialized communications problems, introduces organizations and methods of campus communications media offering opportunities for applied training, familiarizes student with makeup of the campus community. 2 lectures.

Jour 140, 141 Typing (1) (1)

Designed to teach the fundamentals of the touch system in the shortest time. Training is also given in making out business forms and writing business letters. 3 one-hour periods.

Jour 151, 152, 153 Journalism Practice (1-2) (1-2) (1-2)

Credit arranged for students holding editorial or other positions on college publications or securing other similar supervised experience. 1-2 laboratories. Prerequisite: Journalism major or instructor's permission.

Jour 201 Introductory Journalism (3)

An introduction to journalism, survey of its history, and study of techniques of writing the news story. 3 lectures.

† Of the total "elective" units, a minimum of 45 shall be chosen in a field of specialization with the approval of the adviser.

Jour 202 Reporting (3)

Application of news-writing principles to the reporting of news events. Study and practice in writing various types of news stories, including interviews and speeches. Ethical and legal problems in gathering and reporting news. Some attention to news features. 3 lectures.

Jour 221 Elementary Photography (3)

For those who have had limited experience in photography. Picture-taking techniques and darkroom practices. Student must have an approved camera. 2 lectures, 1 laboratory.

Jour 233 Editing and Copy Desk (3)

Copy desk work, head writing, page makeup, special rewrite and editing problems, handling of correspondents, etc. 2 lectures, 1 two-hour laboratory. Prerequisite: Jour 202, Pr 121, 122

Jour 251, 252, 253 Journalism Practice (1-2) (1-2) (1-2)

Credit arranged for students holding editorial or other positions on college publications or securing other similar supervised experience. 1-2 laboratories. Prerequisite: Jour 151, 152, 153 or equivalent experience.

Jour 302 Editorial Feature Writing (3)

Editorial and feature writing techniques. Study of markets for nonfiction articles; practice in gathering material and preparation of articles for technical and trade journals, and other media. 3 lectures. Prerequisite: Jour 233

Jour 303 Advanced Feature Writing (3)

Emphasis on market research and preparation of articles for publication. Special attention given to photographic tie-ins. 3 lectures. Prerequisite: Jour 302, 322 or 323

Jour 322 Press Photography (3)

Advanced picture-taking techniques and darkroom procedures applied directly to news and feature illustration for newspapers. 2 lectures, 1 two-hour laboratory. Prerequisite: Jour 201, 202. Student must have approved flash-equipped camera.

Jour 323 Free-lance Photography (3)

Technique of the picture story, magazine article illustration, livestock and industrial equipment photography, advertising photography. 1 lecture, 2 two-hour laboratories. Prerequisite: Jour 322

Jour 333 Radio News Writing (3)

Radio news programming, fundamentals of writing and editing for radio. Community interviews. Copy preparation. Commercial tie-ins. 1 lecture, 1 two-hour laboratory, and assigned field work. Prerequisite: Sp 201

Jour 351, 352, 353 Journalism Practice (1-2) (1-2) (1-2)

Credit arranged for students holding editorial or other positions on college publications or securing other similar supervised experience. Positions to be filled by the student are presumed to be of a more highly responsible nature than in preceding practice work. 1-2 laboratories. Prerequisite: Jour 151, 152, 153, and 251, 252, 253 or equivalent experience.

Jour 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 activity periods.

Jour 403 Newspaper Management (3)

Management problems in operation of smaller daily or weekly newspapers. Analysis of newspaper organization, circulation principles and practices, production problems, and industrial relations. 3 lectures. Prerequisite: Jour 233, 421

Jour 405 Publicity Methods (3)

Study and application of publicity planning and methods used by business firms, organizations and similar groups—with special emphasis in the agricultural and allied fields. 2 lectures, 1 laboratory. Prerequisite: Jour 202 or minimum three quarters of Jour 151-3, 251-3 or 351-3

Jour 412 Public Relations (3)

Methods employed in dissemination of public information by business, agricultural, industrial, educational, and government organizations. Survey of media used, techniques commonly employed, formation and measurement of public opinion. 3 lectures.

Jour 421 Newspaper and Magazine Advertising (3)

Advertising psychology, advertising salesmanship, copy, layout, and production. Required for majors; recommended for students from other departments needing to know how to advertise and merchandise their own or others' products or services. 2 lectures, 1 two-hour laboratory. Prerequisite: Jour 233 or instructor's permission.

Jour 425 Advertising Layout and Copywriting (2)

Study of advertising typography and illustration, application of production processes in making of layouts and writing of copy. Emphasis on local newspaper and trade magazine advertising. 1 lecture, 1 laboratory. Prerequisite: Jour 421

Jour 427 House Organs and Trade Journals (3)

Organization, management and editing of controlled-circulation and paid-circulation publications in trade and business fields. Included are publications produced at regular intervals by co-operatives, associations and similar groups. 2 lectures, 1 laboratory. Prerequisite: Jour 412 or Jour 421

Jour 432 Radio Advertising (3)

Survey of radio research methods, listenership studies, national networks, local chains, independents, production and transcription services, contracts, writing of commercials, spot announcements, etc. 2 lectures, 1 two-hour laboratory. Prerequisite: Jour 421

Jour 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.

Jour 463 Undergraduate Seminar (2)

Discussion of major political, economic, and social developments that have public interest and significance to the journalist. Ethics of the press, its importance and responsibilities. Correlation of the various phases of journalism and relation of these to other fields. 2 lectures.

Jour 502 Supervision of School Publications (3)

Study of types of school publications with emphasis on student publications including the newspaper and yearbook; methods for organizing and supervising staff; production; integrating publication into the public relations picture; financing. 1 lecture, 2 laboratories. Prerequisite: instructor's approval.

KELLOGG-VOORHIS CAMPUS

KELLOGG CAMPUS
POMONA

VOORHIS CAMPUS
SAN DIMAS



KELLOGG-VOORHIS CAMPUS

CALIFORNIA STATE POLYTECHNIC COLLEGE

POMONA—SAN DIMAS

INTRODUCTION

The Kellogg-Voorhis Campus and the San Luis Obispo Campus are one institution following the educational philosophy long established at San Luis Obispo. The instructional program at Kellogg-Voorhis is designed to offer students of Southern California the opportunity to obtain occupational training in agriculture, engineering, and arts and sciences including business.

The Agricultural Division gives four-year programs leading to the bachelor of science degree in seven majors. They are agricultural business management, animal husbandry, fruit production, general crops production, agricultural services and inspection, ornamental horticulture, and landscape architecture. In addition, the division offers two years of a major in soil science as well as many courses in related agriculture.

The Engineering Division offers four-year programs leading to the bachelor of science degree in aeronautical, electronic, industrial, and mechanical engineering.

The Arts and Sciences Division offers major programs in biological sciences, mathematics, physical education, physical sciences, and social sciences. Necessary fifth-year courses are offered so that students in the Arts and Sciences Division may complete requirements for the general secondary credential.

In the field of business, major offerings are provided in accounting, business administration, and marketing.

Women students will not be admitted during the 1960-61 school year.

HISTORY

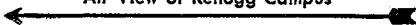
The Kellogg-Voorhis Campus of California State Polytechnic College is composed of two practically adjacent units—the Voorhis Unit, acquired in 1938, and the Kellogg Unit, acquired in 1949.

In 1938 the Voorhis Unit became a part of the California State Polytechnic College when this completely equipped school and farm near San Dimas was deeded to the college by Charles B. Voorhis of Pasadena and his son, former Congressman Jerry Voorhis. This branch of the college, representing an investment of more than a million dollars, was put into operation as a branch of the main institution, specializing in fruit production, ornamental horticulture, general crops production, and horticultural services and inspection.

The Kellogg Unit was given to the people of the State of California in 1949 by the W. K. Kellogg Foundation of Battle Creek, Michigan. It was founded by W. K. Kellogg in 1925 as the Kellogg Arabian Horse Ranch and became famous as one of the outstanding Arabian horse breeding farms in the world. This property was deeded to the State to be used for occupational training consistent with the philosophy and educational objectives of the California State Polytechnic College. A condition of the deed provides that the college maintain an Arabian horse breeding program.

The State of California is now developing a complete new college campus on the Kellogg property. The Science Building, the first completed structure, was put into use in the fall of 1956, and the major instructional operation of the southern branch is now carried on at the Kellogg Campus. The Agricultural Division has expanded steadily since its inception and the college has now added majors in engineering and in arts and sciences with new buildings and equipment for each.

Air View of Kellogg Campus



GENERAL INFORMATION

LANDS AND LOCATION

The Kellogg-Voorhis Campus of California State Polytechnic College is about 25 miles east of Los Angeles near the communities of Covina, West Covina, La Puente, San Dimas, Pomona, La Verne and Claremont. The Voorhis Campus comprises 157 acres climatically suited for specialization in subtropical fruits and ornamental horticulture. Approximately 30 acres are used for citrus, avocados, and deciduous fruits, providing excellent field laboratories for study and project work.

The 816 acres at the Kellogg Campus provide the major campus site and field and laboratory facilities for study and project work in all of the majors in agriculture. In addition, the college leases 278 acres of farmland from the Pacific State Hospital, 1½ miles from the Kellogg Campus, which is devoted to fruits, field and truck crops, grain and pasture.

BUILDINGS AND EQUIPMENT

General

Classroom instruction is centered on the Kellogg Campus. Additional facilities are available at the Voorhis Campus, where certain classes, especially in field laboratory work in agriculture, are offered. Administration and student personnel offices are in the Science Building on the Kellogg Campus.

Library

Library and audiovisual services are centered in the new Library Building on the Kellogg Campus. The library collection includes basic and general books plus specialized documents and periodicals in support of the majors offered. A reading room and a reserve collection are maintained on the Voorhis Campus during evening hours for the convenience of resident students.

Science Building

The 75,000 square-foot Science Building, completed in 1956, contains modern classrooms, large lecture rooms, and laboratories. These are utilized principally by the Agricultural and Arts and Science Divisions. Administration offices are also in this building.

Engineering Buildings

The engineering buildings are on the Kellogg Campus and include two laboratory and shop buildings, one classroom and laboratory building, and a wind tunnel building. These contain equipment and facilities for instruction in aeronautical, electronic, industrial, and mechanical engineering. Included are fully equipped shops for instruction in machine tool practice, welding and sheet metal work; also drafting rooms, offices, lecture rooms, and specialized laboratories for the major course work.

Business Classroom Building

Completed in 1959, the 28,000 square-foot Business Classroom Building is designed especially for instruction in the business majors. In addition to classrooms and offices, it contains laboratories for the operation of business machines, installation of merchandising displays, and the use of other devices employed in modern business practice.

Agricultural Facilities

In addition to the original farm buildings and shops on the Kellogg and Voorhis properties, completely new units to house livestock, poultry, ornamental plants, and fruits and vegetables were completed in 1958 on the Kellogg Campus. Included are modern sheds and pens for beef cattle, sheep and swine, facilities for poultry and poultry products, an apiculture unit, a packing and storage house for fruits and vegetables, and substantial greenhouse, head-house and lath-house units for ornamental horticulture and nursery practice. The new agricultural engineering building houses laboratories for training in farm power, farm machinery, agricultural mechanics, carpentry, irrigation, and surveying. Also included are offices for faculty and a lecture facility. The world-famous Arabian horse stables and show arena are important parts of the agricultural establishment.

Physical Education and Athletics

Physical education and athletic facilities, covering 38 acres, are located on the Kellogg Campus. These include a gymnasium with related classrooms and offices, also fields for football, track, baseball, tennis, and other sports. A five-acre playground is also maintained at the Voorhis Unit for intramural and recreational activities.

Cafeterias

A 25,000-square-foot cafeteria is in operation on the Kellogg Campus and seats 210 students. It also includes a snack bar, outside patio, and a dining room for staff and special groups.

On-campus Housing

The Kellogg Campus has four new residence halls to be opened in the 1960-61 academic year. Each residence hall accommodates 200 students. Students live two to each room and are furnished with beds, wardrobe, study desks, bookshelves, etc. Each residence hall also has a lounge, snack kitchen, and recreational room. Personal laundry facilities are also available.

Residence hall life gives students ready access to the college library, gymnasium, athletic playfields and permits full participation in college life. Good study habits are emphasized in the campus residence halls through carefully planned study schedules that leave time for group socialization and individual interests.

Housing facilities for married students and their families are on the Voorhis Campus. These consist of one double story and three single-story structures equipped with all the necessary facilities for family living. The units house a total of 30 families and all have a living room, kitchenette and bath. Sixteen of these have two bedrooms and 14 are one-bedroom units. The facility is landscaped including a fenced-in play area for children.

Off-campus Housing

Because it is felt that students who live in campus residence halls profit from their association with other students and staff members through sponsored activities, the college recommends that whenever possible students live on the campus. However, because of the limited capacity of college facilities, a listing of private homes, hotels, motels, and apartments is maintained in the college Housing Office.

Chapel

Occasional nonsectarian services, student weddings, and college concerts are held in the Voorhis Chapel during the school year. The architectural style of the chapel was patterned after the old Spanish missions.

Health Center

The student Health Center is a new well-equipped medical clinic. It includes X-ray, physiotherapy, laboratory, emergency cast and treatment facilities as well as doctor's offices and examination rooms. Although there are no infirmary facilities, there are day-rest rooms.

THE FOUNDATION

The California State Polytechnic College Foundation, a nonprofit corporation established by the college, maintains a revolving fund to finance a unique project system for students to aid in the development of techniques and skills essential for success in agricultural production.

This system provides for supervised projects, individually owned or leased and operated by students in such a way as to make it possible for them to gain knowledge and experience in the production and marketing of agricultural products on a commercial scale. This combination of the practical "learn by doing" and "earn while you learn" philosophies not only enables a student to earn money while doing work directly related to his major interest, but also creates an added incentive for the acquisition of further skills and knowledge.

For more complete information see under the heading **THE FOUNDATION** in the General Information section, San Luis Obispo, of this catalog.

STUDENT ORGANIZATIONS AND ACTIVITIES

STUDENT GOVERNMENT

Student government functions under the jurisdiction of the elected student body officers and the Student Affairs Council, made up of elected representatives of the various campus organizations. All regular students are members of the Associated Student Body. The membership fee totals \$15 per year and entitles the student to full participation in the activities of the association. Membership also includes a subscription to the weekly newspaper, *Poly Views*, and the privilege of purchasing at a reduced price the college yearbook, *Madre Tierra*.

PUBLICATIONS

Poly Views is the official publication of the Associated Students and is published weekly during the school year. *Madre Tierra* is the yearbook record of student activities carried on during the year at the Kellogg-Voorhis Campus.

CAMPUS ORGANIZATIONS

Clubs and organizations on the Kellogg-Voorhis Campus cover all departments and activities, and the opportunity exists for every student to take an active part in club life. The college does not recognize or encourage membership in either national or local social fraternities or sororities.

POLY VUE AND EDUCATIONAL FIELD DAY

Poly Vue is the name given to the annual open house of the Kellogg-Voorhis Campus that is held in the spring each year. It is designed to show parents and friends the yearly activities and progress of the institution, as well as to provide a time for friendly social activities. The entire affair is organized and carried out by the students.

The Educational Field Day, sponsored by the Young Farmer Chapter on the Kellogg-Voorhis Campus, provides an opportunity for high school and junior college youths to compete in agricultural contests.

ATHLETICS

The Kellogg-Voorhis Campus participates regularly in intercollegiate competition in basketball, baseball, football, tennis, and track. Teams in basketball, baseball, and track compete in informal league play with other small Southern California colleges. In football, teams compete with colleges such as Occidental, University of Mexico, and Pomona. Golf, tennis, cross country, swimming, and water polo teams also compete in intercollegiate matches.

An extensive intramural program is an integral part of college life at the Kellogg-Voorhis Campus. The program includes such team sports as touch football, basketball, volleyball, and softball. Individual sports such as tennis, badminton, horseshoes, track and field events, swimming, handball, boxing, and wrestling also are a part of intramural competition.

STUDENT PERSONNEL SERVICES

HEALTH AND MEDICAL

Medical services, paid for by the State and by the student through the materials and service fee and the \$3 per quarter medical fee, are designed to provide the services of a family physician while the student is in college and does not include the services of specialists. Diseases of a chronic nature which a student contracted before entering school are not covered. Students may consult the college physician at the Health Center by appointment. No hospitalization or major surgery is provided. Registration in the college is not complete until a student has had his entrance physical examination or received approval for other arrangements from the Medical Director.

COUNSELING

Individual counseling service is offered each student. This service consists of educational, vocational, and personal counseling in accordance with the needs of the student.

PLACEMENT

A centralized placement service is available to students who have completed their college program. The Placement Office and departments work together in assisting students to obtain the most suitable employment consistent with their preparation and experience.

No guarantee of placement is made to any student, but a sincere effort is made to find employment for anyone who shows himself worthy of this service.

SUMMER EMPLOYMENT

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

The Placement Office receives many summer job listings. Ranchers and businessmen visit the campus in person and large business concerns send recruiters to interview undergraduates for summer employment. A summer job often leads to permanent employment.

PART-TIME EMPLOYMENT

In addition to opportunities for students to earn money through project activities, the college has established a policy of giving a maximum number of students experience by employing them to assist in the operations of the entire campus and farm. The number of campus jobs is greater than in the typical college where regular full-time employees do much more of the work.

STUDENT LOANS

A number of student loan funds on the Kellogg-Voorhis Campus provide temporary assistance to worthy students. Loans from these funds are made for varying periods of time, according to regulations determined by a faculty committee and in conformance with conditions prescribed in the establishment of the particular loan fund. Applications should be made to the Associate Dean, Activities, in the Student Personnel Office.

The character and integrity of the student are the primary qualifications for obtaining a loan. Evidence of real need for such temporary assistance must be shown. Students who have spent funds far beyond the necessary school expenses will not be considered for loans, even though need is shown.

Alex M. Wilson Memorial Loan Fund

The family and friends of Alex M. Wilson established a memorial loan fund in his memory with an original grant of \$500. The purpose of this fund is to make short- and long-term loans available to students of California State Polytechnic College.

Associated Students Loan Fund

The Associated Students established a loan fund with an original grant of \$500 for the purpose of making short-term loans available to students enrolled at the Kellogg-Voorhis Campus.

Cal Poly Women's Club Student Accommodation Loan Fund

The Cal Poly Women's Club established a student accommodation loan fund for the purpose of making short-term loans to deserving students.

Chet Pencille Memorial Fund

The Pest Control Operators of California established the Chet Pencille Memorial Fund with an original grant of \$2,500. The purpose of this fund is to make short- and long-term loans available to deserving young men enrolled in services and inspection.

Lemon Men's Club Loan Fund

The Lemon Men's Club of California established this loan fund with an original grant of \$500 to make short-term loans available to deserving young men. Although preference is given fruit production students, other students are not excluded from receiving loans from this fund.

"Los Ganaderos Club" Loan Fund

The college animal husbandry club established the "Los Ganaderos Club" Loan Fund with an original grant of \$200. Subsequent to the original grant the Arabian Horse Association of Southern California has contributed an additional \$200 to the fund. Although preference is given to students majoring in animal husbandry, other students are not excluded from receiving loans from this fund.

Katherine and Edwin Jobe Loan Fund

Mr. and Mrs. Verne Jobe established this loan fund with an original grant of \$4,000 for the purpose of making both short- and long-term loans available to deserving students.

Phillip H. Henry Memorial Loan Fund

Friends of Phillip H. Henry established a memorial loan fund in his memory with an original grant of \$1,200. The purpose of this fund is to make short- and long-term loans available to students of California State Polytechnic College.

Terminix Educational Foundation Fund

The Terminix Company Inc. of Los Angeles established this fund with an original grant of \$500 to make short- and long-term loans available to deserving students. Although preference is given to students enrolled in services and inspection, other students are not excluded from receiving loans from this fund.

California Fertilizer Association Loan Fund

A \$500 loan fund has been established by the Soil Improvement Committee of the California Fertilizer Association for the purpose of making small, short-term loans available to deserving students, in order that these students may continue their education.

Ornamental Horticulture Alumni Association Loan Fund

The Ornamental Horticulture Alumni Association established this loan fund to make short- and long-term loans available to students majoring in ornamental horticulture.

SCHOLARSHIPS

Sears, Roebuck and Company Agriculture Scholarship Awards are available to advanced and first-year students who enroll in agriculture. These awards are fully described in the San Luis Obispo section of this catalog.

The Harry E. Rosedale Memorial Scholarship of \$100 is made available for a student enrolled in ornamental horticulture at the Kellogg-Voorhis Campus. The student must have completed one year of work in the Ornamental Horticulture Department.

The Lemon Men's Club Annual Award of Merit of \$100 goes to an outstanding upper classman in Citrus Fruit Production.

One \$200 scholarship and one \$100 scholarship are included in the Chet Pencille Memorial Fund. They may be awarded to entering freshmen and/or students transferring from other colleges who enroll with the Services and Inspection Department and have completed the junior year.

Three \$100 scholarships are made available at the Kellogg-Voorhis Campus by the California Landscape Contractors Association as awards of merit to upper classmen specializing in the field of ornamental horticulture.

One \$100 scholarship is awarded by the Bandini Fertilizer Company to an outstanding student specializing in ornamental horticulture.

One \$100 scholarship is awarded by Chuck's Nursery of Covina, to a sophomore student specializing in the field of ornamental horticulture.

One \$100 scholarship is made available by the Vitren Corporation for an outstanding student in poultry or animal husbandry.

One \$150 scholarship is awarded by each of the following clubs to an entering student in Fruit Production.

1. Central California and Tulare County Sunkist Managers Club
2. Foothill Sunkist Managers Club
3. Sunkist Managers Club Central Lemon Association
4. Tri-County Sunkist Managers Club

One \$150 scholarship is awarded by Sunkist Growers, Inc., as a second-year award to the most outstanding recipient of the Sunkist Managers Club Scholarships.

An alumnus of the college provides annually an award of a life membership in the California State Polytechnic College Alumni Association to an outstanding senior student who has demonstrated a high quality of leadership in his student life.

ADMISSIONS, REGULATIONS, AND GRADUATION REQUIREMENTS

Except as otherwise noted, the sections at the beginning of this catalog covering GENERAL INFORMATION, ADMISSIONS, GENERAL REGULATIONS, and DEGREES AND CREDENTIALS apply to the Kellogg-Voorhis Campus.

FEES AND EXPENSES

State Fees and Deposits

Materials and service fee (quarter):

Each student enrolled for six units or less.....	\$12.00
Each student enrolled for over six units.....	22.00
Each student enrolled in summer quarter.....	22.00

Nonresident tuition:

Each nonresident student enrolled for 15 units or more (per quarter).....	86.25
Each nonresident student enrolled for less than 15 units (per quarter per unit or fraction of unit).....	5.75

Late registration fee.....	5.00
Transcript of record fee (no charge for first copy).....	1.00
Course credit by special examination fee (per unit).....	1.00
Extension course fee (per unit).....	1.00, 5.00 or 5.75
Change of program fee.....	1.00
Failure to meet administratively required appointment or time limit.....	2.00
Credential fee.....	4.00
Check returned for any cause.....	2.00

Parking fee:

Nonreserved spaces (per quarter):	
Regular students.....	9.00
Limited students.....	4.50
Each alternate car in addition to fee for first vehicle.....	1.00
Reserved spaces (per quarter).....	15.00

Other Fees *

Associated student card fee (fall quarter).....	7.50
Associated student card fee (winter and spring quarters, each).....	3.75
Post office box rental (all students, per quarter).....	.50
Medical fee (per quarter).....	3.00
Graduation fee (must be paid at time application for graduation is submitted).....	10.00

Note: Fees for summer quarter are the same as for the other quarters. Fees are subject to change upon approval of the State Director of Education.

* Not State fees.

Living Expenses

STUDENTS LIVING IN CAMPUS RESIDENCE HALLS

Room and board per quarter, including parking fee (subject to change).....	\$210.00
Housing security deposit (payable prior to occupancy).....	20.00

Note 1: Room and board payable in advance. Arrangements to pay in three equal installments may be made upon application for campus housing. A service fee of \$4 per quarter shall be charged for the right to make installment payments.

Note 2: Students are required to furnish blankets, bed spreads, and study lamps. The college furnishes weekly linen service of bed sheets and pillow cases.

Note 3: The board plan includes breakfast and dinner seven days per week excluding college holidays. Lunch is available at the Kellogg dining hall on a cash basis.

TYPICAL STUDENT EXPENSES

Following is an estimate of typical expenses per quarter for students living in campus residence halls. Of the total amount, the student should be prepared to pay from \$325 to \$375, depending upon his major, at the time of fall quarter registration and approximately the same amount at the time of winter and spring quarter registration.†

Associated student card (fall quarter, \$7.50, winter and spring quarters, \$3.75 each)	\$7.50
Post office box rental (per quarter).....	.50
Medical fee (per quarter).....	3.00
Materials and service fee (per quarter).....	22.00
Room and board (14 meals per week).....	210.00
Books and supplies (estimated).....	50.00 *
Weekend meals (estimated \$15 per month).....	45.00
Laundry (estimated \$10 per month).....	30.00
Estimated total expenses per quarter.....	\$368.00

FAMILY HOUSING

Rental Charge on Apartments:

1-bedroom apartments, furnished, including utilities (per month).....	\$35.00
2-bedroom apartments, furnished, including utilities (per month).....	40.00

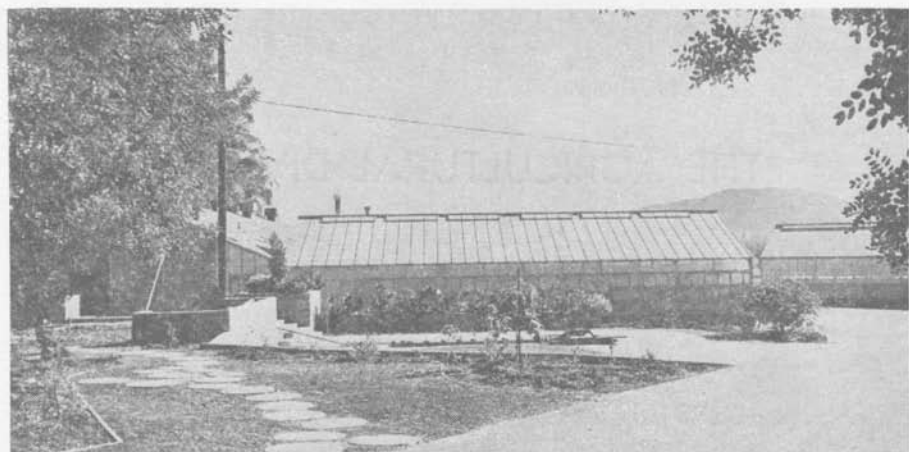
* Beginning engineering students should be prepared to pay up to \$100 in their first quarter.

† Students enrolling under Public Law 550 should be prepared to pay all costs at the time of registration. Students enrolling under the auspices of other laws or agencies supplying educational assistance should check in advance with the appropriate agency representative regarding payment of fees and/or costs.

THE AGRICULTURAL DIVISION



Rose Parade Chrysanthemums Growing on Voorhis Campus



Ornamental Horticulture Unit



Livestock Units on Kellogg Campus

THE AGRICULTURAL DIVISION

INSTRUCTION

Instruction in agriculture on the Kellogg-Voorhis Campus of the California State Polytechnic College is primarily confined to eight graduation majors leading to the bachelor of science degree. Each curriculum is so arranged that a student beginning as a freshman is enrolled immediately in courses in his major, so that he can determine in a short time whether or not he is fitted for work in the field he has selected.

The courses offered in each agricultural curriculum may be grouped into four areas as follows:

1. Major agriculture—The required sequence of courses offered by the department in which the student expects to graduate. These courses constitute the core instruction leading to specific preparation for the production field of the student's choice.
2. Related agriculture—Supporting courses in agriculture selected from closely allied fields. They supplement the major agricultural block in (1).
3. Science and mathematics—Courses selected from scientific fields which provide basic biological, physical and social science and mathematical background and support to the agricultural block in (1) and (2) above.
4. Humanistic-social—Courses which provide cultural background for intelligent living in a complex world society.

The following chart illustrates the distribution of required units in the four areas indicating emphasis and balance through the four years. The entire program totals 198 quarter units including elective units which vary depending upon the student's major. Electives in the freshman and sophomore years are frequently chosen from agricultural courses.

	<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
Major agriculture	12	12	12	6
Related agriculture	9	18	10	13
Science and mathematics.....	18	7	15	3
Humanistic-social	10½	11½	9	6

ADMISSION

Admission to the Agricultural Division is open to any male high school graduate who meets the requirements listed in the section on admissions. Although no specific high school pattern of courses is required, it is to a student's advantage to have a good background in vocational agriculture and both physical and biological science.

FACILITIES

The college has facilities necessary for the best practical training possible in its major fields. The college farm consists of fertile soils typical of the Southern California area with enough variation in soil types and climate to give students a broad background of experience.

The Fruit Production Department has for instructional use 60 acres of citrus fruit, 15 acres of avocados, and smaller acreages of deciduous fruits and nuts. This department has at its disposal a variety of specialized equipment for all cultural operations, including equipment for cultivation, weed control, orchard heating, pest control, and propagation. A modern, student-operated packinghouse on campus is used to process fruit from the college orchards.

In the general crop program approximately 250 acres are devoted to the production of field crops, vegetable crops, and irrigated pastures. Available for student use is modern equipment necessary for complete instruction in crops production, including equipment for tillage, pest control, weed control, planting, fertilizing, and harvesting. Facilities in this department also include vegetable packinghouse and propagation areas.

The Ornamental Horticulture Department has more than 70 acres devoted to ornamental plantings for use in laboratory work, with additional land available for commercial flower growing. In addition this department offers its students the use of nine glasshouses, two lathhouses, two screenhouses, two propagation houses, and numerous hotbeds and coldframes.

Students majoring in agricultural services and inspection use the facilities of the entire farm in their work in specific production courses. This department has at its disposal complete facilities in bee production including a modern apiary and honey house.

The facilities of the Soil Science Department include a soils laboratory equipped with modern soil testing equipment as well as a fieldhouse for growing plants under controlled conditions of nutrition and environment. The facilities of the entire farm are also available for the use of students in obtaining practical knowledge in soil management.

The Animal Husbandry Department is equipped with modern facilities for beef cattle, horses, sheep, and swine to accommodate both college herds and student-owned projects. Barns, feed yards, and 500 acres of both irrigated and natural pasture are available for departmental use. A modern poultry plant emphasizing egg and meat production complete with a modern dressing plant is available for student use.

A new agricultural engineering building complete with shops and classrooms is equipped for training students in mechanical skills such as farm machinery operation and repair, farm building construction, welding, electrical wiring and plumbing. Auxiliary buildings house farm machinery and tractors, and provide space for equipment construction and repair, and farm power instruction.

In addition to modern irrigation pump testing and demonstration equipment, irrigation facilities include distributive systems typical of those used commercially in Southern California. Students obtain practice in working with check irrigation, furrow irrigation, and sprinkler irrigation both stationary and portable.

In keeping with the college philosophy of "learning by doing," each student is provided an opportunity to learn the fundamental skills involved in the care, maintenance, and operation of all equipment and facilities to assure him of occupational competence. A supervised work program is an important part of the college instruction and all departments offer jobs outside of class time so that students may earn while attending college.

AGRICULTURAL BUSINESS MANAGEMENT

Department Head, Robert E. Lloyd

William P. Rowley

Milo G. Lacy

Frederick Donald Davis

The development of agriculture in California through specialization, mechanization, and improved breeding, fertilizing, and pest control methods has resulted in the growth of many business firms which meet the demand for agricultural services performed off the farm. In addition an increasingly important industry is concerned with the distribution of agricultural products from the producer, through processing, wholesaling, and retailing channels to the ultimate consumer.

The agricultural business management program is a business-administration college program complemented with a firm agricultural foundation. It is designed to train students for such positions as: business manager, credit manager, produce buyer, purchasing agent, dealer serviceman, salesman, appraiser, and government inspection and program specialist. In addition to business-management, sales and sales promotion training, students may elect a concentration of work in specified production fields to gain valuable production techniques and experiences.

The food distribution industry merchandises much of agriculture's product as processed foods or fresh produce. This industry co-operates with the department in training and job-experience programs to prepare students for employment in this field. Chainstore buying practices, merchandising techniques and supermarket functions are studied in detail.

To supplement classroom and laboratory sessions, field trips are taken to food distribution centers, warehouses and retail stores, to typical agricultural industries and production centers. Undergraduate students are encouraged to find part-time employment in related agricultural industry and commerce.

CURRICULUM IN AGRICULTURAL BUSINESS MANAGEMENT

Freshman	F	W	S
Introduction to Agricultural Business (ABM 101).....	3		
Office Organization and Operation (OA 102).....		3	
Agricultural Mechanics (AE 121, 122).....	2	2	
Language Communication (Eng 104, 105, 106).....	3	3	3
Health Education (PE 107).....	2		
Basic Mathematics (Math 101).....		3	
Business Mathematics (Math 106).....			3
Physical Education (PE 141, 142, 143).....	½	½	½
Basic Biology (Bio 115).....	3		
Basic Biology Demonstration (Bio 116).....	1		
† General Physical Science (PSc 101, 102).....		4	4
General Psychology (Psy 202).....			3
* Electives	2	2	3
	<hr/> 16½	<hr/> 17½	<hr/> 16½
Sophomore			
Business Organization and Management (ABM 201).....	3		
Sales of Agricultural Commodities (ABM 202).....		3	
Job Instruction Training (ABM 203).....			1
Food Merchandising (ABM 204).....			3
Principles of Economics (Ec 201, 202).....	3	3	
Public Speaking (Sp 201).....			2
Literature (Eng 211, 212, or 213).....	3		
† General Physical Science (PSc 103).....	4		
Sports Education (PE 241, 242, 243).....	½	½	½
Principles of Accounting (Actg 121, 122).....		3	3
Business Law (Bus 301, 302).....		3	3
Family Relations (Psy 206).....			3
* Electives	3	4	2
	<hr/> 16½	<hr/> 16½	<hr/> 17½

* Twenty-four elective units are to be selected from courses in agricultural production majors at the direction of the head of the Agricultural Business Management Department.

† Chem 324, 325, 326 may be substituted for PSc 101, 102, 103.

	F	W	S
Junior			
Agricultural Credit (ABM 301).....	3		
Storage and Inventory Control (ABM 302).....		3	
Advertising and Promotion of Agricultural Products (ABM 305).....		3	
Agricultural Marketing (FM 304).....	3		
Descriptive Statistics (Math 211).....			3
Human Relations (Psy 304).....	3		
Economic Problems (Ec 213).....			3
Cost and Payroll Accounting (Actg 221).....			3
State and Local Government (Pol Sc 401).....	3		
Growth of American Democracy (Hist 304).....			3
Economic Geography (Geog 312).....		3	
American Government (Pol Sc 301).....		3	
* Electives.....	4	4	5
	<hr/>	<hr/>	<hr/>
	16	16	17
Senior			
Business and Sales Finance (ABM 303).....			3
Personnel Management and Industrial Relations (ABM 402).....	3		
Wholesaling and Retailing (ABM 412).....		3	
Transportation of Agricultural Commodities (ABM 416).....			3
Senior Project (ABM 461, 462).....	2	2	
Undergraduate Seminar (ABM 463).....			2
Land Appraisal and Sales (ABM 406).....		3	
Report Writing (Eng 301).....	3		
Insurance Principles (Bus 403).....	3		
United States in World Affairs (Hist 305).....			3
Advanced Public Speaking (Sp 303).....		2	
* Electives.....	5	6	5
	<hr/>	<hr/>	<hr/>
	16	16	16

DESCRIPTIONS OF COURSES IN AGRICULTURAL BUSINESS MANAGEMENT

ABM 101 Introduction to Agricultural Business (3)

The field and scope of agricultural business. Fundamental concepts, tools, and practice. 3 lectures.

ABM 201 Business Organization and Management (3)

Forms and problems of agricultural business organization and operation. Functions and fundamental skills of business management. 3 lectures.

ABM 202 Sales of Agricultural Commodities (3)

The role of salesmanship in the agricultural economy and other sales producing activities. Emphasis on practical sales techniques and solutions to common sales problems. 3 lectures.

ABM 203 Job Instruction Training (1)

The principles and techniques of instructing mechanical or technical jobs. 1 lecture.

ABM 204 Food Merchandising (3)

Agricultural marketing practices, emphasizing the selling function. Current trends in the field of supermarket operation. Guest speakers, and field trips. 3 lectures.

ABM 301 Agricultural Credit (3)

Principles and techniques of reducing credit risks. Sources of credit information, credit terms, laws relating to credit instruments. Collection problems and techniques related to agricultural industry. 3 lectures.

* Twenty-four elective units are to be selected from courses in agricultural production majors at the direction of the head of the Agricultural Business Management Department.

ABM 302 Storage and Inventory Control (3)

Techniques of storage and warehouse operation. Inventory control methods and management, purchasing and receiving documents, record keeping, and materials handling problems. 2 lectures, 1 laboratory.

ABM 303 Business and Sales Finance (3)

Methods of financing. Analysis of financial requirements, instruments, and statements of agricultural business and sales agencies. Sources and uses of credit. Financial planning. 3 lectures.

ABM 305 Advertising and Promotion of Agricultural Products (3)

Principles of demand creation. Relationship of market research, production, packaging, advertising, quality control, sales promotion, and store display. Practical application of merchandising principles to agricultural business. 2 lectures, 1 laboratory.

ABM 402 Personnel Management and Industrial Relations (3)

Employer-employee relationships. Manpower utilization and management of related industry and commerce. Labor relations and principles of collective bargaining. 3 lectures.

ABM 406 Land Appraisal and Sales (3)

A course designed to familiarize the student with the principles of California real estate code governing real estate transactions and appraisal of rural and suburban property. 3 lectures.

ABM 412 Wholesaling and Retailing Agricultural Commodities (3)

The field of wholesaling and retailing agricultural commodities including auctions, commission houses, commission merchants, food brokers, carlot receivers, jobbers, shippers, and supply houses. Principles of buying and selling. Terms and trade customs. 3 lectures.

ABM 416 Transportation of Agricultural Commodities (3)

A study of the principles of transportation of perishable agricultural commodities and the functions of the traffic manager. Detailed examination of various regulations, documents, and rate structures of the different means of transport. 3 lectures.

ABM 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.

ABM 463 Undergraduate Seminar (2)

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

AG 400 Special Problems (1-2)

For advanced students with sufficient preparation to benefit from specialized study. According to needs and interest of student, total credit limited to 4 units with not more than 2 units in any one quarter.

DESCRIPTIONS OF COURSES IN POULTRY INDUSTRIES**PI 131 Poultry Principles (4)**

Fundamentals of poultry production. Natural history, anatomy, physiology and life cycle of birds. Kinds, varieties, and breeds of poultry and their commercial uses. 3 lectures, 1 laboratory.

PI 132 Brooding and Rearing (4)

Principles and practices of purchasing, brooding, rearing, and selling chickens for various market demands. 3 lectures, 1 laboratory. Prerequisite: PI 131

PI 133 Egg Production (4)

Principles and practices of the management of chickens in egg production. Methods of feeding, culling, keeping records, maintaining egg quality, and selling eggs and fowl. 3 lectures, 1 laboratory. Prerequisite: PI 131

PI 231 Poultry Marketing (4)

Channels through which poultry travels from producer to consumer. Buying, processing, and selling of poultry. Economic, sanitation, management, and merchandising problems involved. 3 lectures, 1 laboratory. Prerequisite: PI 131

PI 232 Egg Marketing (4)

Channels through which eggs travel from producer to consumer. Buying, processing, and selling of eggs. Economic, management, and merchandising problems involved. 3 lectures, 1 laboratory. Prerequisite: PI 131

PI 236 Turkey Raising (4)

Principles and practices in purchasing, brooding, rearing, and selling turkeys for various market demands. 3 lectures, 1 laboratory. Prerequisite: PI 131

DESCRIPTIONS OF COURSES IN FARM MANAGEMENT**FM 100 Project Records (1)**

Organization of the foundation, records needed in conducting a project, methods of keeping records and their analysis. Adapted to student conducted projects under the supervision of the college. 1 lecture.

FM 304 Agricultural Marketing (3)

Problems in marketing agricultural products both co-operatively and otherwise. Structure and functions of the market. Emphasis on distribution of California farm products. 3 lectures. Prerequisite: Ec 201

FM 321 Farm Records (3)

The fundamental processes of record keeping based on the uses of records, the kinds of records that could be kept, the farm inventory, depreciation, the cash and accrual basis of income tax reporting, the basic fundamental reports, i.e., the balance sheet and the operating statement and their analysis. 2 lectures, 1 laboratory. Prerequisite: Ec 202

FM 322 Farm Management I (4)

Measures of farm profits, method of finding profitability of enterprise, factors affecting farm profits, getting started in farming; problems involving the reorganization of actual farms. 3 lectures, 1 laboratory.

FM 403 Agricultural Prices and Government Control (3)

General price level, pricemaking process, price variations and trends, price reports and forecasting, governmental agricultural price control programs, price characteristics of specific agricultural commodities. 3 lectures. Prerequisite: Ec 202

AGRICULTURAL SERVICES AND INSPECTION DEPARTMENT

Department Head, Edward C. Appel, Jr.

Kenneth R. Hobbs

Lloyd Newell

The Agricultural Services and Inspection Department has three primary functions:

1. To prepare students for employment in civil service and open positions with county, state, and federal agencies. County, state, and federal inspectors are co-operative agents whose duties are to enforce agricultural laws and regulations which have been established for the protection and assistance of agricultural enterprises. The protection of agricultural crops from the numerous plant and animal pests, the prevention of fraud and deception in the marketing of these crops requires the services of many inspectors.
2. To prepare students for employment as sales service representatives of the agricultural chemical and crop marketing industries. Agricultural chemical industries offer employment in sales and advisory capacities to those with specific training and with a basic knowledge of agricultural practices. Many opportunities are available in the marketing of agricultural commodities for graduates with training in fruit and vegetable grading, packing, and marketing. Applied training is offered to prospective supervisors, buyers, and sellers of agricultural crops.
3. To prepare students for employment in structural and agricultural pest control operations. This industry is rapidly expanding, due to the tremendous increase in housing and industrial development and re-establishment of agricultural lands.

Summer appointments with county and state agencies or commercial companies, after one year of training in this major, provide experience and a summer income.

CURRICULUM IN AGRICULTURAL SERVICES AND INSPECTION

Freshman	F	W	S
Agricultural Law and Procedure (SI 101).....	3		
Language Communication (Eng 104, 105, 106).....	3	3	3
Agricultural Mathematics (Math 102, 103).....		3	3
Agricultural Mechanics (AE 121, 122).....	2	2	
Health Education (PE 107).....			2
Physical Education (PE 141, 142, 143).....	½	½	½
General Entomology (Ent 126).....	4		
Basic Biology (Bio 115).....		3	
Basic Biology Lab (Bio 145).....		2	
Agricultural Botany (Bot 120).....			4
Plant Production Electives.....	4	4	4
	16½	17½	16½
Sophomore			
Economic Insect Pests (SI 228, 229).....		3	3
Plant Identification (SI 224).....	4		
Pest Control Materials (SI 231).....		4	
Weeds and Weed Control (CP 133).....			4
Rodent Control (SI 223).....			3
Principles of Economics (Ec 201, 202).....	3	3	
Pest Control Equipment (AE 233).....			3
Family Relations (Psy 206).....			3
Soils (SS 121).....		4	
Literature.....	3		
Public Speaking (Sp 201).....		2	
General Plant Pathology (Path 223).....	4		
Sports Education (PE 241, 242, 243).....	½	½	½
Electives.....	1		
	15½	16½	16½

	F	W	S
Junior			
Standardization (SI 321).....		4	
Plant Quarantine (SI 322).....		4	
Produce Market Quality (SI 325).....	3		
Services and Inspection Problems (SI 372, 373).....		1	1
† Plant Pathology Electives.....	4		4
Advanced Entomology (Ent 334).....		3	
Farm Records (FM 321).....	3		
General Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Report Writing (Eng 301).....			3
American Government (Pol Sc 301).....	3		
Electives.....	1		4
	18	16	16
Senior			
Pest Control Practices (SI 424).....	3		
Senior Project (SI 461, 462).....	2	2	
Undergraduate Seminar (SI 463).....			2
Fertilizers (SS 221).....			4
Agricultural Biochemistry (Chem 328).....	4		
U. S. in World Affairs (Hist 305).....			3
Growth of American Democracy (Hist 304).....		3	
Human Relations (Psy 304).....		3	
Electives.....	8	8	7
	17	16	16

DESCRIPTIONS OF COURSES IN AGRICULTURAL SERVICES AND INSPECTION

SI 101 Agricultural Law and Procedure (3)

Provisions of the Agricultural Code and other laws affecting industries serving agriculture and the agricultural inspector; structures, and functions of state and county departments of agriculture, California seed law, agricultural chemicals, grain warehouse inspection, agricultural and structural pest control operators. 3 lectures.

SI 223 Rodent Control (3)

Small animals and birds injurious to agricultural crops and structures; emphasizing introduced and native rats and mice, ground squirrels, pocket gophers, and moles. Identification, seasonal history, and economic importance. Control methods and materials, their uses and precautions. Related laws and regulations. 2 lectures, 1 laboratory.

SI 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 laboratory. Prerequisite: Bot 120

SI 228 Economic Insect Pests (3)

Recognition and distribution of the important mites and insects attacking the major field, cereal, and truck crops. Hosts and identification of damage to various plant parts. Seasonal history, habits, and problems relating to recommended control measures. 2 lectures, 1 laboratory. Prerequisite: Ent 126

SI 229 Economic Insect Pests (3)

Recognition and distribution of the important mites and insects attacking citrus, deciduous fruit, small fruit, berries, and nut trees. Hosts and identification of damage to various plant parts. Seasonal history, habits, and problems relating to recommended control measures. 2 lectures, 1 laboratory. Prerequisite: SI 228

† Two applied plant pathology courses to be selected with approval of major adviser.

SI 231 Pest Control Materials (4)

Economic entomology as it pertains to the development of pest control materials; properties and formulations of pesticides; insect, plant, and animal tolerances; application of and precautions for modern insecticides, including the most recent developments; related laws and regulations. 3 lectures, 1 laboratory. Prerequisite: Ent 126, Chem 4 or the passing of a placement test.

SI 321 Standardization (4)

Standardization provisions of the Agricultural Code relating to fruits, nuts, vegetables, eggs, and honey. Minimum requirements for marketing, including maturity standards; disease, insect, and physiological quality and condition factors; container markings and size designations. 3 lectures, 1 laboratory. Prerequisite: SI 325

SI 322 Plant Quarantine (4)

Purpose and application of federal, foreign, and domestic plant quarantines and California plant quarantine laws and regulations; identification, habits and seasonal history of pests and diseases concerned; areas under quarantine, commodities covered, restrictions, and established treatments. 3 lectures, 1 laboratory. Prerequisites: SI 101, Ent 126, Path 223

SI 325 Produce Market Quality (3)

Fundamentals, principles, and procedures for inspecting fruits and vegetables. Quality and condition entities important in marketing operations; size determinants, methods of packing, market containers, varieties, areas of production and time of harvest for major fruits and vegetables. 2 lectures, 1 laboratory. Prerequisite: Path 223

SI 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, habits; means of control and exclusion; pesticides registered for use in controlling these pests; related laws and regulations. 2 lectures, 1 laboratory. Prerequisite: Ent 126. Offered odd-numbered years.

SI 333 Household Pests (3)

A continuation of SI 332 to include pests existing as nuisances in homes or other enclosures of occupancy, dooryard pests, and pests attacking man and domestic animals, including pets, poultry, and wild animals whose ectoparasites also attack man. 2 lectures, 1 laboratory. Prerequisite: Ent 126. Offered odd-numbered years.

SI 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 laboratory. Prerequisite: Ent 126. Offered even-numbered years.

SI 336 Beekeeping (3)

Care, management, and manipulation of bees by beginners. Practical application of principles for effective establishment and maintenance of home and commercial apiaries. Recognition and control of bee diseases. Laws and regulations pertaining to beekeeping. 2 lectures, 1 laboratory. Prerequisite: Ent 126

SI 372, 373 Services and Inspection Problems (1) (1)

Breakdown of fields of employment and opportunities. Application forms, letter of application, data sheet, the interview, application followup. Speakers representing agricultural and structural pest control, agricultural chemical, crop marketing, and allied industries, and governmental agencies. 1 lecture. Prerequisite: Junior standing.

SI 419 Seed Technology (2)

Identification of agricultural, vegetable, and weed seeds; inspection methods and procedures. Technique of purity and germination tests in accordance with official procedures. California seed law and other pertinent laws and regulations. 2 lectures. Offered even-numbered years.

SI 424 Pest Control Practices (3)

Inspection methods and procedures for important insect, weed, rodent, and disease pests of major agricultural crops. How to determine when control measures are necessary and evaluation of control programs. Detection surveys. Related laws and regulations. 2 lectures, 1 laboratory. Prerequisite: Senior standing.

SI 437 Nursery Procedures and Pests (2)

Inspection techniques and procedures for nursery plants prepared and offered for sale. Identification and relative importance of pests. Control recommendations, plant tolerances to pesticides. Quarantine and shipping requirements. Related laws and regulations. 1 lecture, 1 laboratory. Offered odd-numbered years.

SI 446 Methods in Structural Pest Control (2)

Field pest control operations directed against wood destroying and household pests. 2 laboratories. Prerequisites: SI 332, 333, 334, Path 335. Offered even-numbered years.

SI 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.

SI 463 Undergraduate Seminar (2)

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

AG 400 Special Problems (1-2)

For advanced students with sufficient preparation to benefit from specialized study. According to needs and interest of student, total credit limited to 4 units with not more than 2 units in any one quarter.

ANIMAL HUSBANDRY DEPARTMENT

Department Head, Harry McLachlin

Mack Kennington

Jack Gesler
Edward Nelson

Homer Fausch

The location of the Kellogg-Voorhis Campus near the center of the commercial livestock feeding industry and the Los Angeles market, which is the leading slaughter center of the West, combines naturally with the college facilities to provide opportunities for students to obtain practical training in livestock production and management, with emphasis on feeding, marketing, and processing.

The departmental emphasis is on the commercial feeding and marketing of beef cattle with specialized offerings in meats, wool, and livestock marketing. Instruction in herd management is included. The program includes work in other closely related departments to give students the broad background necessary for successful employment.

The program provides training primarily for placement in the following fields: commercial feedlot operations, livestock marketing, meat packing, herd management, farm management, vocational agricultural teaching, and related industries.

Beef cattle, sheep, swine, and horses are maintained by the college for use in the instructional program. Meat animal breeding herds are performance tested with records maintained by students under staff supervision. Facilities for student-owned-and-operated projects are made available by the California State Polytechnic College Foundation.

CURRICULUM IN ANIMAL HUSBANDRY

Freshman	F	W	S
Elements of Beef Marketing (AH 131).....	4		
Elements of Swine Production (AH 122).....		4	
Elements of Sheep Production (AH 123).....			4
Feeds and Feeding (AH 101, 102).....		2	2
Agricultural Mechanics (AE 121, 122).....	2		2
Language Communication (Eng 104, 105, 106).....	3	3	3
Agricultural Mathematics (Math 102, 103).....	3	3	
Project Records (FM 100).....			1
Basic Biology (Bio 115).....		3	
Basic Biology Lab (Bio 145).....		2	
Health Education (PE 107).....			2
¹ Agricultural Engineering Electives.....			2
Physical Education (PE 141, 142, 143).....	½	½	½
Electives.....	3		
	15½	17½	16½
Sophomore			
Meat Animal Slaughter and Processing (AH 227).....	4		
Sheep and Wool Production (AH 232).....		4	
Feeder Cattle Production (AH 233).....			4
¹ Agricultural Engineering Electives.....		2	2
Anatomy and Physiology (VS 123).....			4
² Plant Science Elective.....	4		
Soil Science (SS 121 or 230).....	4		
Principles of Economics (Ec 201, 202).....		3	3
Genetics (Bio 303).....			3
General Zoology (Zoo 131, 132).....	4	4	
Sports Education (PE 241, 242, 243).....	½	½	½
General Bacteriology (Bact 221).....		4	
	16½	17½	16½

¹ Six units to be selected from AE 123, 131, 221, 222, 227, 240, 241.
² CP 122, 123, 333 or SS 223.

Junior	F	W	S
Market Swine Production (AH 223).....			4
³ Beef Husbandry and Improvement (AH 332).....		4	
Advanced Livestock Feeding (AH 303).....	3		
Animal Breeding (AH 304).....	3		
Animal Parasitology (VS 203).....		3	
General Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Public Speaking (Sp 201).....	2		
Farm Records (FM 321).....		3	
Growth of American Democracy (Hist 304).....			3
American Government (Pol Sc 301).....		3	
Family Relations (Psy 206).....			3
Electives.....	4		3
	16	17	17
Senior			
Senior Project (AH 461, 462).....	2	2	
Undergraduate Seminar (AH 463).....			2
⁴ Animal Husbandry Elective.....		4	
Principles of Farm Management (FM 322).....	4		
Agricultural Biochemistry (Chem 328).....	4		
Animal Nutrition (AH 402).....		3	
⁵ Economics Elective.....			3
Literature.....		3	
U.S. in World Affairs (Hist 305).....		3	
Electives.....	6	2	10
	16	17	15

DESCRIPTIONS OF COURSES IN ANIMAL HUSBANDRY

AH 101 Feeds and Feeding (2)

Identification and classification of feeds; simple use of food nutrients, protein, fat and carbohydrates; methods of preparing feeds; relative values of common feeds for each class of livestock; the use of by-product feeds. 2 lectures.

AH 102 Feeds and Feeding (2)

The digestion and utilization of feeds; feeding standards and computation of standard rations for livestock; economy in feeding, and purchasing feeds by nutritive values; important vitamins and minerals and feed sources thereof. 2 lectures. Prerequisite: AH 101

AH 122 Elements of 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 selecting correct type of hogs. 3 lectures, 1 laboratory.

AH 123 Elements of Sheep Production (4)

Sheep operations in the United States. Emphasis on breeds and adaptation to California conditions. Principles of selecting, culling, and judging sheep. Market classes and marketing of sheep. Home slaughter and carcass cuts. Factors affecting wool value. 3 lectures, 1 laboratory. Prerequisite: AH 101

AH 124 Basic Horsemanship (2)

Fundamentals of care and handling of light horses, including stabling, grooming, feeding, and equitation. Types, uses, and care of light horse equipment. 2 laboratories.

³ With approval of adviser, the student may substitute an Animal Husbandry course of equivalent value.

⁴ AH 337, 421, 422 or 423.

⁵ Economics elective to be selected from ABM 201, 303, Bus 301, FM 403.

AH 131 Elements of Beef Marketing (4)

Survey of market beef production in the United States with emphasis on Southern California. Beef cattle terms. Study of central market and functions. Grades and classes of market cattle and carcasses. Importance of byproducts. Breed characteristics. 3 lectures, 1 laboratory.

AH 223 Market Swine Production (4)

Management of the swine herd and care of pigs until weaning. Selection of feeder pigs. Feeding and managerial practices involved in developing the finished product. Market channels, cycles, production cost analysis, hog slaughter, carcass grading, and pork processing. 3 lectures, 1 laboratory. Prerequisites: AH 102, 122

AH 225 Horse Husbandry (4)

History, size and scope of light horse industry in California, with emphasis on Arabian and Thoroughbred horses. Breeds, types, and selection of light horses for popular use. Showing, marketing, and transportation methods. Feeds and pastures. Equine organizations and publications. 3 lectures, 1 laboratory. Prerequisites: AH 102, 124

AH 227 Meat Animal Slaughter and Processing (4)

Slaughter and processing of cattle, sheep, and hogs. Live animal and carcass grading and yield. Curing methods, byproducts, and consumption trends. Observation of commercial slaughterhouses. 2 lectures, 2 laboratories.

AH 230 General Animal Husbandry (4)

Selection, feeding, management of sheep, swine, and cattle and their uses in California. For non-animal husbandry majors. 3 lectures, 1 laboratory.

AH 232 Sheep and Wool Production (4)

Management of commercial sheep operations. Breeding, lambing, selection, culling, marketing, shearing, grading, packing, and judging wool. Disease and parasite control. Range management. 3 lectures, 1 laboratory. Prerequisites: AH 102, 123

AH 233 Feeder Cattle Production (4)

Grading and selection of stocker and feeder cattle; necessary margin. Factors affecting economy and efficiency of gain. Disease problems and control. Feeder production on winter range, silage, irrigated pasture, soilage, hay, byproducts. Supplemental feeding. 3 lectures, 1 laboratory. Prerequisites: AH 102, 131

AH 234 Horseshoeing (2)

Fundamentals of horseshoeing, anatomy and physiology of the horse's foot, pastern, and legs. Trimming feet, fitting and nailing shoes. Normal shoeing, corrective shoeing. 1 lecture, 1 laboratory combined.

AH 303 Advanced Livestock Feeding (3)

Nutritional requirements for maintenance, growth, fattening, reproduction and lactation. Calculation of efficient and economical rations. Sources and composition of nutrients. Biological and replacement value of feeds. Recent developments in feeding. 3 lectures.

AH 304 Animal Breeding (3)

Physiology of reproduction, application of genetics to animal breeding. Systems of mating animals, use of inbreeding, crossbreeding, and selection as applied to farm animals. 3 lectures.

AH 326 Livestock Judging (2)

Training in selection of beef cattle, sheep, swine, and horses according to breed, type, and use. 2 laboratories. Prerequisite: Junior standing.

AH 329 Advanced Horse Husbandry (4)

Techniques in training young horses. Care and management of mare and stallion during breeding season. Breeding and herd records. Fitting and showing. Show management. 3 lectures, 1 laboratory. Prerequisite: AH 124

AH 332 Beef Cattle Husbandry and Improvement (4)

Feeding and managing the breeding herd. Investment requirements and cost of production. Equipment, disease problems, and selection. Recordkeeping and performance testing. Fitting and marketing sale cattle. Breeding systems and bloodlines. 3 lectures, 1 laboratory.

AH 337 Wool Technology and Marketing (4)

Study of factors which determine commercial value of fleeces. Emphasis on clean fleece weight for grade and relative importance of quality, length, soundness, purity, crimp, color, and condition. Detailed study of markets and wool marketing. Management practices affecting wool value. 2 lectures, 2 laboratories. Prerequisite: AH 232

AH 338 Wool Judging (2)

Training in judging and scoring fleeces on the basis of grade, class, yield, quality, etc. Preparation for intercollegiate judging contests. 2 laboratories. Prerequisite: AH 232

AH 402 Animal Nutrition (3)

The metabolism of proteins, carbohydrates, fats, minerals, and vitamins. Relationship of proper nutrition to livestock production. 3 lectures. Prerequisites: AH 102, Chem 328

AH 421 Meat Technology (4)

Characteristics of meat and meat products as related to processing operation, manufacture, and marketing. 3 lectures, 1 laboratory. Prerequisites: AH 227, Chem 326

AH 422 Commercial Feedlot Operations (4)

Management of the commercial feedlot. Selection of feeder cattle; procurement of feedstuffs; economical rations; disease control; livestock and equipment financing; recordkeeping and feeder-owner agreements; and cattle marketing. 3 lectures, 1 laboratory.

AH 423 Livestock Marketing (4)

Livestock marketing practices and procedures. Observation of the central market. Study of factors affecting livestock and meat prices. Functions of livestock marketing agencies. 2 lectures, 2 laboratories. Prerequisites: AH 131, 227. Offered even-numbered years.

AH 441 Advanced Livestock Judging (2)

Intensive practice in livestock judging in preparation for livestock judging team to compete in intercollegiate contests. 2 laboratories. Prerequisite: AH 326

AH 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.

AH 463 Undergraduate Seminar (2)

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

AG 400 Special Problems (1-2)

For advanced students with sufficient preparation to benefit from specialized study. According to needs and interest of student, total credit limited to 4 units with not more than 2 units in any one quarter.

DESCRIPTION OF COURSE IN DAIRY HUSBANDRY**DH 230 General Dairy Husbandry (4)**

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

DESCRIPTIONS OF COURSES IN VETERINARY SCIENCE**VS 123 Anatomy and Physiology (4)**

Anatomy and the related physiological functions of farm animals. 3 lectures, 1 laboratory. Prerequisites: Zoo 131, 132

VS 203 Animal Parasitology (3)

Life cycles and control of internal and external livestock parasites of economic importance to the livestock industry. 3 lectures. Prerequisite: Zoo 132

FRUIT PRODUCTION DEPARTMENT

Department Head, Albert E. Canham

Harry L. Maltby

Lloyd Newell

An industry as economically important as the California fruit industry is in constant need of the services of effectively trained men. The Fruit Production Department has designed its curriculum to meet this need.

Each student obtains actual field experience in orchard practices through the operation of college-owned fruit orchards. Various types of management programs enable students to acquire a basic foundation for citrus, avocado and deciduous fruit production. Valuable knowledge related to the handling and marketing of California fruits is made easily accessible through the college-operated citrus packinghouse and local fruit processing plants and marketing organizations.

The purpose of the fruit production program is to prepare students for such occupations as orchard operators or managers, laboratory and field technicians for public agencies and private enterprises; teachers of agriculture, and representatives of marketing organizations directly or indirectly serving the citrus and avocado industries.

CURRICULUM IN FRUIT PRODUCTION

Freshman	F	W	S
Citrus Fruit Production (CF 121, 122, 123).....	4	4	4
Language Communication (Eng 104, 105, 106).....	3	3	3
Agricultural Mathematics (Math 102, 103).....	2	3	3
Agricultural Mechanics (AE 121, 122, 123).....	2	2	2
Farm Tractors (AE 241).....	2		
Physical Education (PE 141, 142, 143).....	½	½	½
General Entomology (Ent 126).....	4		
Basic Biology (Bio 115).....		3	
Basic Biology Lab (Bio 145).....		2	
Agricultural Botany (Bot 120).....			4
Project Records (FM 100).....	1		
	16½	17½	16½
Sophomore			
Citrus Pest Control (CF 221).....	4		
* Fruit Production Courses.....	4		4
Citrus Diseases (CF 226).....			4
Fruit Propagation (CF 245, 246).....		1	1
Principles of Economics (Ec 201, 202).....		3	3
Public Speaking (Sp 201).....	2		
Sports Education (PE 241, 242, 243).....	½	½	½
Health Education (PE 107).....		2	
General Plant Pathology (Path 223).....		4	
Farm Surveying (AE 131).....	2		
Farm Power (AE 227).....		2	
Farm Machinery (AE 221).....			2
Soils (SS 121).....	4		
Soil Management (SS 122).....		4	
Electives.....			3
	16½	16½	17½

* Eight units to be selected from the following courses: CF 222, CF 223, FP 131, FP 132, FP 136, FP 231.

	F	W	S
Junior			
Citrus and Avocado Marketing (CF 301).....	3		
Packinghouse Management (CF 322).....		4	
General Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Report Writing (Eng 301).....		3	
American Government (Pol Sc 301).....		3	
Irrigation (AE 240).....	4		
Fertilizers (SS 221).....			4
Farm Records (FM 321).....	3		
Principles of Farm Management (FM 322).....			4
Electives.....	3	3	4
	<hr/>	<hr/>	<hr/>
	17	17	16
Senior			
Orchard Management (CF 323).....			4
Senior Project (CF 461, 462).....	2	2	
Undergraduate Seminar (CF 463).....			2
Growth of American Democracy (Hist 304).....	3		
Plant Physiology (Bot 322).....		3	
Genetics (Bio 303).....		3	
Literature (Eng 212).....			3
Family Relations (Psy 206).....	3		
U.S. in World Affairs (Hist 305).....			3
Agricultural Biochemistry (Chem 328).....	4		
Electives.....	4	8	3
	<hr/>	<hr/>	<hr/>
	16	16	15

DESCRIPTIONS OF COURSES IN FRUIT PRODUCTION

CF 121 Citrus Fruit Production (4)

Methods used in operating commercial citrus orchards. Adaptation of operations to California conditions, economic importance of industry, selection of orchard site, pest control, irrigation methods and practices. 3 lectures, 1 laboratory.

CF 122 Citrus Fruit Production (4)

Frost and wind protection methods, rootstalk selection and performance. Commercial varieties of citrus grown in California. Selection, planting, and care of young trees. 3 lectures, 1 laboratory.

CF 123 Citrus Fruit Production (4)

Cultural operations, including fertilization, pruning, disease control, and soil management. Propagation of citrus including nursery methods, topworking, harvesting and marketing of citrus. 3 lectures, 1 laboratory. Prerequisite: Bio 115, 145

CF 221 Citrus Pest Control (4)

Recognition of citrus pests, damage, seasonal habits in relation to control. Control methods and materials. Spray equipment operation, and soil fumigation. 3 lectures, 1 laboratory. Prerequisites: Ent 126, CF 121

CF 222 Avocado Production (4)

Origin and culture of the avocado. Industry development, selection of orchard site, orchard development and planting, climatic tolerances, irrigation, and fertilization. 3 lectures, 1 laboratory.

CF 223 Avocado Production (4)

Propagation, pruning, and tree training of the avocado. Established and experimental varieties adapted to commercial production, pests and diseases of the avocado and their control. 3 lectures, 1 laboratory. Prerequisites: Bio 115, 145, Ent 126

CF 226 Citrus Diseases (4)

Diseases of citrus under California conditions, their symptoms and methods of control. 3 lectures, 1 laboratory. Prerequisites: Path 223, CF 122

CF 245 Fruit Propagation (1)

Nursery propagation of fruit plants. Budding, tip grafting, cuttings, and propagation, seedbed preparation, planting seedlings, care and management of the nursery. 1 laboratory. Prerequisite: Bio 115, 145

CF 301 Citrus and Avocado Marketing (3)

Present-day practices in marketing citrus and avocados. Organization of co-operatives and private corporations and their functions in the assembling, processing, and transportation of fruit; types of sales, merchandising, advertising, and marketing costs. 3 lectures. Prerequisites: CF 123, 223

CF 322 Packinghouse Management (4)

Management of citrus and avocado packinghouses in relation to harvesting, pooling systems, marketing agreements and prorates, processing and packing, storage and precooling, grower and labor relations. 3 lectures, 1 laboratory. Prerequisites: CF 123, 226

CF 323 Citrus and Avocado Orchard Management (4)

Factors of management affecting efficient operation of citrus and avocado orchards. Effect of orchard operations and practices on production and quality of fruit. 3 lectures, 1 laboratory. Prerequisites: CF 221, 223, 226

CF 425 Fruit Storage (2)

Storage of fresh fruits, factors affecting the health and vigor of fresh fruits under various conditions. Respiration and maturity changes and determinations of fruit in storage. 1 lecture, 1 laboratory. Offered odd-numbered years.

CF 426 Citrus and Avocado Products (3)

Products manufactured from citrus and avocados. Use, methods of manufacture, chemistry involved in processing, and the position of this field in relation to the citrus and avocado industry. 2 lectures, 1 laboratory. Prerequisites: Chem 326, CF 322

CF 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. Prerequisite: Senior standing.

CF 463 Undergraduate Seminar (2)

Intensive study of the problems and new developments in the operation and management of citrus and avocado orchards. Critical study of the economics of these industries. 2 lectures. Prerequisite: Senior standing.

FP 131 Pomology (4)

Commercial deciduous fruits and nuts. Varieties, production areas, seasonal cultural practices and problems. 3 lectures, 1 laboratory.

FP 132 Subtropical Fruits (4)

Subtropical fruits including the date, olive, fig, papaya, cherimoya, mango, Macadamia nut, carob, for commercial planting in Southern California. Climatic and cultural requirements, fruiting and growth habits, varietal characteristics, and propagation. 3 lectures, 1 laboratory. Prerequisite: Bio 115, 145. Offered odd-numbered years.

FP 136 Small Fruit Production (4)

Small fruits grown commercially in California. Specialized berry culture, varieties, production areas, propagation, training, pruning, pest control, cultural practices, and harvesting. 3 lectures, 1 laboratory. Offered odd-numbered years.

FP 230 General Fruit Production (4)

Common orchard practices in producing certain deciduous, citrus, avocados, and other subtropical fruits. Varieties, areas, propagation, planting, pruning, disease and pest control for home and commercial plantings. For students other than fruit production majors. 3 lectures, 1 laboratory. Offered even-numbered years.

FP 231 Grape Production (4)

Producing, processing, and marketing of raisin, table, and wine grapes. 3 lectures, 1 laboratory. Offered even-numbered years.

AG 400 Special Problems (1-2)

For advanced students with sufficient preparation to benefit from specialized study. According to needs and interest of student. Total credit limited to 4 units, with not more than 2 units in any one quarter. Prerequisite: Advanced standing.

GENERAL CROPS DEPARTMENT

Department Head, Robert L. Procsal

Jerry Fullerton

Fredrick D. Pettem

Milton R. White

The primary function of this department is to prepare students for commercial production of vegetable and field crops.

The college offers training on a campus with soil and climatic conditions typical of Southern California. In addition the campus is located near Los Angeles, one of the world's largest vegetable markets.

The type of training offered not only prepares students for specific enterprise production but also qualifies them for positions in certain allied fields, including farm management, fertilizer and pest control industries, marketing and processing, and agencies of the state and federal governments.

Students are offered opportunities to develop and care for commercial vegetable and field crop plantings of their own on the college's 300 acres of cultivated land. A modern packing unit and nursery facilities are located on the campus for student use. Financial assistance is available through the college foundation so that individual students may participate in "learn by doing" and "earn while learning" experiences.

CURRICULUM IN GENERAL CROP PRODUCTION

Freshman	F	W	S
Cereal Crops (CP 122).....	4		
Field Crops (CP 121).....		4	
Weeds and Weed Control (CP 133).....			4
Project Records (FM 100).....	1		
Agricultural Mechanics (AE 121, 122, 123).....	2	2	2
Farm Tractors (AE 241).....	2		
Basic Biology (Bio 115).....	3		
Basic Biology Lab (Bio 145).....	2		
Agricultural Botany (Bot 120).....		4	
General Entomology (Ent 126).....			4
Language Communications (Eng 104, 105, 106).....	3	3	3
Agricultural Mathematics (Math 102, 103).....		3	3
Physical Education (PE 141, 142, 143).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<u>17$\frac{1}{2}$</u>	<u>16$\frac{1}{2}$</u>	<u>16$\frac{1}{2}$</u>
Sophomore			
Vegetable Crop Production (TC 225, 226).....	4		4
Harvesting and Packaging Vegetables (TC 224).....		4	
Soils (SS 121).....	4		
Soil Management (SS 122).....		4	
Fertilizers (SS 221).....			4
Farm Surveying (AE 131).....	2		
Farm Power (AE 227).....		2	
Farm Machinery (AE 221).....			2
General Plant Pathology (Path 223).....		4	
Principles of Economics (Ec 201, 202).....	3	3	
Public Speaking (Sp 201).....			2
Family Relations (Psy 206).....			3
Health Education (PE 107).....	2		
Sports Education (PE 241, 242, 243).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<u>15$\frac{1}{2}$</u>	<u>17$\frac{1}{2}$</u>	<u>15$\frac{1}{2}$</u>

	F	W	S
Junior			
Irrigation (AE 240).....	4		
Crop Technology (CP 222).....		4	
Irrigated Pastures (CP 333).....			4
Genetics (Bio 303).....	3		
Farm Records (FM 321).....	3		
Principles of Farm Management (FM 322).....			4
General Inorganic Chemistry (Chem 324, 325).....	4	4	
Organic Chemistry (Chem 326).....			4
Literature.....		3	
American Government (Pol Sc 301).....			3
Electives.....	3	4	2
	<hr/>	<hr/>	<hr/>
	17	15	17
Senior			
Seed Production (CP 331).....	4		
Crop Pest Control (CP 321).....	4		
Crop Farm Operations (CP 337).....		3	
Plant Breeding (CP 304).....			3
Growth of American Democracy (Hist 304).....	3		
Agricultural Biochemistry (Chem 328).....		4	
* Economics.....		3	
U.S. in World Affairs (Hist 305).....			3
Senior Project (CP 461, 462).....	2	2	
Undergraduate Seminar (CP 463).....			2
Electives.....	4	4	9
	<hr/>	<hr/>	<hr/>
	17	16	17

DESCRIPTIONS OF COURSES IN GENERAL CROPS

CP 121 Field Crops (4)

Growing of California field crops other than cereals, such as row-planted 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 laboratory.

CP 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 laboratory.

CP 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 laboratory.

CP 133 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 laboratory.

CP 222 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 laboratory. Prerequisites: CP 121, 122, TC 224

CP 230 General Field Crops (4)

Production, harvesting, and use of important California cereal and field crops. Production areas, varieties, disease, and pest control. 3 lectures, 1 laboratory.

CP 304 Plant Breeding (3)

Principles and techniques of improving ornamental and agronomic plants. 2 lectures, 1 laboratory. Prerequisite: Bio 303

* To be selected from advanced economics or management and sales courses with the approval of the adviser.

CP 321 Crop Pest Control (4)

Methods of recognizing and combating insect pests, plant diseases, and rodents attacking commercial vegetable and field crops. Sprays, dusts, fumigants, and poisons, as well as cultural and sanitation practices of control. 3 lectures, 1 laboratory. Prerequisites: Bot 120, Path 223, Ent 126

CP 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 laboratory. Prerequisites: CP 121, 122, 133, TC 226

CP 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 laboratory.

CP 337 Crop Farm Operation (3)

Operation of commercial vegetable and field crop acreages. Land preparation, cultivation, planting, fertilization, and pest control. Familiarity with more specialized farm equipment. 2 lectures, 1 laboratory. Prerequisites: CP 121 or 122, TC 224 or 225

CP 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.

CP 463 Undergraduate Seminar (2)

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

DESCRIPTIONS OF COURSES IN TRUCK CROPS PRODUCTION**TC 224 Harvesting and Packaging Truck Crops (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 laboratory.

TC 225 Vegetable Crop Production (4)

Production of vegetables grown in the cooler seasons of the year. The major crops and producing areas of California. Project in crop production. 3 lectures, 1 laboratory.

TC 226 Vegetable Crop Production (4)

Production of vegetables of major economic value grown in the warmer seasons of the year. Manual application of production techniques on college owned acreage. 3 lectures, 1 laboratory.

TC 230 General Truck Crops (4)

Principles of production, harvesting, and marketing of major truck crops grown in California. Specific production problems relating to areas. 3 lectures, 1 laboratory.

AG 400 Special Problems (1-2)

For advanced students with sufficient preparation to benefit from specialized study. According to needs and interest of student, total credit limited to 4 units with not more than 2 units in any one quarter.

ORNAMENTAL HORTICULTURE DEPARTMENT

Department Head, Oliver A. Bacheller

Warren Asa

James L. Degen

James M. Griffin

Howard O. Boltz

Jere S. French

Richard A. Moore

The Ornamental Horticulture Department offers two majors: Ornamental Horticulture and Landscape Architecture. The Ornamental Horticulture major provides opportunity for specialization in two areas—one emphasizes the nursery-growing field, and the other landscape contracting.

The function of the nursery growing aspect of the program is to prepare students for positions in the ornamental horticulture industry. Students in their first year get practical experience in the skills and knowledge that will make them immediately valuable to their employers. Class and individual projects give a down-to-earth slant on the instructional material. Student project owners receive a share of the profits. Graduates are prepared for positions in general nursery work, specialized growing, greenhouse management, and flower production.

The landscape contracting aspect of the program trains individuals in the management-construction field of the landscape industry. As landscape contractors they may establish their own business, or secure employment with landscape contracting firms as supervisors, estimators, landscape salesmen, or construction foremen. Graduates are also trained for management positions with park departments, public institutions, or private estates.

The major in Landscape Architecture prepares individuals for the design-architecture area of the landscape industry. As graduate landscape architects they have a broad choice of positions: they may establish their own private offices or take employment with firms of landscape architects preparing plans and specifications, supervising construction and planting for residential developments.

The 800-acre campus is a valuable outdoor laboratory for students in both majors. Those in ornamental horticulture grow plant material for use on the campus, and flowers for the college rose parade float. They also grow and sell cut flowers, pot plants, and nursery stock. Student salesmen learn how to meet customers and sell their products. The campus is used for class problems in landscape design, landscape construction and contracting, thus providing live problems and valuable practical experience upon which the more theoretical knowledge acquired later in the curriculum can build.

Field trips in both majors take advantage of the close proximity to the nation's leading ornamental horticulture and landscaping industries in Southern California. Here well designed residential gardens and large commercial landscape developments are observed and students visit many retail and large-scale growing operations.

The rapid expansion of population in California has resulted in an increased demand for the services of landscape architects, contractors, and nurserymen. Part-time employment in all these areas after one or two years of training, provides valuable experience and supplementary income.

CURRICULUM IN ORNAMENTAL HORTICULTURE

Freshman	F	W	S
Basic Horticulture (OH 131).....	4		
Ornamental Shrubs (OH 122).....		4	
* Nursery Practices (OH 121).....			4
Language Communication (Eng 104, 105, 106).....	3	3	3
Agricultural Mathematics (Math 102, 103).....		3	3
Landscape Construction (AE 124, 125).....	2	2	
Electricity and Plumbing (AE 122).....			2
Physical Education (PE 141, 142, 143).....	½	½	½
Health Education (PE 107).....	2		
† Basic Biology (Bio 115).....	3		
† Basic Biology Lab (Bio 145).....	2		
† Agricultural Botany (Bot 120).....		4	
† General Entomology (Ent 126).....			4
‡ Project Records (FM 100).....	1		
	17½	16½	16½
Sophomore			
* Specialized Plant Propagation (OH 222).....		4	
Ornamental Trees (OH 221).....	4		
* Principles of Landscape Design (LA 224).....	4		
Landscape Design of Small Homes (LA 225).....		4	
Herbaceous Landscape Plants (OH 321).....			4
Principles of Economics (Ec 201, 202).....	3	3	
Sales of Agricultural Commodities (ABM 202).....			3
Farm Tractors (AE 241).....			2
Soils (SS 121).....		4	
Farm Surveying (AE 131).....		2	
Public Speaking (Sp 201).....	2		
† General Plant Pathology (Path 223).....	4		
Sports Education (PE 241, 242, 243).....	½	½	½
Literature.....			3
‡ Electives.....			4
	17½	17½	16½
Junior			
* Flower Shop Operation (OH 339).....			4
* Greenhouse Design and Management (OH 323).....		4	
* Commercial Cut-flower Growing (OH 334).....	4		
* Diseases and Pests of Ornamental Plants (OH 327).....			4
‡ Farm Records (FM 321).....	3		
American Government (Pol Sc 301).....		3	
General Inorganic Chemistry (Chem 324, 325).....	4	4	
* Organic Chemistry (Chem 326).....			4
Fertilizers (SS 221).....			4
Family Relations (Psy 206).....		3	
* Planting Design (LA 226).....	3		
‡ Electives.....	3	2	
	17	16	16

* Students specializing in landscape contracting will delete the courses marked * and will substitute the following: Freshman (LA 141, 142, 143) Sophomore (AE 132, LA 226) Junior (LA 338, 339, OH 329, SS 122, PSc 209) Senior (OH 333, 335, LA 331, 332).

† Students specializing in landscape contracting will select 12 units of Biological Science from those marked †.

‡ Students specializing in landscape contracting will select a minimum of 15 units from business administration and management courses subject to approval of the departmental advisor.

Senior	F	W	S
† Genetics (Bio 303)			3
* Agricultural Biochemistry (Chem 328)		4	
* Fruit Production (FP 230 or 136)	4		
Undergraduate Seminar (OH 463)			2
Senior Project (OH 461, 462)	2	2	
Economics (FM 304, 403 or Bus 301)	3		
Growth of American Democracy (Hist 304)		3	
U.S. in World Affairs (Hist 305)			3
‡ Electives	7	7	8
	<hr/>	<hr/>	<hr/>
	16	16	16

CURRICULUM IN LANDSCAPE ARCHITECTURE

Freshman			
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	1/2	1/2	1/2
Health Education (PE 107)	2		
Ornamental Shrubs (OH 122)		4	
Landscape Construction (AE 124, 125)	2	2	
Electricity and Plumbing (AE 122)			2
Basic Biology (Bio 115)	3		
Basic Biology Demonstration (Bio 116)	1		
Agricultural Mathematics (Math 102, 103)		3	3
Basic Horticulture (OH 131)			4
Landscape Drafting (LA 141)	3		
Theory of Design (LA 142, 143)		3	3
Electives	3	1	1
	<hr/>	<hr/>	<hr/>
	17 1/2	16 1/2	16 1/2
Sophomore			
Basic Landscape Design (LA 228, 229)		4	4
Ornamental Trees (OH 221)	4		
Herbaceous Landscape Plants (OH 321)			4
Perspective (LA 241)	2		
Delineation (LA 242, 243)		2	2
General Physical Science (PSc 101, 102, 103)	4	4	4
Principles of Economics (Ec 201, 202)	3	3	
Sports Education (PE 241, 242, 243)	1/2	1/2	1/2
Farm Surveying (AE 131, 132)		2	2
Modern Literature (Eng 211)	3		
Electives	1	1	1
	<hr/>	<hr/>	<hr/>
	17 1/2	16 1/2	17 1/2
Junior			
Intermediate Landscape Design (LA 324, 326)		4	4
Landscape Construction Drawing (LA 338, 339)	4		4
Planting Design (LA 226)	3		
Native Plant Materials (OH 336)			3
Farm Records (FM 321)		3	
Public Speaking (Sp 201)	2		
Advanced Public Speaking (Sp 303)		2	
Soils (SS 121)		4	
Fertilizers (SS 221)			4
Family Relations (Psy 206)	3		
American Government (Pol Sc 301)	3		
Electives	1	3	2
	<hr/>	<hr/>	<hr/>
	16	16	17

* Students specializing in landscape contracting will delete the courses marked * and will substitute the following: Freshman (LA 141, 142, 143) Sophomore (AE 132, LA 226) Junior (LA 338, 339, OH 329, SS 122, PSc 209) Senior (OH 333, 335, LA 331, 332).

† Students specializing in landscape contracting will select 12 units of Biological Science from those marked †.

‡ Students specializing in landscape contracting will select a minimum of 15 units from business administration and management courses subject to approval of the departmental advisor.

Senior	F	W	S
Advanced Landscape Design (LA 434, 435, 436).....	4	4	4
History and Literature of Landscape Architecture (LA 424) ..	3		
Landscape Contracting (LA 331, 332).....	4	4	
Turf Maintenance and Management (OH 333).....			4
Senior Project (LA 461, 462).....	2	2	
Undergraduate Seminar (LA 463).....			2
Business Law (Bus 301).....		3	
Growth of American Democracy (Hist 304)		3	
U.S. in World Affairs (Hist 305).....			3
Business Statements (Bus 212).....			1
Electives	3		1
	<hr/>	<hr/>	<hr/>
	16	16	15

DESCRIPTIONS OF COURSES IN ORNAMENTAL HORTICULTURE

OH 121 Nursery Practices (4)

Commercial nursery operations. Propagation, nursery layout, seed sowing, transplanting, potting, canning, fertilizing, irrigation, and pest control. Bedding plants, hot plants, trees and shrubs. 3 lectures, 1 laboratory.

OH 122 Ornamental Shrubs (4)

Broadleaf shrubs and vines used in California. Identification, habits of growth, cultural requirements, and landscape use. 3 lectures, 1 laboratory.

OH 131 Basic Horticulture (4)

The basic skills of horticulture. Techniques and plans for their use in the gardening and nursery trade. 3 lectures, 1 laboratory.

OH 221 Ornamental Trees (4)

Broadleaf trees grown and used in California. Identification, habits of growth, cultural requirements, and landscape use. 3 lectures, 1 laboratory.

OH 222 Specialized Plant Propagation (4)

Commercial specialized propagation including all types of grafting, budding, layerage, inarching, separations, divisions, and cuttings. Flask seeding. Use of the college facilities and frequent field trips to wholesale growers. 3 lectures, 1 laboratory. Prerequisites: OH 131, 122, Bot 120

OH 321 Herbaceous Landscape Plants (4)

The identification, habits of growth, and landscape uses of ornamental annuals and herbaceous perennials commonly grown for California landscape. 3 lectures, 1 laboratory. Prerequisites: OH 121, 122

OH 323 Greenhouse Design and Management (4)

Construction, maintenance, and management of forcing structures. Growing of commercial flower crops under glass, lath, and cloth. Experience in greenhouse watering, fertilizing, and pest control operations. 3 lectures, 1 laboratory. Prerequisites: OH 122, 221, 222

OH 327 Diseases and Pests of Ornamental Plants (4)

The effect of diseases and pests on ornamental plants found in nurseries, greenhouses, and commercial cut flowers. Their identification, control, and prevention. Field trips to the production areas to study field conditions. 3 lectures, 1 laboratory. Prerequisites: OH 122, 221, Ent 126, Path 223

OH 329 Tree Surgery (3)

Instruction and practice in the use of safety lines; in the fertilizing, trimming, bracing, cabling, repair, and maintenance of ornamental trees. 2 lectures, 1 laboratory. Prerequisites: OH 131, 221

OH 333 Turf Maintenance and Management (4)

Practice in the maintenance and management of turf areas, including such specialized areas as golf greens, athletic fields, and park lawns. 3 lectures, 1 laboratory. Prerequisites: OH 131, SS 221

OH 334 Commercial Cut-flower Growing (4)

Planting, cultural care, pest control, harvesting, storage, and marketing of cut flowers. Field trips to nearby production centers and the flower market. 3 lectures, 1 laboratory. Prerequisites: OH 131, 122, 222

OH 335 Park and Estate Management (3)

Planning, scheduling, and operational techniques applicable to the maintenance of grounds in public and private parks and estates. 2 lectures, 1 laboratory. Prerequisites: OH 131, 221, 321, LA 224, 226

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 laboratory.

OH 339 Flower Shop Operation (4)

The operations of a retail florist shop. History and background, selection of location, layout and arrangement, equipment and supplies, policies and management, buying and selling. 3 lectures, 1 laboratory.

OH 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.

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.

AG 400 Special Problems (1-2)

For advanced students with sufficient preparation to benefit from specialized study. According to needs and interest of student, total credit limited to 4 units with not more than 2 units in any one quarter.

DESCRIPTIONS OF COURSES IN LANDSCAPE ARCHITECTURE**LA 141 Landscape Drafting (3)**

Drafting techniques and standards, progressing from tracings to light-construction working drawings. 3 laboratories.

LA 142, 143 Theory of Design (3) (3)

Studies in form, space, color, and materials, and their relation to three-dimensional problems. 2 lectures, 1 laboratory.

LA 224 Principles of Landscape Design (4)

Basic principles of design and the application of these principles in the solving of landscape design problems. For nonmajors. 2 lectures, 2 laboratories.

LA 225 Landscape Design of Small Homes (4)

Adaptation of landscape design principles to the garden layout of residential properties. For nonmajors. 2 lectures, 2 laboratories.

LA 226 Planting Design (3)

The proper association of plant materials according to texture, color, and mass. The techniques involved in their grouping, arranging, and planting about buildings. 2 lectures, 1 laboratory. Prerequisites: OH 122, 221, 321, LA 225

LA 228, 229 Basic Landscape Design (4) (4)

Fundamental concepts in the analysis and solution of site problems. 2 lectures, 2 laboratories. Prerequisites: LA 142, 143

LA 241 Perspective (2)

Mechanical and sketching perspective. 2 laboratories.

LA 242, 243 Delineation (2) (2)

Two-dimensional representation of three-dimensional subjects using different media which enable a student to express his ideas visually. 2 laboratories. Prerequisite: LA 241

LA 324, 326 Intermediate Landscape Design (4) (4)

The application of design concepts and principles to increasingly more difficult problems: Parks, schools, golf courses, subdivisions and other large scale specialized projects. 1 lecture, 3 laboratories. Prerequisites: LA 229, 243, 338

LA 331, 332 Landscape Contracting (4) (4)

Practice in supervising men and applying approved techniques in landscape construction. Cost finding and estimating, contract and specification writing, and legal aspects of the landscape industry. 3 lectures, 1 laboratory. Prerequisite: LA 338

LA 338 Landscape Construction Drawing (4)

Construction problems involving the formulation and preparation of plans for grading, drainage and irrigation staking, and other working drawings including the writing of specifications. 2 lectures, 2 laboratories. Prerequisites: Math 103, AE 122, 132

LA 339 Landscape Construction Drawing (4)

Detailed construction drawings of walls, walks and surfacing, gates and fences, pools, barbecues, shelters, and other garden structures. 2 lectures, 2 laboratories. Prerequisite: LA 338

LA 424 History and Literature of Landscape Architecture (3)

The relationship of religious, economic, and social conditions; topography and climate to the landscape architecture of the major nations at various times and places. The contributions of the literature, and landscape designers of note to the field of landscape architecture. 2 lectures, 1 laboratory.

LA 434, 435, 436 Advanced Landscape Design (4) (4) (4)

A study of the relationship of buildings and building groups to irregular topography and the further long-range growth and development of the land and elements thereon. The writing of specifications. 1 lecture, 3 laboratories. Prerequisite: LA 326

LA 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.

LA 463 Undergraduate Seminar (2)

Methods and developments, practices and procedures in the field. 2 lectures.

AG 400 Special Problems (1-2)

For advanced students with sufficient preparation to benefit from specialized study. According to needs and interest of student, total credit limited to 4 units with not more than 2 units in any one quarter.

SOIL SCIENCE DEPARTMENT

Department Head, Harry V. Welch, Jr.
Walter Hesse

The functions of this department are to provide training in soil science for students in the Agricultural Division enrolled in other majors and to prepare students in the occupational fields of soils, conservation, range management, education, and farming. Courses in soil science have been developed with lecture, laboratory, and field coverage to provide fundamental knowledge of the subject and its application in agricultural production.

Completion of the four-year curriculum entitles the graduate to a bachelor of science degree in soil science. The last two years of the curriculum are offered only at San Luis Obispo.

Facilities of the department have been expanded to provide sufficient laboratory space and equipment to meet the needs of the program. The application of soil management practices on the college farm is utilized to the fullest possible extent in the study of methods for putting soil knowledge to work. Work of outstanding value on nearby ranches and that being carried on by public agencies is also widely utilized.

CURRICULUM IN SOIL SCIENCE

Freshman	F	W	S
Soils (SS 121)	4		
Range Management (SS 223)		4	
California Soils (SS 133)			3
Forage Crops (CP 121)		4	
Agricultural Mechanics (AE 121)		2	
Language Communication (Eng 104, 105, 106)	3	3	3
Agricultural Mathematics (Math 102, 103)		3	3
Physical Education (PE 141, 142, 143)	½	½	½
Health Education (PE 107)			2
Basic Biology (Bio 115)	3		
Basic Biology Lab (Bio 145)	2		
Agricultural Botany (Bot 120)			4
Electives	3		
	<hr/> 15½	<hr/> 16½	<hr/> 15½
Sophomore			
Fertilizers (SS 221)	4		
Soil Management (SS 122)		4	
Soil Conservation (SS 222)			3
General Plant Pathology (Path 223)		4	
Public Speaking (SP 201)	2		
General Fruit Production (FP 230)	4		
Surveying (AE 131)		2	
Farm Tractors (AE 241)			2
Principles of Economics (Ec 201, 202)	3	3	
Sports Education (PE 241, 242, 243)	½	½	½
General Entomology (Ent 126)			4
General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Geology (PSc 209)			3
	<hr/> 17½	<hr/> 17½	<hr/> 16½

	F	W	S
Junior (San Luis Obispo)			
Soil Classification (SS 321).....	4		
Soil Fertility (SS 322).....		3	
Range Technology (SS 332).....			3
Irrigation (AE 240).....			4
Literature.....	3		
Mathematics (Math 114, 115).....	3	3	
Farm Records (FM 321).....			3
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
General Bacteriology (Bact 221).....		4	
Agricultural Biochemistry (Chem 328).....		4	
General Animal Husbandry (AH 230).....	4		
* Electives.....			7
	<hr/>	<hr/>	<hr/>
	17	17	17
Senior (San Luis Obispo)			
Farm Management I (FM 322).....	4		
† Economics Elective.....		3	
U.S. in World Affairs (Hist 305).....		3	
Family Relations (Psy 206).....			3
Senior Project (SS 461, 462).....	2	2	
Undergraduate Seminar (SS 463).....			2
Soil Microbiology (SS 422).....			4
Soil Chemistry (SS 423).....		3	
Soil Physics (SS 432).....	4		
* Electives.....	6	6	6
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	16	17	15

DESCRIPTIONS OF COURSES IN SOIL SCIENCE

SS 121 Soils (4)

Physical, chemical, and biological properties of soils as related to agriculture. 3 lectures, 1 laboratory.

SS 122 Soil Management (4)

Effect of tillage, manuring, drainage, and irrigation practices on soil productivity. 3 lectures, 1 laboratory. Prerequisite: SS 121

SS 133 California Soils (3)

Origin, formation, and composition of California soils. Interpretation and utilization of soil survey and other data in crop production. 2 lectures, 1 laboratory. Prerequisite: SS 121. Offered odd-numbered years.

SS 221 Fertilizers (4)

Composition, value, and use of fertilizer materials and soil correctives. Methods employed in the manufacture, distribution, and application of fertilizers. 3 lectures, 1 laboratory. Prerequisite: SS 121

SS 222 Soil Conservation (3)

Climate, topography, soils and land use in relation to soil and water losses. Evaluation of soil and water conservation programs and practices. 2 lectures, 1 laboratory. Prerequisite: SS 121. Offered even-numbered years.

* Students electing to specialize in Soil Conservation must select 16 units from the following courses: AH 101, 102, Bot 322, CP 321, DH 230, Eng 301, PH 230, and SS 323, 433.
Students electing to specialize in the more technical aspects of Soils must select 16 units from the following courses: Bot 322, Chem 331, 332, Eng 301, Math 118, Phys 121, 122, and SS 433.

† Economics elective to be selected from FM 304, 305, 310, 403, Ec 213, and FM 421 or 425.

SS 223 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 laboratory. Prerequisite: SS 121 or SS 230

SS 230 General Soils (4)

General properties of soils including common soil management, fertility, and conservation practices. Nonsoils majors. 3 lectures, 1 laboratory.

SS 231 Advanced Soil Management (3)

Soil and water problems affecting the production of crops. Methods of studying these problems and recent advances in soil and water management. 2 lectures, 1 laboratory. Prerequisites: SS 122, 221

RELATED AGRICULTURAL COURSES

In addition to courses within major departments of study, courses in agricultural mechanics are necessary to provide adequate training for practical applications of the major field of study.

DESCRIPTIONS OF COURSES IN AGRICULTURAL ENGINEERING

Chairman, Haven Q. Conard

Warren Asa

Donald E. Kibbe

Dudley R. Smith

AE 121 Carpentry and Concrete (2)

Elements of carpentry and concrete work as applied to farm buildings and structures, concrete walks, floors, foundations, and concrete block construction. Use of both hand and power equipment. 1 lecture, 1 laboratory.

AE 122 Electricity and Plumbing (2)

Rural wiring practices, types of material used, fractional horsepower electric motor installation, soldering, water pipe selection and fitting. 1 lecture, 1 laboratory.

AE 123 Welding (2)

Elements of arc and acetylene welding of mild steel; flat horizontal, vertical, and overhead positions. Arc and acetylene cutting. Brazing and hard-facing. 1 lecture, 1 laboratory.

AE 124, 125 Landscape Construction (2) (2)

Instruction and practice in the construction techniques applicable to landscaping. 1 lecture, 1 laboratory.

AE 131 Farm Surveying (2)

Care and use of surveying equipment. Land measurement. Differential leveling. Laying out contours and ditch lines. Writing and interpreting field notes. 1 lecture, 1 laboratory. Prerequisite: Math 103

AE 132 Applied Farm Surveying (2)

Methods of plane table mapping, use of contour maps, planimeter and profiles in calculating earth yardage and reservoir capacity. Borrow pit and land leveling problems. 1 lecture, 1 laboratory. Prerequisite: AE 131

AE 221 Farm Machinery (2)

Basic principles of machines. Materials and construction. Lubrication and maintenance. Selection, operation, and adjustment of seed bed preparation equipment. Seeding, planting, harvesting, and commercial fertilizer equipment. 1 lecture, 1 laboratory. Prerequisite: AE 241

AE 227 Farm Power (2)

Internal combustion engine fundamentals, both gasoline and diesel. Troubleshooting, overhauling, and making major adjustments and repairs. 1 lecture, 1 laboratory. Prerequisite: AE 241, Math 102

AE 233 Pest Control Equipment (3)

Principles of operation of the various types of spraying, dusting, and fumigation equipment used by the structural and agricultural pest control industries. Care, adjustment, and repair of this equipment. 2 lectures, 1 laboratory. Prerequisite: AE 122

AE 240 Irrigation (4)

Fundamental principles and practices of irrigation. Soil-moisture relationships, water measurement, methods of irrigation, crop requirements, farm irrigation structures, pumps and pumping, and problems of the irrigation farmer. 3 lectures, 1 laboratory. Prerequisites: AE 131, SS 121

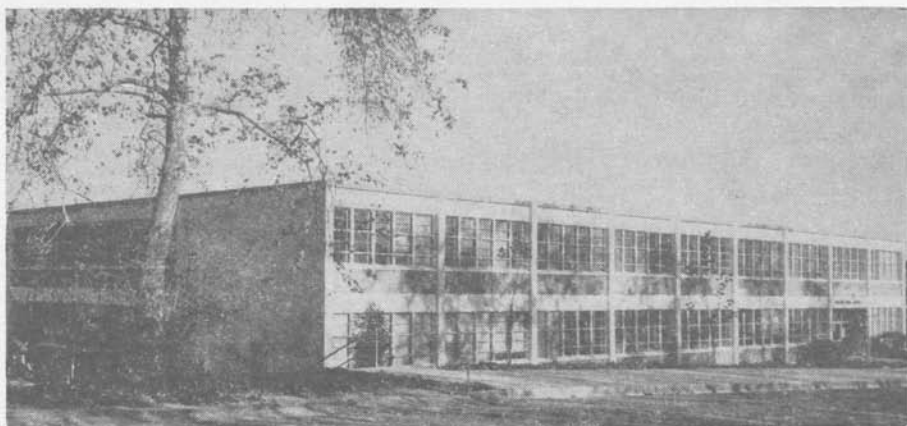
AE 241 Farm Tractors (2)

Field and shop practice in the operation, service, and adjustment of the modern farm tractor; including both wheel and track types with gasoline and diesel power units. 1 lecture, 1 laboratory.

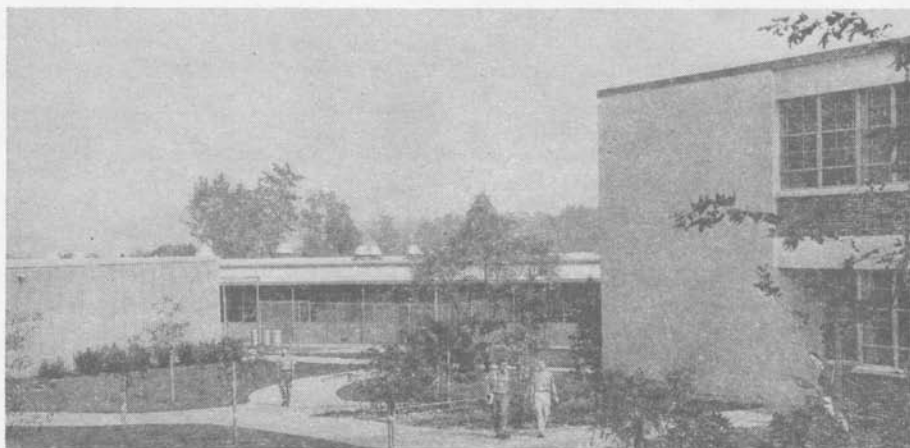
AE 244 Farm Equipment Projects (1-3)

Construction of trailers and other implements. 1 laboratory per unit. Prerequisites: AE 121, AE 123

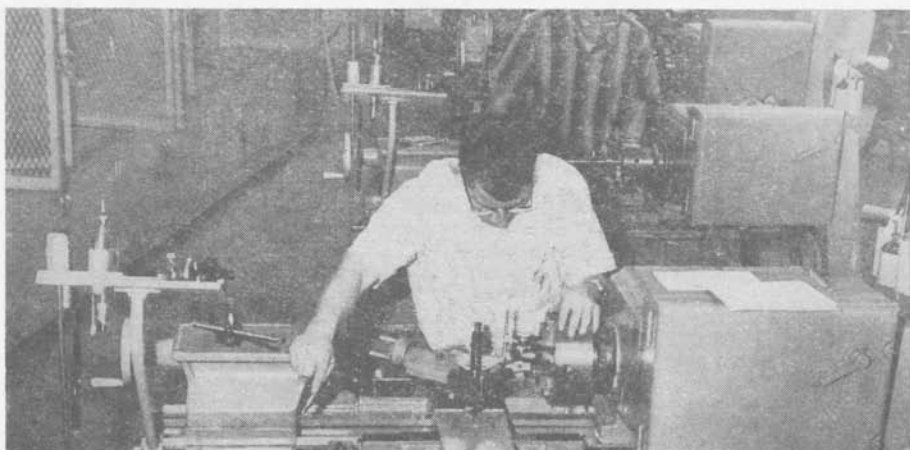
THE ENGINEERING DIVISION



Engineering Classroom Building



Engineering Center



Machine Shop

THE ENGINEERING DIVISION

The bachelor of science degree in engineering is granted in four major fields: aeronautical, electronic, industrial, and mechanical. The specific objectives of the respective majors are described in the introductory statements which precede each departmental section. However, all of the curricula have certain common objectives and characteristics.

1. They are designed to produce a well-rounded graduate who is particularly well-qualified in the engineering fields of planning, product development, production, operation, management, service, and sales.

2. They place substantial emphasis on laboratory work. Students study in close contact with actual engineering equipment in order that they may develop a natural feeling for engineering work.

3. They place substantial emphasis on personal growth and the ability to deal with people and economics as well as with equipment.

4. They utilize considerable concentration in a major field to enable students to attain a depth of knowledge in subject matter.

The curricula are taught in an atmosphere of dynamic engineering activity. Wherever possible, problems are related to actual engineering situations rather than academic exercises. This approach makes course work an exciting and challenging experience. The student finds himself faced with problems that require clear and complete thinking combined with the development of sound engineering judgment.

The resources of a growing industrial community are also utilized to provide additional atmosphere and experiences.

There is very little basic difference between the engineering curricula at San Luis Obispo and at the Kellogg-Voorhis campus. However, geographical location and minor differences in course structure and emphasis do give the student reasons for choosing one or the other campus as most suited to his individual needs. He is encouraged to consult with the administrative staff of either campus in examining the detailed basis for his choice.

It is recommended that the high school student planning a career in engineering take a balanced program including mathematics, physical science, drawing and shops.

AERONAUTICAL ENGINEERING DEPARTMENT

George R. Graves

Wallace E. Nally

The four-year curriculum in aeronautical engineering is offered to train students in the basic principles and skills required in the design, manufacture, maintenance, and testing of aircraft and their components. These basic skills have a solid foundation in mathematics, physics, mechanics, thermodynamics, and drafting.

Graduates of the Aeronautical Engineering Department find employment in many of the varied fields associated with the manufacture of military and commercial aircraft such as: design drafting, aerodynamics, stress analysis, service engineering, flight test engineering, maintenance engineering, and laboratory testing. These graduates are employed by the various aircraft and aircraft component manufacturers, airlines, government test bases and research laboratories.

Laboratories include a completely equipped low-speed wind tunnel, with a flow velocity of 250 mph available through the 32-inch by 45-inch test section; and a smoke tunnel for visual observation of flow phenomena; Schlieren apparatus is used for visually observing or photographically recording supersonic flow patterns.

The structural laboratory includes equipment for fabricating and testing a large variety of "built-up" structural shapes, including full-size aircraft components.

CURRICULUM IN AERONAUTICAL ENGINEERING

Freshman	F	W	S
Aeronautical Engineering Fundamentals (Aero 124, 125, 126)	3	3	3
Aircraft Machinery Laboratory (Aero 144, 145, 146)	1	1	1
Descriptive Geometry (ME 125)			2
Aircraft Construction Laboratory (Aero 155, 156)		1	1
Engineering Drafting (ME 121, 122)	2	2	
Machine Shop (MS 142, 144)	1	1	
Welding (Weld 144, 146)	1	1	
Mathematics for Engineers (Math 117)	5		
Analytic Geometry and Calculus (Math 118, 201)		5	3
General Physics (Phys 131)			4
Language Communication (Eng 104, 105, 106)	3	3	3
Health Education (PE 107)	2		
Physical Education (PE 141, 142, 143)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<u>18½</u>	<u>17½</u>	<u>17½</u>
Sophomore			
Aircraft Design Drafting (Aero 247, 248, 249)	2	2	2
Growth of American Democracy (Hist 304)			3
Strength of Materials (ME 202, 203)		3	3
Materials Test Laboratory (ME 249)			1
Engineering Statics (ME 201)	3		
Engineering Dynamics (ME 204, 205)		3	2
Electrical Engineering (EE 231)			3
Analytic Geometry and Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
General Physics (Phys 132, 133)	4	4	
American Government (Pol Sc 301)	3		
Principles of Economics (Ec 201)	3		
Principles of Accounting (Actg 121)		3	
Sports Education (PE 241, 242, 243)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<u>18½</u>	<u>18½</u>	<u>17½</u>
Junior			
Elementary Aerodynamics (Aero 301, 302)	3	3	
Aerodynamic Heating (Aero 304)			3
Wind Tunnel Testing (Aero 343)			2
Aircraft Stress Analysis (Aero 327, 328)	3	3	
Design Analysis (Aero 347)	2		
Aircraft Structures Laboratory (Aero 349)			2
Electrical Engineering (EE 232)	3		
Electronic Engineering (EL 222, 223)	3	3	
General Chemistry (Chem 321, 322)		4	4
Applied Biology (Bio 110)			3
Thermodynamics (ME 301)		3	
Literature	3		
Electives			3
	<u>17</u>	<u>16</u>	<u>17</u>
Senior			
Aircraft Propulsion Systems (Aero 401, 402)	3	3	
Aerodynamics (Aero 404, 405)	3	3	
Aircraft Design (Aero 444, 445, 446)	3	3	3
Aeronautical Measurements Laboratory (Aero 457, 458)	2	2	
Senior Project (Aero 461, 462)	2	2	
Undergraduate Seminar (Aero 463)			2
Senior Aeronautical Electives		3	3
Family Relations (Psy 206)			3
U.S. in World Affairs (Hist 305)			3
Electives	4	2	3
	<u>17</u>	<u>18</u>	<u>17</u>

DESCRIPTIONS OF COURSES IN AERONAUTICAL ENGINEERING**Aero 124 Aeronautical Engineering Fundamentals (3)**

The atmosphere and its effects. Application of basic engineering fundamentals to aircraft and aircraft systems. Basic theory of flight. Dimensional analysis and scientific notation. Slide rule and graphing techniques. 2 lectures, 1 laboratory. Concurrent: Math 117

Aero 125 Aeronautical Engineering Fundamentals (3)

Basic aircraft structures. Aircraft fluid systems. Aircraft flight stability. Weight and balance methods. 2 lectures, 1 laboratory. Prerequisite: Math 118. Concurrent: Aero 124

Aero 126 Aeronautical Engineering Fundamentals (3)

Aircraft electrical systems, aeronautical propulsion systems. Basic theory of rockets and introduction to space flight. 2 lectures, 1 laboratory. Prerequisite: Math 201. Concurrent: Aero 125

Aero 144 Aircraft Machinery Laboratory (1)

Basic aeronautical engineering experiments. Report writing fundamentals. Making and using graphs. Wind tunnel familiarization. Pressure, temperature, and angular velocity experiments. 1 laboratory. Concurrent: Aero 124

Aero 145 Aircraft Machinery Laboratory (1)

Basic aeronautical engineering experiments. Aircraft weight and balance experiments. Hydraulic system, fuel system, pneumatic system, and structures testing. Report writing. 1 laboratory. Concurrent: Aero 125

Aero 146 Aircraft Machinery Laboratory (1)

Basic aeronautical engineering experiments. Testing of aircraft electrical systems. Aircraft engine disassembly and reassembly. Aircraft engine testing. Environmental testing procedures. 1 laboratory. Concurrent: Aero 126

Aero 155 Aircraft Construction Laboratory (1)

Fundamentals of sheet metal fabrication of aircraft structures and components. Principles of riveting, fastening and joining aircraft structures. 1 laboratory. Prerequisite: Math 117

Aero 156 Aircraft Construction Laboratory (1)

Assembly of sheet metal components. Corrosion protection; coatings, plating, painting. Special fastening and joining techniques. Resistance welding techniques. 1 laboratory. Prerequisite: Aero 155

Aero 240 Additional Engineering Laboratory (1-2)

Elective project work. Total credit limited to four units, with not more than two units in any one quarter. 1 or 2 laboratories. Prerequisite: Permission of Instructor.

Aero 247 Aircraft Design Drafting (2)

Aircraft lofting practices. Design and layout of sheet metal details and assemblies. Preparation of standard aircraft drawings. Title block details. 2 laboratories. Prerequisite: Aero 146, 156, Math 118

Aero 248 Aircraft Design Drafting (2)

Design of machined parts, castings, forgings, extruded and rolled shapes and assemblies. Dimensioning techniques. Calculations and use of handbooks. 2 laboratories. Prerequisite: Aero 247

Aero 249 Aircraft Design Drafting (2)

Design of aircraft structural assemblies. Fastener and process callout used in the aircraft industry. Joining dissimilar structural components. 2 laboratories. Prerequisite: Aero 248

Aero 301 Elementary Aerodynamics (3)

The atmosphere, dynamics and thermodynamics of air, airspeed determinations, types of fluid flow, fluid friction, airfoil theory, wing theory, lift, induced drag, parasite drag, power. 3 lectures. Prerequisite: Math 316

Aero 302 Elementary Aerodynamics (3)

Propeller theory, propeller selection methods, aircraft propulsion methods, basic performance problems. Special performance problems. 3 lectures. Prerequisite: Aero 301

Aero 304 Aerodynamic Heating (3)

Heating of aerodynamic surfaces due to supersonic and hypersonic velocities. Heat transfer through the field surrounding an airplane or missile traveling at high speeds. Equipment and personnel protection from excessive heat. Atmospheric re-entry problems and current solutions adopted by industrial aircraft manufacturers. 3 lectures. Concurrent: Aero 301

Aero 327 Aircraft Stress Analysis (3)

Aircraft materials properties. Tension, compression, bending, torsion and shear flow in statically determinate aircraft. Structural elements. Buckling effects in columns. Combined stresses. 2 lectures, 1 laboratory. Prerequisites: ME 203, Math 316

Aero 328 Aircraft Stress Analysis (3)

Statically indeterminate structures. Beam column theory. Shear flow in multicell structures. Diagonal tension theory. 2 lectures, 1 laboratory. Prerequisite: Aero 327

Aero 343 Wind Tunnel Testing (2)

Theory of operation and fundamental principles of wind tunnel testing. Special instruments used in wind tunnel testing. Scale effect, end effect and correction factor calculations. 2 laboratories. Prerequisite: Aero 302, EL 223

Aero 347 Design Analysis (2)

An introduction to practical methods of design based on fundamental laws of engineering. Design decisions verified by written analysis. Design of aircraft components and simple systems. 2 laboratories. Concurrent: Aero 301, 327

Aero 349 Aircraft Structures Laboratory (2)

Strain gage application in aircraft structural testing. Testing of typical aircraft structural elements. Photostress and stresscoat techniques. Dimensional analysis and theory of models. Experimental approach with multi-variable systems. 2 laboratories. Prerequisite: Aero 328, EL 223

Aero 400 Special Problems for Advanced Undergraduates (1-2)

Individual project work for senior students. Total credit limited to 4 units with not more than 2 units in any one quarter. 1 or 2 laboratories. Prerequisite: Approval of department head.

Aero 401 Aircraft Propulsion Systems (3)

Analysis of reciprocating, turboprop, turbojet, pulsejet, athodyd, and rocket aircraft engines with respect to thrust, utilization of available energy, and charge handling. Aviation fuel characteristics; hydrocarbons, rocket propellants and atomic fuel. 3 lectures. Prerequisite: Aero 302, 304, Chem 322

Aero 402 Aircraft Propulsion Systems (3)

Analysis of reciprocating, turboprop, turbojet, pulsejet, athodyd, and rocket engines with respect to fuel burning, performance. Gas turbine thermodynamic analysis, and structural and mechanical requirements of aircraft engines. 3 lectures. Prerequisite: Aero 401, 404

Aero 403 Rocket Propulsion (3)

Classification of propulsion systems. Definitions of rocketry terms. Rocket history. Nozzle theory and thermodynamic relations. Rocket propellant performance calculations. Heat transfer in rocket thrust chambers. Liquid propellant rocket systems. Solid propellant rocket fundamentals. Design of solid propellant rockets. Flight performance and flight testing. 3 lectures. Prerequisite: Aero 402

Aero 404 Aerodynamics (3)

Two-dimensional analysis of supersonic flow, flow in a duct, normal shocks, Prandtl-Meyer expansion and oblique shock. Thin airfoils, transonic conditions. Supersonic wind tunnels, test methods. 3 lectures. Prerequisite: Aero 302, 304

Aero 405 Aerodynamics (3)

Performance analysis of propeller driven and jet powered aircraft. Drag build-up from theory and experimental data. Variation in performance with change of aircraft configuration and propulsive units. 3 lectures. Prerequisite: Aero 404

Aero 408 Advanced Aircraft Structural Analysis (3)

Indeterminate structures, frame analysis, treatment of plates and shells, shear lag and deformation, effect of skin cutout, application of structural theory to the design of aircraft components. 3 lectures. Prerequisite: Aero 349

Aero 412 Missiles (3)

Extension of aeronautical engineering principles to rockets and missiles; theory of design, propulsion systems and controls, flight characteristics and guidance. 3 lectures. Prerequisite: Aero 404, 401

Aero 444 Aircraft Design (3)

Design of aircraft components and systems. Static systems, design parameters. Design verification by written analysis. 3 laboratories. Prerequisite: Aero 349, 302

Aero 445 Aircraft Design (3)

Design of aircraft, missile and rocket system components. Dynamic systems design parameters. Design verification by written analysis. 3 laboratories. Prerequisite: Aero 304, 401, 444

Aero 446 Advanced Design (3)

Advanced design of aircraft, missile, rocket systems and components. Design verification by written analysis. 3 laboratories. Prerequisite: Aero 402, 405, 445

Aero 457, 458 Aeronautical Measurements Laboratory (2) (2)

Use of laboratory instruments to develop the technique of obtaining engineering measurements. Special assigned problem in the field of aeronautical engineering. 2 laboratories. Prerequisite: EL 223, Aero 349

Aero 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. 2 laboratories. Prerequisite: Senior standing, all skills courses must be completed.

Aero 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent engineering developments. 2 lectures. Prerequisite: Aero 462

ELECTRONIC ENGINEERING DEPARTMENT

Department Head, Philip Wessels

William A. Drake
Robert G. Irvine

A. Wallace Schnitger
George A. Mellard

Donald C. Squires
Ralph W. Ritchie

The program of the Electronic Engineering Department prepares students for that branch of engineering which is concerned with the transmission, reception, and utilization of information, and the electronic control of mechanical and electrical operations.

Graduates of this department are employed by manufacturing concerns, broadcast and television stations, oil companies, utilities, government laboratories and agencies, sales organizations, and schools. The work of these graduates is concerned chiefly with application engineering, product development, test and evaluation, technical operations, and engineering sales. The multiplicity of electronic devices in industry business offices, military installations, and the home is rapidly increasing the opportunities for field engineering and self-employment in technical services.

The four-year course is planned so that the student starts in his freshman year with a series of courses in electronic technology. At the same time, the student is also preparing himself in mathematics and physics for the more advanced engineering courses which begin in the second year. This plan provides (1) an opportunity to explore the field before undertaking engineering courses, (2) skills and techniques for early employment as a technician, (3) a descriptive background for engineering courses, and (4) strong motivation for the study of mathematics, physics, and engineering courses.

The laboratory work is organized to parallel closely the type of work the young engineer is usually assigned during his first few years of employment after graduation. The student starts in the freshman year with very closely supervised jobs, proceeds from directed experiments in analysis to student planned investigation, and advances to some senior year projects which involve engineering synthesis.

It is recommended that the high school student planning a career in electronic engineering take a balanced program including mathematics, physical science, drawing, and shops. The junior college student planning to transfer into this department would do well to meet, insofar as possible, the requirements of this curriculum.

The department occupies new facilities consisting of six laboratories, two shops, and several auxiliary rooms. The laboratories are equipped with the latest instruments and test equipment available for the study and investigation of most phases of electronics. The facilities and equipment coupled with the method of "learn by doing" provide an opportunity for the student to gain a knowledge of industrial practices as well as an excellent theoretical background.

The department is sponsoring three student organizations: a student branch of the Institute of Radio Engineers, an Electronics Club, and an amateur radio group.

CURRICULUM IN ELECTRONIC ENGINEERING

Freshman	F	W	S
Electronic Technology (EL 101, 102, 103).....	3	3	3
Electronic Technology Laboratory (EL 141, 142, 143).....	2	2	2
Drafting for Electronics (EL 146).....			2
Engineering Drafting (ME 121, 122).....	2	2	
Machine Shop (MS 142, 144).....	1		1
Welding (Weld 144, 145).....	1	1	
Sheet Metal (MS 155).....	1		
Mathematics for Engineers (Math 117).....	5		
Analytic Geometry and Calculus (Math 118, 201).....		5	3
General Physics (Phys 131).....			4
Language Communication (Eng 104, 105, 106).....	3	3	3
Health Education (PE 107).....		2	
Physical Education (PE 141, 142, 143).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	18½	18½	18½

	F	W	S
Sophomore			
Radio Frequency Measurements (EL 201)	3		
Pulse Measurements (EL 202)		3	
Electronic Control Measurements (EL 203)			3
RF Measurements Laboratory (EL 241)	1		
Pulse Measurements Laboratory (EL 242)		1	
Electronic Control Laboratory (EL 243)			1
Physical Electronics (EL 208, 209)		2	2
Electron Tube Laboratory (EL 248, 249)		1	1
Fundamentals of Electrical Engineering (EE 212, 213)	3	3	
Electrical Laboratory (EE 246, 249)	1		1
Engineering Statics (ME 201)		3	
Engineering Dynamics (ME 204)			3
Analytic Geometry and Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
Physics of Electricity and Magnetism (Phys 204)	4		
Principles of Economics (Ec 201)	3		
General Physics (Phys 132)			4
Sports Education (PE 241, 242, 243)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/>	<hr/>	<hr/>
	18½	16½	18½
Junior			
Network Analysis (EL 301)	3		
Communication Networks (EL 302)		3	
Communication Lines (EL 303)			3
Networks Laboratory (EL 341, 342)	1	1	
Communication Lines Laboratory (EL 343)			1
Audio Frequency Amplifiers (EL 304)	3		
Radio Frequency Amplifiers and Oscillators (EL 305)		3	
Modulators and Detectors (EL 306)			3
Audio Engineering Laboratory (EL 344)	1		
Radio Engineering Laboratory (EL 345, 346)		1	1
Servomechanisms (EL 307)			3
Servomechanisms Laboratory (EL 347)			1
Electric Machines (EE 313)		3	
Thermodynamics (ME 301)	3		
Engineering Materials (ME 314)			3
Differential Equations (Math 317)	2		
General Chemistry (Chem 321, 322)	4	4	
Applied Biology (Bio 110)			3
Managerial Economics (Ec 413)		3	
	<hr/>	<hr/>	<hr/>
	17	18	18
Senior			
Pulse Techniques (EL 404)	3		
Microwave Components (EL 401)		3	
Electromagnetic Fields (EL 402)	3		
Advanced Electronic Laboratory (EL 441, 442)	1	1	
Electronic System Synthesis (EL 451, 452, 453)	1	1	1
Senior Project (EL 461, 462)	2	2	
Undergraduate Seminar (EL 463)			2
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
U.S. in World Affairs (Hist 305)			3
Family Relations (Psy 206)	3		
Business Statements (Bus 212)			1
Literature		3	
Electives		3	
	<hr/>	<hr/>	<hr/>
	16	16	16

DESCRIPTIONS OF COURSES IN ELECTRONIC ENGINEERING

- EL 101 Fundamentals of Electronic Technology (3)**
Fundamentals of DC and AC circuits, meters, inductance and capacitance and applications of basic electrical concepts which provide a fundamental background for the beginning student. 3 lectures. Concurrent: Math 117
- EL 102 Fundamentals of Electronic Technology (3)**
Basic electronic concepts for the beginning student. The vacuum tube, semiconductor fundamentals, power supplies, amplifiers, and an introduction to AM receivers. Problem solving and application of fundamentals to practical situations is emphasized. 3 lectures. Concurrent: Math 118
- EL 103 Fundamentals of Electronic Technology (3)**
Introduction to the fundamentals of radio communication for the beginning student. Basic oscillator circuits, receivers, transmitters, transmission lines, antennas, introductory VHF and UHF techniques, and electronic test instruments. 3 lectures. Concurrent: Math 201
- EL 141, 142, 143 Electronic Technology Laboratory (2) (2) (2)**
Directed assignments facilitating an understanding of the operation and construction of electrical instruments and electronic equipment. Use of test equipment. 2 laboratories.
- EL 146 Drafting for Electronics (2)**
Schematic drafting. Electronic and industrial symbols. Symmetry and balance. Schematic delineation, projection. Graphic integration. 1 lecture, 1 laboratory. Prerequisite: ME 122
- EL 201 Radio Frequency Measurements (3)**
Applied measurement techniques applicable to radio frequency practices. Measurement of frequency, power, and impedance in RF circuitry and TV systems. 3 lectures. Prerequisites: EL 103, 143, Math 201
- EL 202 Pulse Measurements (3)**
Measurement methods and techniques as used in pulsed systems. Pulse generators, TV circuits, electronic counters, and fundamental digital circuits. 3 lectures. Prerequisites: EL 103, 143, Math 201
- EL 203 Electronic Control Measurements (3)**
Measurement techniques used with electronic control circuits and instrument calibration. Servomechanisms, graphic recorders, mechanical-electrical transducers, and instrument calibration circuits. Topics are investigated from a standpoint of application, operational theory, and calibrating techniques. 3 lectures. Prerequisites: EL 103, 143, Math 201
- EL 208, 209 Electron Tubes (2) (2)**
Physical and electrical characteristics and mathematical analysis of the more common types of electron tubes. Introduction to solid state electronics. 2 lectures. Prerequisites: Math 201, Phys 204
- EL 222, 223 Electronic Engineering (3) (3)**
Theory, operation, and application of electronic instruments and controls; adjustment and maintenance of electronic devices. 2 lectures, 1 laboratory. Prerequisites: Math 201, EE 231
- EL 240 Additional Engineering Laboratory (1-2)**
Total credit limited to 4 units, with not more than 2 units in any one quarter.
- EL 241 Radio Frequency Measurement Laboratory (1)**
Experience and familiarization with heterodyne frequency meters, radio frequency transmitters, electronic counters, radio frequency bridges, slotted lines, bolometer and calorimeter power meters, and typical communication equipment. 1 laboratory. Concurrent: EL 201
- EL 242 Pulse Measurements Laboratory (1)**
Experience and familiarization with pulse generators and amplifiers, electronic counters and timers, precept controllers, and fast oscilloscopes. 1 laboratory. Concurrent: EL 202
- EL 243 Electronic Control Laboratory (1)**
Experience and familiarization with magnetic, photographic, electro-writing and ink-type chart recorders. 1 laboratory. Concurrent: EL 203

EL 248, 249 Electron Tube Laboratory (1) (1)

Fundamental experiments investigating the physical and electrical properties of the more common types of electron tubes and transistors and their equivalent circuits. 1 laboratory. Concurrent: EL 208, 209

EL 301 Network Analysis (3)

Nonsinusoidal waves. Network solution and theorems. Impedance transformation and coupled circuits. 3 lectures. Prerequisites: EE 213. Concurrent: Math 317

EL 302 Communication Networks (3)

Four-terminal networks. Analysis and synthesis of frequency selective networks and filters. Transient phenomena. 3 lectures. Prerequisites: EL 301, Math 317

EL 303 Communication Lines (3)

Circuits with distributed constants. The general transmission line equations. High frequency transmission lines. Artificial lines. Impedance charts. 3 lectures. Prerequisite: EL 302

EL 304 Audio Frequency Amplifiers (3)

Vacuum tubes and transistors as circuit elements. Rectifiers and power supply circuits. Audio voltage and power amplifiers. Feedback amplifiers. 3 lectures. Prerequisite: EL 209. Concurrent: EL 301

EL 305 Radio Frequency Amplifiers and Oscillators (3)

Single- and double-tuned radio frequency amplifiers. Class C power amplifiers, loading and coupling networks. Radio frequency oscillators, frequency stability considerations. 3 lectures. Prerequisite: EL 304

EL 306 Modulators and Detectors (3)

Formulation and analysis of the modulation process. Amplitude, phase, and frequency modulation systems. Detection and frequency conversion. Radio transmitter and receiver systems. 3 lectures. Prerequisite: EL 305

EL 307 Servomechanisms (3)

Principles of closed loop control systems. Analysis of transfer functions. Corrective networks. Stability criteria. 3 lectures. Prerequisites: EL 303, 304

EL 311, 312, 313 Industrial Electronics (2) (2) (2)

Analysis of vacuum and gas-filled electron tubes and associated circuits with emphasis on control circuits used in modern welding electronics, photoelectric devices, motor controllers, induction and dielectric heaters.

EL 341, 342 Networks Laboratory (1) (1)

Experimental determination of communication network characteristics and behavior. Familiarization with the capabilities and limitations of laboratory equipment and instruments. 1 laboratory. Concurrent: EL 301, 302

EL 343 Communication Lines Laboratory (1)

Experimental study of circuits with distributed constants. Low-frequency and radio-frequency lines. Stub matching. Use of transmission line charts. 1 laboratory. Concurrent: EL 303

EL 344 Audio Engineering Laboratory (1)

Experimental determination of the important operating characteristics of power supplies and audio voltage and power amplifiers. Performance testing of audio amplifiers in accordance with standard IRE-EIA procedures. 1 laboratory. Concurrent: EL 304

EL 345 Radio Engineering Laboratory (1)

Experimental determination of the important operating characteristics of tuned radio frequency voltage and power amplifiers and radio frequency oscillators. Performance testing of radio receivers in accordance with standard IRE-EIA procedures. 1 laboratory. Concurrent: EL 305

EL 346 Radio Engineering Laboratory (1)

Experimental determination of the important operating characteristics of modulators, detectors, discriminators, and frequency converter circuits. Standard performance testing. 1 laboratory. Concurrent: EL 306

EL 347 Servomechanisms Laboratory (1)

Selected laboratory exercises from EL 307. 1 laboratory. Concurrent: EL 307

EL 351, 352, 353 Industrial Electronics Laboratory (1) (1) (1)

Determination of characteristics of vacuum and gas-filled electron tubes. Analysis of amplifying and oscillating circuits. Operational study of commercial electronic sequence timers, motor speed controls, and radio frequency heating equipment. 1 laboratory. Concurrent: EL 311, 312, 313

EL 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories. Senior standing required.

EL 401 Microwave Components (3)

Basic electromagnetic concepts as applied to specific components. Considered are types of EM waves; reflection, excitation, modes, and propagation frequencies in waveguides; impedance matching; the parallel strip; antennas; microwave tubes and components. 3 lectures. Prerequisites: EL 306, 402

EL 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. Prerequisites: EL 303, Math 317

EL 404 Pulse Techniques (3)

Graphic and quasi-analytical analysis of typical wave-shaping circuits, timing circuits, relaxation oscillators, and elementary pulse generators. Wideband amplifiers. 3 lectures. Prerequisites: EL 303, 306

EL 441, 442 Advanced Electronic Laboratory (1) (1)

Laboratory study of distributed circuits. Pulse generation, amplification and control. UHF and microwave generation, transmission and detection. Antenna characteristics and measurement. Tests on television camera chain, sync generator, and receiver. RF heating. Control system and servomechanism. 1 laboratory.

EL 451, 452, 453 Electronic System Synthesis (1) (1) (1)

Product engineering and product development through all stages from conception of plan to finished product. Commercial standards of performance and appearance. 1 laboratory.

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

Selection and completion of a project under a minimum of supervision. Project results are presented in a formal report. Minimum 120 hours total time.

EL 463 Undergraduate Seminar (2)

Discussion of new developments in the fields of communications and industrial electronics, with particular reference to field of employment. Job analysis. 2 lectures.

DESCRIPTIONS OF COURSES IN ELECTRICAL ENGINEERING

EE 212, 213 Fundamentals of Electrical Engineering (3) (3)

Electric circuits and parameters. Direct current networks. Introduction to network theorems. Energy sources. Magnetic circuits and amplifiers. Alternating current circuits and parameters. Single phase circuits. Symbolic treatment. Polyphase circuits. 3 lectures. Prerequisite: Math 201

EE 231, 232, 233 Principles and Practices of Electrical Engineering (3) (3) (3)

Electrical principles. Electric and magnetic circuits. Electrical machines. Machine controls and applications. Industrial wiring systems. Control and measurements including electronic devices. For nonelectrical engineering majors. 2 lectures, 1 laboratory. Prerequisite: Math 201

EE 246, 249 Electrical Laboratory (1) (1)

Selected laboratory exercises in electrical engineering. 1 laboratory.

EE 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. 2 lectures, 1 laboratory. Prerequisite: EE 213

INDUSTRIAL ENGINEERING DEPARTMENT

Robert C. Hawkins

Robert Quaney

Richard Sligh

The industrial engineering program prepares students for employment with manufacturing firms in work related to planning, production, sales, and management. The curriculum aptly combines mechanical engineering and general business administration.

Emphasis is placed on planning the use of equipment rather than designing the equipment itself; on the production rate and quality of the product rather than on designing the product itself. Parallel emphasis is placed on the managerial and financial aspects of planning, production, and sales.

The program is intended for students who like engineering but who have talents for planning, management, and sales rather than technical design.

The department shares facilities with the Mechanical Engineering and Machine Shop Departments. Excellent production facilities are available to make the instruction realistic and characteristic of the requirements of industry.

CURRICULUM IN INDUSTRIAL ENGINEERING

	F	W	S
Freshman			
Industrial Engineering (IE 111)	3		
Motion Study (IE 122)			3
Time Study (IE 123)		3	
Power Generation (ME 131)	2		
Engineering Drafting (ME 121, 122, 123)	2	2	2
Machine Shop (MS 141, 142, 143)	1	1	1
Welding (Weld 144, 145, 146)	1	1	1
Language Communication (Eng 104, 105, 106)	3	3	3
Mathematics for Engineers (Math 117)	5		
Analytic Geometry and Calculus (Math 118, 201)		5	3
General Physics (Phys 131)			4
Health Education (PE 107)		2	
Physical Education (PE 141, 142, 143)	½	½	½
	17½	17½	17½
Sophomore			
Production Processes (IE 202, 203)		3	3
Industrial Incentives (IE 214)	3		
Production Planning (IE 216)			3
Production Processes Laboratory (IE 243)			1
Engineering Statics (ME 201)	3		
Engineering Dynamics (ME 204)		3	
Machine Shop (MS 144, 145, 146)	1	1	1
Sheet Metal (MS 155, 156)	1	1	
Analytic Geometry and Calculus (Math 202, 203)	3	3	
Descriptive Statistics (Math 211)			3
General Physics (Phys 132, 133)	4	4	
Principles of Economics (Ec 201)		3	
Principles of Accounting (Actg 121)			3
Technical Writing (Eng 219)			3
Family Relations (Psy 206)	3		
Sports Education (PE 241, 242, 243)	½	½	½
	18½	18½	17½

	F	W	S
Junior			
Production Scheduling and Control (IE 304)	3		
Plant Layout and Material Handling (IE 331, 332)	3	3	
Industrial Processes Laboratory (IE 343)			2
Electrical Engineering (EE 231, 232)	3	3	
Electronic Engineering (EL 222)			3
Strength of Materials (ME 202, 203)		3	3
Materials Test Laboratory (ME 249)			1
General Chemistry (Chem 321)	4		
Kinematics (ME 223)			3
American Government (Pol Sc 301)		3	
Growth of American Democracy (Hist 304)			3
Electives	5	4	3
	<hr/>	<hr/>	<hr/>
	18	16	18
Senior			
Management Planning (IE 404, 405, 406)	3	3	3
Quality Control (IE 415)			3
Industrial Data Processing (IE 428)		2	
Tooling for Production (IE 438)	3		
Senior Project (IE 461, 462)	2	2	
Undergraduate Seminar (IE 463)			2
Thermodynamics (ME 301)	3		
Heat Transfer (ME 313)			3
Machine Design (ME 324, 325)	3	3	
Managerial Economics (Ec 413)		3	
U.S. in World Affairs (Hist 305)			3
Applied Biology (Bio 110)			3
Literature		3	
Electives	4		
	<hr/>	<hr/>	<hr/>
	18	16	17

DESCRIPTIONS OF COURSES IN INDUSTRIAL ENGINEERING

IE 111 Industrial Engineering (3)

An introduction to the field of industrial engineering showing the relationship of the industrial engineer to various divisions of business organizations, including manufacturing, sales and services. 3 lectures.

IE 122 Motion Study (3)

Principles of motion economy affecting the design of product, work place layout, and services; effective use of human effort as related to tools and equipment; use of right hand-left hand charts, idle time charts, and other tools used in motion studies. 2 lectures, 1 laboratory.

IE 123 Time Study (3)

Uses for time study. Principles and techniques used to obtain information for setting standards. Training in the different uses of a stop watch and in rating of work rates. 2 lectures, 1 laboratory.

IE 202, 203 Production Processes (3) (3)

Manufacturing processes such as foundry, forging, plastics, chemical milling, powder metallurgy, sponge and solid rubber; raw material processing such as steel, aluminum, glass, cloth and chemicals; finishing processes such as degreasing, painting, plating, and other surface treatments. 3 lectures. Prerequisites: MS 143, Weld 145

IE 214 Industrial Incentives (3)

Types of incentives used in industry such as individual and group incentive plans, bonus plans, and suggestion systems. 3 lectures.

IE 216 Production Planning (3)

Techniques used in planning for production such as flow charts, standard cost and time data, sales forecast and process charts. 3 lectures.

IE 243 Production Processes Laboratory (1)

Inspection trips to selected industrial installations which represent typical examples of the manufacturing processes studied in IE 202, 203. 1 laboratory. Prerequisite: IE 202

IE 304 Production Scheduling and Control (3)

Organization of control, scheduling of production, routing of operations and processing, dispatching and expediting, reporting procedures. Materials planning procurement and control, work-in-process, finished products. 2 lectures, 1 laboratory. Prerequisite: IE 203

IE 331, 332 Plant Layout and Material Handling (3) (3)

Product development, production analysis, selection and utilization of plant equipment, material flow principles, material handling, plant layout. 2 lectures, 1 laboratory. Prerequisite: IE 203

IE 343, 344 Industrial Processes Laboratory (2) (2)

Operation and use of modern machine tools, plastics and metal-forming machinery. Operation by the student of representative types of equipment. 1 lecture, 1 laboratory. Prerequisites: IE 203, MS 146

IE 400 Special Problems for Advanced Undergraduates (1-2)

Arrangements to be made with department head. Total credit limited to 4 units with not more than 2 units in any one quarter. 1 or 2 laboratories.

IE 404, 405, 406 Production Management Planning (3) (3) (3)

Principles of organization and administration; administrative techniques, inter-department relationships; cost and budgetary controls; personnel relations; industrial work measurement, job evaluation; wage payment systems; plant maintenance, industrial safety; plant protection. 2 lectures, 1 laboratory. Prerequisite: IE 332

IE 415 Quality Control (3)

Systems of inspection, analysis, and action taken to control manufacturing processes. Sampling plans, control charts, statistical analysis, and other tools used by management to control costs and improve quality. 3 lectures. Prerequisite: IE 304

IE 428 Industrial Data Processing (3)

Operations and functions performed by modern electronic data processing machines, and how they may be applied to control machine processes, compute control data, and to perform routine clerical work. 2 lectures, 1 laboratory. Prerequisite: Math 211

IE 438 Tooling for Production (3)

Techniques for design and fabrication of tooling jigs and fixtures which result in the most economical production in modern manufacturing plants. 2 lectures, 1 laboratory. Prerequisite: MS 146

IE 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 of 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.

MACHINE SHOP DEPARTMENT

Chairman, Russell Parish

D. E. Brown

Richard Sligh

W. Murphy

Instruction in machine shop practice has two objectives: (1) to give the student a foundation in the basic skills and, (2) to give an understanding of the part machine tools play in present-day engineering and manufacturing enterprises. It is not the intent of the machine shop department to teach machine shop courses on a vocational level, but rather to give the student a knowledge which will further his progress in the engineering fields. Operations, tools, and materials of the trade as well as shop safety are stressed in all departmental offerings.

The machine shop is unusually well equipped with the latest machine tools and heat-treating equipment such as might be found in the best commercial tool room. The shop is also equipped with the tools, attachments, and precision instruments for the construction of dies, tools, jigs, and fixtures such as are found in modern industry. Punch presses, die-casting machines, plastics presses, and die-sinking machines are provided for engineering students taking advanced courses.

DESCRIPTIONS OF COURSES IN MACHINE SHOP**MS 141 Machine Shop (1)**

Fundamentals of precision measurement, layout, and hand and drill press operations. 1 laboratory.

MS 142 Machine Shop (1)

Fundamentals of lathe operation including turning between centers, chuck work, and thread cutting. Also feeds, speeds, and tool grinding. 1 laboratory.

MS 143 Machine Shop (1)

Fundamentals of lathe operation including taper turning, internal thread cutting, precision boring, and other chucking operations. Tool grinding. 1 laboratory. Prerequisite: MS 142

MS 144 Machine Shop (1)

Fundamentals of milling machine and shaper operation including precision setup and plane surfacing operations. 1 laboratory. Prerequisite: MS 142

MS 145 Machine Shop (1)

Advanced lathe practice, lathe accessories and elementary toolmaking. Elementary heat treatment of steels. 1 laboratory. Prerequisite: MS 143

MS 146 Machine Shop (1)

Advanced milling machine and shaper practice including contoured and angular surfacing operations, and rack and spur gear cutting. 1 laboratory. Prerequisite: MS 144

MS 155 Sheet Metal Shop (1)

Familiarization with basic sheet metal techniques, including selection of material, hand forming processes, machine processes, and paint spraying. 1 laboratory.

MS 156 Sheet Metal Shop (1)

Application of the basic techniques to those which would be found in industry, including use of draw press, punch press and press brake. 1 laboratory. Prerequisite: MS 155

MS 240 Machine Shop (1-2)

Advanced individual instruction on all machine tools. Construction and repair of laboratory equipment. Total credit limited to 4 units. 1 or 2 laboratories. Prerequisite: MS 146

MECHANICAL ENGINEERING DEPARTMENT

Department Head, Walter E. Holtz

Robert L. Beardmore
G. E. Griever

Walter Ebersole
Harvey Mylander

Max Epps
Charles T. Seeley

Mechanical engineering deals with equipment, machines and products which are characterized by their utilization of the strength and rigidity of structural materials, the useful properties of fluids, the conversion of energy from fuels to useful work, and the interrelation of wheels, gears, and levers.

Graduates obtain employment with manufacturers, contractors, public utilities, and governmental agencies. Types of work performed by graduates include plant engineering, tool, machine, and pipe design, engineering testing, sales engineering, construction supervision, and maintenance planning.

It is recommended that the high school student planning a career in mechanical engineering take a balanced high school program including mathematics, physical sciences, mechanical drawing, and shops. The junior college student planning to transfer into this department would do well to meet, insofar as possible, the requirements of the curriculum in mechanical engineering.

The department occupies three laboratories where the principles developed in the classroom can be applied to the operation and testing of heat transfer equipment, fluid-handling apparatus, heat power equipment, internal combustion engines, and engineering materials.

CURRICULUM IN MECHANICAL ENGINEERING

	F	W	S
Freshman			
Engineering Drafting (ME 121, 122, 123)	2	2	2
Power Generation (ME 131, 132, 133)	2	3	2
Mechanical Engineering Laboratory (ME 144, 145, 146)	1	1	1
Machine Shop (MS 141, 142, 143-144)	1	1	2
Sheet Metal (MS 155, 156)	1	1	
Welding (Weld 144, 145, 146)	1	1	1
Mathematics for Engineers (Math 117)	5		
Analytic Geometry and Calculus (Math 118, 201)		5	3
General Physics (Phys 131)			4
Language Communication (Eng 104, 105, 106)	3	3	3
Health Education (PE 107)	2		
Physical Education (PE 141, 142, 143)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 18 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$	<hr/> 18 $\frac{1}{2}$
Sophomore			
Engineering Statics (ME 201)	3		
Strength of Materials (ME 202, 203)		3	3
Engineering Dynamics (ME 204, 205)		3	2
Kinematics (ME 223)	3		
Production Processes (IE 202)		3	
Descriptive Geometry (ME 125)			2
Metallurgy (ME 206)	3		
Electrical Engineering (EE 231)			3
Materials Test Laboratory (ME 249)		1	
Machine Shop (MS 145, 146)	1	1	
Analytic Geometry and Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
General Physics (Phys 132, 133)	4	4	
General Chemistry (Chem 321)			4
Sports Education (PE 241, 242, 243)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 18 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

	F	W	S
Junior			
Thermodynamics (ME 301, 302).....	3	3	
Fluid Mechanics (ME 311, 312).....	3		3
Heat Transfer (ME 313).....			3
Machine Design (ME 324, 325, 326).....	3	3	3
Mechanical Vibrations (ME 315).....		3	
Electrical Engineering (EE 232, 233).....	3	3	
Electronic Engineering (EL 222, 223).....		3	3
General Chemistry (Chem 322).....	4		
Applied Biology (Bio 110).....			3
Principles of Economics (Ec 201).....		3	
Technical Writing (Eng 219).....			3
	<hr/>	<hr/>	<hr/>
	16	18	18
Senior			
*Senior Electives.....	6	6	
Mechanical Engineering Laboratory (ME 444).....	2		
Senior Project (ME 461, 462).....	2	2	
Undergraduate Seminar (ME 463).....			2
† Labor Economics (Ec 414).....			3
American Government (Pol Sc 301).....	3		
Growth of American Democracy (Hist 304).....		3	
U.S. in World Affairs (Hist 305).....			3
Family Relations (Psy 206).....			3
Literature.....		3	
Electives.....	3	3	6
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	16	17	17

DESCRIPTIONS OF COURSES IN MECHANICAL ENGINEERING

ME 121 Engineering Drafting (2)

Use of drafting equipment. Freehand lettering. Pictorial drawings. Drafting methods for geometric constructions. Multiplanar projection. Castings, forgings, and machined parts. Techniques of dimensioning. Emphasis on industrial techniques and standards. 1 lecture, 1 laboratory.

ME 122 Engineering Drafting (2)

Auxiliary views and section views. Dimensioning auxiliary views and section views. Relationship between engineering drawings and shop processes. Intersections of surfaces. Development of surfaces. 1 lecture, 1 laboratory.

ME 123 Engineering Drafting (2)

Detail working drawings of typical machine parts. Precision dimensions, limits and tolerances. Screw threads, shop notes, assembly drawings, parts lists. Threaded fasteners, rivets, keys, and springs. Welding drawings. Piping drawings. Elements of structural and architectural drawing. 1 lecture, 1 laboratory.

ME 125 Descriptive Geometry (2)

Solution of typical drafting room problems by graphical methods of multiview projection. Construction of fundamental views. Perpendicular, parallel and skew lines. Relationships of points, lines, and planes. Intersections of planes. Dihedral angles. 2 laboratories. Prerequisite: ME 121

ME 131, 132, 133 Power Generation (2) (3) (2)

Principles of the conversion of energy to mechanical work applied to steam power plants, gas turbines, and internal combustion engines. Problems involving heat, properties of steam and gases, power plants and their auxiliaries. 2 lectures, 1 laboratory (132). 1 lecture, 1 laboratory (131 and 133).

ME 144, 145, 146 Mechanical Engineering Laboratory (1) (1) (1)

Basic mechanical engineering experiments. Pressure, temperature, weight, rotative speed, area, specific gravity, specific weight, density, steam quality, boiler flue gas analysis, boiler feed water analysis, boiler efficiency, diesel and gasoline engine performance, engine economy, and engine indicator cards. Maintenance work on the engines, boilers, and related equipment. 1 laboratory.

* Senior Electives—Select 12 units from the following: Mechanical Systems in Buildings (ME 417, 418), Tool Design (ME 431, 432), Heat Power (ME 411, 412), Advanced Dynamics (ME 414, 415).

† Management Economics (Ec 413) may be substituted.

ME 201 Engineering Statics (3)

Resolution and composition of forces. Equilibrium. Forces and reactions in simple structures. Friction. Centroids and centers of gravity. Moments of inertia of area and mass. Introduction to dynamics. 3 lectures. Prerequisite: Phys 131, Math 201

ME 202, 203 Strength of Materials (3) (3)

Relation between physical properties of materials and their use in engineering structures. Calculation of deflection and required size of basic structural and machine elements. 3 lectures. Prerequisite: ME 201, Math 201

ME 204 Engineering Dynamics (3)

Fundamental concepts of dynamics, rectilinear and curvilinear motion and the forces involved. Rotation and plane motion. 3 lectures. Prerequisites: ME 201, Math 202

ME 205 Engineering Dynamics (2)

Work, energy, power, impulse-momentum, impact, introduction to mechanical vibrations. 2 lectures. Prerequisite: ME 204

ME 206 Metallurgy (3)

Principles of physical metallurgy. Ferrous and non-ferrous metals and their alloys. Structure of metals. Constitution diagrams. Metallography and heat treatment. 3 lectures. Prerequisites: Weld 145, Phys 131

ME 223 Kinematics (3)

The study of motions in machine parts. Displacements, velocities, and accelerations in linkage, cams, gears, and other mechanisms. 2 lectures, 1 drafting laboratory. Prerequisite: Phys 131, ME 123

ME 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 laboratories.

ME 249 Materials Test Laboratory (1)

Commercial tests of materials. Familiarity with physical properties of industrially useful materials. Elements of heat treatment. 1 laboratory. Prerequisite: ME 206, ME 146, MS 144. Concurrent: ME 203

ME 301, 302 Thermodynamics (3) (3)

Solutions of problems dealing with and an understanding of the energy equations, gas relationships, processes of gases and vapors, second law of thermodynamics, internal combustion engine, vapor cycles, refrigeration, and psychrometrics. 3 lectures. Prerequisite: Phys 132, Math 203, Chem 321

ME 311 Fluid Mechanics (3)

Properties and behavior of fluids at rest and in motion. Steady flow energy transformation, dynamic similarity, and fluid friction, with emphasis on both liquids and gases. Fluid-measuring instruments. Theory of jets and rocket propulsion. 3 lectures. Prerequisite: ME 204, Math 203

ME 312 Fluid Mechanics (3)

Fluid resistance, dynamic lift, and propeller action. Compressible flow, subsonic and supersonic. Liquids in open channels. Pumps, turbines, fluid drive mechanisms. Fluid film lubrication. 3 lectures. Prerequisite: ME 311

ME 313 Industrial Heat Transfer (3)

Basic principles of heat transfer and their application to the design of industrial equipment. Steady state and transient problems of conduction by analytical and numerical methods. Free and forced convection. Transfer of radiant energy. 3 lectures. Prerequisite: ME 301

ME 314 Engineering Materials (3)

Structure, composition and physical properties of commercially useful materials. Selection of materials for specific applications. Heat treatment. Corrosion of metals and alloys; protective coatings. 3 lectures.

ME 315 Mechanical Vibrations (3)

Theory and analysis of mechanical vibrations, vibration isolation, vibration measuring equipment, and multicylinder engine balancing. Actual case studies of vibration isolation and machine balancing. 3 lectures. Prerequisite: ME 205, Math 316

ME 324 Machine Design (3)

Stress analysis of machine elements, combined stresses, variable loads and stress concentrations, endurance strength, tolerances and allowances, material properties and screw fastenings. 3 lectures. Prerequisite: ME 203, 223, 204, IE 202

ME 325, 326 Machine Design (3) (3)

Design of machines containing gears, shafts, keys, couplings, bearings, clutches, springs, chain and belt drives, and variable speed drives. Critical shaft speed. Balancing, lubrication, vibration isolation, noise suppression, and thermal effects. 2 lectures, 1 laboratory for ME 325; 1 lecture, 2 laboratories for ME 326. Prerequisite: ME 324, ME 315 required for ME 326

ME 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

ME 411 Heat Power (3)

Application of thermodynamics to actual power cycles. Turbine theory. Modern combustion gas and vapor power plants and auxiliaries. Economics of power generation. 3 lectures. Prerequisite: ME 302

ME 412 Heat Power (3)

Fuels, fuel systems, aspiration, combustion, detonation; mechanism, lubrication and performance of internal combustion engines. 3 lectures. Prerequisite: ME 302

ME 414 Advanced Dynamics (3)

Applications of LaGrange's equations and Hamilton's principle to systems having many degrees of freedom, gyrostatics, trajectory studies of rigid and elastic bodies. 3 lectures. Prerequisite: ME 205, Math 316

ME 415 Advanced Dynamics (3)

Analysis of transient response, beam vibration by Rayleigh's Method, method of influence, coefficients, iteration procedure, fundamentals of servomechanisms including theory of dynamic stability. 3 lectures. Prerequisite: ME 414, 315

ME 417, 418 Mechanical Systems in Buildings (3) (3)

Theory and application of heating, ventilating, air conditioning and refrigeration systems. Electrical and pneumatic controls. Consideration of the influence of auxiliary piping systems such as air, water, gas, waste disposal and compressed air. 3 lectures. Prerequisite: ME 302, ME 313

ME 431, 432 Tool Design (3) (3)

Design of manufacturing tools such as jigs, fixtures, and dies. Materials, tolerance balancing, and toolroom methods as design factors. 2 lectures, 1 laboratory. Prerequisite: ME 326

ME 444 Mechanical Engineering Laboratory (2)

Experimental evaluation of operating characteristics of modern heat power equipment, heat transfer apparatus, internal combustion engines, fluid-handling equipment, electromechanical devices and various types of mechanism by means of modern instrumentation. Measurement of the physical properties of fluids and gases. Formal engineering reports. 1 lecture, 1 laboratory. Prerequisite: ME 326, ME 313, MS 146, Weld 146

ME 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. 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 presentation of a topic in his chosen field. 2 lectures. Prerequisite: Senior standing.

WELDING DEPARTMENT

Leo P. Gorman

William H. Penrod

It is the aim of this department to give students in the engineering and agricultural divisions of the college an opportunity to gain both theoretical and practical knowledge of techniques and applications of the principal welding processes.

Facilities provided include general oxyacetylene welding equipment, automatic and manual flame cutting apparatus, general arc welding equipment, including both AC and DC types, automatic and manual inert-gas shielded arc welding equipment, seam and spot welding machines, and automatic submerged-melt arc welding equipment. A special engineering laboratory is provided for welding design problems and is adequately equipped with apparatus for study of physical properties and chemical analysis of steels and deposited weld metals. X-ray and gamma ray are used for inspection purposes.

DESCRIPTIONS OF COURSES IN WELDING**Weld 144 Welding Survey (1)**

Basic oxyacetylene techniques. Equipment used, applications, safety and limitations. Flame cutting, fusion welding and brazing of light-gauge sheet metal. 1 laboratory.

Weld 145 Fundamentals of Oxyacetylene Welding (1)

Familiarization with the commonly used welded joints. Requirements for the safe and competent welding of light-gauge steel. Procedures used for welding tubing and heavy-gauge steel. 1 laboratory. Prerequisite: Weld 144

Weld 146 Fundamentals of Metallic Arc Welding (1)

Fundamentals of shielded metallic arc welding, flat and horizontal positions. Types, uses, and classification of electrodes and equipment. Various joint types including lap, fillet, and butt joints. 1 laboratory. Prerequisite: Weld 144

Weld 153 Fundamentals of Oxyacetylene Welding (1)

Oxyacetylene welding of piping joints and connections. Techniques used for welding some nonferrous metals. Introduction of simple templet layouts for piping. 1 laboratory. Prerequisite: Weld 145

Weld 156 Fundamentals of Metallic Arc Welding (1)

Shielded metallic arc welding of heavy steel plates. Includes butt weld types, uses of backing materials, hard facing, cast iron, and overhead fillets. Basic weld tests. Arc welding of light-gauge steel sheets. 1 laboratory. Prerequisite: Weld 146

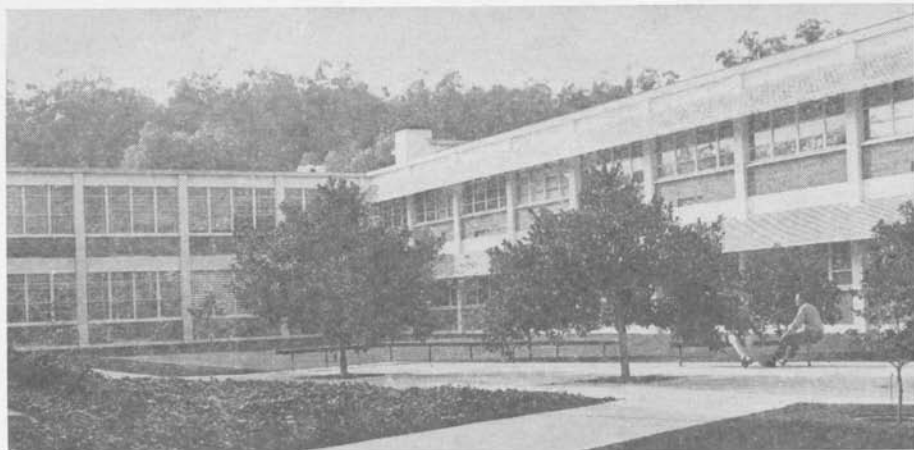
Weld 254 Advanced Welding (1)

Types and uses of various welding machines, their operating costs. The use of structural steel shapes for building machinery and farm equipment. Welding symbols, strength of welded joints, and basic cost estimating problems. 1 laboratory. Prerequisite: Weld 156

Weld 341 Special Problems in Welding (1-3)

Fundamentals of welding metallurgy, weldability of steels, steels and alloys for welded construction. Codes for construction of welded unfired pressure vessels. Design of pressure vessels according to the code used. 1, 2, or 3 laboratories. Prerequisite: Weld 156

ARTS AND SCIENCES DIVISION



Science Building Court



Library



Library Reading Room

ARTS AND SCIENCES DIVISION

The Arts and Sciences Division has three functions in the educational plan of the California State Polytechnic College. Primarily, it is a service division providing all students of the college with instruction in basic and supporting work common to all curricula. Most of the general education is provided by the Arts and Sciences Division with particular emphasis upon preparing the college's graduates for their roles as active, participating citizens of community, state, and nation. A second function of the division is to offer a broad and varied program of teacher education. Teaching credential programs are available in biological sciences, mathematics, physical education, physical sciences, and social sciences. These programs offer opportunities in secondary school teaching. The third function of the division is to provide educational opportunities in its major programs for those who do not choose teaching as an occupation. Each divisional curriculum except elementary education is designed to prepare its graduate for specific nonteaching jobs in its area in keeping with the college's philosophy of occupational education. The Department of Music and Art provides supporting courses which contribute to the cultural and social development of students in all divisions of the college.

BUSINESS CURRICULA

Curricula in business are offered leading to the bachelor of science degree in accounting, business administration, and marketing. Each of these majors is planned to provide degree-level education leading to specific occupations in many aspects of business and commerce.

The business building has classrooms and laboratories well equipped with many types of business machines used in modern industry. The location of the Kellogg-Voorhis Campus in the midst of the highly industrialized Los Angeles area affords unique opportunities for visits to industrial and commercial firms and correlation of classroom work with on-the-job observations of business activities.

ACCOUNTING DEPARTMENT

Department Head, George E. Carlberg
Jewel Mae Riddle

The curriculum of the Accounting Department is designed to provide training for students who wish to enter the business field with a strong background in accounting techniques. The curriculum also lays the groundwork for the state examinations for certification as a public accountant. The managerial use of accounting techniques receive emphasis so that the student's managerial potential is not neglected. The graduate of this department will find employment in such positions as controller, private accountant, auditor, and tax accountant.

The department also serves the needs of students in engineering, agriculture and other arts and sciences majors who desire training in accounting.

CURRICULUM IN ACCOUNTING

Freshman	F	W	S
Language Communication (Eng 104, 105, 106).....	3	3	3
Principles of Accounting (Actg 121, 122, 123).....	3	3	3
Physical Education (PE 141, 142, 143).....	½	½	½
Calculating Machines (OA 151).....	1		
Introduction to Business Management (Bus 101).....	3		
Office Administration (OA 121).....	3		
Typewriting (OA 141, 142).....	1	1	
Health Education (PE 107).....		2	
Basic Mathematics (Math 101).....		3	
Business Mathematics (Math 106).....			3
Electives.....	2	4	7
	<hr/>	<hr/>	<hr/>
	16½	16½	16½

	F	W	S
Sophomore			
Sports Education (PE 241, 242, 243).....	½	½	½
Business Communication (Eng 218).....	3		
Cost and Payroll Accounting (Actg 221).....	3		
Data Processing (Actg 231).....	3		
* Literature, Philosophy, Art or Music.....	3	3	
Principles of Economics (Ec 201, 202).....	3	3	
Public Speaking (Sp 201).....		2	
Family Relations (Psy 206).....			3
Advanced Cost Accounting (Actg 222).....			3
Descriptive Statistics (Math 211).....			3
Electives.....	1	8	7
	<hr/>	<hr/>	<hr/>
	16½	16½	16½
Junior			
* Natural Sciences.....	3	3	3
Intermediate Accounting (Actg 321).....	3		
Credit Management (OA 301).....	3		
American Government (Pol Sc 301).....	3		
Business Law (Bus 301, 302).....	3	3	
Auditing (Actg 325).....		3	
Purchasing and Inventory Control (OA 302).....		2	
Growth of American Democracy (Hist 304).....		3	
Advanced Public Speaking (Sp 303).....			2
Accounting Systems (Actg 306).....			3
U. S. in World Affairs (Hist 305).....			3
Electives.....	2	3	6
	<hr/>	<hr/>	<hr/>
	17	17	17
Senior			
Intermediate Accounting (Actg 322).....	3		
Investment Principles (Bus 404).....	3		
C.P.A. Review Course (Actg 414).....			3
* Natural Sciences.....	3	3	
Senior Project (Actg 461, 462).....	2	2	
Money and Banking (Ec 308).....		3	
Federal Tax Course (Actg 402).....		3	
Budgeting (Bus 426).....			3
Insurance Principles (Bus 403).....			3
Undergraduate Seminar (Actg 463).....			2
Electives.....	5	5	5
	<hr/>	<hr/>	<hr/>
	16	16	16

DESCRIPTIONS OF COURSES IN ACCOUNTING

Actg 121, 122, 123 Principles of Accounting (3) (3) (3)

Principles and practices of fundamental double-entry accounting theory. Problem approach to the subject with illustrations taken from real business situations. Provides information for analysis and allocation purposes. 2 lectures, 1 2-hour laboratory.

Actg 221 Cost and Payroll Accounting (3)

Basic aspects of accounting organization; techniques commonly used in business operations as they concern cost and payroll accounting. Practice in payroll record-keeping and cost accounting procedures. 2 lectures, 1 2-hour laboratory. Prerequisite: Actg 122

Actg 222 Advanced Cost Accounting (3)

Practices involved in compilation of cost accounting data for managerial use, including budgetary controls, joint costs and byproducts, standard cost systems, and cost analysis. 2 lectures, 1 2-hour laboratory. Prerequisite: Actg 221

* To be selected from the General Education List.

Actg 231 Data Processing (3)

Application of the latest techniques in the use of modern methods of handling numbers, with special reference to accounting and statistical methods. Includes principles of punchcard machines and electronic data processing. 2 lectures, 1 laboratory. Prerequisite: Actg 123

Actg 304 Income Tax Accounting (3)

Accounting techniques as they apply to federal and state income tax regulations. Intended primarily for students planning to go into the field of public accounting. 3 lectures. Prerequisite: Actg 123

Actg 306 Accounting Systems (3)

The installation and operation of accounting systems in business, with special attention to internal control. 3 lectures. Prerequisite: Actg 221, 231

Actg 321, *322 Intermediate Accounting (3) (3)

The advanced theory of accounts and its application. Standards of practice and recent opinions of the American Institute of Certified Public Accountants. Modern financial statement terminology. 2 lectures, 1 2-hour laboratory. Prerequisite: Actg 123, 221

Actg 325 Auditing (3)

Auditing standards and techniques. Preparation of audit reports and statements. Ethical and legal responsibilities of the auditor. 2 lectures, 1 2-hour laboratory. Prerequisite: Actg 222 or 321

Actg 400 Special Problems for Advanced Undergraduates (1-2)

Individual or group investigations of special areas in accounting and related fields. Total credit limited to 4 units with not more than 2 units in any one quarter. Prerequisite: Senior standing or consent of instructor.

Actg 402 Federal Tax Course (3)

Principles of taxation as applied to business; structures of tax forms and records necessary to satisfy governmental requirements. 3 lectures. Prerequisite: Actg 321

† Actg 411 Governmental and Institutional Accounting (2)

Accounting for nonprofit institutions; auditing of revenues and expenditures. 2 lectures. Prerequisite: Actg 321

Actg 414 C. P. A. Review Course (3)

Review of contemporary accounting theory applied to advanced problems of the kind contained in C.P.A. examinations. 3 lectures. Prerequisite: 30 units of accounting or equivalent accounting experience.

Actg 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. Formal report is required. Required minimum of 120 hours.

Actg 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the students' major fields. 2 meetings. Prerequisite: Senior standing or special permission.

* Offered in even-numbered years only.

† Offered in odd-numbered years only.

BIOLOGICAL SCIENCES DEPARTMENT

Department Head, John F. Lamiman

Howard S. Brown	Jack L. Erspamer	Ormond G. Mitchell
Jerome E. Dimitman	Vernon L. Gregory	Edward T. Roche
	Harold L. Lint	

The curriculum in the biological sciences is designed to fulfill the following objectives: (1) To give students majoring in the various agricultural departments the biological concepts that are basic to the understanding of their practical work. (2) To furnish the biological training for students who plan to prepare for teaching of life sciences in secondary schools. (3) To provide the basic course work for students who plan to enter such fields as wildlife conservation, entomology, food and drug act enforcement, plant pathology, and laboratory and museum work. (4) To give the courses which will fulfill the general education requirement in life science.

The department laboratories, located in the Science Building, have the latest scientific equipment and are well supplied with laboratory materials. The glass-houses provide excellent facilities for the practical application of basic concepts in the plant science field. The curriculum and favorable location of the campus provide opportunities for students to become familiar with the fauna and flora of Southern California through field as well as laboratory experiences.

CURRICULUM IN BIOLOGICAL SCIENCES

Freshman	F	W	S
Language Communication (Eng 104, 105, 106).....	3	3	3
Physical Education (PE 141, 142, 143).....	½	½	½
Health Education (PE 107).....	2		
Basic Biology (Bio 115).....	3		
Basic Biology Laboratory (Bio 145).....	2		
¹ General Inorganic Chemistry (Chem 324, 325).....	4	4	
Basic Mathematics for General Education (Math 101, 112)....		3	3
General Zoology (Zoo 131, 132).....		4	4
Organic Chemistry (Chem 326).....		4	4
Electives	3	2	3
	17½	16½	17½
Sophomore			
Sports Education (PE 241, 242, 243).....	½	½	½
Principles of Economics (Ec 201, 202).....	3	3	
General Botany (Bot 121, 122).....	4	4	
Genetics (Bio 303).....	3		
Literature	3		
General Bacteriology (Bact 221).....		4	
Literature, Art or Music.....		3	3
General Entomology (Ent 126).....			4
Public Speaking (Sp 201).....			2
Descriptive Statistics (Math 211).....			3
² Group Electives	3		4
Electives		3	
	16½	17½	16½

¹ Chem 321, 322, 323 will substitute for Chem 324, 325.

² See listing of group electives following this curriculum.

	F	W	S
Junior			
Biotechniques (Bio 341, 342).....	2	2	
³ General Physical Science (PSc 101, 102).....	4	4	
American Government (Pol Sc 301).....	3		
Family Relations (Psy 206).....		3	
Growth of American Democracy (Hist 304).....		3	
U.S. in World Affairs (Hist 305).....			3
Principles of Evolution (Bio 213).....			3
Senior Project (Bio 461).....			2
² Group Electives.....	4	4	5
Electives.....	3		4
	<hr/>	<hr/>	<hr/>
	16	16	17
Senior			
Senior Project (Bio 462).....	2		
General Physiology (Bio 335).....	4		
Agricultural Biochemistry (Chem 328).....		4	
Undergraduate Seminar (Bio 463).....		2	
Plant and Animal Ecology (Bio 325).....		3	
Taxonomy of Higher Plants (Bot 343).....			3
² Group Electives.....	4	3	3
Electives.....	5	4	10
	<hr/>	<hr/>	<hr/>
	15	16	16

Group Electives

Thirty units will be selected from the following groups with a minimum of 6 units from each group.

	<i>Units</i>
Group I	
Zoo 236 Invertebrate Zoology or Zoo 425, Parasitology.....	4
Zoo 323 Embryology or Zoo 326, Comparative Anatomy.....	4
Zoo 226 Vertebrate Field Zoology or Zoo 329, Ornithology.....	4
Ent 331 Insect Taxonomy or Ent 423, Structure and Function.....	3
Group II	
Bot 322 Plant Physiology.....	3
Bot 334 Plant Morphology or Bot 335, Plant Anatomy.....	3
Path 223 General Plant Pathology or Bot 426, Mycology.....	4-3
Bot 307 Economic Botany.....	2
Bot 236 Families of Flowering Plants.....	3
Group III	
Bio 321 Conservation of Natural Resources.....	3
Bio 225 Microtechnique.....	3
Bio 400 Special Problems for Undergraduates.....	1-2
Bio 425 Mechanisms of Evolution.....	3
Bio 352 Genetics Laboratory.....	2
Bio 423 Plant and Animal Cytology.....	4
Group IV	
PSc 209 Geology.....	3
SS 230 General Soils.....	4
Chem 329 Agricultural Biochemistry.....	4
AH 101, 102 Feeds and Feeding.....	2-2
AH 230 General Animal Husbandry.....	4
AH 304 Animal Breeding.....	3
CP 230 General Field Crops.....	4
FP 230 General Fruit Production.....	4
TC 230 General Truck Crops.....	4

² See listing of group electives following this curriculum.

³ Physics 131, 132, 133 will substitute.

DESCRIPTIONS OF COURSES IN BACTERIOLOGY

Bact 221 General Bacteriology (4)

Morphology, classification, physiology, and cultivation of bacteria; relation of bacteria to health of man, animals, and plants. 2 lectures, 2 laboratories. Prerequisites: Bio 145 or Chem 321 or 324

DESCRIPTIONS OF COURSES IN BIOLOGY

*** Bio 104 General Life Science (4)**

General survey of living things and life processes common to plants and animals. Importance of biology to daily living. Application of nature. 3 lectures, 1 laboratory.

Bio 110 Applied Biology (3)

Biology of man with application to engineering and industry. 3 lectures.

Bio 115 Basic Biology (3)

Introduction to living things; basic structure and function of plants and animals and their relationship to the physical world. 3 lectures.

Bio 116 Basic Biology Demonstration (1)

Laboratory methods in biology. For students desiring more than the 3-unit Basic Biology which must be taken concurrently. Does not satisfy laboratory prerequisite of other Biological Sciences courses. 1 hour lecture-discussion.

Bio 145 Basic Biology Laboratory (2)

Laboratory techniques in the study of cells, plant and animal structure and functions; survey of plant and animal taxonomic relationships. 2 laboratories. Prerequisite: To be taken concurrently with or after Bio 115

Bio 213 Principles of Evolution (3)

Introduction to plant and animal evolution. 3 lectures. Prerequisite: Bio 145

Bio 225 Microtechnique (3)

Methods of preparing plant and animal tissues for microscopic study. 1 lecture, 2 laboratories. Prerequisite: Consent of instructor.

*** Bio 230 Nature Study (4)**

Planned especially for elementary education majors. Emphasis on forms of life easily observed and identified outdoors; common plants and animals found in Southern California; natural phenomena, rocks, and minerals. 3 lectures, 1 laboratory. Prerequisite: Bio 104 and PSc 104

Bio 303 Genetics (3)

Principles of heredity and variation. 3 lectures. Prerequisite: Bio 145

*** Bio 314 Teaching Elementary School Science (3)**

Organizing the science program: teaching procedures; content of science instruction in the elementary school; appropriate experiments, field trips, and collections. 3 lectures. Prerequisite: Bio 230

Bio 321 Conservation of Natural Resources (3)

Fundamental concepts, practices, local and national laws concerning natural resources of the United States with emphasis on California and the western states. 2 lectures, 1 laboratory, and field work. Prerequisite: Consent of instructor.

Bio 325 Plant and Animal Ecology (3)

Response of plants and animals to their environment. 2 lectures, 1 laboratory. Prerequisite: Bot 122 or Zoo 132

† Bio 335 General Physiology (4)

Physical mechanisms at cellular level. 2 lectures, 2 laboratories. Prerequisite: Chem 328

* Not offered in 1960-61.

† Offered in odd-numbered years only.

Bio 341, 342, 343 Biotechniques (2) (2) (2)

Preparation of plant, animal, and insect materials for display, study, or teaching purposes. Prerequisite: Bot 121 or Zoo 131

Bio 352 Genetics Laboratory (2)

Laboratory techniques in genetics. 2 laboratories. Taken concurrently with or after Bio 303

Bio 400 Special Problems for Advanced Undergraduates (1-2)

Total credit limited to 4 units with not more than 2 units in any one quarter. 1 or 2 laboratories. Prerequisite: Senior standing or consent of instructor.

Bio 423 Plant and Animal Cytology (4)

Detailed study of animal and plant cells, structurally and functionally. 2 lectures, 2 laboratories. Prerequisite: Bot 122 and Zoo 132

Bio 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 with results presented in a formal report. Minimum of 120 hours total time.

Bio 463 Undergraduate Seminar (2)

Study and discussion of recent developments in the field of biology. 2 meetings. Prerequisite: Bio 462

Bio 521 Curriculum and Methods in the Biological Sciences (3)

Curricula, methods, devices, and procedures that may be used effectively in organizing and conducting high school biology courses. 2 lectures, 1 observation laboratory. Prerequisite: Graduate standing.

Bio 590 Seminar in Biology (1-3)

Arrangements to be made with department head. 1 to 3 units in one quarter; maximum of 6 units. Prerequisite: Graduate standing.

DESCRIPTIONS OF COURSES IN BOTANY**Bot 120 Agricultural Botany (4)**

Principles of structure, function, and classification of seed plants and fungi with special application to agriculture. 3 lectures, 1 laboratory. Prerequisite: Bio 145

Bot 121 General Botany (4)

Structure and function of plants. 2 lectures, 2 laboratories. Prerequisite: Bio 145

Bot 122 General Botany (4)

Nature and relationships of plant groups from bacteria to angiosperms. 2 lectures, 2 laboratories. Prerequisite: Bio 145

Bot 236 Families of Flowering Plants (3)

Recognition of the major orders and families of flowering plants. 2 lectures, 1 laboratory. Prerequisite: Bio 145

Bot 322 Plant Physiology (3)

Functions of plants; water relations, metabolism, and plant growth. 2 lectures, 1 laboratory. Prerequisite: Bot 120 or Bot 122

Bot 334 Plant Morphology (3)

Evolution of the plant kingdom as illustrated by comparative morphology of major plant groups. 2 lectures, 1 laboratory. Prerequisite: Bot 122

Bot 335 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 laboratories. Prerequisite: Bot 122

Bot 343 Taxonomy of Higher Plants (3)

General principles of classification of plants; procedure for identification of unknown plants; preparation and use of specimens. 1 lecture, 2 laboratories. Prerequisite: Bot 122

Bot 349 Grass Identification (2)

Structure and variation in grasses. Use of a key in identification. Recognition of tribes of grass family. Use of vegetative characters in identification of common hay and pasture grasses. 2 laboratories. Prerequisite: Bio 145

Bot 426 Mycology (3)

Morphological, cultural, and pathological characteristics of fungi. 2 lectures, 1 laboratory. Prerequisite: Bot 122 or consent of instructor.

DESCRIPTIONS OF COURSES IN ENTOMOLOGY**Ent 126 General Entomology (4)**

Basic principles of insect classification, with a survey of orders and important families. Structure, development, and behavior of insects. General principles of control. 2 lectures, 2 laboratories.

Ent 331 Insect Taxonomy (3)

Classification of insects; taxonomic categories and procedure; nomenclature and use of literature. 1 lecture, 2 laboratories. Prerequisite: Ent 126

Ent 334 Advanced Entomology (3)

Immature insects of economic importance; methods of evaluation of insect control procedures; principles of biological control; insect ecology. 2 lectures, 1 laboratory. Prerequisite: Ent 126

Ent 423 Structure and Function in Insects (4)

Comparative anatomy and physiology of insects. 2 lectures, 2 laboratories. Prerequisite: Ent 126

DESCRIPTIONS OF COURSES IN PLANT PATHOLOGY**Path 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 laboratories. Prerequisite: Bot 120 or Bot 122

Path 324 Advanced Plant Pathology (3)

Methods and materials used in diagnosis of plant diseases; special reference to techniques for differentiation of plant disease problems. 2 lectures, 1 laboratory. Prerequisite: Path 223

Path 335 Fungi Attacking Wood Products (3)

Recognition and identification of fungi found in timber products. Types of damage, means of prevention, and control measures. 2 lectures, 1 laboratory.

DESCRIPTIONS OF COURSES IN ZOOLOGY**Zoo 131 General Zoology (4)**

Tissues and organ systems of vertebrates; emphasis on man and domestic animals. 2 lectures, 2 laboratories. Prerequisite: Bio 145

Zoo 132 General Zoology (4)

Invertebrate animals from protozoa to chordates. A study of the variety and distribution of animal life with emphasis on those forms of economic and medical importance. 2 lectures, 2 laboratories. Prerequisite: Bio 145

† Zoo 224 Animal Physiology (3)

Introduction to functions of vertebrate organ systems. 2 lectures, 1 laboratory. Prerequisites: Zoo 131, 132

Zoo 226 Vertebrate Field Zoology (4)

Identification, life histories, and economic importance of vertebrates, especially birds and mammals. Fieldwork emphasized. 2 lectures, 2 laboratories, and fieldwork. Prerequisite: Zoo 132

† Offered in odd-numbered years only.

Zoo 234, 235 Human Anatomy and Physiology (4) (4)

Structure and function of organ systems of man. Planned for physical education and nonbiological sciences majors. 3 lectures, 1 laboratory. Prerequisite: Bio 145

Zoo 323 Embryology (4)

Embryonic development of vertebrate body with particular emphasis on frog, chick, and man. 2 lectures, 2 laboratories. Prerequisite: Zoo 132

Zoo 326 Comparative Anatomy of Vertebrates (4)

Comparative structure of vertebrate organ systems. 2 lectures, 2 laboratories. Prerequisites: Zoo 131 and 132

Zoo 329 Ornithology (3)

Identification, structure, physiology, ecology, behavior, and economic importance of birds, especially of Pacific Coast region. 1 lecture, 2 laboratories or field exercises and field project. Prerequisite: Zoo 131 and consent of instructor.

Zoo 422 Histology (4)

Tissue, microscopic organology, and correlation of form with function. 2 lectures, 2 laboratories. Prerequisite: Zoo 132

Zoo 425 Parasitology (4)

External and internal parasites of man and animals; life histories, control, distribution, and economic importance. 2 lectures, 2 laboratories. Prerequisite: Zoo 132

Zoo 435 Arthropod Vectors (3)

Role of insects, mites, ticks, and other arthropods in causation and transmission of diseases. Classification, structure, and life history of arthropods and parasites. 2 lectures, 1 laboratory. Prerequisite: Zoo 425, recommended Ent 126

BUSINESS ADMINISTRATION DEPARTMENT

Eugene J. Devine

John W. Francis

The business administration program prepares students for employment in the administrative and technical functions of both small and large businesses. The training, first of all, provides an opportunity for employment in the business community. Specialized course work is designed to shorten the essential period of apprenticeship all executives must serve. Correlated theory and practice are provided early in the program so that the student will know both the why and how of business operation.

The curriculum enables the graduate to understand the basic principles of business and realize the close relationship among the various aspects of the business world. Students are prepared for a wide range of positions in industry, commerce, finance and public service; e.g., proprietor-manager, management trainee, executive trainee, department head in a large business, purchasing agent, department store buyer. In addition to a wide offering of courses in business the student selects courses from the general education list to help him better understand his relationships in society and responsibilities as a citizen in a community.

CURRICULUM IN BUSINESS ADMINISTRATION

Freshman	F	W	S
Language Communication (Eng 104, 105, 106).....	3	3	3
Physical Education (PE 141, 142, 143).....	½	½	½
Introduction to Business Management (Bus 101).....	3		
Office Management (OA 121).....	3		
Typewriting (OA 141, 142).....	1	1	
Principles of Accounting (Actg 121, 122, 123).....	3	3	3
Health Education (PE 107).....		2	
Mathematics (Math 101, 106).....		3	3
Electives.....	3	4	7
	<hr/> 16½	<hr/> 16½	<hr/> 16½
Sophomore			
Sports Education (PE 241, 242, 243).....	½	½	½
Marketing Principles (Mktg 201).....	3		
Business Communication (Eng 218).....	3		
* Literature, Philosophy, Art or Music.....	3	3	
Principles of Economics (Ec 201, 202).....	3	3	
Public Speaking (Sp 201).....		2	
Advertising Principles (Mktg 204).....		3	
Data Processing (Actg 231).....			3
Family Relations (Psy 206).....			3
Descriptive Statistics (Math 211).....			3
Electives.....	4	5	7
	<hr/> 16½	<hr/> 16½	<hr/> 16½
Junior			
* Natural Sciences.....	3	3	3
American Government (Pol Sc 301).....	3		
Sales Management (Mktg 301).....	3		
Managerial Accounting (Bus 306).....	3		
Business Law (Bus 301, 302).....	3	3	
Growth of American Democracy (Hist 304).....		3	
Transportation and Traffic Management (Bus 304).....		3	
U.S. in World Affairs (Hist 305).....			3
Manufacturing Management (Bus 305).....			3
Advanced Public Speaking (Sp 303).....			2
Electives.....	2	5	6
	<hr/> 17	<hr/> 17	<hr/> 17

* To be selected from the General Education List.

Senior	F	W	S
Managerial Economics (Ec 413)	3		
Investment Principles (Bus 404)	3		
* Natural Sciences	3	3	
Senior Project (Bus 461, 462)	2	2	
Money and Banking (Ec 308)		3	
Public Relations (Jour 212)		3	
Budgeting (Bus 426)			3
Business and Government (Ec 302)			3
Insurance Principles (Bus 403)			3
Undergraduate Seminar (Bus 463)			2
Labor Economics (Ec 414)			3
Electives	5	5	2
	<hr/>	<hr/>	<hr/>
	16	16	16

DESCRIPTIONS OF COURSES IN BUSINESS ADMINISTRATION

Bus 101 Introduction to Business Management (3)

The field of American business enterprise: appreciation of the scope and problems. An introduction to the problems of management. 3 lectures.

Bus 212 Business Statements (1)

Business statements examined from the standpoint of their use as a managerial tool in the operation of a business enterprise in industry or agriculture. Interpretation of the balance sheet, the profit and loss statement, and supplementary financial statements. 1 lecture.

Bus 301 Business Law (3)

The principles of contracts, the sale of personal property, negotiable instruments, and the sale of real property. 3 lectures. Prerequisite: Ec 201

Bus 302 Business Law (3)

Mortgages, bailments, partnerships, insurance, agency and employment. 3 lectures. Prerequisite: Bus 301

Bus 304 Transportation and Traffic Management (3)

Purchase and sale of transportation. Rate structures and controls. Rate claims and Interstate Commerce Commission proceedings. Study of uses of bills of lading and claims. Storage locations, and routing considerations. 3 lectures.

Bus 305 Manufacturing Management (3)

Principles and techniques for organizing and performing manufacturing operations. 3 lectures.

Bus 306 Managerial Accounting (3)

Accounting as a managerial tool, including budget, cost, and profit interpretation. 3 lectures. Prerequisite: Actg 122

Bus 400 Special Problems for Advanced Undergraduates (1-2)

Individual or group investigation of special areas in the field of business. Total credit limited to 4 units with not more than 2 units in any one quarter. Prerequisite: Senior standing or consent of instructor.

Bus 403 Insurance Principles (3)

Principles of insurance as they affect the conduct of a business. Coverage of risks on materials and merchandise, transportation, and business interruption. 3 lectures.

Bus 404 Investment Principles (3)

Principles of determining most desirable channels for investment of business funds. 3 lectures.

Bus 405 Analysis of Investments (3)

Analysis and evaluation of corporate securities and their price fluctuation. 3 lectures. Prerequisite: Bus 404

* To be selected from the General Education List.

Bus 426 Budgeting (3)

Preparation and structure of budgets. Their effective administration. 2 lectures, 1 laboratory. Prerequisite: Actg 123

Bus 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. Formal report is required. Required minimum of 120 hours.

Bus 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the students' major fields. 2 meetings. Prerequisite: Senior standing or special permission.

EDUCATION DEPARTMENT

The Education Department provides instruction to students who seek careers in the teaching profession. Those who plan to teach in the elementary schools major in education and receive much of their major instruction in this department. However, the elementary education curriculum is strong in subject-matter work and practical skills. The student is introduced to the teaching profession and the nature of a teaching career early in the freshman year. He is also taken on visits to public schools in the area to acquaint him with the classroom from the teacher's point of view. The first year is also marked by intensive study of history, language, art, and science, including agriculture.

Further school observation including reports and conferences and a study of general methods of teaching comes late in the second year. This year also is devoted to developing in the student the many basic skills required for effective elementary school teaching. The last two years bring the student into close contact with actual school situations through a full year of methods instruction and the directed teaching experience. In addition, the student receives instruction in the technical aspects of child growth, psychology, evaluation, and curriculum. Two features of this curriculum are the penmanship and first aid requirements. All new students are required to take a penmanship test, followed by a course in remedial penmanship for those who do not meet college standards. A course leading to a Red Cross first aid card is required in the junior year so that every graduate will possess a valid card upon initial employment.

For students seeking secondary credentials, the Education Department offers work in professional education. The student majors in the field of his teaching major, receiving from the Education Department the supporting instruction which helps him learn the techniques of teaching in his chosen field. Student teaching is under the joint direction of the student's major and minor departments and the Education Department. Curricula are presently offered leading to the General Secondary Credential with majors in life science and general science, mathematics, physical education, physical science and general science, and social studies, and the Special Secondary Credential in Physical Education. The student interested in secondary school teaching as a career is directed to the course descriptions of the major field in which he is interested.

CURRICULUM IN ELEMENTARY EDUCATION

Major not offered in 1960-61

Freshman	F	W	S
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Introduction to Education (Ed 107)	3		
History of Civilization (Hist 101, 102, 103)	3	3	3
Elementary Physical Science (PSc 104)	4		
Introduction to the Social Sciences (Soc Sc 101)	3		
Health Education (PE 107)		2	
General Life Science (Bio 104)		4	
Arithmetic for Elementary Teachers (Math 121, 122)		3	3
Art Materials and Skills (Art 234)			3
¹ Agricultural Science			4
	16½	15½	16½

¹ A general course in agriculture to be approved by the adviser.

	F	W	S
Sophomore			
Sports Education (PE 241, 242, 243)	½	½	½
Literature, Philosophy, Art, or Music	3		
Public Speaking (Sp 201)	2		
Basic Music Skills (Mu 201)	3		
General Psychology (Psy 202)	3		
School and Community Health Education (PE 203)	2		
Nature Study (Bio 230)	4		
Literature		3	
Craft Materials and Skills (Art 235)		3	
Consumer Economics (Ec 105)		3	
History of California (Hist 112)		3	
Observation and Teaching Procedures (Ed 303)			3
Problems in Speech Development (Sp 302)			2
Elements of Geography (Geog 221)			3
Children's Literature (Eng 205)			3
Educational Psychology (Psy 312)			3
² Electives		5	4
	17½	17½	18½
Junior			
American Government (Pol Sc 301)	3		
Family Relations (Psy 206)	3		
Principles of Elementary Education (Ed 302)	3		
Child Growth and Development (Psy 305)	3		
The Teaching of Reading (Ed 314)	3		
Growth of American Democracy (Hist 304)		3	
³ Physical Science Elective		3	
Audiovisual Materials and Methods (AV 431)		3	
Teaching Social Studies and Language Arts (Soc Sc 314)		3	
U.S. in World Affairs (Hist 305)			3
Safety and First Aid (PE 121)			2
Teaching Elementary School Science (Bio 314)			3
⁴ Teaching Elementary School Arithmetic (Math 314)			3
² Electives	3	4	5
	18	16	16
Senior			
Directed Teaching (Ed 431)	8	4	
Senior Project (Ed 461, 462)	2	2	
Evaluation in the Elementary School (Ed 406)		3	
Undergraduate Seminar (Ed 463)			2
² Electives	4	7	14
	14	16	16

DESCRIPTIONS OF COURSES IN EDUCATION

Ed 1 Remedial Penmanship (1)

Development of skills in handwriting for education majors showing a deficiency. Cursive and manuscript styles on paper and blackboard. 1 two-hour laboratory.

Ed 107 Introduction to Education (3)

The nature of the teaching profession. Qualifications of successful teachers. Analysis of duties and amenities of elementary and secondary school teaching. School law and certification requirements. Opportunities for advancement. Observation of teaching situations in public schools. 3 lectures.

² Twenty-one units of electives to be selected from content courses approved by the adviser.

³ To be selected from the General Education List.

⁴ Additional courses are available in the teaching of Art (Art 314), Music (Mu 314) and Physical Education (PE 314).

Ed 301 Principles of Secondary Education (3)

Introduction to secondary school teaching. Analysis of the specific problems and challenges of the secondary school. Requirements of a good secondary school teacher. Objectives, functions, and curricula of California secondary schools. 3 lectures.

*** Ed 302 Principles of Elementary Education (3)**

Introduction to elementary school teaching. Philosophies of elementary education and elementary school practices in California. Aims and objectives of education in a democracy. 3 lectures.

*** Ed 303 Observation and Teaching Procedures (3)**

Introduction to techniques and procedures used in elementary school teaching. Observation in elementary schools at all levels. Methods of teaching basic elementary school subjects. Preparation for intensive study of teaching methods in the various subject fields. 3 lectures.

Ed 305 Guidance Techniques for Teachers and Parents (3)

Counseling and guidance as an integral part of good education. Parent-child relationships. Teacher-child relationships. Diagnostic techniques and the parent conference. Mental hygiene; community and state resources available to parents and teachers. 3 lectures. Prerequisite: Psy 305

*** Ed 314 The Teaching of Reading (3)**

Reading readiness; the psychology of learning to read. Instructional materials. Evaluation of reading skills. Development of independent reading abilities. Recreational reading. 3 lectures. Prerequisite: Psy 305

Ed 403 Secondary School Teaching Plans and Techniques (5)

Planning lessons, unit development, specific teaching skills, class management, and utilization of community resources and relationships. Demonstrations and observation in secondary schools. Classroom planning co-ordinated with public school practice. 5 lectures. Prerequisite: Psy 312

*** Ed 406 Evaluation in the Elementary School (3)**

Appraising the results of instruction in terms of educational objectives. Pupil growth as a product of environment, health, attitudes, and mental ability. Value of cumulative records, reports to parents, and teacher-made tests as evaluation devices. 3 lectures. Prerequisite: Ed 431 or permission of the instructor.

Ed 421 Student Teaching (Special Secondary) (9)

Observation and teaching under direction of a selected regular teacher in a secondary school. Participation in representative public school activities. Supervision by major department and teacher education staff. For special secondary credential candidates.

Ed 430 Student Teaching (3-12)

Student teaching includes participation, teaching, and allied activities under the direction of a selected regular teacher in a public secondary school with consultation from college supervisors. The application for student teaching must be approved prior to registration for Ed 430.

*** Ed 431 Student Teaching (Elementary) (12)**

Observation and teaching under direction of a selected regular teacher in an elementary school. Participation in a wide variety of representative public elementary school activities.

*** Ed 461, 462 Senior Project (2) (2)**

Selection and completion of a project in elementary education under a minimum of supervision. Projects typical of problems graduates will be faced with as professional elementary teachers. Results presented in a formal report. Minimum of 120 hours total time.

*** Ed 463 Undergraduate Seminar (2)**

Study and discussion of recent and current developments in elementary education. Analysis of current literature in the field. 2 lecture-discussions.

* Not offered in 1960-61.

*** Ed 478 Problems in Elementary Curriculum Construction (3)**

Advanced approach to the development of elementary school curricula. Public relations; people involved in building the curriculum; implementing the purpose of education through the curriculum; child development and the curriculum. 3 lectures. Prerequisite: Ed 431

Ed 501 Philosophy of Education (3)

The function of philosophy; the meaning of education; significance of present philosophical points of view; educational aims and values; democracy and education; the relationship of various philosophical outlooks to educational methods and subject matter. 3 lectures.

Ed 503 Counseling and Guidance (3)

The philosophy, techniques, and administration of individual and group guidance programs. Individual counseling. The assessment of students' interests, abilities, and achievement with respect to educational and vocational choice, and school and life orientation. 3 lectures.

Ed 504 Evaluation in Secondary Education (3)

Preparation and use of tests; new objective tests; check lists and rating scales. Supplementary observational techniques. The use of all such devices in evaluation. Assigning grades and reporting results. 3 lectures.

Ed 508 Educational Sociology (3)

Sociological backgrounds of school children; effects of social, economic, and political trends and issues on education; problems of leisure, recreation, and occupations; modern interpretations of democratic ideology. Sociological problems are utilized to define the social objectives of the school. 3 lectures.

* Not offered in 1960-61.

ENGLISH AND SPEECH DEPARTMENT

Acting Chairman, Ben Siegel

Virginia H. Adair
Sydney R. Bobb
John F. FulbeckC. Edwin Harwood
William D. Schenck
Samuel I. BellmanRalph C. McCormic
Frank A. Tenant
Howard West

Courses in English and speech are designed to serve three purposes: (1) to help the student develop habits of sound thinking and logical organization of material; (2) to provide opportunities for the student to use language accurately, clearly, and interestingly in speaking and writing; and (3) to develop the technique of reading to the point of understanding others' ideas and using those ideas effectively. The sole objective of the department is to provide service courses in the fields of English, speech, and journalism and to offer appropriate courses in these fields to meet the general education needs of students in the other majors offered by the college.

The English 104, 105, 106 course sequence is required of all students except those who enter with credit in freshman composition. In addition, one of the following courses is required: English 211, 212, 213, 311, 312, 313. Other courses are offered for department patterns and as electives.

A placement test is given to aid in the assignment of students to the appropriate level of training in language communication. Students who demonstrate considerable deficiency will be assigned to English 4, a preparatory course without credit toward a degree. A passing grade in this course entitles the student to advance to English 104.

Courses in journalism also are offered by this department.

DESCRIPTIONS OF COURSES IN ENGLISH**Eng 4 Preparatory English (3)**

For the student who needs additional work before entering English 104. The organization of ideas into logical, clear sentences and paragraphs. Basic principles of grammar and rhetoric. Written exercises based upon selected readings. 3 lectures.

Eng 104 Language Communication (3)

Oral and written communication skills. Argumentation, description, and narration taught through selected readings and short essays and reports. Library project. 3 lectures. Prerequisite: Satisfactory score in placement examination or Eng 4

Eng 105 Language Communication (3)

Oral and written communication skills. Argumentation, description, and narration taught through selected readings and short reports. Term-paper project. Book review. 3 lectures. Prerequisite: Eng 104

Eng 106 Language Communication (3)

Oral and written communication skills. Argumentation, description, and narration taught through literary and mass media materials. Business letters. Introduction to literary forms, particularly poetry and the short story. Book review. 3 lectures. Prerequisite: Eng 105

*** Eng 205 Children's Literature (3)**

Readings for elementary and junior high school students. Selection, evaluation, and discussion of material. 3 lectures. Prerequisite: Eng 106

Eng 207 English Literature (3)

Study of the major English literary works from beginnings to the Renaissance. 3 lectures. Prerequisite: Eng 106

Eng 208 English Literature (3)

Study of the major English literary works from Milton to Wordsworth. 3 lectures. Prerequisite: Eng 106

Eng 209 English Literature (3)

Study of the major English literary works from Byron to the present. 3 lectures. Prerequisite: Eng 106

* Not offered in 1960-61.

Eng 211 Modern Literature (3)

The study, through the contemporary short story and novel, of man's intellectual, social, and scientific ideas. His search for knowledge, self-understanding, and values. 3 lectures. Prerequisite: Eng 106

Eng 212 Modern Literature (3)

The study, through contemporary drama, of man's intellectual, social, and scientific ideas. His search for knowledge, self-understanding, and values. 3 lectures. Prerequisite: Eng 106

Eng 213 Modern Literature (3)

The study, through contemporary poetry and biography, of man's intellectual, social, and scientific ideas. His search for knowledge, self-understanding, and values. 3 lectures. Prerequisite: Eng 106

Eng 218 Business Communication (3)

Business writing techniques and forms. Emphasis on letters of application, inquiry, sales, credit, and customer relations. Oral reports and interviews. 3 lectures. Prerequisite: Eng 106

Eng 219 Technical Writing (3)

Principles and practices of technical writing. Preparation, organization and communication of technical data; preparation of training materials. 3 lectures. Prerequisite: Eng 106

Eng 301 Report Writing (3)

Report writing techniques. Research, organization, and preparation of specialized and technical information. Regular written reports. 3 lectures. Prerequisite: Eng 106

Eng 311 American Literature (3)

Historical, religious, political, literary, and philosophical ideas in American writings from the Colonial to the Romantic Period. 3 lectures. Prerequisite: Eng 106

Eng 312 American Literature (3)

Historical, religious, political, literary, and philosophical ideas in American writings from 1830 to 1885. 3 lectures. Prerequisite: Eng 106

Eng 313 American Literature (3)

Historical, religious, political, literary, and philosophical ideas in American writings from the rise of Realism to the present. 3 lectures. Prerequisite: Eng 106

Eng 314 Advanced Composition (3)

Intensive study of modern English usage. Study of current practices in written composition. Exercises in narration, description, exposition, and argumentation. 3 lectures. Prerequisite: Eng 106

Eng 315 Shakespeare (3)

Selected comedies and tragedies of Shakespeare. Study of their place in the secondary school curriculum and the best techniques of presentation to young people to provide enjoyment and appreciation. 3 lectures. Prerequisite: Eng 106

Eng 319 Advanced Technical Writing (2)

Preparation of training materials; technical reports; technical papers. 2 lectures. Prerequisite: Eng 219

Eng 404 Modern Drama (3)

Study of the dramatic form and its development. Selected plays suitable for study and production in the secondary school. 3 lectures. Prerequisite: Eng 106

Eng 415 The Modern Novel (3)

Analysis of the novel. Selected foreign and American novels, with special emphasis upon the European influences. 3 lectures. Prerequisite: 9 units of literature.

Eng 417 The Short Story (3)

Selected short stories demonstrating form, content, style, and plot. Analysis of ideas and structure as training for accurate and effective writing. 3 lectures. Prerequisite: 9 units of literature.

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

Selection and completion of a project under a minimum of supervision. Projects are 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.

Eng 463 Undergraduate Seminar (2)

Reports of senior projects, discussions of professional articles of an appropriate level. 2 lecture-discussions. Prerequisite: Completion of senior project.

DESCRIPTIONS OF COURSES IN SPEECH**Sp 201 Public Speaking (2)**

Effective oral communication. Expository, narrative, and persuasive speeches. Practice in extemporaneous, impromptu, and prepared talks, and panel discussions. 2 lectures. Prerequisite: Eng 105

Sp 203 Oral Interpretation (2)

Selection, analysis, and presentation of radio, television, and stage scripts, poetry, short stories, and famous speeches. 2 lectures. Prerequisite: Sp 201

Sp 302 Problems in Speech Development (2)

Common and typical speech deviations usually found in elementary and secondary pupils; classroom procedures for the improvement and correction of speech; classroom speech activities. 2 lectures. Prerequisite: Sp 201

Sp 303 Advanced Public Speaking (2)

Formal group discussion: symposium, panel, and round-table. Simulated business and professional situations; parliamentary procedure and after-dinner speeches. Speech projects before college and community groups. 2 lectures. Prerequisite: Sp 201

Sp 304 Argumentation and Persuasion (2)

Organization and presentation of evidence; construction of the brief. Analysis and discussion of current issues. Formal and informal debates. 2 lectures. Prerequisite: Sp 201

Sp 347 Drama Workshop (2)

Practical experience in the selection, direction, and production of campus plays. Included are acting, stagecraft and lighting, makeup, publicity, and business arrangements. May be repeated for not more than 6 units. 2 2-hour laboratories. Prerequisite: Permission of the instructor.

Sp 351, 352, 353 Debate (1) (1) (1)

Training and experience in intercollegiate and parliamentary debate. 1 2-hour laboratory. May be repeated for not more than 6 units. Prerequisite: Sp 303

Sp 403 Speech Techniques in Society (2)

Role of spoken discourse in the solution of social problems. Special concern with forms of discussion such as panels, forums, and symposia. 2 lectures. Prerequisite: Sp 201

DESCRIPTIONS OF COURSES IN JOURNALISM**Jour 151, 152, 153 Journalism Practice (1-2) (1-2) (1-2)**

Laboratory course for college publications and student news bureau beginning staff members. 1-2 laboratories. Prerequisite: Permission of the instructor and satisfactory score in placement examination or Eng 4

Jour 101 Introductory Journalism (3)

Introduction to journalism; survey of newspaper history; study of news writing techniques. 3 lectures. Prerequisite: Satisfactory score in placement examination or Eng 4

Jour 102 Reporting (3)

Fundamentals of news reporting, writing, editing, and makeup. Introduction to basic news sources and documents. 3 lectures. Prerequisite: Jour 101

Jour 212 Public Relations (3)

The effects of organized information upon public thinking. Dissemination of ideas by business, industrial, social, and governmental organizations. Survey of mass media. Term project. 3 lectures. Prerequisite: Eng 106

Jour 251, 252, 253 Advanced Journalism Practice (1-2) (1-2) (1-2)

Laboratory course for experienced staff members of college publications or student news bureau. 1-2 laboratories. Prerequisite: Permission of the instructor.

Jour 351, 352, 353 Editorial Practice (1-2) (1-2) (1-2)

Laboratory course for college publications or student news bureau staff members holding editorial or equivalent positions. 1-2 laboratories. Prerequisite: Permission of the instructor.

DESCRIPTION OF COURSE IN SPANISH**Span 221, 222, 223 Conversational Spanish (3) (3) (3)**

Oral drill and conversational practice. Class drill in pronunciation, sentence structure, vocabulary, and basic conversation in relation to Latin-American usage. Listening and responding to recorded materials. 2 lectures, 1 2-hour laboratory.

MARKETING DEPARTMENT

Charles F. Meals

The curriculum in Marketing is designed to prepare students for positions in that portion of the business field which concerns itself with bringing to users the products of either agriculture or industry. It covers the fields of retail, wholesale, and industrial selling, and provides training leading to such jobs as that of salesman, store operator, sales manager, advertising manager, advertising agency executive, and research director. Required courses cover not only those subjects dealing directly with marketing, but also many others involving the structure and organization of business as a whole, so that graduates will have an adequate grasp of the overall problems of an organization, and will be equipped to make their marketing activities an important part of the complete operation.

Courses and the curriculum have been built so as to provide the opportunity for actual work experience as well as theory. Instructors are selected on the basis of their marketing experience as well as their educational backgrounds.

CURRICULUM IN MARKETING

	F	W	S
Freshman			
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Typewriting (OA 141, 142)	1	1	
Principles of Accounting (Actg 121, 122)	3	3	
Office Management (OA 121)	3		
Introduction to Business Management (Bus 101)	3		
Health Education (PE 107)		2	
Basic Mathematics (Math 101)		3	
Business Mathematics (Math 106)			3
Electives	3	4	10
	<hr/>	<hr/>	<hr/>
	16½	16½	16½
Sophomore			
Sports Education (PE 241, 242, 243)	½	½	½
Business Communication (Eng 218)	3		
Advertising Principles (Mktg 204)	3		
Marketing Principles (Mktg 201)	3		
* Literature, Philosophy, Art or Music	3	3	
Principles of Economics (Ec 201, 202)	3	3	
Public Speaking (Sp 201)		2	
Advertising Practices (Mktg 205)		3	
Salesmanship (Mktg 208)		3	
Descriptive Statistics (Math 211)			3
Family Relations (Psy 206)			3
Sales Promotion (Mktg 206)			3
Electives	1	2	7
	<hr/>	<hr/>	<hr/>
	16½	16½	16½
Junior			
* Natural Sciences	3	3	3
Business Law (Bus 301, 302)	3	3	
Sales Management (Mktg 301)	3		
American Government (Pol Sc 301)	3		
Credit Management (OA 301)	3		
Growth of American Democracy (Hist 304)		3	
Industrial Marketing (Mktg 302)		3	
Transportation and Traffic Management (Bus 304)		3	
U.S. in World Affairs (Hist 305)			3
Retail Store Management (Mktg 303)			3
Economic Problems (Ec 213)			3
Advanced Public Speaking (Sp 303)			2
Electives	2	2	3
	<hr/>	<hr/>	<hr/>
	17	17	17

* To be selected from the General Education List.

Senior	F	W	S
Market Analysis and Research (Mktg 401).....	3		
Human Relations (Psy 304).....	3		
* Natural Sciences.....	3	3	
Senior Project (Mktg 461, 462).....	2	2	
Interpretation of Business Data (Mktg 402).....		3	
Public Relations (Jour 212).....		3	
Money and Banking (Ec 308).....		3	
Undergraduate Seminar (Mktg 463).....			2
Budgeting (Bus 426).....			3
Insurance Principles (Bus 403).....			3
Electives.....	5	2	8
	<hr/>	<hr/>	<hr/>
	16	16	16

DESCRIPTIONS OF COURSES IN MARKETING

Mktg 201 Marketing Principles (3)

A survey of the problems concerned with the marketing of goods and services with emphasis on sound principles and practices. 3 lectures.

Mktg 204 Advertising Principles (3)

Technical, economic, and professional aspects of advertising. Campaign organization for effective advertising. 3 lectures.

Mktg 205 Advertising Practices (3)

Considerations involved in production and placing of advertising. Copy, layout, production and reproduction processes, media selection and research. 3 lectures. Prerequisite: Mktg 204

Mktg 206 Sales Promotion (3)

Methods of marketing merchandise, channels of distribution, co-ordination of sales and advertising effort, special inducements, and point-of-purchase displays. 3 lectures.

Mktg 208 Salesmanship (3)

Salesmanship and the role of the salesman in retail and wholesale selling. Sales techniques. Salesmanship and product service. Solutions to sales problems. 3 lectures.

Mktg 301 Sales Management (3)

Organization and operation of sales forces. Determination of market potentials. Methods of remuneration. 3 lectures.

Mktg 302 Industrial Marketing (3)

Marketing of products for resale or further manufacture. 3 lectures.

Mktg 303 Retail Store Management (3)

Problems of merchandising, location, layout, display, advertising, records, purchasing, personnel relations, and other considerations of retail operations. 3 lectures.

Mktg 306 Space and Time Buying (3)

Studies of the most effective use of advertising funds from the standpoint of selection of print media and the purchase of radio and television time. 3 lectures. Prerequisite: Mktg 305

Mktg 400 Special Problems for Advanced Undergraduates (1-2)

Individual or group investigation of special areas in the field of marketing. Total credit limited to 4 units with not more than 2 units in any one quarter. Prerequisite: Senior standing or consent of instructor.

Mktg 401 Market Analysis and Research (3)

Determination of market potentials, sales areas and sales quotas. Sources of market data. Techniques of quantitative and qualitative market analysis. 3 lectures. Prerequisite: Mktg 301

* To be selected from the General Education List.

Mktg 402 Interpretation of Business Data (3)

Sources and types of data, their significance and application to forecasting. 3 lectures. Prerequisite: Mktg 301

Mktg 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. Formal report is required. Required minimum of 120 hours.

Mktg 463 Undergraduate Seminar (2)

Study and discussion by students of recent developments in the student's major fields. 2 meetings. Prerequisite: Senior standing or special permission.

MATHEMATICS DEPARTMENT

Department Head, Wallace A. Raab

Kenneth B. Kriege	Douglas H. Moore	William C. Paugstat
Cameron C. Bogue	William C. McIntosh	Harold F. Simmons
Joseph Kachun	George C. Carlstedt	Bernard Gedanken

The Mathematics Department offers courses needed in the agricultural and engineering divisions for the purpose of developing vocational proficiency and courses designed to contribute to the general education of all students.

Placement tests are given to entering students to determine their facility and preparation in mathematics. The results of these tests are used to help in placing the new student in courses where he will most likely succeed. Students in engineering will normally begin their college work in mathematics with Math 117. Students in agriculture will normally begin with Math 102. Students in arts and sciences will normally begin with Math 101.

The major in mathematics is planned with two objectives. First, it is intended to prepare secondary school teachers of mathematics who are aware of the significance of mathematics and of its contributions to modern living. Its second objective is to prepare mathematicians for industrial and civil service employment. The major program requires extensive work in applied mathematics and skills courses with a view to producing mathematicians who are capable of using their knowledge in a wide variety of applications. A high school student planning a major in mathematics should take three semesters of algebra, one of trigonometry, two of geometry, two of physics, and two of chemistry.

CURRICULUM IN MATHEMATICS

Freshman	F	W	S
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Mathematics for Engineers (Math 117)	5		
* Biological Science	3	3	
General Physics (Phys 131, 132)		4	4
Analytic Geometry and Calculus (Math 201)		5	3
Health Education (PE 107)			2
General Chemistry (Chem 321)			4
† Electives	5	1	
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	16½	16½	16½
Sophomore			
Sports Education (PE 241, 242, 243)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
General Physics (Phys 133 or 204)	4		
Principles of Economics (Ec 201)	3		
Literature	3		
Analytic Geometry and Calculus (Math 202, 203)	3	3	
General Psychology (Psy 202)		3	
* Economics		3	3
Literature, Philosophy, Art, or Music		3	3
Family Relations (Psy 206)			3
Differential Equations (Math 316)			3
† Electives	3	4	4
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	16½	16½	16½

* At least 3 units to be selected from the General Education list.

† Fifteen units to be selected from skills courses approved by the adviser. Teaching majors elect Psy 312, Ed 301, and Ed 403 in junior and senior years.

	F	W	S
Junior			
Differential Equations (Math 317)	2		
Theory of Equations (Math 307)	3		
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
Mathematical Analysis of Engineering Problems (Math 318, 319)		3	3
U.S. in World Affairs (Hist 305)			3
Senior Project (Math 461)			2
‡ Mathematics Electives	3	3	3
† Electives	6	8	6
	17	17	17
Senior			
Senior Project (Math 462)	2		
Undergraduate Seminar (Math 463)			2
‡ Mathematics Electives	3	6	3
† Electives	11	10	11
	16	16	16

DESCRIPTIONS OF COURSES IN MATHEMATICS

Math 1 Preparatory Mathematics (3)

Fundamentals of arithmetic, denominate numbers, introduction to algebra, percentage, exponents, simultaneous linear equations. Required of all students who show a deficiency in algebra on the placement examination. 3 lectures.

Math 7 Preparatory Algebra (5)

Signed numbers, linear equations, literal equations, formula evaluation, functional relationships, graphing linear and quadratic equations, factoring algebraic functions, fractional equations. 5 lectures.

Math 101 Basic Mathematics (3)

Graphs, charts, ratio, proportion, variation, basic algebraic operations, linear and quadratic equations, logarithms. 3 lectures. Prerequisite: Satisfactory score on mathematics placement examination or Math 1

Math 102 Agricultural Mathematics I (3)

Percentage, formulas, linear equations, simultaneous linear equations, problems involving soils and irrigation, dairy products, horticulture and agronomy, feeds, fertilizers, discounts and interest, slope, mixtures, nutritive ratio, perimeters, areas, volumes, specific gravity, ratio and proportion, farm construction, farm mechanics. 3 lectures. Prerequisite: Satisfactory score on placement examination or Math 1

Math 103 Agricultural Mathematics II (3)

Exponents, logarithms, Mannheim slide rule, introduction to trigonometry, statistical data, measures of central tendency, standard deviation, rectangular co-ordinates, plotting curves, expanding and factoring polynomials. 3 lectures. Prerequisite: Math 102

Math 106 Business Mathematics (3)

Simple interest, discounts, compound interest, annuities, sinking funds, amortization, insurance, stocks and bonds. 3 lectures. Prerequisite: Math 101

Math 112 Basic Mathematics for General Education (3)

Elements of trigonometry, analytic geometry, and statistics as applied to biological sciences, physical education, social sciences. 3 lectures. Prerequisite: Math 101

Math 117 Mathematics for Engineers (5)

A unified treatment of the basic principles of college algebra and trigonometry. 5 lectures. Prerequisite: Math 7 or satisfactory score on placement examination.

† Fifteen units to be selected from skills courses approved by the adviser. Teaching majors elect Psy 312, Ed 301, and Ed 403 in junior and senior years.

‡ Fifteen units of mathematics electives to be selected from applied mathematics courses approved by the adviser.

Math 118 Analytic Geometry and Calculus (5)

A continuation of college algebra and trigonometry. Introduction to analytic geometry and calculus. 5 lectures. Prerequisite: Math 117

† **Math 121 Arithmetic for Elementary Teachers I (3)**

The idea of numbers, our number system, and number concept; the four fundamental operations with whole numbers and common fractions. Achievement and remedial tests are used. 2 lectures, 1 activity period. Prerequisite: Satisfactory score on placement examination or Math 1

† **Math 122 Arithmetic for Elementary Teachers II (3)**

Decimal fractions; the meaning of percent and its application; universal arithmetic and formulas; measurement of length, scale drawings, and straight line graphs. 2 lectures, 1 activity period. Prerequisite: Math 121 or instructor's permission.

† **Math 123 Arithmetic for Elementary Teachers III (3)**

Measurement of angles, areas, and volumes; the study of plane figures and geometrical solids; liquid and dry measures; units of weight and time; the metric system. The actual use of these measurements. 2 lectures, 1 activity period. Prerequisite: Math 122 or instructor's permission.

Math 201, 202, 203 Analytic Geometry and Calculus (3) (3) (3)

Continuation of analytic geometry and calculus. 3 lectures. Prerequisite: Math 118

Math 211 Descriptive Statistics (3)

Graphical representation of statistical data; calculation and uses of various averages, measures of variability, elementary probability and the normal probability curve, simple linear correlation. 3 lectures. Prerequisite: Math 103, 106, 112, or 117

Math 213 Elementary Engineering Problems (2)

Selected problems from engineering fields which are solvable by the methods of elementary mathematics. Selection of topics from: polar co-ordinates, empirical equations, properties of determinants, infinite series, hyperbolic functions, multiple integration, partial derivatives. 2 lectures. Prerequisite: Math 203

Math 217 Mathematics of Digital Computers I (3)

Boolean algebras and number systems with particular reference to the calculus of binary numbers. 3 lectures. Prerequisite: Math 118

Math 218 Mathematics of Digital Computers II (3)

Basic functions of digital computers; introduction to numerical methods and analysis; introduction to programming. 3 lectures. Prerequisite: Math 217

Math 304 Programming of Digital Computers (3)

Coding of general purpose and special purpose digital computers. Preparation of programs of general purpose computers. Subroutines. 3 lectures. Prerequisite: Math 218

Math 307 Introduction to Theory of Equations (3)

Complex numbers, general theorems on algebraic equations, solution of the general cubic, methods of solution of algebraic equations. 3 lectures. Prerequisite: Math 201

† **Math 314 Teaching Elementary School Arithmetic (3)**

The content of the elementary school arithmetic curriculum; teaching number concepts; developing skills, appreciation, and understanding of arithmetical problems; evaluation. 3 lectures. Prerequisites: Math 122 or equivalent and Psy 305

Math 316 Differential Equations (3)

An introduction to first order differential equations and simple linear equations with constant coefficients. Applications to dynamics, electric circuits, and heat flow. 3 lectures. Prerequisite: Math 203

† Not offered in 1960-61.

Math 317 Differential Equations (2)

Linear differential equations with constant coefficients. Operational methods including an introduction to the Laplace transform and their application. 2 lectures. Prerequisite: Math 316

Math 318 Mathematical Analysis of Engineering Problems (3)

Infinite series, Fourier series, series solution of differential equations, Gamma functions, Bessel functions, elliptic integrals. 3 lectures. Prerequisite: Math 316

Math 319 Mathematical Analysis of Engineering Problems (3)

Introduction to the solution of partial differential equations, Fourier integral. 3 lectures. Prerequisite: Math 318

Math 322 Statistical Method (3)

Elements of sampling theory, measures of reliability, testing of hypotheses, essentials of product control, linear and curvilinear correlation, multiple correlation. 2 lectures, 1 2-hour laboratory. Prerequisite: Math 211

Math 400 Topics in Applied Mathematics (1-2)

Individual or group investigations of selected topics in applied mathematics. Total credit limited to 4 units. 1 or 2 lecture-discussions. Prerequisite: Permission of instructor.

Math 402 Secondary School Mathematics (3)

Evaluation of content, texts, and supplementary material for seventh- and eighth-grade arithmetic, ninth- and twelfth-grade mathematics, and remedial mathematics; techniques for developing concepts. 3 lectures. Prerequisite: Math 203

Math 403 Secondary School Mathematics (3)

Evaluation of content, texts, and supplementary materials for first- and second-year algebra, plane geometry, and trigonometry; techniques for developing concepts. 3 lectures. Prerequisite: Math 203

Math 404 Vector Analysis (2)

Algebra of free vectors with applications. Introduction to differential and integral calculus of vectors. 2 lectures. Prerequisite: Math 316

*** Math 405 Vector Analysis (2)**

Calculus of scalar and vector functions. Derivation and properties of gradient, divergence, and curl. Applications of analytic vector methods to problems of physics and engineering. 2 lectures. Prerequisite: Math 404

† Math 408 Functions of a Complex Variable (2)

Fundamental properties of a complex variable. Conformal mapping and its applications to heat transfer, electric potential theory, and hydrostatics. 2 lectures. Prerequisites: Math 213 and 316

Math 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 presented in a formal report. Minimum of 120 hours total time.

Math 463 Undergraduate Seminar (2)

Discussions through seminar methods of new developments in the fields of student's particular interests. 2 lecture-discussions.

Math 521 Curriculum and Methods in Mathematics (3)

Modern tendencies and general aims of secondary school mathematics. Objectives of, and methods for effective teaching in general mathematics, algebra, geometry, and trigonometry. 3 lectures. Prerequisite: Graduate standing.

Math 590 Seminar in Mathematics (1-3)

Topics in advanced mathematics chosen according to the interests and needs of the students enrolled. Each seminar will have a subtitle according to the nature of the content. 1, 2, or 3 lectures. Prerequisite: Instructor's approval and graduate standing.

* Offered in even-numbered years only.

† Offered in odd-numbered years only.

MUSIC AND ART DEPARTMENT

Chairman, Lowell K. Weeks

Robert M. Sekerak

Martin I. Wang

Courses in the Music and Art Department are designed to give all musically inclined students the opportunity to participate in college musical organizations and to further their proficiency in singing and in playing instruments. An effort also is made to give students interested in music a broader insight into the general field of music through courses in appreciation.

Students must have had some previous experience with a musical instrument in order to try out for band or orchestra. While previous experience in choral singing is helpful, it is not mandatory.

Art and audiovisual courses provide a cultural background for all students and furnish many kinds of skills and techniques necessary to success in teaching, advertising, sales, and other professional activities.

DESCRIPTIONS OF COURSES IN MUSIC**Mu 141, 142, 143 Dance Orchestra (2) (2) (2)**

Limited to those who have had considerable experience playing musical instruments, dances, community programs, and radio broadcasts. 2 activity periods. Total credit limited to 24 units.

Mu 147, 148, 149 Brass, String, or Woodwind Choir (1) (1) (1)

Open to qualified players. Rehearsal and public performance in trios, quartets, and quintets. 1 activity period. Total credit limited to 12 units.

Mu 151, 152, 153 Band (1) (1) (1)

Limited to those students who have had experience with band instruments. The band plays for college functions, assemblies, athletic games, and rallies. Smaller groups organized from the band for special functions. 1 activity period. Total credit limited to 12 units.

Mu 154, 155, 156 Men's Glee Club (1-2) (1-2) (1-2)

Four-part vocal compositions; fundamentals of breathing, tone production, diction, and interpretation. Quartets, octets, and soloists. Tryouts in fall only. 1 or 2 activity periods. Total credit limited to 24 units.

Mu 157, 158, 159 Women's Glee Club (1-2) (1-2) (1-2)

Choral literature for women's voices; independence and skill in part singing; care and development of the voice; choral interpretation; performances in public concerts and at campus functions. Small groups and soloists. Tryouts in fall only. 1 or 2 activity periods. Total credit limited to 24 units.

Mu 161, 162, 163 Choir (1) (1) (1)

A cappella singing for both men and women. Standard choir repertory. Formal concerts presented each school year. 1 activity period. Total credit limited to 12 units.

Mu 201 Basic Music Skills (3)

Introduction to basic music skills necessary for the elementary school teacher; singing, theory, conducting, playing an instrument, listening, and creating music. 3 lectures.

Mu 202 Music Theory (3)

Elements of music theory; construction of major and minor scales; intervals, rhythms, sight singing, musical terms, syllable work. 3 lectures.

Mu 204, 205, 206 Music Appreciation (2) (2) (2)

Appreciation of the physical and aesthetic aspects of music developed through acquainting the student with the better known schools and composers of past and present, the forms of musical composition and the instruments and choirs of musical ensembles. Lectures, recordings, and demonstrations. 2 lectures.

***Mu 314 Teaching Elementary School Music (3)**

Principles and techniques of conducting the teacher's own program in elementary school music. Content and activities suitable for elementary children; includes skills and appreciation. 3 lectures. Prerequisite: a course in the fundamentals of music.

DESCRIPTIONS OF COURSES IN ART**Art 210 Art and Life (3)**

Sensibility toward one's environment. The relation of art to man's conquest of knowledge. The evolution of artistic principles and their application in modern times. Art and education, society, the individual, and industry. 3 lectures.

Art 234 Art Materials and Skills (3)

The development of appreciative and creative skills. The materials involved in elementary expression in art media, emphasizing drawing and graphic work. Selecting, organizing, guiding, and evaluating individual and group activities. 2 lectures, 1 laboratory.

Art 235 Craft Materials and Skills (3)

Basic projects with various craft materials such as ceramics, metal, textiles, wood, and leather. The development of three-dimensional skills and concepts through the materials and their properties. Evaluative criteria applied to craft materials. 2 lectures, 1 laboratory.

Art 244 Fundamentals of Drawing (2)

Analysis and practice in functional drawing, basic design, and study of form. Development of individual techniques. Pursuit of individual projects to suit abilities and interests of students. 2 2-hour laboratories.

*** Art 314 Teaching Elementary School Art (3)**

Curriculum and teaching procedures in art and crafts in the elementary school. The application of art skills in the elementary curriculum. 3 lectures.

DESCRIPTIONS OF COURSES IN AUDIOVISUAL EDUCATION**AV 221 Elementary Photography (2-3)**

For those who have had limited experience in photography. Picture taking techniques and darkroom practices. 1 lecture, 1 or 2 laboratories.

AV 400 Special Problems in Audiovisual Production (1-2)

Experience in production of models, mockups, and other audiovisual devices in the student's field. Total credit limited to 4 units, with not more than 2 units in any quarter. 1 or 2 laboratories. Prerequisite: AV 431 or consent of instructor.

AV 431 Audiovisual Materials and Methods (3)

Visual and auditory methods and materials of value in classroom teaching in elementary and secondary schools. Lecture, lecture-demonstration, discussion, pre-viewing, and laboratory work. Planning and correlating use of audiovisual techniques in the classroom. 2 lectures, 1 laboratory. Prerequisite: Psy 312 or permission of the instructor.

AV 432 Audiovisual Methods in Business and Industry (3)

Industrial and business uses of visual and auditory materials in planning training aids, mass communication materials, demonstrations, mockups, models, and conferences. Planning, pre-viewing, and skill development for business and industry. 2 lectures, 1 laboratory. Prerequisite: Psy 304 or permission of the instructor.

* Not offered in 1960-61.

OFFICE ADMINISTRATION DEPARTMENT

Robert J. Healey

The office administration curriculum permits students to emphasize administrative phases of the office work, and the place of the office manager as part of the management team so that graduates will be able to take over complete operation of small or medium-sized offices.

Typical positions for which graduates in this major will be qualified are those of credit manager, office manager, and records supervisor. The curriculum seeks to give students both theoretical and practical knowledge and skill in applying the principles they learn. It seeks also to give them a broad concept of the entire structure of business and of the important part which efficient office procedures play in profitable operations.

This curriculum, like all others at Cal Poly, places heavy emphasis in the early years of the program on courses required for the major and also stresses "learning-by-doing" methods. Instructors are chosen on the basis of their actual work experience as well as their educational and teaching backgrounds.

CURRICULUM IN OFFICE ADMINISTRATION

Major not offered in 1960-61

	F	W	S
Freshman			
Language Communication (Eng 104, 105, 106).....	3	3	3
Physical Education (PE 141, 142, 143).....	½	½	½
Typewriting (OA 141, 142, 143).....	1	1	1
Principles of Accounting (Actg 121, 122, 123).....	3	3	3
Office Administration (OA 121, 122, 123).....	3	3	3
Calculating Machines (OA 151).....	1		
Introduction to Business Management (Bus 101).....	3		
Health Education (PE 107).....		2	
Basic Mathematics (Math 101).....		3	
Business Mathematics (Math 106).....			3
Office Machines (OA 153).....			1
Electives	2	2	2
	<hr/>	<hr/>	<hr/>
	16½	17½	16½
Sophomore			
Sports Education (PE 241, 242, 243).....	½	½	½
Business Communication (Eng 218).....	3		
Data Processing (Actg 231).....	3		
Cost and Payroll Accounting (Actg 221).....	3		
* Literature, Philosophy, Art or Music.....	3	3	
Principles of Economics (Ec 201, 202).....	3	3	
Public Speaking (Sp 201, 303).....		2	
Family Relations (Psy 206).....			3
Descriptive Statistics (Math 211).....			3
Advanced Cost Accounting (Actg 222).....			3
Electives	2	8	5
	<hr/>	<hr/>	<hr/>
	17½	16½	16½
Junior			
* Natural Sciences	3	3	3
American Government (Pol Sc 301).....	3		
Credit Management (OA 301).....	3		
Business Law (Bus 301, 302).....	3	3	
Growth of American Democracy (Hist 304).....		3	
Purchasing and Inventory Control (OA 302).....		2	
U.S. in World Affairs (Hist 305).....			3
Accounting Systems (Actg 306).....			3
Managerial Accounting (Bus 306).....			3
Electives	4	6	4
	<hr/>	<hr/>	<hr/>
	16	17	16

* To be selected from the General Education list.

Senior	F	W	S
* Natural Sciences	3	3	
Money and Banking (Ec 308)		3	
Insurance Principles (Bus 403)			3
Budgeting (Bus 426)			3
Senior Project (OA 461, 462)	2	2	
Undergraduate Seminar (OA 463)			2
Federal Tax Course (Actg 402)		3	
Labor Economics (Ec 414)			3
Electives	11	5	5
	<hr/>	<hr/>	<hr/>
	16	16	16

DESCRIPTIONS OF COURSES IN OFFICE ADMINISTRATION

OA 121, 122, 123 Office Administration (3) (3) (3)

Basic office procedures and practices. Knowledge and techniques necessary to work in or manage a business office. Practice with machines and application of procedures commonly found in the office. 2 lectures, 1 laboratory.

OA 141, 142, 143 Typewriting (1) (1) (1)

Fundamentals of the touch system. Training in preparing business forms and business letters. 3 1-hour periods.

OA 151 Calculating Machines (1)

Experience and discrimination in the use of adding and listing machines and rotary and printing calculators. 1 laboratory.

OA 153 Office Machines (1)

The use of the latest types of mechanical equipment found in the business office. Dictating, transcribing, various types of duplicating machines, and other machines commonly used in business. 1 laboratory.

OA 244, 245, 246 Shorthand (2) (2) (2)

The most effective techniques for recording and transcribing personal dictation. 2 2-hour laboratories. Prerequisite: OA 245: OA 244 or 60 wpm; OA 246: OA 245 or 80 wpm.

OA 301 Credit Management (3)

Problems of the credit manager in reducing credit risks, determining sources of credit information, application of credit terms, laws relating to credit instruments, and collection problems. 3 lectures.

OA 302 Purchasing and Inventory Control (2)

Management problems of procurement, maintaining proper control records, warehousing, financing, and materials handling and storage. 2 lectures.

OA 400 Special Problems for Advanced Undergraduates (1-2)

Individual or group investigation of problems in the areas of office administration. Total credit limited to four units with not more than two units in any one quarter. Prerequisite: Senior standing or consent of instructor.

OA 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. Formal report is required. Required minimum of 120 hours.

OA 463 Undergraduate Seminar (2)

Study and discussion by students of recent development in the students' major fields. 2 meetings. Prerequisite: Senior standing or special permission.

* To be selected from the General Education list.

PHYSICAL EDUCATION DEPARTMENT

Department Head, Magnus Syverson

V. Barney Anooshian Robert B. Stull Donald E. Warhurst
Donald L. Halderman

The primary function of the Physical Education Department is to provide both required and elective courses in physical education and health to meet the general education needs of all students. To supplement this general education, the department provides an intramural sports program for the students of the college and makes opportunities available for participation in intercollegiate athletics.

A second function of the department is to offer a four-year major in physical education leading to the bachelor of science degree for students who are interested in preparing to become secondary teachers.

Facilities include a new gymnasium, outdoor basketball, tennis, and volleyball courts and turfed area for football, baseball, track and field.

CURRICULUM IN PHYSICAL EDUCATION

Not Open to Women in 1960-61

	F	W	S
Freshman			
Language Communication (Eng 104, 105, 106).....	3	3	3
* Mathematics		3	3
Health Education (PE 107).....			2
Physical Education (PE 141, 142, 143).....	½	½	½
Safety and First Aid (PE 121).....	2		
Community Recreation (PE 126).....			3
Swimming and Water Sports (PE 123).....		2	
Basic Biology (Bio 115, 145).....	3	2	
General Physical Science (PSc 101, 102, 103) or equivalent....	4	4	4
Electives	4	2	1
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	16½	16½	16½
Sophomore			
* Literature, Philosophy, Art or Music.....	3	3	3
Principles of Economics (Ec 201).....	3		
Intramural Sports (PE 232).....		3	
Principles of Physical Education (PE 201).....	3		
Apparatus and Gymnastics (PE 225M or 225W).....	2		
School and Community Health Education (PE 203).....	2		
Public Speaking (Sp 201, 303).....	2	2	
Human Anatomy and Physiology (Zoo 234, 235).....		4	4
Sports Education (PE 241, 242, 243).....	½	½	½
General Psychology (Psy 202).....			3
* Social Sciences		3	
Family Relations (Psy 206).....			3
Electives	2	1	
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	17½	16½	16½

* To be taken from General Education list.

	F	W	S
Junior			
American Government (Pol Sc 301).....	3		
† Growth of American Democracy (Hist 304).....		3	
† Football Coaching Theory and Practice (PE 321).....			2
† Track and Field Coaching Theory and Practice (PE 333).....		2	
† Baseball Coaching Theory and Practice (PE 323).....			2
or			
† Teaching Progression in Girls Sports (PE 324W, 325W, 326W).....	2	2	2
U.S. in World Affairs (Hist 305).....			3
Teaching Elementary School Physical Education (PE 314)....		3	
Child Growth and Development (Psy 305).....	3		
Physiology of Exercise (PE 303).....			3
Kinesiology (PE 302).....		3	
Techniques of Officiating (PE 331M or 331W).....	2		
Direction of Physical Education Activity (PE 341, 342, 343)....	1	1	1
* Electives (Men).....	8	4	6
* Electives (Women).....	6	4	8
	<hr/>	<hr/>	<hr/>
	17	16	17
Senior			
† Minor Sports Theory and Practice (PE 441, 442, 443).....	1	1	1
or			
† Teaching Progression in Dance (PE 446W, 447W, 448W)....	2	2	2
Senior Project (PE 461, 462).....	2	2	
† Basketball Coaching Theory and Practice (PE 422).....	2		
or			
† Introduction to Dance (PE 334).....		3	
Organization and Administration of Physical Education (PE 401).....	3		
Methods of Physical Education (PE 403).....	3		
Tests and Measurements of Physical Education (PE 425).....		3	
Administration of School Health Education (PE 405).....		2	
Athletic Training and Massage (PE 432M) (Men majors only).....		1	
Adaptive Physical Education (PE 406).....			2
Undergraduate Seminar (PE 463).....			2
§ Electives (Men).....	5	8	11
§ Electives (Women).....	6	5	10
	<hr/>	<hr/>	<hr/>
	16	17	16

DESCRIPTIONS OF COURSES IN PHYSICAL EDUCATION

PE 107 Health Education (2)

Personal hygiene and health education; investigation of the principles which promote attitudes and practices for optimum physical and mental health. Fire prevention and public safety; alcohol and other drugs. 2 lectures.

PE 121 Safety and First Aid (2)

A standard American Red Cross first aid course. Instruction and practice in the immediate and temporary care of injuries and sudden illness. 1 lecture, 1 2-hour laboratory.

PE 123 Swimming and Water Sports Theory and Practice (2)

Supervision of pool activities. Swimming instruction and safety. Teaching and coaching swimming and water polo. 1 lecture, 1 2-hour laboratory. Prerequisite: Demonstrated swimming ability.

* Teaching majors elect: Art, Music, PE 300, Ed 403, Ed 421, Psy 312.

† Social Science teaching minors should take Hist 301, 302, 303 in lieu of this course.

‡ Alternative requirements for men and women physical education majors.

§ Teaching majors elect: Music, PE 300, Ed 403, Ed 421, Psy 312.

PE 126 Community Recreation (3)

The supervision and administration of community recreational activities from the viewpoint of school, city and recreation commission administration; games and activities suitable for recreation programs. 2 lectures, 1 2-hour laboratory.

PE 141 Physical Education (½)

Fundamentals of sports and games. 2 activity periods.

PE 142 Physical Education (½)

Tumbling and apparatus work; basic sports; gymnastics and calisthenics. 2 activity periods.

PE 143 Physical Education (½)

Sports activities; physical tests; progressive activities. 2 activity periods.

PE 144, 145 Beginning Swimming (½) (½)

Beginning swimming for all who do not pass college swimming test. 2 activity periods.

PE 147, 148, 149 Adaptive Activities (½) (½) (½)

Group and individual exercise based upon individual needs in posture, body mechanics, nutrition, post injury and illness, and cardiac cases. Students take these courses in lieu of PE 141, 142, 143 upon recommendation of the college physician. 2 activity periods.

PE 151M, 152M, 153M Competitive Athletics (½) (½) (½)

May be substituted for required physical training by those qualified to compete in intercollegiate sports program. 10 hours activity.

PE 201 Principles of Physical Education (3)

History of physical education and the concept of physical education as a profession. Correlation between principles and methods. 3 lectures.

PE 203 School and Community Health Education (2)

Organization and administration of the school health program and its interrelationship to community health agencies; underlying principles; legal aspects; administrative divisions of health instruction, health services, and healthful school living. 2 lectures.

PE 214 Administration of Recreation (3)

Organization and administration of recreation with implications for public and voluntary agency programs. Prerequisite: PE 126

PE 225M Apparatus and Gymnastics (2)

A critical analysis of the methods and problems in teaching and coaching apparatus and gymnastics. Application is made to the secondary teaching situation with emphasis on lesson planning, development of teaching units, organization for class activity and administration of the program. 1 lecture, 1 2-hour laboratory.

PE 225W Apparatus and Gymnastics (2)

Progression and teaching techniques in tumbling and gymnastic stunts. 1 lecture. 1 2-hour laboratory.

PE 232 Intramural Sports (3)

The principles and policies underlying programs of intramural sports in secondary schools and community centers. 2 lectures, 1 2-hour laboratory.

PE 241 Sports Education (½)

Training and competition in seasonal sports such as speed ball, touch football, golf, swimming, and tennis. 2 activity periods.

PE 242 Sports Education (½)

Training and competition in seasonal sports such as basketball, badminton, volleyball, boxing, and wrestling. 2 activity periods.

PE 243 Sports Education (½)

Training and competition in seasonal sports such as tennis, track and cross-country running, softball, archery, and soccer. 2 activity periods.

PE 245 Advanced Swimming and Lifesaving (2)

Lifesaving techniques. The Senior Red Cross Life Saving and Water Safety Certificate will be issued to those students who satisfactorily complete this course. 1 lecture, 1 2-hour laboratory.

PE 247, 248, 249 Adaptive Activities (½) (½) (½)

Group and individual exercise based upon individual needs in posture, body mechanics, nutrition, post injury and illness, and cardiac cases. Students take these courses in lieu of PE 241, 242, 243 upon recommendation of the college physician. 2 activity periods.

PE 251M, 252M, 253M Competitive Athletics (½) (½) (½)

May be substituted for required physical training by those qualified to compete in intercollegiate sports program. 10 hours activity.

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 302 Kinesiology (3)

The 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. Prerequisite: Zoo 235

PE 303 Physiology of Exercise (3)

Effects of physical activity upon the circulatory, respiratory, and other physiological systems. The relationship of strength, co-ordination, flexibility, endurance, fatigue, conditioning, and related factors to human movement and athletic performance. 3 lectures. Prerequisite: PE 302

PE 314 Teaching Elementary School Physical Education (3)

Prepares the student to guide elementary school age children through a well-balanced program in physical education. Aims, objectives, procedures, methods, evaluation and program planning. 3 lectures. Prerequisite: Psy 305

PE 321 Football Coaching Theory and Practice (2)

Fundamentals and systems of offensive and defensive football. Care and purchase of equipment, supplies and facilities. Rules of the game. 1 lecture, 1 2-hour laboratory.

PE 323 Baseball Coaching Theory and Practice (2)

A critical analysis of the methods and problems of teaching and coaching baseball at the secondary school level. Emphasis on strategy, selection of players, officiating, interpretation of rules, scoring, and administration of interschool games. 1 lecture, 1 2-hour laboratory.

PE 324W, 325W, 326W Teaching Progression in Girls' Sports (2) (2) (2)

Fundamentals and techniques of the following sports: basketball, softball, badminton, archery, tennis, soccer, speedball, speed-a-way, hockey, volleyball, golf. 1 lecture, 1 2-hour laboratory.

PE 331M Techniques of Officiating (2)

Problems, techniques, and practices of officiating men's sports. 1 lecture, 1 laboratory.

PE 331W Techniques of Officiating (2)

Techniques of officiating girls' sports. 1 lecture, 1 laboratory.

PE 333 Track and Field Coaching Theory and Practice (2)

Coaching techniques for various track and field events. Problems of team balance; study of rules. 1 lecture, 1 2-hour laboratory.

PE 334 Introduction to Dance (3)

Fundamental knowledge and skills in dance, including rhythm analysis and social-recreation dance. 1 lecture, 2 2-hour laboratories.

PE 341, 342, 343 Direction of Physical Education Activity (1) (1) (1)

Required of all majors in physical education. Under close staff supervision students conduct regular physical education classes. 2 one-hour periods.

PE 401 Organization and Administration of Health and Physical Education (3)

Underlying philosophy, principles, policies, and procedures of administration as applied to health and physical education. Legal aspects and the interrelationships with the general school curriculum at the local, state, and national levels. 3 lectures.

PE 403 Curriculum and Methods in Health and Physical Education (3)

Methods, curricular materials, and evaluation procedures in elementary and secondary schools health and physical education. Directed observations, field experience; class organization, management of games and relays. 3 lectures.

PE 405 Administration of School Health Education (2)

A consideration of the principles, policies, and practices involved in the administration of the school health curriculum and its relation to public and private health agencies in the community. 2 lectures.

PE 406 Adaptive Physical Education (2)

Growth and development patterns; their relation to special and regular physical education programs. Analysis of postural divergence and procedures for prevention and correction. 2 lectures. Prerequisite: PE 303

PE 422 Basketball Coaching Theory and Practice (2)

Fundamental individual basketball skills. Theories of offensive and defensive team play. 1 lecture, 1 2-hour laboratory.

PE 425 Tests and Measurements in Physical Education (3)

Physical tests and measurements of skill, strength, speed, agility, and endurance as a basis for grading and evaluating the program and as a measure of progress in activities. 2 lectures, 1 2-hour laboratory.

PE 432M Athletic Training and Massage (1)

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. 1 combined lecture and laboratory. Prerequisite: PE 406

PE 441, 442, 443 Minor Sports Theory and Practice (1) (1) (1)

Fundamentals and techniques of the following minor sports: boxing, wrestling, tennis, golf, gymnastics, badminton, and six-man football. 1 2-hour laboratory.

PE 446W, 447W, 448W Teaching Progression in Dance (2) (2) (2)

Teaching progression in dance: folk, contemporary, and social. 2 2-hour laboratories. Prerequisite: PE 334

PE 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.

PE 463 Undergraduate Seminar (2)

Discussion of new developments in recreation, health, and physical education. 2 lectures.

PE 590 Seminar in Physical and Health Education (1-3)

Special problems in selected areas of health education and physical education. Maximum of six units credit may be earned. 1 to 3 lecture-discussions. Prerequisite: Graduate standing.

PHYSICAL SCIENCES DEPARTMENT

Acting Department Head, G. Thomas Moran

Myron S. Dendurent
Ramiro C. Dutra

Edward M. Kelly
Horace G. Ferris

Elmer H. Rice
Dorothy V. Winslow

Courses in the physical sciences are designed to give students majoring in the Agricultural and Engineering Divisions the necessary chemical and physical background for an understanding of the scientific principles underlying their practical work. The department also contributes to the general education of all students by giving them a thorough foundation in the method and factual content of the physical sciences and the roles they play in society.

Department facilities include modern scientific equipment which allows the student to become acquainted with the latest techniques.

Students enrolling in General Inorganic Chemistry are required to pass a placement test, Chem 4, or the equivalent.

The curriculum in physical sciences is planned to prepare secondary school teachers of physics and chemistry as well as general science, and to qualify graduates for entry at the bachelor's degree level into positions in industry and civil service. It is recommended that the high school student planning to major in physical sciences include in his high school program three semesters of algebra, one of trigonometry, two of geometry, two of physics, and two of chemistry.

CURRICULUM IN PHYSICAL SCIENCES

	F	W	S
Freshman			
Language Communication (Eng 104, 105, 106).....	3	3	3
General Chemistry (Chem 321, 322, 323).....	4	4	4
Physical Education (PE 141, 142, 143).....	½	½	½
* Biological Sciences.....	3		
Machine Shop (MS 141, 142).....	1	1	
Mathematics for Engineers (Math 117).....	5		
General Physics (Phys 131, 132).....		4	4
Analytic Geometry and Calculus (Math 118, 201).....		5	3
Health Education (PE 107).....			2
	16½	17½	16½
Sophomore			
Sports Education (PE 241, 242, 243).....	½	½	½
Principles of Economics (Ec 201).....	3		
General Physics (Phys 133 or 204).....	4		
Engineering Statics (ME 201).....	3		
Analytic Geometry and Calculus (Math 202, 203).....	3	3	
Engineering Drafting (ME 121).....		2	
Family Relations (Psy 206).....		3	
Astronomy (PSc 216).....		3	
* Literature or Philosophy.....			3
Public Speaking (Sp 201).....			2
Light (Phys 223).....			3
† Electives.....	4	5	9
	17½	16½	17½

* To be selected from the General Education list. Teaching majors elect at least 6 additional units in life sciences.

† Twenty-two units to be selected from Physical Sciences and Mathematics courses approved by the adviser. Teaching majors also elect Psy 312, Ed 301 and Ed 403 in junior and senior years.

	F	W	S
Junior			
American Government (Pol Sc 301).....	3		
* Literature, Philosophy, Art, or Music.....	3		
Organic Chemistry (Chem 326).....	4		
Growth of American Democracy (Hist 304).....		3	
Quantitative Analysis (Chem 331).....		4	
Advanced Electricity and Magnetism (Phys 313).....		3	
Physical Chemistry (Chem 432).....			4
U.S. in World Affairs (Hist 305).....			3
Geology (PSc 209).....			3
† Electives.....	6	6	6
	<hr/>	<hr/>	<hr/>
	16	16	16
Senior			
* Social Sciences.....	3		
Modern Physics (Phys 401, 402).....	3	3	
Senior Project (Phys or Chem 461, 462).....	2	2	
Undergraduate Seminar (Phys or Chem 463).....			2
† Electives.....	8	11	14
	<hr/>	<hr/>	<hr/>
	16	16	16

DESCRIPTIONS OF COURSES IN CHEMISTRY

Chem 4 Preparatory Chemistry (3)

For students whose background is deficient in chemistry and mathematics. Symbols, nomenclature, molecular theory, problems dealing with the metric system, density, formulas, percentage composition, and chemical equations. 3 lectures. Prerequisite: Math 103 or equivalent.

Chem 321 General Chemistry (4)

General principles including atomic structure, acids and bases, ions, solutions, types of chemical reactions, properties of gases, liquids, and solids, and elementary equilibria. For engineering, physical science, and mathematics majors. 3 lectures, 1 laboratory. Prerequisite: Chem 4 or the passing of a placement test.

Chem 322 General Chemistry (4)

Electrochemistry and the chemistry of the alkali metals and the commoner non-metals. 3 lectures, 1 laboratory. Prerequisite: Chem 321

Chem 323 General Chemistry (4)

The metals, nuclear chemistry, fuels including the hydrocarbons, and some of the important hydrocarbon derivatives. Qualitative analysis in the laboratory. 3 lectures, 1 laboratory. Prerequisite: Chem 322

Chem 324 General Inorganic Chemistry (4)

Fundamental principles including gas laws, valence, equations, and chemical calculations. Elementary atomic theory and periodic classification of the elements. For agricultural students. 3 lectures, 1 laboratory. Prerequisite: Chem 4 or the passing of a placement test.

Chem 325 General Inorganic Chemistry (4)

Basic principles of solution, equilibrium, and colloids. Properties of the common elements and their compounds with applications to agriculture. 3 lectures, 1 laboratory. Prerequisite: Chem 324

Chem 326 Organic Chemistry (4)

The fundamental concepts of organic chemistry with applications to industrial and agricultural processes. 3 lectures, 1 laboratory. Prerequisite: Chem 322 or 325

* To be selected from the General Education list. Teaching majors elect at least 6 additional units in life sciences.

† Twenty-two units to be selected from Physical Sciences and Mathematics courses approved by the adviser. Teaching majors also elect Psy 312, Ed 301 and Ed 403 in junior and senior years.

Chem 327 Organic Chemistry (4)

Continuation of Chem 326 to include a further study of the types of compounds important to agricultural and industrial processes. 3 lectures, 1 laboratory. Prerequisite: Chem 326 or its equivalent

Chem 328 Agricultural Biochemistry (4)

Fundamental chemistry of carbohydrates, proteins, fats, vitamins, enzymes, and hormones as applied to their function in plant and animal metabolism. Special reference to the chemistry involved in the use, analysis, and manufacture of fertilizers, feeds, and insecticides. 3 lectures, 1 laboratory. Prerequisite: Chem 326

Chem 331 Quantitative Analysis (4)

Volumetric industrial analytical procedures based upon precipitometry, redoximetry, alkalimetry, and acidimetry. Laboratory work is the focal point with class discussion supplying supporting theory. 2 lectures, 2 laboratories. Prerequisite: Chem 322 or 325

Chem 332 Quantitative Analysis (4)

Principles of gravimetric analysis applied to industrial methods for metals with less work on determination of anions. Basic theory of laboratory procedure considered in class discussions. 2 lectures, 2 laboratories. Prerequisite: Chem 331

Chem 333 Instrumental Methods of Analysis (3)

Spectrophotometry, electroanalysis, and other instrumental methods of analysis. 2 lectures, 1 laboratory. Prerequisite: Chem 332

Chem 337 Soil Analysis (2)

Chemical analysis as a means of diagnosing problems related to western soils. 1 lecture, 1 laboratory. Prerequisite: Chem 325, SS 121, Math 102, 103

Chem 338 Plant Tissue Analysis (2)

Chemical analysis of plant tissue as a guide to fertilization and crop production. 1 lecture, 1 laboratory. Prerequisite: Chem 325, SS 121, Math 102, 103

Chem 400 Special Problems for Advanced Undergraduates (1-2)

Individual or group investigations for advanced students. Total credit limited to 4 units in Chem 400 and Phys 400 with not more than 2 units in any one quarter. 1 or 2 laboratories.

Chem 432 Physical Chemistry (4)

Physical properties and molecular constitution of gases, liquids, and solids. Elementary chemical thermodynamics and kinetic theory. Thermochemistry, colloids, phase rule, and reaction rates. 3 lectures, 1 laboratory. Prerequisite: Chem 323

Chem 433 Physical Chemistry (4)

The relationship between thermodynamics and chemical equilibrium. The liquid state; solutions and colloids; phase diagrams and the phase rule. Electrochemistry including application to routine analyses. Reaction rates and applications to commercial processes. 3 lectures, 1 laboratory. Prerequisite: Chem 432

Chem 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 presented in a formal report. Minimum of 120 hours total time.

Chem 463 Undergraduate Seminar (2)

A study of current developments in chemistry and a discussion of periodical literature at an appropriate level. 2 lecture-discussions.

DESCRIPTIONS OF COURSES IN PHYSICS**Phys 131 General Physics (4)**

Fundamental principles of mechanics, Vectors, statics, uniform motion, accelerated motion, work and energy, rotational motion, elasticity, impact, and harmonic motion. 3 lectures, 1 laboratory. Concurrent: Math 118, or higher.

Phys 132 General Physics (4)

Fundamental principles of hydraulics, heat, sound, and light. Fluids at rest and in motion, temperature, expansion, quantity of heat, heat transfer, thermodynamics, thermal properties of matter, wave motion, vibrating bodies, acoustical phenomena, nature and propagation of light, geometric optics. 3 lectures, 1 laboratory. Prerequisite: Phys 131

Phys 133 General Physics (4)

Fundamental principles of magnetostatics, electrostatics, and current electricity. Coulomb's law, electric field, potential, properties of dielectrics, capacitance, Ohm's law, electrochemistry, magnetism and magnetic fields, measuring instruments, magnetic field of a moving charge, induced emf, ac circuits, electronics. 3 lectures, 1 laboratory. Prerequisite: Phys 132

Phys 204 Physics of Electricity and Magnetism (4)

Coulomb's law, the electrostatic field, potential, properties of dielectrics, capacitance and capacitors, the magnetostatic field, the magnetic field of a current, induced electromotive force, inductance, magnetic properties of matter. 4 lectures. Prerequisites: Phys 131, Math 201

Phys 212 Sound

Vibratory motion. Transverse waves, longitudinal waves, vibration of bars. Velocity of sound, vibrating air columns. Interference. Intensity and intensity level. Loudness and loudness level. 3 lectures. Prerequisite: Phys 133 or 204

Phys 223 Light (3)

The physical nature of light. Reflection, refraction, diffraction, interference, polarization, and absorption of light. 2 lectures, 1 laboratory. Prerequisite: Phys 133 or 204

Phys 301 Heat (3)

Kinetic theory and elementary thermodynamics. Expansion of solids and liquids. Fusion, evaporation, and sublimation of pure substances. Observable behavior of gases. Molecular motion in pure gases. Thermodynamic processes and cycles. Entropy. Thermal condition and radiation. 3 lectures. Prerequisite: Phys 133 or 204, Math 203

Phys 313 Advanced Electricity and Magnetism (3)

Principles of electrostatics, magnetostatics, and electrodynamics. Direct and alternating currents. Maxwell's equations. 3 lectures. Prerequisite: Phys 133 or 204, Math 316

Phys 339 Soil Physics (2)

Fundamental aspects of soil physics and its application. 1 lecture, 1 laboratory. Prerequisite: SS 121, Math 103

Phys 400 Special Problems for Advanced Undergraduates (1-2)

Individual or group investigations for advanced students. Total credit limited to 4 units in Phys 400 and Chem 400 with not more than 2 units in any one quarter. 1 or 2 laboratories.

Phys 401 Modern Physics (3)

Determination of "e/m" and "e", photoelectric effect, atomic spectra and the Bohr atom, elementary quantum mechanics. Preliminary consideration of the special theory of relativity. 3 lectures. Prerequisite: Phys 133 or 204, Math 203

Phys 402 Modern Physics (3)

X-rays, radioactivity, particle accelerators, nuclear reactions, fission and fusion, cosmic rays, low temperature phenomena. 3 lectures. Prerequisite: Phys 401

Phys 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 presented in a formal report. Minimum of 120 hours total time.

Phys 463 Undergraduate Seminar (2)

Study of current development in physics and discussion of periodicals of an appropriate level. 2 lecture-discussions.

DESCRIPTIONS OF COURSES IN PHYSICAL SCIENCE

PSc 101 General Physical Science (4)

Geological features and processes. Astronomical phenomena and concepts. The development of a better understanding of man's physical environment. The scientific method of working and thinking. 3 lectures, 1 recitation. Prerequisite: A college-level course in mathematics.

PSc 102 General Physical Science (4)

Fundamental principles of physics. 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-level course in mathematics.

PSc 103 General Physical Science (4)

Fundamental principles of chemistry. Chemical changes and their uses. A number of recent advances. Objective observation and experimentation in the solution of problems relating to natural phenomena. 3 lectures, 1 recitation. Prerequisite: A college-level course in mathematics.

*** PSc 104 Elementary Physical Science (4)**

Understanding of the physical environment through study of the physical sciences. Basic principles of chemistry, physics, astronomy, geology, and meteorology. 3 lectures, 1 laboratory.

PSc 209 Geology (3)

Fundamental geologic processes. General surface features of the earth. Rocks and minerals. 3 lectures.

PSc 216 Astronomy (3)

Astronomical properties of the earth, solar system, stars, and galaxies. Principles and methods of astronomical investigation. 3 lectures.

PSc 521 Curriculum and Methods in the Physical Sciences (3)

Techniques, aims and objectives in the teaching of physics, chemistry, physical science, and general science at the secondary school level. Selection and organization of teaching material. Evaluation of results. 3 lectures. Prerequisite: Graduate standing.

PSc 590 Seminar in the Physical Sciences (1-3)

Special problems in selected areas of physics and chemistry. Maximum of six units may be earned. 1 to 3 lectures. Prerequisite: Graduate standing.

* Not offered in 1960-61.

SOCIAL SCIENCES DEPARTMENT

Department Head, Hugh O. La Bounty

Gertrude C. Boland	Louis J. King	Dorothy M. Tucker
Fernando Penalosa	Werner H. Marti	John J. Wilson
George T. Galbreath	Donald H. Pflueger	

The Social Sciences Department serves agricultural, engineering, and arts and sciences students by providing courses that give the necessary basic backgrounds in economics, history, political science, geography, sociology, and philosophy. In the area of general education, the department prepares the student to understand himself and others better and to participate in political, social, and economic affairs. The department seeks to provide the student with certain vocational and social abilities, skills, and habits which are prerequisite for successful living and effective citizenship.

The social sciences major is planned to prepare secondary school teachers of the social studies and to train students for entry jobs in civil service and business and industry which require a bachelor's degree with a major in the social sciences. The course offerings in this department also assist majors in other departments to prepare themselves for civil service positions by providing information of value on the job and in preparing for civil service examinations. There are no special requirements for admission to the social sciences major. Since courses in the social sciences generally have heavy reading requirements, it is recommended that high school students interested in this major field seek to develop their reading skills before entering college.

CURRICULUM IN SOCIAL SCIENCES

Freshman	F	W	S
Language Communication (Eng 104, 105, 106).....	3	3	3
History of Civilization (Hist 101, 102, 103).....	3	3	3
Physical Education (PE 141, 142, 143).....	½	½	½
¹ Natural Sciences.....	3	3	3
Health Education (PE 107).....	2		
² Mathematics.....		3	3
Electives.....	5	4	4
	<hr/>	<hr/>	<hr/>
	16½	16½	16½
Sophomore			
Principles of Sociology (Soc 201, 202, 203).....	3	3	3
Sports Education (PE 241, 242, 243).....	½	½	½
General Psychology (Psy 202).....	3		
Introduction to Philosophy (Phil 201).....	3		
¹ Natural Sciences.....	3	3	
Principles of Economics (Ec 201, 202).....	3	3	
Public Speaking (Sp 201, 303).....		2	2
Family Relations (Psy 206).....		3	
Economic Problems (Ec 213).....			3
American Government (Pol Sc 301).....			3
Descriptive Statistics (Math 211).....			3
Electives.....	1	2	2
	<hr/>	<hr/>	<hr/>
	16½	16½	16½

¹ To be taken from science courses in the General Education list; at least 3 units in a life science and 3 units in physical sciences.

² To be taken from mathematics courses in the General Education list.

	F	W	S
Junior			
³ History of the United States (Hist 301, 302, 303).....	3	3	3
⁴ Literature.....	3	3	3
History of the Far East (Hist 311).....	3		
History of Southwest Asia and Africa (Hist 312).....		3	
History of Latin America (Hist 313).....			3
Economic Geography (Geog 312).....		3	
Business Law (Bus 301).....			3
⁵ Electives.....	8	5	5
	<hr/> 17	<hr/> 17	<hr/> 17
Senior			
⁶ Inter-American Relations (Pol Sc 411).....	3		
⁶ International Relations (Pol Sc 412).....		3	
⁶ Comparative Government (Pol Sc 413).....			3
Economics.....	3		
Senior Project (Soc Sc 461, 462).....	2	2	
State and Local Government (Pol Sc 401) or History of California (Hist 112).....		3	
Social Psychology (Psy 401).....			3
Undergraduate Seminar (Soc Sc 463).....			2
⁵ Electives.....	8	8	8
	<hr/> 16	<hr/> 16	<hr/> 16

DESCRIPTIONS OF COURSES IN ECONOMICS

Ec 105 Consumer Economics (3)

Consumer-producer relationships; money management, buying methods; investments, insurance, and housing; agencies that help the consumer. 3 lectures.

Ec 201, 202 Principles of Economics (3) (3)

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. 3 lectures.

Ec 213 Economic Problems (3)

Specific current economic problems selected with reference to the needs of the students. 3 lectures. Prerequisite: Ec 201, 202

*** Ec 301 Public Finance (3)**

The principles of government financing and its various economic and social effects; collecting, spending and administration of public funds, particularly at state and local levels. 3 lectures. Prerequisite: Ec 201, 202

† Ec 302 Business and Government (3)

The economic significance of controls placed by government upon business; divergent issues arising from present relations of government to business. 3 lectures. Prerequisite: Ec 201, 202

*** Ec 308 Money and Banking (3)**

Relation of money and banking to the general economy; interrelationships between money and banking and production and distribution. 3 lectures. Prerequisite: Ec 201, 202

Ec 413 Managerial Economics (3)

How economic analysis can be used in formulating business policies; analysis of the social impact of management's role in the economy. 3 lectures. Prerequisite: Ec 201

³ Hist 304 may not be substituted for any part of this requirement.
⁴ At least 3 units to be taken from literature courses in General Education list.
⁵ Teaching majors elect Psy 312, Ed 301, and Ed 403 in junior and senior years.
⁶ Hist 305 may not be substituted for any of these requirements.
* Offered in even-numbered years only.
† Offered in odd-numbered years only.

Ec 414 Labor Economics (3)

Economic analysis of the facts and forces in wage determination. The economic importance of access to jobs, unemployment insurance, governmental policy, and union functions, such as health, housing, and education. 3 lectures. Prerequisite: Ec 201

DESCRIPTIONS OF COURSES IN HISTORY**Hist 101, 102, 103 History of Civilization (3) (3) (3)**

Development of civilization from earliest times to the present. Political, economic, social, intellectual, and religious contributions of the various peoples to contemporary life. 3 lectures.

Hist 112 History of California (3)

Development of California; early explorations, colonization; organization, government, and economy from beginnings to the present; development of culture, industry, agriculture, government, and population. 3 lectures.

Hist 301, 302, 303 United States History (3) (3) (3)

A comprehensive survey of the development of the United States from the 15th century to the present. 3 lectures.

Hist 304 Growth of American Democracy (3)

The historic backgrounds of present-day economic, political, and social problems. Development of American institutions and ideals. 3 lectures. Prerequisite: Pol Sc 301

Hist 305 United States in World Affairs (3)

The origin, forms, and forces of international relations. Current problems of security since World War II. American ideals. Development of the United States influence in world affairs. Finding and evaluating authoritative source material on world affairs. 3 lectures. Prerequisite: Eng 105, Hist 304

Hist 311 History of the Far East (3)

Historic background of the Far East since the 18th century. Development of major Oriental powers. United States influence, interests and responsibilities in the Far East. 3 lectures. Prerequisite: Hist 303 or 304

Hist 312 History of Southwest Asia and Africa (3)

Twentieth century developments in the Middle East, India, and Africa. Modern imperialism and the recent rise of nationalistic forces in those areas. Political and economic trends; social, religious, and cultural factors in these areas. 3 lectures. Prerequisite: Hist 303 or 304

Hist 313 History of Latin America (3)

Survey of Latin America from the 15th century to the present. Emphasis on the economic, cultural, and historical development of the area. 3 lectures. Prerequisite: Hist 303 or 304

Hist 417 History of the Soviet Area (3)

A survey of modern Russian history with an emphasis on the post World War I period. The rise of Communism and its subsequent spread throughout Eastern Europe and Asia. 3 lectures. Prerequisite: Pol Sc 301, Hist 303 or 304, and Hist 305 or equivalent.

DESCRIPTIONS OF COURSES IN POLITICAL SCIENCE**Pol Sc 301 American Government (3)**

The origin, nature, and distribution of political power. Declaration of Independence. The Constitution of the United States. Function and current problems of national, state, and local government. Finding and evaluating authoritative source materials on political affairs. 3 lectures. Prerequisite: Sophomore standing.

Pol Sc 401 State and Local Government (3)

The structure, function, and problems of state, county, municipal, and district governments. 3 lectures. Prerequisite: Pol Sc 301, Hist 304

Pol Sc 411 Inter-American Relations (3)

Inter-American affairs. Political, economic, and social problems; forces motivating cultural behavior, industrial development, trade techniques, agricultural methods. Opportunities for employment in agriculture, engineering, and business. Finding and evaluating authoritative source materials on Latin American affairs. 3 lectures. Prerequisite: Pol Sc 301, Hist 303 or 304

Pol Sc 412 International Relations (3)

Analysis of international organizations, including political and economic types. Problems of security, the League of Nations, the United Nations and its special agencies. 3 lectures. Prerequisite: Pol Sc 301, Hist 303 or 304

Pol Sc 413 Comparative Government (3)

Contemporary political situation in Britain, France, Soviet Union, Germany, Italy, and Japan. Policies and problems; forces making for conflict and adjustment. Constitutional, economic, communal, and sovereignty bases. 3 lectures. Prerequisite: Pol Sc 412 or permission of the instructor.

DESCRIPTIONS OF COURSES IN GEOGRAPHY**Geog 221 Elements of Geography (3)**

Elements of geography primarily for the elementary school teacher; map reading and making; the effect of geography upon industry and agriculture. 3 lectures.

Geog 308 Global Geography (3)

Survey of man's utilization and occupation of the earth. Interrelations of human life and elements of natural dependence of nations; world trade. Supporting power of geographical environment. 3 lectures.

Geog 312 Economic Geography (3)

The physical environment as it affects the economic well-being of the individual. Analysis of the geographical location of agriculture and industry both domestic and international, emphasizing the economic interdependence of geographical areas and the availability and use of resources. 3 lectures. Prerequisite: Ec 201

DESCRIPTIONS OF COURSES IN PHILOSOPHY**† Phil 201 Introduction to Philosophy (3)**

Introduction to the science of correct and accurate thinking and reasoning; a survey of prevalent philosophical theories and their application in the contemporary world. 3 lectures.

*** Phil 204 Ethics (3)**

Implications of ethics and ethical systems; scientific inquiry into the principles of the morality of human actions. 3 lectures.

DESCRIPTIONS OF COURSES IN SOCIOLOGY**Soc 201, 202, 203 Principles of Sociology (3) (3) (3)**

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. 3 lectures. Prerequisite: Social sciences major or permission of the instructor.

Soc 204 Anthropology (3)

Human culture, its history and development. Particular emphasis upon the development of the cultures of the Indians of North, Central, and South America. 3 lectures.

Soc 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 2-hour laboratory.

* Offered in even-numbered years only.

† Offered in odd-numbered years only.

DESCRIPTIONS OF COURSES IN THE SOCIAL SCIENCES**Soc Sc 101 Introduction to the Social Sciences (3)**

The social sciences in their relationship to modern living; an overview of the contributions of social sciences to cultural, social, and economic development. 3 lectures.

Soc Sc 311 Contemporary Social Problems (3)

Analysis of leading social problems facing American society today. Observations of selected social welfare institutions. 3 lectures. Prerequisite: Soc 201, 202, 203

*** Soc Sc 314 Teaching Social Studies and Language Arts (3)**

Social studies and language arts content and its placement in the elementary grades; handwriting, listening and speaking; child development approach to content; unit planning; evaluation. 3 lectures. Prerequisite: Psy 305

Soc Sc 400 Special Problems for Advanced Undergraduates (1-2)

Independent and group study of selected problems in the social sciences. Total credit limited to 4 units. 1 or 2 meetings. Prerequisite: Permission of the instructor and junior standing.

Soc Sc 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 of 120 hours total time.

Soc Sc 463 Undergraduate Seminar (2)

Intensive study of selected social problems with application of various techniques for analysis. 2 meetings. Prerequisite: Completion of senior project.

Soc Sc 590 Seminar in the Social Sciences (1-3)

Special problems in selected areas of the social sciences. Each seminar will have a subtitle describing its nature and content. 1-3 lectures. Prerequisite: Graduate standing.

Soc Sc 521 Curriculum and Methods in Secondary Social Studies (3)

Content, organization, and scope of social science curriculum in secondary schools. Methods of teaching. Evaluation of procedures. Observation of classroom practices in local schools. 3 meetings. Prerequisite: Admission to teacher education program and graduate standing.

DESCRIPTIONS OF COURSES IN PSYCHOLOGY**Psy 1 Reading Improvement (2)**

Improvement of basic reading skills. Training in quick, accurate visual and auditory perception. Vocabulary development. Improvement of comprehension through analyses of author's purpose and techniques. 2 lectures.

Psy 101 Study Skills (2)

Improvement of basic study skills. Study habits, principles of learning, tools of learning, orientation to college. 2 lectures.

Psy 202 General Psychology (3)

Basic concepts, methods, and vocabulary of psychology with emphasis upon human behavior as an object of scientific study: learning, personality, growth and development, intelligence, individual differences, emotion, motivation, and adaptive behavior. 3 lectures.

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 206 Family Relations (3)

The social and psychological backgrounds of the family in our culture. The development of family living in western society. Preparation for marriage and marital adjustment. 3 lectures.

* Not offered in 1960-61.

Psy 304 Human Relations (3)

The problems of everyday human relations in face-to-face groups, particularly in job situations. Development of skill in dealing with others through participation in case studies, role playing, and class discussions. 3 lectures.

Psy 305 Child Growth and Development (3)

Developmental aspects of the physical, social, emotional, and intellectual growth of the child from birth to adolescence. Focus on child as a person and emphasis on the awareness of self, at various ages, in relation to the world and environment. 3 lectures. Prerequisite: Psy 202

Psy 306 Adolescent Psychology (3)

The physical, social, emotional, and intellectual growth of the adolescent. Emphasis upon personality formation, social adjustment, and the problem of self-identity. 3 lectures. Prerequisite: Psy 202

Psy 312 Educational Psychology (3)

Psychological principles of the learning process and mental hygiene at the elementary and secondary levels. Emphasis upon learning and the motivation of the learner. 3 lectures. Prerequisite: Psy 202

Psy 401 Social Psychology (3)

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 controls, leadership. 3 lectures. Prerequisite: Psy 202 or permission of the instructor.

DIRECTORIES

DEPARTMENT HEADS AND CHAIRMEN BY DIVISIONS

SAN LUIS OBISPO

AGRICULTURAL DIVISION

Agricultural Business Management.....	Daniel C. Chase
Agricultural Engineering.....	James Merson
Animal Husbandry.....	Lyman Bennion
Dairy Husbandry and Manufacturing.....	Harmon Toone
Farm Management.....	Edgar Hyer
Field, Fruit, and Truck Crops.....	William Troutner, Acting
Food Processing.....	
Ornamental Horticulture.....	Howard C. Brown
Poultry Husbandry.....	Richard Leach
Soil Science.....	Logan Carter
Veterinary Science.....	John Allen

ENGINEERING DIVISION

Aeronautical Engineering.....	Joy O. Richardson
Air Conditioning and Refrigeration Engineering.....	James McGrath
Architectural Engineering.....	George J. Hasslein
Electrical Engineering.....	Fred W. Bowden
Electronic Engineering.....	Clarence Radius
Industrial Engineering.....	Millard J. Fotter
Machine Shop.....	Francis F. Whiting
Mechanical Engineering.....	Charles P. Davis, Acting
Printing.....	A. M. Fellows
Welding and Metallurgical Engineering.....	Richard C. Wiley

ARTS AND SCIENCES DIVISION

Biological Sciences.....	Glenn A. Noble
Business.....	
Education.....	Walter P. Schroeder
English and Speech.....	David M. Grant
Home Economics.....	Marjory M. Elliott
Mathematics.....	Milo E. Whitson
Military Science and Tactics.....	Col. Wilford E. H. Voehl
Music.....	Harold P. Davidson
Physical Education.....	Robert A. Mott
Physical Sciences.....	Woodford E. Bows
Social Sciences.....	A. Norman Cruikshanks
Technical Arts.....	Carl Cummins
Technical Journalism.....	Kenneth Kitch

KELLOGG-VOORHIS

AGRICULTURAL DIVISION

Agricultural Engineering.....	Haven Q. Conard
Agricultural Business Management.....	Robert Lloyd
Agricultural Services and Inspection.....	Edward C. Appel, Jr.
Animal Husbandry.....	Harry B. McLachlin
Fruit Production.....	Albert E. Canham
General Crops Production.....	Robert L. Procsal
Ornamental Horticulture.....	Oliver A. Batcheller
Soil Science.....	Harry V. Welch, Jr.

ENGINEERING DIVISION

Aeronautical Engineering.....	_____
Electronic Engineering.....	Philip A. Wessels
Industrial Engineering.....	_____
Machine Shop.....	Russell Parish
Mechanical Engineering.....	Walter E. Holtz
Welding.....	_____

ARTS AND SCIENCES DIVISION

Accounting.....	George E. Carlberg
Biological Sciences.....	John F. Lamiman
Business Administration.....	_____
Education.....	_____
English and Speech.....	Ben Siegel, Acting
Marketing.....	_____
Mathematics.....	Wallace A. Raab
Music and Art.....	Lowell K. Weeks
Office Administration.....	_____
Physical Education.....	Magnus Syverson
Physical Sciences.....	G. Thomas Moran, Acting
Social Sciences.....	Hugh O. LaBounty

FACULTY

(Number in parenthesis indicates year of appointment)

Listed as of February, 1960

- McPHEE, JULIAN A. (1933) President
 B.S., University of California, 1917; M.A., 1928; LL.D., Armstrong College, 1952.
 Experience: Agriculture Extension Service, University of California; U.S. Navy; director of vocational agriculture, El Dorado County High School and Gilroy Union High School; chief, Bureau of Agricultural Education, State Department of Education (California); director, War Food Production Training Program for California; acting chief, Bureau of Readjustment Education; assistant executive officer, State Board of Vocational Education; state director, Vocational Education (California).
- * ADAIR, VIRGINIA H. (1957) English and Art
 B.S., Mount Holyoke College, 1933; M.A., Radcliffe College, 1936; additional graduate work, University of Wisconsin, University of Washington, Claremont Graduate School.
 Experience: Teaching fellow, University of Wisconsin; librarian and bibliotherapist; instructor, College of William and Mary, Pomona College, La Verne College.
- ADAMSON, ROBERT W. (1953) Mechanical Engineering
 B.S., Ch.E., Tulane University, 1941; M.S., Ch.E., Oregon State College, 1948.
 Experience: Petroleum refinery engineer, Standard Oil Co. of N.J.; instructor, mechanical engineering, Oregon State College; research assistant, industrial sales engineer, Union Oil Co. of Cal. Registered professional engineer, California.
- ALEXANDER, WILLIAM M. (1958) Political Science
 B.S., Oregon State College, 1949; M.S., 1951; M.A., Pennsylvania State University, 1953; additional study at University of Stockholm, George Washington University, and University of Oregon.
 Experience: Management assistant, U.S. Geological Survey; teaching fellow, University of Oregon; instructor, Oregon State College.
- ALLEN, FRANCIS S. (1949) Head Librarian
 Litt.B., Xavier University, 1933; B.S. in L.S., University of Illinois, 1941.
 Experience: Librarian, Seattle College; officer, U.S. Army; librarian, Shrivensham American University, England; assistant circulation librarian, Oregon State College.
- ALLEN, JOHN K. (1952) Veterinary Science
 D.V.M., Iowa State College, 1934.
 Experience: Bureau of Animal Industry, State of Iowa; Federal Bureau of Animal Industry; divisional superintendent in charge of feeding operations, Swift & Co., Omaha, Nebraska; U.S. Army Veterinary Corps; general practice of veterinary medicine.
- ALLÉN, RAY (1955) Welding
 B.A. in Industrial Education, Santa Barbara State College, 1942; additional graduate work, Santa Barbara State College.
 Experience: Instructor, U.S. Naval Air Technical Training Center; technician, U.S. Air Force; instrument technician, welder, and machinist, self-employed; welder, Ventura Coastal Lemon Co.; engineer, Carpinteria Fire District.
- AMATO, ANTHONY J. (1955) Ornamental Horticulture
 B.S., California State Polytechnic College, 1949; graduate work, California State Polytechnic College.
 Experience: Instructor, Mt. San Antonio Junior College, Pomona; Oakland Junior College, Oakland; landscape architect and contractor, Walnut Creek, California; officer, U.S. Air Force.

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- ANDERSON, ELIZABETH B. (1958).....English
 B.S. in Journalism, Ohio University, 1938; M.A., California State Polytechnic College, 1959.
 Experience: Reporter and feature writer, Athens Messenger, Athens, Ohio; copywriter, Cleveland Press, Cleveland, Ohio; advertising department, General Electric Company, Bridgeport, Connecticut; free-lance writing.
- ANDERSON, OLIVE M. (1958).....Mathematics
 B.A., University of Madras, India, 1928; L.T., 1929.
 Experience: Teacher, Stanes European High School, Coonoor, India; Baldwin Girls' High School, Bangalore, India.
- ANDERSON, PAUL B. (1956).....English
 B.A., University of Minnesota, 1925; M.A., Harvard University, 1927; Ph.D., 1931; additional graduate study, University of Chicago, Ohio State University, University of California, Danforth seminars, Pacific School of Religion and Claremont College.
 Experience: Instructor, Massachusetts State College; professor, Parsons College, Tusculum College; professor, director of debate, academic dean, Otterbein College; professor, academic dean, National College.
- ANDERSON, RICHARD A. (1947).....Physical Education and Athletics
 B.S. in Education, University of Southern California, 1942; M.S. in Education, 1947; additional graduate work, University of California, Los Angeles.
 Experience: Playground director, Los Angeles Playground and Recreation Department; officer, U.S. Navy; swimming pool director, South Pasadena; assistant instructor in physical education and assistant swimming coach, University of Southern California.
- ANDERSON, ROY E. (1949).....Acting Dean, Arts and Sciences
 A.B., Pacific Lutheran College, 1940; M.A., Stanford University, 1948; M.B.A., 1952; additional graduate work, Stanford University.
 Experience: Assistant manager, Hancock Oil Company, Tacoma, Washington; teacher, Parkland and Tacoma, Washington, public schools systems; officer, U.S. Army; instructor, Monterey Peninsula College, Monterey, California; National Park Ranger.
- ANDERSON, RUSSELL K. (1955).....Animal Husbandry
 B.S., University of Minnesota, 1948; M.S., Iowa State College, 1950; Ph.D., Iowa State College, 1956.
 Experience: Instructor in animal husbandry, Iowa State College; assistant swine herdsman, Iowa State College, Ames, Iowa; assistant swine herdsman, University of Minnesota, St. Paul, Minnesota.
- ANDERSON, WARREN R. (1946).....Electrical Engineering
 B.S. in agriculture, University of Minnesota, 1939; B.S. in EE., Louisiana State University, 1944; graduate work, Central Signal Corps School, Camp Crowder, Missouri.
 Experience: Teacher of agricultural science, Windom, Minnesota; engineer, Plant Engineering Agency, Philadelphia; engineer, Automatic Electric Company, Chicago. Registered professional engineer, California.
- ANDREINI, ROBERT L. (1954).....English and Speech
 B.A., Stanford University, 1941; M.A., 1949; additional graduate study, University of California, Berkeley.
 Experience: U.S. Air Force; instructor in English and speech in California high schools; real estate promotion in San Mateo, California.
- ANDRESEN, JAMES G. (1956).....Mechanical Engineering
 B.S., California State Polytechnic College, 1956.
 Experience: U.S. Army.
- ANDREWS, DALE W. (1950).....Education
 B.S., University of California, Davis, 1941; M.A., California State Polytechnic College, 1952; Ph.D., University of Minnesota, 1957.
 Experience: Director of agriculture and supervising teacher, Merced Union High School; director of agriculture and supervising teacher, Arroyo Grande Union High School, Arroyo Grande; officer, U.S. Marine Corps.

- * ANOOSHIAN, V. BARNEY (1958)..... Physical Education
A.B., San Jose State College, 1947; graduate work, San Jose State College, Stanford University, University of Nevada.
Experience: Instructor, Summerville High School, Tuolumne County; coach and instructor, Modesto High School.
- * APPEL, EDWARD CARL, JR. (1946)..... Head, Horticultural Services and
Inspection Department
B.S., Oregon State College, 1940.
Experience: Agricultural inspector and deputy county agricultural commissioner, Department of Agriculture, San Bernardino County; officer, U.S. Navy.
- APPLEGARTH, JOHN H. (1952)..... Biological Sciences
A.B., San Jose State College, 1935; M.A., Stanford University, 1938; additional graduate work, University of Maryland.
Experience: Instructor, San Jose State College; Bureau of Plant Quarantine and Entomology; ranger-naturalist, Sequoia National Park; commodity expert, drug and miscellaneous plants, U.S. Tariff Commission, Chemical Division, Washington, D.C.; instructor, University of Maryland.
- ARMENTROUT, WILLIAM W. (1953)..... Counseling Center and Education
B.S., University of Missouri, 1939; A.B., Colorado State College of Education, 1940; M.A., Columbia University, 1940; EdD., Stanford University, 1953.
Experience: Guidance counselor, Menlo School and College; personnel classification officer and personnel consultant, U.S. Air Force; assistant registrar, Stanford University.
- * ASA, WARREN (1956)..... Ornamental Horticulture
B.S., University of Illinois, 1949.
Experience: Greenhouse and nursery business; designer, flower shop; technical editor, Florists' Publishing Company; American Geographical Society, Alaskan Expedition, 1953; horticulture research in Mexico; Army ski troops.
- * ASCHENBRENNER, ALBERT J. (1947)..... Associate Dean (Counseling and Testing)
A.B., Whitman College, Washington, 1940; M.S., University of Southern California, 1947. Additional graduate work, Montana State University, Claremont Graduate School, University of Southern California.
Experience: Custer County High School, Miles City, Montana; Infantry School, Fort Benning, Georgia.
- AVARY, J. D. (1954)..... Economics
B.A., University of Texas, 1944; M.A., 1948; additional graduate study, University of California at Los Angeles.
Experience: Farm operator; Social Science Analyst, Bureau of Agricultural Economics, U.S.D.A.; research assistant, Federal Reserve Bank, Dallas; instructor, Texas Christian University; teaching assistant, U.C.L.A.; teacher, Long Beach State College.
- BABB, JAMES H. (1959)..... Printing
Experience: Fifteen years experience in printing, 6½ of which was as owner of Visalia Printing Service.
- BALDWIN, NANCY J. (1959)..... Physical Education
B.S., University of Akron, 1955; M.S., University of California, Los Angeles, 1959; additional graduate study, Kent State University.
Experience: Instructor, outdoor education and camping, Sargent College; leadership and athletic assistant, C.Y.O. and Y.W.C.A., Akron, Ohio; physical education and health instructor, elementary and junior high schools, Cuyahoga Falls, Ohio; St. Bernard High School, Playa del Rey, California; recreation and intramural director, University of Akron; playground director, Cuyahoga Falls, Ohio.
- BANDES, WILLIAM D. (1958)..... Mathematics
B.S., North Carolina State College, 1952; M.S., Bucknell University, 1958.
Experience: Textile engineer; teaching assistant, Bucknell University; U. S. Army Research and Development.

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- BARR, STANLEY L. (1959)** English
 B.A., St. Bernardine of Siena College, 1953; M.A., University of Michigan, 1955; additional graduate study, University of Wisconsin, Harvard University, University of Oregon.
 Experience: Teacher, Michigan Public Schools; assistant professor, Lakeland College; instructor, Wisconsin State College.
- * **BATCHELLER, OLIVER A. (1946)** Head, Ornamental Horticulture Department
 B.S., Oregon State College, 1936; graduate work, Oregon State College.
 Experience: Assistant farm adviser, Oregon; branch manager, California Nursery Company, California; officer, U. S. Army.
- BAUER, GEORGE C. (1958)** Mechanical Engineering
 M.E., Cornell University, 1925.
 Experience: Mechanical engineer, U. C. Radiation Laboratory; mechanical design engineer, Aerojet General Corporation and Westinghouse Electric Corporation; administration and instruction, Engineering School, Curtiss Wright Technical Institute; draftsman-engineer at various aircraft companies.
- BEALS, MARK G. (1958)** Counselor
 B.A., Lycoming College, 1956; M.A., University of Hawaii, 1958.
 Experience: Instructor in problems of mental illness, Kapiolani Technical Institute, Honolulu; co-ordinator for youth programs, Williamsport, Pennsylvania; U. S. Army.
- * **BEARDMORE, ROBERT L. (1958)** Mechanical Engineering
 B.S., 1951, M.S., 1952, University of Illinois, Chicago, Illinois.
 Experience: Industrial engineer and mechanical engineer, Hood Sponge Rubber Company, Chicago, Illinois; industrial engineer, U. S. Rubber Company, Chicago, Illinois.
- BEATIE, GEORGE C. (1959)** Music
 A.B., University of California at Santa Barbara, 1949; M.A., California State Polytechnic College, 1956; graduate study, University of California at Santa Barbara, Northwestern University.
 Experience: Assistant instructor, University of California at Santa Barbara; music director, USNR, University of Rochester, New York; teacher, Nipomo Elementary School, Oceano Elementary School, Arroyo Grande Union High School; director, student activities, Arroyo Grande Union High School.
- BECK, CARL G. (1932)** Farm Management
 B.S., Colorado A. & M. College, 1921. Additional study, Colorado A. & M. and University of California at Berkeley and Davis.
 Experience: Director of vocational agriculture, Del Norte Union High School, Colorado; Middletown Union High School and Colusa Union High School, California; principal, Del Norte Union High School, Colorado; U. S. Army.
- * **BELCHER, MELVIN B. (1958)** Electronics Engineering
 B.S., 1951, University of California, Berkeley, California; additional study in nuclear power, atomic defense, power system engineering.
 Experience: Test engineer, analytical engineer, General Electric Company, Schenectady; service engineer, Western Audiograph, Los Angeles.
- * **BELLMAN, SAMUEL IRVING (1957)** English
 B.A., University of Texas, 1947; M.A., Wayne University, 1951; Ph.D., the Ohio State University, 1955; University Fellow, the Ohio State University, 1953.
 Experience: Assistant instructor, the Ohio State University; columnist, the Fresno Guide; instructor, Fresno State College, San Luis Obispo Campus of California State Polytechnic College; instructor, San Luis Obispo Adult School.
- BENNION, LYMAN L. (1938)** Head, Animal Husbandry Department
 B.S. from Utah State College, 1929.
 Experience: Sales Department, Purina Mills; American Packing Company, Union Stockyards, Ogden, Utah; agriculture instructor, Salinas Union High School; agricultural extension service, University of California.

* Kellogg-Voorhis staff.

- BERGHELL, JOY GARRISON (1956)**..... Library
 B. of Journalism, University of Missouri, 1935.
 Experience: Copywriter, public relations and promotion, Los Angeles Times; account executive, R. W. Webster Advertising, Los Angeles; editorial writer, Southwestern Signal Corps Training Center, San Luis Obispo; free-lance advertising, publicity and newspaper writer.
- BETZ, ELLARD W. (1947)**..... Machine Shop
 B.A., Santa Barbara State College, 1942.
 Experience: U.S. Navy; teacher, Victorville, California.
- BILLE, RALPH O. (1948)**..... Agricultural Engineering
 B.S., University of Minnesota, 1922; M.S., 1940.
 Experience: Agriculture instructor in secondary schools, Minnesota; agricultural engineering and industrial arts instructor, State Teachers College, Platteville, Wisconsin.
- BIRKETT, RICHARD J. (1955)**..... Animal Husbandry
 B.S., California State Polytechnic College, 1953; additional work, California State Polytechnic College.
 Experience: Feed and milking supervision, Union Stock Farms, Blythe, California.
- BISHOP, CHESTER O. (1957)**..... Mechanical Engineering
 B.S., McPherson College, 1929; M.S., Texas A. & M. College, 1955.
 Experience: Professor, Arkansas Tech; Hind Junior College, Raymond Mississippi; instructor, San Angelo College, Texas; Copiah-Lincoln Junior College, Wesson, Mississippi; Texas A. & M. Radar School; engineer and manager, B & M Machine Co., Grenada, Mississippi.
- * **BLINKHERN, LOUISE (1955)**..... Librarian
 B.A., University of California, 1929; Certificate in Librarianship, 1931.
 Experience: Librarian, San Marino Public Library, San Marino, California; cataloger and audiovisual assistant, Arcadia Unified School District, Arcadia, California.
- BLOOM, EMMETT A. (1946)**..... Animal Husbandry
 B.S. Agriculture, University of California, Davis, 1934.
 Experience: Agricultural instructor at Ripon, Laton, and Corning High Schools.
- * **BOBB, SYDNEY RALPH (1958)**..... English
 A.B., 1939, University of Chicago, M.A., 1948; Ph.D., Stanford University, 1954.
 Experience: U.S. Army; instructor, Washington State College; acting instructor, Stanford University; instructor, California State Polytechnic College, San Luis Obispo.
- * **BOGUE, CAMERON C. (1955)**..... Mathematics
 B.A., University of Redlands, 1943; M.A., University of Michigan, 1947.
 Experience: Occidental Life Insurance Company, Los Angeles, California; instructor, Eliot Junior High School, Altadena, California.
- * **BOLAND, GERTRUDE C. (1957)**..... Social Science
 A.B., Mt. St. Mary's College, 1936; B.S., Georgetown University, 1948; M.A., Catholic University, 1950; candidate for Ph.D., Claremont Graduate School.
 Experience: Elementary teacher, Los Angeles City Schools; U.S. Navy; instructor, Manhattanville College of the Sacred Heart; senior statistician and group leader, Aerojet General Corp.
- * **BOLTZ, HOWARD O. (1947)**..... Landscape Architecture
 B.S., University of California, 1941; M.S., 1947.
 Experience: Landscape architect in private practice; officer, U.S. Army.
- BONGIO, ENRICO P. (1948)**..... Welding
 A.B., Chico State College, 1948.
 Experience: Welder, Chicago Bridge and Iron Company; U.S. Army; welder and shop maintenance, Churchill Frozen Foods Company, Eureka, California; general metal shop work, Woodsman Power Saw Company, Eureka; welder, Eureka Boiler Works and Steel Products; shop instructor, Sonoma Valley Union High School, Sonoma, California.

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- BOOTHE, ROBERT O. (1954)**..... English
B.A., University of Wisconsin, 1950; M.A., Los Angeles State College, 1953; additional graduate study, University of California at Los Angeles, Los Angeles State College, University of Michigan and Mexico City College.
Experience: Instructor, El Camino College; instructor, Compton College; freelance journalist and photographer; toolmaker, tool designer, and engineer.
- BOSTROM, ROBERT M. (1956)**..... Graduate Manager
B.S., California State Polytechnic College, 1956.
Experience: Dormitory manager, California State Polytechnic College.
- BOUKIDIS, ANN P. (1957)**..... Physical Education
B.S., University of Arizona, 1950; M.A., Los Angeles State College, 1957.
Experience: Recreation supervisor, Germany, U.S. Army; teacher, Los Angeles City School System.
- BOWDEN, FREDERICK W. (1949)**..... Head, Electrical Engineering Department
B.S., California Institute of Technology, 1932; M.S. in E.E., 1933; additional graduate work, California Institute of Technology.
Experience: Geophysics, Shell Oil Company; electrical engineer, Oilfields Service Co.; mechanical and electrical consultant, Walt Disney Enterprises; head Electrical Research Department, Lockheed Aircraft Corp.; associate professor, University of Southern California College of Aeronautics. Registered professional engineer, California.
- * **BOWLIN, ROBERT L. (1959)**..... Registrar
B.S., California Polytechnic College, 1953; M.A., 1958; additional graduate study, Claremont Graduate School.
Experience: Teacher, Whittier Union High School; investigator-interrogator, Department of Army in Europe; U.S. Army, Counterintelligence.
- BOWLS, WOODFORD E. (1937)**..... Head, Physical Sciences Department
A.B., University of California, 1932; M.A., 1935; Ph.D., 1937.
Experience: Teaching assistant and teaching fellow in physics, University of California.
- BOYLE, KENNETH D. (1947)**..... Dairy Manufacturing
B.S., University of Minnesota, 1942.
Experience: Butter and ice cream, Neepawa Creamery and Produce Co., Neepawa, Manitoba, and Central Creameries, Brandon, Manitoba; Royal Canadian Air Force; research staff and foreman in experimental plant, Golden State Co., Ltd., San Francisco.
- BRADLEY, HENRY, Master Sergeant, U.S. Army (1954)**..... Military Science and Tactics
Experience: Warrant Officer, U.S. Army: Armored Battalion Supply Officer; Unit Administrator; administrative assistant to special service officer, Camp Hunter Liggett and Fort Ord, California; Sergeant Major and Personnel Sergeant Major, Training Center, Fort MacArthur, California.
- BRANNUM, THOMAS P. (1952)**..... Animal Husbandry
B.S., California State Polytechnic College, 1948.
Experience: Dos Pueblos Ranch, Goleta, California; U.S. Army Air Force; agriculture instructor, Santa Ynez High School.
- BRECKAN, ERLING A. (1958)**..... Industrial Engineering
B.S., University of Illinois, 1941; M.B.A., University of California at Los Angeles, 1952.
Experience: Officer, U.S. Army; lecturer, University of California at Los Angeles; assistant to plant manager, Neomatic, Inc.
- BRENDLIN, GENE E. (1950)**..... Foundation Manager
B.S., University of California, 1934.
Experience: Director, vocational agriculture, Fallbrook Union High School, Linden Union High School, Tracy Union High School, and Arroyo Grande Union High School; farmer, San Luis Obispo County.

* Kellogg-Voorhis staff.

- BROMLEY, J. PHILIP (1947)**..... Farm Management
B.S., University of Southern California, 1934; M.S., 1936; graduate work at Columbia, Texas A. & M., and University of California.
Experience: Teacher, Garvey School District; instructor, San Diego State College; officer, U.S. Navy.
- BROWN, DEWEY E., Capt., USA (1958)**..... Military Science and Tactics
B.B.A., Texas A. & M., 1951; Graduate Basic and Advance Course, the Armor School, Ft. Knox, Kentucky.
Experience: Company Commander and Staff Officer; Brigade S3, 7th Infantry Division, Korea.
- * **BROWN, DONALD E. (1958)**..... Machine Shop
Mount San Antonio College; U.C.L.A.; Los Angeles State College.
Experience: General machinist, Hanson Manufacturing Company, Pomona; production and experimental machinist, H. W. Loud, Pomona; experimental machinist, Glenn Jones Machinists, Ontario, California.
- BROWN, HOWARD C. (1946)**..... Head, Ornamental Horticulture Department
B.S., California State Polytechnic College, 1943; M.S., Ohio State University, 1954.
Experience: U.S. Army Air Force; instructor, Ohio State University.
- * **BROWN, HOWARD S. (1948)**..... Botany
B.A., 1943, University of California at Los Angeles, M.A., 1948; additional graduate work, Claremont Graduate School.
Experience: Teaching assistant, University of California at Los Angeles; officer, U.S. Marine Corps.
- BROWN, MARVIN D. (1956)**..... English
B.A., Washburn College, 1933; B.D., Andover Newton, 1936; S.T.M., 1939; Th.D., Iliff School of Theology, 1954.
Experience: Assistant, Washburn College; parish work, Garden City, Kansas; Denver, Colorado; Santa Barbara, California; instructor, U.S.A.R. Schools; officer, U.S. Army.
- BROWN, WILLIAM H. (1957)**..... Architectural Engineering
B. Arch., University of Florida, 1954; graduate study, University of Florida.
Experience: Draftsman, Trend Associates, L. C. Kingscott & Associates, Kalamazoo, Michigan; Viking Products Co., Vicksburg, Michigan; Valley Metal Products Co., Plainwell, Michigan; instructor, University of Florida; designer, John E. Piercy, Architect, Gainesville, Florida.
- BRUNK, ATHOL J. D. (1957)**..... Physics
B.S., Northwestern State Teachers College, 1937; M.A., West Texas State Teachers College, 1941.
Experience: Instructor in mathematics and science, high school, Beaver, Oklahoma; elementary principal, Alamogordo, New Mexico; officer, U.S. Navy; mathematics instructor, Atascadero, California.
- BRYSON, PAUL R. (1956)**..... Physics
A.B., Pacific Union College, 1941; M.A., University of Southern California, 1949; additional graduate work, University of Southern California.
Experience: Instructor and administrator, California College of Medical Technicians; instructor in physics, Reedley High School and College.
- BUCY, L. LAVERNE (1955)**..... Animal Husbandry
B.S., University of Kentucky, 1943; M.S., 1950; Ph.D., University of Illinois, 1954.
Experience: Graduate assistant in animal science, University of Illinois; teacher of vocational agriculture, Kentucky high schools; farming; U.S. Navy.
- BURLINGHAM, HERBERT H. (1948)**..... Agricultural Education and Teacher Training
B.S., Oregon State College, 1929; graduate work, University of California.
Experience: Executive student, Swift and Company; director of agriculture, Willits Junior-Senior High School; director of agriculture and critic teacher, Madera Union High School; director of agriculture and critic teacher, Paso Robles Union High School; regional supervisor, State Bureau of Agricultural Education, California.

* Kellogg-Voorhis staff.

- BUSCHMAN, WILLIAM O.** (1956)..... Mathematics
A.B., Reed College, 1941; M.Ed., University of Oregon, 1947; Ed.D., Oregon State College, 1953; additional graduate work.
Experience: Marine engineering and naval architecture, Kaiser Co., and others; teaching, Portland Public Schools, Gresham Union High School; instructor, Multnomah College; assistant professor, Oregon State System of Higher Education, General Extension Division; assistant professor, Portland State College; research, University of Oregon Medical School, Stanford Research Institute, and Institute for Motivational Research.
- BUTZBACH, ARTHUR G.** (1950)..... Education and Co-ordinator of Graduate Studies
A.B., Stanford University, 1926; M.A., 1929; Ed.D., 1948.
Experience: Teacher and principal, Lower Lake Union High School; assistant professor of education, Drake University and Sacramento State College.
- * **CANHAM, ALBERT E.** (1948)..... Head, Fruit Production Department
B.S., University of California at Los Angeles, 1941.
Experience: Officer, U.S. Navy; manager of avocado and citrus orchards; owner and operator of commercial weed and pest control company; instructor in I-on-F program, Palomar College, Vista, California.
- CARDANI, JOSEPH C.** (1959)..... Business
B.A., Arizona State University, 1959; M.S.B.A., Arizona State University, 1959.
Experience: Owner chain of retail stores and wholesale company; State Department Offices for Voice of America; Fiscal Officer, U.S. Army, Psychological Warfare Branch; District Manager, Arizona Office of Emergency Management.
- * **CARLBERG, GEORGE E.** (1949)..... Head, Accounting Department
B.S., University of California, 1947; graduate work, University of California at Los Angeles and Claremont Graduate School.
Experience: Livestock buyer, Armour & Co., officer, U.S. Army; field man, Arden Farms Co.
- * **CARLSTEDT, GEORGE C.** (1959)..... Mathematics
B.S., U.S. Coast Guard Academy, 1924; M.S., Purdue University, 1958.
Experience: Captain, U.S. Coast Guard (retired); instructor, Bradley University.
- CARRINGTON, JAMES H.** (1943)..... Agricultural Engineering
Special Vocational Arts Credential, University of California, Los Angeles, 1940; Special Vocational Arts Credential, University of California, Berkeley, 1941 and 1942.
Experience: Auto mechanic, Los Molinos Garage, Los Molinos; auto shop instructor, Los Molinos High School, Los Molinos.
- CARTER, LOGAN SAMPSON** (1947)..... Head, Soil Science Department
B.S., Oregon State College, 1930; Ph.D., Michigan State College, 1934.
Experience: Instructor, Michigan State College; U.S. Department of Soil Conservation; Bureau of Reclamation, U.S. Department of Interior, Washington, D.C.
- CASS, MARJORIE** (1957)..... Education
B.S., University of Nebraska, 1932; M.A., Columbia University, 1945; additional graduate work, University of Missouri, 1947.
Experience: Teacher, Nebraska and Iowa; instructor, Stephens College; assistant professor, Grinnell College.
- CHAFFEE, WALTER R.** (1958)..... Education and Audiovisual
Michigan State University, 1946-53.
Experience: Graphic designer, Michigan State University AV center; art director, Repertoire Magazine and Dee Publishing Company, Hollywood; 3-D graphic designer, Hunt-Johnson Display Company, San Diego; graphic designer, Floats, Inc., El Monte, California.

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- CHANDLER, EVERETT M. (1951)..... Dean of Students
A.B., University of California, 1939; additional graduate work, University of California.
- Experience: Administrative officer, U.S. Air Force; personnel technician, State Personnel Board; management analyst, State Department of Finance; extension teacher, Sacramento State College; U.S. Air Force.
- CHANEY, NATHAN H. (1959)..... Electronic Engineering
B.S., Southwestern Louisiana Institute, 1948; M.S., Denver University, 1959.
- Experience: Seismograph operator, Sun Oil, Socony Vacuum, National Geophysical; graduate assistant, University of Alaska; Corps of Engineers, Ladd Air Force Base; instructor, Iowa State College and Denver University; electrical engineer, Creole Petroleum Company.
- CHASE, DANIEL C. (1954)..... Agricultural Business Management
B.S., University of Arizona, 1946; M.Agr. Ed., 1951; Ed.D., Pennsylvania State University, 1954.
- Experience: Teacher of vocational agriculture, veterans' instructor, Tolleson Union High School, Tolleson, Arizona; supervising teacher, University of Arizona; veterans' co-ordinating teacher, State Department of Vocational Education, Phoenix, Arizona; farm editor and columnist, *Arizona Republic*; assistant professor and head, division of farm management, Arizona State College, Tempe, Arizona.
- CHIZEK, GAYLORD J. (1958)..... Farm Management
B.S., Kansas State College, 1957; M.S., 1958.
- Experience: Assistant instructor, Kansas State College, Manhattan, Kansas; farmer; U.S. Army.
- CLOONAN, CLIFFORD B. (1957)..... Electronic Engineering
B.S., University of Colorado, 1955.
- Experience: Design engineer, Collins Radio Co., Cedar Rapids, Iowa; physical science aid, National Bureau of Standards, Boulder, Colorado; instructor, U.S. Army Signal Corps.
- CLUCAS, GEORGE G. (1956)..... Dean, Finance and Development
A.B., University of Michigan, 1947; M.P.A., 1949.
- Experience: Senior administrative analyst, office of the Legislative Auditor for California.
- COCKRIEL, GEORGE W. (1957)..... Industrial Engineering
Experience: Chief, Pacific Fire District, Sacramento; special agent, U.S. Army counterintelligence; investigator, office of the District Attorney, Reno, Nevada; instructor, fire safety and control, California Highway Patrol Academy, Sacramento.
- COLLINS, RALPH C. (1955)..... Co-ordinator of Secondary Student Teaching
B.S., Drake University, 1932; M.A., 1941; Ed.D., University of Colorado, 1951.
- Experience: Officer and navigation instructor, U.S. Navy; physics instructor, East High School, Des Moines, Iowa; graduate assistant, Iowa State College and University of Colorado; head, Science Department, Eugene High School, Eugene, Oregon; assistant professor, Central Washington College of Education, Drake University, University of Oregon.
- COLLINS, SPELMAN B. (1939)..... Animal Husbandry
B.S., Agriculture, University of California, 1925.
- Experience: Agriculture instructor, Middletown, Calistoga, and Livermore high schools.
- COMPTON, MEL D. (1958)..... Welding
Engineering courses, University of Southern California and University of California at Los Angeles; education courses, University of California at Los Angeles.
- Experience: Welder and teacher in apprentice program, Standard Oil Company; instructor in welding, Compton College and El Camino College.
- * CONARD, HAVEN Q. (1946)..... Chairman, Agricultural Engineering
B.S., Iowa State College, 1943.
- Experience: Teaching, Engineering Drafting Department, Iowa State College; officer, U.S. Air Force.

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- COOK, DAVID W. (1941).....Curriculum Evaluator
 B.S., University of California, 1937.
 Experience: Examiner, Board of Fire Underwriters of the Pacific; engineer, Insurance Company of North America; instructor, electrical engineering and mathematics; co-ordinator of navigation instruction, U.S. Naval Flight Preparatory School; registrar; chairman, Mathematics Department, California State Polytechnic College.
- COOK, EDWARD P. (1958).....Welding
 Special courses at Burbank Technical Institute, 1942, and Frank Wiggins Trade School, 1936.
 Experience: Supervisor, California Stamping Manufacturing; welder, Beckman Instruments; weld supervisor, Master Products Company, Precision Sheet Metal, and Lockheed Aircraft Company; shop foreman, Howell Manufacturing Company; welder, Webber Store Fixtures and Barker Brothers.
- CRANE, FRANKLIN S. (1958).....Mechanical Engineering
 Petroleum Engineer, Colorado School of Mines, 1943; graduate work, Massachusetts Institute of Technology.
 Experience: Division engineer, Oil Well Supply Company; chief engineer, Martin-Decker Corporation; secretary-treasurer and director, Decker Engineering Corporation; officer, U.S. Navy; registered petroleum engineer, California.
- CRUIKSHANKS, ANDREW N. (1947).....Head, Social Sciences
 A.B., University of California, 1931; M.A., Stanford University, 1933; Ed.D., Stanford University, 1957.
 Experience: Instructor, social studies and speech, Sacramento High School; educational supervisor, U.S. Department of Interior, CCC; instructor, social studies and speech, Fort Bragg High School; director of adult education and community forums, Fort Bragg; tour director, Europe and Middle East; professional lecturer.
- CULBERTSON, JAMES T. (1953).....Mathematics
 A.B., Yale University, 1934; graduate work, University of Pennsylvania, 1935-37; Ph.D., Yale University, 1940.
 Experience: Research fellow, Yale University; professor, mathematics and physics, Cumberland University; head of mathematics department, Southwestern University; research associate mathematical biology, University of Chicago; assistant professor of philosophy, University of Southern California; research associate, Rand Corporation.
- CUMMINS, CARL C. (1958).....Head, Technical Arts Department
 A.B., University of California, Santa Barbara, 1948; M.S., University of Southern California, 1953; Ed.D., University of California, 1957.
 Experience: Construction supervisor, National Steel and Shipbuilding Corporation, San Diego; tool maker, tool designer, and plant engineer, Ryan Aeronautical Company, San Diego; tool engineer, Rohr Aircraft Corporation, Chula Vista; engineer, Southern Pacific Company; production consultant, El Cajon; instructor, U.S. Army; industrial arts teacher, San Diego Unified School District; instructor, San Diego Junior College; professor of industrial arts, San Diego State College.
- DAVIDSON, HAROLD P. (1936).....Chairman, Music Department
 B.A., Pomona College, 1929; M.A., Claremont College, 1932; additional graduate work, University of Southern California.
 Experience: Head of Music Department, Emerson Junior High School, Pomona; master training teacher, Claremont College.
- DAVIS, CHARLES P. (1958).....Acting Head, Mechanical Engineering Department
 B.S., Mechanical Engineering, Rensselaer Polytechnic Institute, 1948.
 Experience: Instructor and assistant professor, Rensselaer Polytechnic Institute; development engineering and product engineer leader, General Electric Company.

- * DAVIS, DONALD F. (1957)..... Poultry
 B.S., Pennsylvania State College, 1933.
 Experience: Manager, Poultry and Egg Department, Swift & Company, Wilkes-Barre, Pennsylvania; manager, Pennsylvania egg-laying test; district manager, feed division, the Quaker Oats Company; manager, Feed Sales, California Milling Corp., Los Angeles.
- DEAN, ARNOLD M. (1949)..... Soil Science
 B.S., University of Alberta, Canada, 1943; M.S., 1946; Ph.D., University of Wisconsin, 1949.
 Experience: Laboratory assistant, Dominion Department of Agriculture, Edmonton, Alberta; teaching assistant, University of Wisconsin; industrial fellowship, University of Wisconsin.
- * DEGEN, JAMES L. (1959)..... Ornamental Horticulture
 B.S., California State Polytechnic College, 1954.
 Experience: Nursery, landscape contracting business, Costa Mesa, California; U.S. Army.
- * DENDURENT, MYRON S. (1957)..... Physical Sciences
 B.S., Kansas State College, 1939; M.S., 1939.
 Experience: Engineer, Westvaco Chlorine Products Corp., U.S. Army Chemical Warfare Service, Goodyear Tire and Rubber Co.; instructor, University of Kansas City, Bethany College, Idaho State College.
- * DEVINE, EUGENE J. (1959)..... Business
 B.B.A., Tulane University, 1957; M.B.A., 1958; additional graduate work, University of California at Los Angeles, Claremont Graduate School.
 Experience: Instructor, University of Portland, Tulane University, University of Mississippi; accountant, Pacific Dry Dock Company, Wesson Oil Sales Company, Fireman's Fund Insurance Company, Associated Hospital Service; U.S. Marine Corps.
- DE VOROS, EVELYN K. (1955)..... English and Speech
 B.A., University of Texas, 1936; M.A., University of Michigan, 1941; Ph.D., University of Michigan, 1945.
 Experience: Instructor in Texas Public Schools; instructor, Louisiana Polytechnic Institute; assistant professor, Bowling Green State University, Ohio, University of California, Santa Barbara College.
- DICKEY, RICHARD K. (1956)..... Electrical Engineering
 B.S., University of California, 1948; M.S., 1956.
 Experience: Project engineer, Berkeley Scientific Co.; design engineer, Remler Co., Ltd.; engineer, Alameda Naval Air Station.
- DICKSON, BRUCE A. (1952)..... Soil Science
 B.S.A., University of British Columbia, Canada, 1940; M.S.A., 1942; Ph.D., University of California, Berkeley, 1952.
 Experience: Teaching assistant, University of British Columbia; teaching assistant, University of California at Berkeley; assistant in plant nutrition, Dominion Experimental Station, Saanichton, B.C.; soil specialist; Dominion Experimental Farm, Agassiz, B.C.
- DILLION, JERRY L. (1954)..... Electronic Engineering
 B.S., in Electronic Engineering and Mathematics, California State Polytechnic College, 1954.
 Experience: Technician, Clayton Radio Co., Modesto, California; technician, U.S. Army, Sacramento, California.
- DILTS, RALPH W. (1944)..... History and Political Science
 A.B., Montana State University, 1936; M.A., 1938; graduate study, University of California, 1940-1941.
 Experience: Stevensville High School, Stevensville, Montana; graduate assistant, Montana State University; graduate assistant, University of California; U.S. Bureau of Reclamation.

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- * **DIMITMAN, JEROME E. (1949)**..... Plant Pathology
B.S., University of California at Berkeley, 1943; M.S., University of California, Citrus Experiment Station, Riverside, 1949; Ph.D., University of California, 1958.
Experience: Citrus production, University of California at Los Angeles; assistant plant pathologist, California State Department of Agriculture; officer, U.S. Navy.
- * **DRAKE, WILLIAM A. (1959)**..... Electronic Engineering
B.S., California Institute of Technology, 1951; additional graduate studies, University of California.
Experience: Senior reliability engineer, Convair, Pomona, California.
- DUNN, WESLEY T. (1959)**..... Printing
Experience: Instructor, Compton High School; rotary press operator, Moore Business Forms; 11 years experience as composition-press operator for various printing firms.
- * **DUTRA, RAMIRO C. (1959)**..... Chemistry
B.S., University of California, Davis, 1954; M.S., 1954; Ph.D., 1959.
Experience: Teaching and research assistant, University of California; junior specialist to assistant specialist, California Agricultural Experiment Station; lecturer in Dairy Chemistry, University of California.
- * **EBERSOLE, WALTER (1958)**..... Mechanical Engineering
B.A., 1941, Santa Barbara State College; graduate work, University of Southern California, Los Angeles.
Experience: Project engineer, Shaffer Oil Tool Works, Brea, California; designer, University of Southern California Engineering Center, Los Angeles, California; process engineer, B. H. Hadley Co., Pomona, California; instructor, engineering, drafting, etc., Mount San Antonio College, Pomona, California.
- ECKROTE, LAWRENCE H. (1955)**..... Printing
Experience: Foreman, Mail of Woodland and San Bernardino Orange Belt News; machinist, Santa Barbara News-Press and San Luis Obispo Telegram-Tribune Co. Over 30 years of experience in the printing industry.
- EILERS, PATRICIA (1956)**..... Graduate Nurse
R. N., San Diego County Hospital, 1936.
Experience: San Luis Obispo County General Hospital.
- ELLIOTT, MARJORY M. (1955)**..... Head, Home Economics Department
B.S., University of Missouri, 1931; M.A., 1939; additional graduate work at University of Chicago and University of California at Los Angeles.
Experience: Vocational home economics teacher, high schools, Missouri; supervising teacher, University of Missouri; teacher trainer, Northwest Missouri State College; lecturer, University of Hawaii; assistant state supervisor of home economics, Iowa State Board of Vocational Education; associate professor, The Stout Institute; teaching assistant, University of California at Los Angeles.
- ELSTON, CHARLES A. (1947)**..... Mathematics
A.B., Santa Barbara State College, 1932; M.S., University of Southern California, 1940.
Experience: Teacher, Santa Barbara County Schools; instructor, head, Mathematics Department, Junior High School, and instructor, Adult Evening School, San Luis Obispo; surveyor, U.S.E.D. and Southern Pacific Railroad.
- * **ENGLUND, CARL R. (1948)**..... Dean of Agriculture, Kellogg-Voorhis Campus
B.S., University of California, Berkeley, 1939.
Experience: Director of vocational agriculture, Reedley Union High School and Junior College, Reedley, California; head, crops department, California State Polytechnic College, Voorhis Unit.
- * **EPPS, MAX (1960)**..... Mechanical Engineering
B.S. in chemical engineering, University of Southern California, 1934. M.S. in chemical engineering, 1935.
Experience: General Petroleum Corporation, Los Angeles, California, chief automotive engineer; Socony Vacuum, Paulsboro, New Jersey, assistant supervisor of engine laboratories; Fairchild Aircraft, Ranger Engine Division, Farmingdale, New York, fuel and lubrication engineer.

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- ERICSON, CHRISTINE (1955).....Library
 B.A., University of Colorado, 1949; M.A. (Libr. Sci.), University of Denver, 1950.
 Experience: Beloit, Wisconsin, Public Library; Whiting, Indiana, Public Library; Post Library, Fort Riley, Kansas.
- ERNATT, EDWARD T. (1958).....Education
 A.B., Wayne State University, Detroit, 1946; M.Ed., 1950; Ed.D., University of Michigan, 1956.
 Experience: Elementary schoolteacher, Taylor Center Schools, Inkster, Michigan; district superintendent, Nankin-Dearborn Schools, Inkster, Michigan; elementary schoolteacher, Santa Barbara, California; supervising teacher, University of California, Santa Barbara College; district superintendent, West Park School District, Fresno, California.
- * ERSPAMER, JACK L. (1956).....Botany
 B.S., University of Washington, 1941; Ph.D., University of California, 1953.
 Experience: Teaching assistant, University of Washington, University of California; research assistant, University of California, Citrus Experiment Station, Riverside.
- ERVIN, GERALD E. (1959).....Architectural Engineering
 B.A., University of Washington, 1953; M.A., Massachusetts Institute of Technology, 1958.
 Experience: Draftsman-designer, Louis C. Kingscott & Associates, and Anderson, Beckwith and Haible, Architects.
- ESSIG, FREDERICK M. (1946).....Biological Sciences
 A.B., University of California, 1917; Ph.D., 1920; B.D., University of Southern California, 1927.
 Experience: Teaching assistant, University of California; instructor, University of California at Los Angeles; professor, Asbury College, Kentucky; chaplain, U.S. Army.
- FALKENSTERN, OSWALD J. (1953).....Mathematics
 B.S., Montana State College, 1939; additional graduate work, University of Colorado and Colorado A. & M. College; M.S., San Jose State College, 1952.
 Experience: High school teacher and coach, Baker and Opheim, Montana; air navigation officer, U. S. Navy; mathematics instructor, Colorado A. & M. College; instructor and chairman of junior high school mathematics, Salinas.
- * FAUSCH, HOMER D. (1956).....Animal Husbandry
 B.S., University of Minnesota, 1947; M.S., 1950; Ph.D., 1953.
 Experience: U.S. Air Force; Associate Professor and head, animal husbandry department, Northwest Experiment Station, University of Minnesota, Crookston, Minnesota; secretary-treasurer Red River Valley Aerial Sprayers, Inc., Crookston, Minnesota.
- FELLOWS, ALBERT MELVIN (1946).....Head, Printing Department
 Experience: Special training courses in journalism, advertising, mechanical art and print shop management; U.S. Army, World War I; journeyman printer and supervisor of apprentice training programs; superintendent of printing plants in Kansas City, Missouri, and Birmingham, Alabama.
- * FERRIS, HORACE GARFIELD (1958).....Physical Sciences
 B.A., Pomona College, 1936; M.A., University of California, Los Angeles, 1939; Ph.D., 1949.
 Experience: Physicist, U.S. Naval Ordnance Test Station, California Institute of Technology, Scripps Institute of Oceanography, Robert Shaw-Fulton Company, Anaheim, California, Hughes Aircraft Company, Fullerton, California; lecturer, Pomona College, University of Southern California; instructor, San Diego State College; associate professor, Chapman College, Orange, California.
- FISHER, CLIFFORD E. (1956).....Electronic Engineering
 B.A., Adams State College, 1946; B.S., California State Polytechnic College, 1950; M.S., Stanford University, 1951; engineer, Stanford University, 1953.
 Experience: Engineer, Stanford Research Institute; Station KGIW, Alamosa, Colorado; U.S. Signal Corps.

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FISHER, CLYDE P. (1947).....Dean, Educational Services and Curriculum Development
A.B., University of Oklahoma, 1942; M.A., University of Southern California,
1947; Ph.D., 1955.

Experience: Teaching assistant in Mathematics, lecturer in mathematics, University of Southern California; officer, U.S. Army; instructor, mathematics; assistant to the dean, Liberal Arts Division; assistant to the executive dean; building program co-ordinator, California State Polytechnic College.

FLANAGAN, JAMES ROBERT (1959).....Animal Husbandry
B.S., California State Polytechnic College, 1959.
Experience: Rancher.

* FLYNN, THOMAS J. (1959).....Mathematics
B.S., United States Naval Academy, 1927; United States Naval Postgraduate School, Ordnance Engineering, 1935; Advanced Management Program, Harvard Business School, 1951; M.S., Purdue University, 1959.

Experience: United States Navy; Bureau of Ordnance, Navy Department, Research and Development and Production.

FOOTE, ALVIN (1956).....English
Colorado College, 1926-29; A.B., 1948; M.A., 1949; additional graduate study, Tulane University.

Experience: U.S. Army; instructor, Colorado College; instructor, Centenary College; instructor, Tulane University.

FOLSOM, VOLMAR A. (1946).....Mathematics
B.S., Iowa State College, 1934; M.E., Colorado University, 1937; additional graduate work, Southern Methodist University.

Experience: High school and junior college teaching; officer, U. S. Navy; assistant professor, mathematics, Southern Methodist University.

* FORREST, WILLIAM M. (1957).....Building Specialist
A.B., University of California, 1956; M.S.L.S., University of Southern California, 1957.

Experience: Pilot, U.S. Air Force.

FOTTER, MILLARD J. (1954).....Head, Industrial Engineering Department
B.S. in Mechanical Engineering, Armour Institute of Technology, 1935; M.S., University of Southern California, 1956.

Experience: Major, U.S. Air Force; sales engineer, Stanley E. Morris Co., Los Angeles; production engineer, Southland Paper Co., Los Angeles; industrial engineer, Southwestern Engineering Co., Los Angeles; industrial engineer, International Harvester Co., Chicago, Illinois, and Memphis, Tennessee. Registered professional engineer, California.

FOX, FRANK W. (1957).....Animal Husbandry
B.S., California State Polytechnic College, 1951; M.A., California State Polytechnic College, 1957.

Experience: Director of Vocational Agriculture, Lassen Union High School, Susanville, California.

* FOXEN, MILDRED E. (1955).....Supervising Nurse
R.N., Womens Christian Association, 1943.

Experience: Resident nurse, College of Wooster, Wooster, Ohio; Intercommunity Hospital and office nurse, Medical Center, Covina, California.

* FRANCIS, JOHN W. (1960).....Business
B.A., University of California, Los Angeles, 1951; additional study at University of Southern California Law School and University of California, Los Angeles, Law School.

Experience: Teacher, Palms Junior High School and University High School, Los Angeles.

FRANCK, MICHEL N. (1956).....History and Political Science
B.S., City College, New York City, 1934; M.A., New York University, 1935; Ph.D., 1949.

Experience: Trade delegate; commercial attaché, Brussels, Belgium; associate professor, Pacific Lutheran College; administrative assistant, Olin-Mathieson Chemical Corp.

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- * FRENCH, JERE STUART (1957) Landscape Architecture
A.B., Washington University (St. Louis), 1951; B.S., Michigan State University, 1956.
Experience: Paving construction, St. Louis, Missouri; landscape architect, National Park Service, San Francisco; landscape architect, F. B. Stressau, Miami, Florida; instructor, U. S. Navy.
- FROST, ROBERT H. (1953) Physics
A.B., University of California, 1939; M.A., 1945; Ph.D., 1947.
Experience: Teaching assistant, University of California; assistant professor, University of Missouri.
- FRYBERGER, E. L. (1957) Electrical Engineering
B.S., U. S. Naval Academy, 1923; U. S. Naval Post Graduate School; M.S., Harvard University, 1930; George Washington University.
Experience: Officer, U. S. Navy (Retired); instructor, George Washington University; associate professor, Valparaiso University.
- * FULBECK, JOHN F. (1958) English
Tusculum College, Greenville, Tenn., 1937; Upsala College, East Orange, New Jersey, 1937; A.B., 1951. Graduate study, University of Southern California.
Experience: Scholastic Magazine, New Jersey state representative; Independent Press, advertising manager, Bloomfield, New Jersey; U. S. Navy; Southwest News Press, The South End Bee, editor, Los Angeles; instructor and lecturer, University of Southern California, Chouinard Art Institute, Los Angeles.
- * FULLERTON, JERRY (1959) Graduate Manager and Crops
B.S., California State Polytechnic College, 1959.
Experience: Burpee Seed Company, Santa Paula, California; Hofmeister Ranches, Ojai, California.
- FURILMSKY, GEORGE S. (1955) Electrical Engineering
B.S., Bradley University, 1949; M.S., 1950.
Experience: Instructor, Peoria Manual Training High School; graduate assistant, Bradley University; superintendent, buildings and grounds, Blackburn College.
- * GALBREATH, GEORGE T. (1953) Social Sciences
A.B., Stanford University, 1948; M.A., 1949; additional graduate study, University of California.
Experience: Instructor, California State Polytechnic College, San Luis Obispo Campus; assistant professor of economics, Armstrong College; manager, Galbreath Orchards.
- GARTLAND, THOMAS E. (1956) Mathematics
A.B., M.A., Creighton University, 1933; additional graduate work, University of Arizona, University of Minnesota, and State University of Iowa; evening and extension courses, Hastings College, UCLA, and Chaffey College.
Experience: Teacher-administrator, Nebraska; instructor Air Corps cadets, Butler University; St. Thomas Military Academy; teacher, Arizona, and Riverside, California; chairman education department and mathematics instructor, St. Ambrose College.
- GARZA, RAYMOND E. (1955) Agricultural Engineering
B.S., California State Polytechnic College, 1952.
Experience: Sales and service in farm machinery throughout California; apprentice mechanic in farm machinery.
- GATES, VINCENT J. (1958) Public Relations Coordinator, Journalism
B.S., University of Oregon, 1939.
Experience: Editor and reporter, *Salinas Index Journal* and *Salinas Morning Post*; press officer and public information officer, U. S. Navy; editor, *Santa Rosa Republican*; staff reporter and assistant city editor, *San Jose Evening News*; information officer and editor, California State Employees Association; director of publications, Henry J. Kaiser Co.

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- * GEDANKEN, BERNARD (1960) Mathematics
A.B., University of California, 1947; M.A., 1950; additional graduate study at University of California and University of Southern California.
Experience: Applied mathematician, Institute of Engineering Research, Berkeley, California; agent, Taub Mortgage Company, Oakland, California; assistant professor, San Diego State College.
- GENTHNER, FREDERICK L. (1952) Library
B.A., Ohio Wesleyan, 1940; B.S. in L.S., George Peabody, 1941; A.M.L.S., University of Michigan, 1950.
Experience: Periodicals librarian, Ball State Teachers College; officer, U. S. Army; assistant reference librarian, Ohio State University.
- GERARD, E. DOUGLAS (1951) Agricultural Engineering
B.S., University of British Columbia, 1950; M.S., University of Saskatchewan, 1951.
Experience: Instructor, University of British Columbia; instructor, University of Saskatchewan; shop superintendent, British Columbia Forest Products, Pitt Lake, British Columbia; service manager, Tractor and Allied Equipment, Limited, Mel-fort, Saskatchewan.
- GERARD, ROBERT P. (1959) Industrial Engineering
B.S., Oregon State College, 1958.
Experience: Industrial estimator, Todd Shipyards Corporation; planner-estimator, U.S. Navy, Treasure Island; machinist and engineering draftsman, Mare Island Navy Yard.
- * GESLER, JACK T. (1957) Animal Husbandry
B.S., California State Polytechnic College, 1952; M.S., Kansas State College, 1956; graduate study, State College of Washington.
Experience: Instructor in meats, State College of Washington; assistant meats instructor, Kansas State College.
- GIBFORD, WILLIAM R. (1955) Animal Husbandry
B.S., California State Polytechnic College, 1947.
Experience: Horse trainer, Ed Wright Stables and 1001 Ranch, Riverside, California; horse trainer and horseshoer, San Luis Obispo; employee, Humphrey Meat Packing Company, San Miguel, California; Pacific Valley Cattle Company, King City, California; U.S. Marine Corps.
- GIBSON, J. CORDNER (1949) Education
B.S., University of California, 1937; M.S., University of Southern California, 1955.
Experience: Director of vocational agriculture, Downey and Whittier Union High Schools; U.S. Army; regional supervisor, Bureau of Agricultural Education; Dean, Student Personnel and Business Management, Kellogg-Voorhis.
- * GIMPLE, GLENN W. (1959) Manager, Horse Breeding Program
B.S., California State Polytechnic College, 1959; graduate study, California Polytechnic College.
Experience: Foreman, 3 D Ranch, Fairfield, California; trainer, Brooks Ranch, Napa, California; trainer, J. B. Lynch Ranch, Napa, California; public training stable, Napa, California.
- GOLD, MARCUS (1947) (1954) Audiovisual Service Co-ordinator
B.A., University of California, 1942; B.L.S., 1947; additional graduate work, University of California.
Experience: U.S. Army; library, University of California; audiovisual librarian, California State Polytechnic College; research assistant, University of California.
- GOODE, JESSE B. (1956) Mathematics
B.S., U.S. Naval Academy, 1919; U.S. Naval Academy Post Graduate School; Columbia University, 1926.
Experience: United States Navy; instructor, Clinch Valley College, University of Virginia, Wise, Virginia.

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- * GORMAN, LEO P. (1957).....Welding
Adult Teacher Certificate, University of California, Los Angeles, 1941.
Experience: Welding instructor, Covina High School, Whittier High School, Fullerton Junior College; supervisor of welding training program, Defense Welding & Engineering Company; welder, Northrop Aircraft, Inc.; Standard Oil Company of California; Los Angeles Ship Building & Dry Dock Co.; shop superintendent, South Basin Oil Co., California.
- GOULD, NORMAN S. (1950).....Education and Psychology
A.B., Pomona College, 1948; M.S., University of Southern California, 1949; additional graduate work, Florida State University.
Experience: Instructor, Basic Medical Sciences, U.S. Army; Assistant to Dean of Students, University of Southern California; Lecturer, University of California Extension Division; Instructor, San Luis Obispo Adult Education.
- GOW, IMOGENE V. (1947).....Supervising Nurse
R.N., Union Labor Hospital, Eureka, 1921.
Experience: In charge floor nurses, Union Labor Hospital; nurse, Stanford Lane, San Francisco; private duty, Eureka and Yreka.
- GRAN, RUTH (1957).....Graduate Nurse
R.N., Mary's Help Hospital, San Francisco, 1936.
Experience: San Mateo Clinic; Army Nurse Corps; San Luis Obispo General Hospital.
- GRANT, DAVID M. (1950).....Chairman, English and Speech Department
B.A., Iowa State Teachers College, 1935; M.A., University of Iowa, 1940; Ph.D., Stanford University, 1953.
Experience: Instructor in public schools in Iowa; chairman, Department of Speech, Hastings College, Hastings, Nebraska; officer, U. S. Navy; instructor, Stanford University.
- * GRAVES, GEORGE (1958).....Aeronautical Engineering
B.S., 1955, Marquette University, Milwaukee, Wisconsin.
Experience: Stress analyst, Douglas Aircraft Company, Long Beach, California; lead mechanic, Capital Airline Inc., Milwaukee, Wisconsin.
- GRAVES, R. L., JR. (1951) (1957).....Architectural Engineering
B.S., University of Kansas, 1948; M. Arch. and Urban Design, Cranbrook Academy of Art, 1950.
Experience: Instructor, University of Florida; University of Alabama; State College of Washington; University of Kansas; architect, private practice; designer, L. N. Boney, Architect; draftsman, R. R. Calder, Architect; U. S. War Department; U. S. Navy.
- GRAVES, THEODORE G. (1947).....Air Conditioning and Refrigeration Engineering
B.A., Humboldt State College, 1940; graduate work, Oregon State College.
Experience: Instructor, Paia School, Paia, Maui, Hawaii; instructor, Maui High School, Maui, Hawaii; teacher, San Francisco, California; lecturer, University of California, Santa Barbara College.
- * GRAY, MARGARET S. (1958).....Librarian
B.A., Whittier College, 1931; B.L.S., University of Southern California, 1942.
Experience: U. S. Army Library Service; Pomona College Library; Claremont College Library; Pomona Public Library.
- GREEN, LISLE R. (1955).....Soil Science
B.S., Utah State College, 1941; M.S., 1948.
Experience: Range Examiner, U. S. Grazing Service; Range Conservationist, U. S. Soil Conservation Service, Texas; Range Conservationist, U.S.D.A., California Range Experiment Station; U. S. Army Air Force.
- GREGORY, C. HEROLD (1950).....Printing
B.S., California State Polytechnic College, 1952.
Experience: Superintendent, Chancey-Citizen Co., Beverly Hills; manager, printing department, Grimes-Stassforth Stationery Co., Los Angeles; instructor, U. S. Navy.

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- * GREGORY, VERNON L. (1953)..... Biological Science
 B.S., University of Miami, 1941; M.A., DePauw University, 1947; additional graduate work, University of Southern California, 1949-1953.
 Experience: Undergraduate assistant in zoology, University of Miami; graduate assistant, DePauw University; naval aviator, United States Navy; flight instructor, United States Navy; instructor in zoology, University of Miami; graduate associate, University of Southern California; curriculum specialist, California State Polytechnic College.
- * GRIEVER, GERHARDUS E. (1958)..... Mechanical Engineering
 B.S., Middlebare Technische School, Leeuwarden, Holland, 1924.
 Experience: Design engineer, Devenco, Inc., New York, The Foundation Company of Canada, Ltd., Noranda Mines, Ltd., and Mitchell Engineering; project engineer, The Rankin Company, Canada; assistant chief engineer, African Explosives and Chemical Industries, South Africa; design engineer, Pretoria Portland Cement Co., Slurry, South Africa; design engineer, General Mining and Finance Co., Johannesburg, South Africa; design engineer of material handling plant, various companies in Holland.
- * GRIFFIN, JAMES M. (1949)..... Ornamental Horticulture
 B.S., California State Polytechnic College, 1949; M.A., 1952.
 Experience: Instructor, institutional on-the-farm training program; landscape and nursery business, San Diego; studio greensman, Hollywood; U.S. Army Air Force.
- GUPTA, S. C. (1958)..... Electronic Engineering
 B.A., University of Punjab, 1951; M.A., 1953; B.Sc., University of Glasgow, 1957; graduate work, University of Glasgow.
 Experience: Engineer, Physikalisches Technische Bundesanstalt, Germany; Pye Ltd., England; Electricité de France, France; British Electricity Authority, England; Theodore Kiepe A. G., Germany; Remington Rand Ltd., Scotland; assistant lecturer, University of Glasgow; Atomic Energy Establishment, India.
- GUSTAFSON, LESTER W. (1947)..... Aeronautical Engineering
 B.S., Aeronautical Engineering, University of Minnesota, 1932; graduate work, University of Minnesota, 1933.
 Experience: Assistant in experimental engineering, University of Minnesota; experimental engineer, Minneapolis Moline Power Implement Company, Minneapolis; Tropic Air Corporation, Chicago; aerodynamics engineer, Lockheed Aircraft Corporation; Hughes Aircraft Company.
- HAGMANN, FRIEDA B. (1959)..... Library
 B.E., Whitewater State Teachers College, Wisconsin, 1949; M.A.-L.S., University of Denver, 1954.
 Experience: High school librarian, Milwaukee Public Schools; research librarian, Pabst Brewing Company; special services librarian, U.S. Army, Germany; reference librarian, University of Denver; head librarian, Inglewood Branch Library, Los Angeles County System.
- * HALDERMAN, DONALD L. (1959)..... Physical Education
 B.S., University of Southern California, 1951; M.S., 1959.
 Experience: Teacher-coach, Whittier High School and California High School, Whittier; naval aviator, United States Naval Reserve.
- HALL, RICHARD E. (1947)..... Machine Shop
 B.S., Aeronautical Engineering, California State Polytechnic College, 1952; training on Packard aircraft engines, 1942; Allison aircraft engines, 1944; Pratt and Whitney aircraft engines, 1948.
 Experience: Aircraft mechanic, Lockheed Aircraft, and Hancock Field, Santa Maria; mechanic, Sacramento Air Depot.
- HAMMITT, LEWIS E. (1946)..... Physics
 B.S., Whitman College, 1926; M.A., University of Washington, 1940; additional graduate work, University of Washington. U.S. Navy Air Navigation School, 1943.
 Experience: Laboratory assistant, Whitman College; principal, Mabton High School, Mabton, Washington; instructor in physics and chemistry, Longview High School, Longview, Washington; officer, U.S. Navy.

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- HANKS, CHARLES J. (1954).....Mathematics
B.S., Pennsylvania State Teachers College at Shippensburg, 1942; M.A., University of Pennsylvania, 1949; Ed.D., University of Arkansas, 1954.
Experience: Assistant professor, Drexel Institute of Technology; line coach and graduate assistant, University of Arkansas; officer, U.S. Coast Guard.
- HARDEN, F. SHELDON (1948).....Physical Education and Athletics
B.A., Santa Clara, 1943; M.A., College of the Pacific, 1950.
Experience: Player-coach, Sacramento Nuggets professional football team; playground supervisor, City of Sacramento; Red Cross swimming instructor, San Luis Obispo High School; officer, U.S. Army.
- HARRIS, ROY M. (1954).....Animal Husbandry
B.S., M.S., Utah State Agricultural College, 1954; additional research work.
Experience: American Packing and Provision Company, Swift and Co., Ogden, Utah; meatcutter, U.S. Army; breeding herdsman, Suncrest Hereford Ranch, Springerville, Arizona; Gibbs Quarter Horse and Hereford Ranch, Mackay, Idaho; assistant livestock husbandman, U.S.A.C. farm, Logan, Utah.
- * HARWOOD, C. EDWIN (1958).....English
B.A., Olivet College, Michigan, 1933; M.A., University of Michigan, 1940; Ph.D., University of Colorado, 1958.
Experience: Instructor, St. Louis High School, St. Louis, Michigan; Lapeer High School, Lapeer, Michigan; General Motors Institute, Flint, Michigan; University of Colorado, Boulder, Colorado; professor, Pasadena College.
- HASSLEIN, GEO. JOHANN (1949).....Head, Architectural Engineering Department
B. of Arch., University of Southern California, 1945, A.I.A.
Experience: Road and bridge design in Mexico and Central America for Pan-American Highway; airport design for Army Engineers; development work at M.I.T. for Gilfillan Bros.; with architects and practice in Los Angeles area; designer for Summer Spaulding, and Wurdeman and Becket; chief designer, Kistner, Curtis and Wright. Registered architect, California.
- HATFIELD, R. C. (1949).....Biological Sciences
B.Sc., University of Dayton, 1941; M.A., University of California at Los Angeles, 1947; Ph.D., University of California at Los Angeles, 1950.
Experience: Chemist, Research Division, National Cash Register Co.; U.S. Navy; assistant in bacteriology, University of California at Los Angeles; Chief of Laboratories, F.O.D. Assessment Branch, Fort Detrick, Md.
- HAUGSTEN, ROBERT C. (1952).....Equipment Technician, Arts and Sciences Division
B.S., California State Polytechnic College, 1952; M.A., College of the Pacific, 1958.
- * HAWKINS, ROBERT C. (1959).....Industrial Engineering
B.S.I.E., General Motors Institute, 1948.
Experience: Manufacturing research engineer, Packard Motor Car Company; process engineer, Fisher Body Production Engineering; suggestion plan manager and special assignment to manufacturing manager, Holley Carburetor Company.
- HAYES, HAROLD P. (1952).....Dean of the College
B.M.E., University of Santa Clara, 1941; graduate study, Stanford University.
Experience: Test and commercial engineer, General Electric Company; officer, U.S. Navy; head of Mechanical Engineering Department, University of Santa Clara, 1946-1951; sales engineer, Dudley Machinery Corporation. Registered professional engineer, California; Dean, Engineering Division, California State Polytechnic College.
- HAYES, J. A. (1957).....Air Conditioning and Refrigeration Engineering
B.S., Massachusetts Institute of Technology, 1933.
Experience: St. Louis Board of Education; Bryant Air Drier, Division of Carrier Corp.; American Wheelabrator Corp.; Bell Refrigeration Corp.; Baker Ice Machine Co.; Wright Aeronautical Corp.; John H. Stevens Co.; Carrier Corp.; Best Foods, Inc.; officer, U.S. Army; owner Hayes Engineering Co.; registered professional engineer in Ohio, Missouri, and California.

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- HAYMAN, NOEL R. (1958)..... Physics
 B.Sc., Victoria University College, New Zealand, 1950; B.S., 1955, M.S., 1956, Springfield College, Massachusetts; Ph.D., University of Oregon, 1958.
 Experience: Royal New Zealand Air Force; teacher, elementary and secondary schools, New Zealand; administrative assistant, Springfield College; teaching assistant, University of Oregon.
- HEALEY, JOHN R. (1947)..... Journalism and Publications
 B.A., San Jose State College, 1941.
 Experience: Reporter, San Jose News; public relations, McClellan Field, Sacramento; reporter, Sacramento Union; Valley editor, Modesto Bee.
- * HEALEY, ROBERT JOSEPH (1958)..... Office Management
 B.S., State Teachers' College, Salem, Massachusetts, 1950; M.S., Oklahoma State University, 1952; additional study, San Francisco State College.
 Experience: U.S. Navy; teaching fellow and instructor, Oklahoma State University; office manager, Groendyke Transportation, Inc., Wichita, Kansas; instructor, Modesto High School, Modesto, California.
- HEINZ, JOHN A. (1953)..... Audiovisual Department
 B.A., University of Washington, 1950; graduate study, San Francisco State College.
 Experience: Technical and research assistant, University of Washington; production assistant, Korry Film Productions; free lance photographer, Seattle; production co-ordinator, Criterion Films, Inc., Seattle; film editor, KRON-TV, San Francisco.
- HELMAN, ANATOL (1957)..... Architectural Engineering
 B.S., Warsaw Polytechnic Institute, 1934.
 Experience: Designer, Associated Architects and Planners; T. B. Bourne Associates, Inc.; DeWitt and Swank, Architects; Hugh Gibbs and E. McCoy, Architects; Hal Roach Motion Picture Studios; Anglo-Iranian Oil Co.; Urbanization Commission, Lithuania; Warsaw Municipal Power Station; architect, Spanish Architect-Engineer Companies; Técnicos Españoles Asociados; instructor, University of Nebraska; University of Oklahoma; Navy Orientation School; E. B. Badger Co.; draftsman, Warsaw Cooperative Building Society.
- HENDRIKS, HAROLD J. (1952)..... Electronic Engineering
 B.S., Iowa State College, 1940; M.S., 1941; graduate study, University of Colorado, 1949.
 Experience: Engineer, Collins Radio Company, Cedar Rapids, Iowa; engineer, U.S. Naval Ordnance Test Station, Inyokern; industrial experience program, Westinghouse Electric Corporation, East Pittsburgh, Pa.; associate professor, electrical engineering, University of Nevada, Reno, Nev.
- HERALD, CHARLES A. (1958)..... Electronic Engineering
 B.Sc., M.Sc., Dalhousie University, Halifax, Nova Scotia, 1935.
 Experience: Assistant professor, University of Massachusetts; instructor, Pennsylvania State University; instructor, Communication School, Canadian Department of National Defense; lecturer, McGill University; lecturer, University of British Columbia; special gauge examiner, assistant and junior physicist, National Research Council, Ottawa.
- HESCH, EARL R. (1956)..... Mechanical Engineering
 B.S., University of New Mexico, 1955; M.S., Oklahoma A. & M. College, 1956.
 Experience: U.S. Army; draftsman, Los Alamos Scientific Laboratory; survey party chief, C. H. Cole; surveyor-draftsman, City of Albuquerque.
- * HESSE, WALTER H. (1956)..... Soil Science
 B.S., California State Polytechnic College, 1952; M.S., Agronomy, Cornell University, 1953; Ph.D., Agronomy, 1955.
 Experience: Research assistant, Cornell University; teaching and research, University of Nevada; engineering officer, U.S.N.R. and merchant marine.
- HICKENBOTTOM, YVONNE E. (1958)..... Education
 B.A., University of California, Los Angeles; M.E., University of Southern California, 1956.
 Experience: Teacher, Kingsbury Elementary School, Redlands; teacher, John B. Monlux Elementary School, North Hollywood; teacher, Arminta Elementary School, North Hollywood.

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HICKS, WILLIAM R. (1957).....Physical Education
B.S., University of California, Los Angeles, 1950; M.A., Long Beach State College, 1959.

Experience: United States Army; teacher, Long Beach City Schools.

HIGBEE, ROSS C. (1959).....Mathematics
B.S., California State Polytechnic College, 1958; M.S., San Jose State, 1959.

Experience: Mathematician, Naval Ordnance Laboratory, Corona; research engineer, NASA Ames Laboratory, Moffett Field; programmer, General Electric Vallecitos Atomic Laboratory, Pleasanton.

* HOBBS, KENNETH R. (1950).....Horticultural Services and Inspection
B.S., Oregon State College, 1946; M.A., 1948; Ph.D., 1955, Oregon State College.

Experience: Technician and curator, Department of Entomology, Oregon State College; agricultural inspector, Los Angeles County Department of Agriculture; inspector, Bureau of Nursery Service, State Department of Agriculture, field representative, structural pest control.

HOFFMAN, GEORGE E. (1956).....Industrial Engineering
B.S., Carnegie Institute of Technology, 1951.

Experience: Assistant manager, J. J. Newberry Co.; cost estimator, Douglas Aircraft Co.; engineer, Robertshaw Fulton Controls; Kennecott Copper Corp., Ray, Arizona.

HOGAN, WILBUR C. (1959).....Mathematics
B.S., United States Coast Guard Academy, 1928; M.S., Purdue University, 1959.

Experience: Officer, U.S. Coast Guard; commanding officer, Port Townsend Training Station; director, U.S. Coast Guard Institute.

HOLLINGSWORTH, CAROL L. (1959).....Placement Supervisor
B.A., Whittier College, 1956; additional study, Long Beach State College.

Experience: Summer camp counselor, Long Beach Public Schools; teacher, Owens Valley Unified School District, Independence, California; employment security officer, Department of Employment, State of California, Sacramento, California.

HOLMES, KENNETH R. (1955).....Architectural Engineering
B. of Arch., University of Pennsylvania, 1949; graduate certificate, Ecole Nationale Superior des Beaux Arts, Paris, France, 1950.

Experience: Designer, various architects in Philadelphia and England; associate professor, Virginia Polytechnic Institute.

HOLMQUIST, ROBERT E. (1946).....Physics
B.A., University of Oregon, 1932; M.A., Oregon State College, 1936; additional graduate work, Purdue University and University of Washington.

Experience: Teaching assistant, University of Oregon and Oregon State College; instructor, University of Oregon; teaching fellow, Purdue University and University of Washington; inspection supervisor, Boeing Aircraft Company.

HOLT, RAY J. (1955).....Physics
A.B., University of California, 1939; M.A., 1949.

Experience: Physicist, University of California Radiation Laboratory; aircraft inspector, Consolidated Vultee Aircraft Corporation; high school and junior college teacher.

* HOLTZ, WALTER E. (1954).....Head, Mechanical Engineering Department
B.S. in Mechanical Engineering, Illinois Institute of Technology, 1949; M.S. in Mechanical Engineering, California Institute of Technology, 1953.

Experience: Project engineer, Aerojet Corp., Azusa, California; project engineer, Baker Engineering Corp., Los Angeles, California; engineer, Carrier Corp., Chicago, Illinois; engineer, U.S. Naval Air Missile Test Center, Point Mugu, California; instructor, Mechanical Engineering, California State Polytechnic, San Luis Obispo; officer, U.S. Air Force. Registered professional engineer, California.

HOOVER, RALPH W. (1948).....Animal Husbandry and Agricultural Mechanics
Experience: Instructor in horseshoeing and blacksmithing, U.S. Army; horse-shoer, Porterville, California.

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- HOOVER, ROBERT F. (1946)**..... Biological Sciences
 B.A., Stanford University, 1934; M.A., University of California, 1935; Ph.D., University of California, 1937.
 Experience: Teaching assistant and research assistant, University of California; instructor, Yakima Valley Junior College; U.S. Army.
- HOSTETTER, H. CLYDE (1958)**..... Special Studies
 B.J., University of Missouri, 1949; additional study, University of Kansas, University of Southern California, American University.
 Experience: Officer, U.S. Navy; feature writer and chief photographer, *Topoka (Kansas) Daily Capital*; public relations director, United States Junior Chamber of Commerce; public relations consultant, Hughes Aircraft Company; editor official Kansas magazine, *To The Stars*; editor official Junior Chamber magazine, *Future*; associate editor, *Pathfinder and Town Journal*; free-lance writer and photographer.
- HOUK, A. L. (1946)**..... Chemistry
 B.S., Michigan State College, 1926; M.S., 1928; Ph.D., Pennsylvania State College, 1933.
 Experience: Graduate assistant in chemistry, Michigan State College and Pennsylvania State College; analyst, Michigan Agricultural Experiment Station; instructor in chemistry, Michigan State College; research chemist and group leader, Rohm and Haas Company, Philadelphia, Pennsylvania.
- HOULIS, JEROME F. (1959)**..... Physics and Chemistry
 B.S., California State Polytechnic College, 1958; graduate study, California State Polytechnic College.
 Experience: Electronics maintenance, U.S. Air Force.
- * **HOUSE, HENRY (1947)**..... Associate Dean (Activities)
 B.S., California State Polytechnic College, 1943; additional graduate work, University of California, California State Polytechnic College.
 Experience: Director of vocational agriculture, Brawley Union High School; officer, U.S. Marine Corps.
- HOUSTON, ERNEST R. (1957)**..... Ornamental Horticulture
 B.S., Oklahoma State University, 1943; M.S., Ohio State University, 1947; additional graduate work, Oklahoma State University.
 Experience: Assistant professor, Oklahoma State University; manager of plant shipments, *Furrow and Co.*, Guthrie, Oklahoma; grower and consultant, *Higdon Flower Shop and Nursery*, Oklahoma City, Oklahoma; U.S. Army.
- HOWE, HENRY E. (1956)**..... Printing
 B.A., University of Wisconsin, 1930; B.S., Stout Institute, 1942.
 Experience: Assistant, newspaper plant; instructor-co-ordinator, Stout Institute; Racine Vocational School; U.S. Air Corps; editor and publisher, *The Dial*, Wisconsin.
- HUGHES, LEROY BARRY (1950)**..... Director of Athletics
 B.S., University of Oregon, 1931; M.A., Stanford University, 1950.
 Experience: Physical education teacher and coach, Monterey High School; head athletic coach, Menlo Junior College; officer, U.S. Navy.
- HYER, EDGAR A. (1951)**..... Head, Farm Management Department
 B.S., Utah State College, 1939; M.S., 1942; Ph.D., Cornell University, 1948.
 Experience: Land use economist, Utah; field supervisor of A.A.A., Utah; U.S. Army; graduate assistant, Cornell University; assistant professor of agricultural economics, Oregon State College.
- HYNES, C. DENNIS (1957)**..... Biological Sciences
 B.A., Macalester College, 1951; M.S., University of Michigan, 1953; Ph.D., University of Florida, 1957.
 Experience: Museum assistant, University of Michigan; teaching assistant and research assistant, University of Florida.
- * **IRVINE, ROBERT G. (1959)**..... Electronic Engineering
 B.S.E.E., Utah State University, 1956.
 Experience: Electronic engineer, Convair, Pomona.

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- JACINTO, MARY (1957)..... Graduate Nurse
R.N., Mary's Help Hospital, San Francisco, 1955.
Experience: King's General Hospital, Hanford.
- JAMES, ARTHUR F. (1956)..... Medical Officer
M.D., University of Chicago, 1953; B.A., University of California at Los Angeles.
Experience: Internship, U.S.P.H.S. Hospital, Staten Island, New York; U.S. Public Health Service, San Pedro; private practice, Wilmington, California.
- JENKINS, JOHN L. (1956)..... Home Economist
University of Wisconsin, 1923; University of California, 1956.
Experience: Own decorating business; instructor, adult education, various California schools.
- JENSEN, JAMES J. (1948)..... Physical Education and Athletics
A.B., Washington State College, 1935; M.S., Stanford University, 1940.
Experience: Football and track coach, Shelton High School, Washington; history teacher and football and track coach, Santa Rosa High School, Santa Rosa, California; track coach and guidance assistant, Menlo Junior College, Menlo Park, California; U.S. Navy; track coach and instructor in health and physical education, San Francisco Junior College, California.
- JENSEN, ROBERT P. (1954)..... Mechanical Engineering
B.S. in Industrial Education, The Stout Institute, 1932; M.S., 1938.
Experience: Instructor, Orange Coast College; instructor, College of the Sequoias; assistant professor, Kansas State Teachers College; instructor, Maryland high schools; operation sheet writer in production engineering, Pratt Whitney Corp., Kansas City, Missouri.
- JOHNSON, MEAD R. (1956)..... English
B.A., University of Denver, 1939; M.A., 1949; additional graduate work, University of Denver.
Experience: Advertising manager, Sterling (Colorado) Farm Journal; U.S. Army; instructor in Colorado and California public schools; instructor, Colorado School of Mines; associate professor, Central Missouri State College.
- JOHNSON, MILES B. (1957)..... English
B.A., Gustavus Adolphus College, 1947; M.A., University of Minnesota, 1951; M.A., University of Denver, 1953.
Experience: Buyer, Johnson Manufacturing Co.; instructor, Florence State College and Memphis State College; assistant professor, Luther College; instructor, College of Puget Sound.
- JOHNSON, RICHARD F. (1950)..... Animal Husbandry
B.S., Iowa State College, 1942; M.S., State College of Washington, 1947.
Experience: U.S. Army; instructor, College of Agriculture and assistant animal husbandman, Experiment Station, State College of Washington, Pullman, Washington.
- JOHNSON, ROBERT M. (1946-54) (1956)..... Mechanical Engineering
B.A., Santa Barbara State College, 1937; additional graduate work in meteorology, Boeing School of Aeronautics.
Experience: Meteorologist, Pan American Airways and Pennsylvania Central Airlines; meteorology instructor, Randolph Field and Pan American Airways; junior civil engineer, Division of Highways, California.
- JORGENSEN, EDWARD J. (1947)..... Physical Education and Athletics
B.A., Chico State College, 1936; M.S., University of Southern California, 1950.
Experience: Instructor, physical education and industrial arts, South Fork, Ferndale, and Watsonville high schools; athletic director, Marin Junior College; officer, U.S. Navy.

JUDD, W. BOYD (1956)..... Mathematics
B.S., St. Mary's College, 1939; M.A., University of California, 1951; additional graduate study, University of California.

Experience: High school teacher, California; instructor, Army specialized training program, University of Santa Clara; research mathematician, University of California; in charge of statistical operations, Bureau of Research and Guidance, Office of Los Angeles County Superintendent of Schools; I.B.M. supervisor, State of California, Department of Public Health.

KABAT, HERBERT R. (1952)..... Physics
B.S., United States Naval Academy, 1938; M.A., Stanford University, 1951; additional graduate work, University of Southern California, Stanford University, University of Colorado.

Experience: Officer, U.S. Navy; research analyst, Rheem Mfg. Co.; instructor, Pasadena City College, College of the Sequoias.

* **KACHUN, JOSEPH (1959)**..... Mathematics
B.A., University of Pittsburgh, 1940; graduate work, University of Pittsburgh.

Experience: Assistant professor of Mathematics, University of Pittsburgh, 1950-59; Lieutenant, United States Navy, instructing Navigation, 1943-46; instructor, Duquesne University, Pittsburgh, Penn State University; National Science Program, summer, 1940.

KARCH, GEORGE P. (1958)..... Physics
B.A., University of Iowa, 1926; Ed.M., University of Oklahoma, 1940; additional graduate work in physics, University of Iowa and Oregon State College.

Experience: Teacher, Bartlesville Junior College and College High School; research, Phillips Petroleum Company; officer, U.S. Navy.

KAY, THOMAS D. (1958)..... Machine Shop
B.S., Wayne State University, 1957.

Experience: Assistant training director, Ex-Cello-O Corporation; apprentice instructor, Chrysler Corporation; radio team chief and refrigeration mechanic, U.S. Army; machinist, Detroit-Timken Axle Company; apprentice, Goodyear Tire and Rubber Company.

* **KELLY, EDWARD M. (1957)**..... Physical Science
B.S., Pennsylvania State College, 1943; M.S., 1945; Ph.D., Brown University, 1950.

Experience: Assistant professor, University of Maine; physicist, North American Aviation; physicist, Rheem Manufacturing Co.

KENNEDY, ROBERT E. (1940)..... Vice President
A.B., San Diego State College, 1938; M.A., Stanford University, 1950.

Experience: Editorial staff of San Diego Sun, San Diego Daily Journal, San Luis Obispo Telegram-Tribune, Palo Alto Times; executive secretary and manager, Civic Affairs Conference, San Diego; advertising manager, Hamilton's Ltd., San Diego; at California State Polytechnic College: instructor, English and journalism; acting college librarian; instructor, communications and English, U.S. Naval Flight Preparatory School; chairman, journalism department; public relations director and publications adviser; assistant to the president, dean, Arts and Sciences.

KENNELLY, BRUCE (1947)..... Chemistry
B.S., University of Kentucky, 1944; M.S., Purdue University, 1946; additional graduate work, Purdue University and University of Southern California; Ph.D., Cornell University, 1952.

Experience: Chemist, department of agricultural chemistry, Purdue University; research chemist, department of Biochemistry and Nutrition, Cornell University.

* **KENNINGTON, MACK H. (1958)**..... Animal Husbandry
B.S., University of Idaho, 1946; M.S., Purdue University, 1956; Ph.D., 1958.

Experience: U.S. Air Force; assistant agricultural extension agent, Bannock Company, Pocatello, Idaho; research assistant, Purdue University.

KENYON, PAUL (1957)..... Special Studies
LL.B., Southern Methodist University law school, 1949; additional graduate study.

Experience: Insurance legal staff, investment counseling, methods analyst, and business systems and procedures analyst.

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- * KIBBE, DONALD E. (1958) Agricultural Engineering
B.S., California State Polytechnic College, 1956.
Experience: Manager, Surge of So. Oregon; salesman, Hawthorne Machinery, San Diego, California; sales engineer, Service Equipment Supply Company, Rocklin, California.
- * KING, LOUIS J. (1958) Psychology
A.A., Santa Monica City College, 1941; B.A., University of California, Los Angeles, 1943; M.S.W., University of Southern California, 1954; Ed.D., University of Southern California, 1958.
Experience: Marriage counselor, American Institute of Family Relations, Los Angeles, California; personnel counselor, Los Angeles, California; vocational & personal counselor, University of Southern California, Veterans Administration; instructor, Los Angeles City Schools, Torrance City Schools, Santa Ana Junior College; assistant superintendent, attendance & welfare, Los Angeles City Schools.
- KIRKPATRICK, WILLIAM M. (1949-51) (1953) Agricultural Engineering
B.S., California State Polytechnic College, 1949.
Experience: Welder, Marinship Corporation; Diesel and heavy construction equipment mechanic, Corps of Engineers, U.S. Army; machinery and maintenance engineer advisor (agricultural and industrial) Thai Government, Foreign Operations Administration, U.S. Government.
- KITCH, KENNETH H. (1950) Head, Agricultural Journalism Department
A.B., Southwestern College, 1930; A.M., Kansas University, 1937.
Experience: Reporting, editing, advertising staffs, various Kansas daily newspapers; instructor, community high schools, Arlington and Altamont, Kansas; correspondent for Kansas City Star; editorial columnist for chain of southeast Kansas weeklies; instructor, Dallas, Texas, Technical High School; wire editor and writer, Associated Press; assistant director, Dallas Adult Education Program; public relations and advertising counsel, Dallas and San Antonio; news editor, WFFA, Dallas; editor and managing editor, Southern Seedsman and Sun-Up magazines; freelance magazine writer.
- KOGAN, IRVIN J. (1957) Electronic Engineering
B.A., Wayne University, 1954; M.A., Stanford University, 1955.
Experience: Instructor, Orange Coast College; U.S. Air Force.
- KOMBRINK, RICHARD T. (1955) Mechanical Engineering
A.B., Loyola University, 1946.
Experience: Pilot, U.S. Army Air Corps; draftsman, Hess Greiner, and Pollard; sales engineer, T. H. Creears Corp.; waste disposal plant operator and draftsman, Los Angeles City.
- KORSMEYER, RUSSELL (1958) Electrical Engineering
B.S.E.E., University of Missouri, 1950; M.S.E.E., University of Southern California, 1958.
Experience: Electrical engineer, Los Angeles Department of Water and Power; junior design engineer, North American Aviation, Inglewood, California; relay engineer, Gulf States Utilities, Beaumont, Texas. Registered professional engineer, California.
- * KRIEGE, KENNETH B. (1957) Mathematics
B.S., California State Polytechnic College, 1951; M.A., 1951.
Experience: Teacher, San Luis Obispo Junior High School, Pomona High School.
- * LA BOUNTY, HUGH O. (1953) Head, Social Sciences Department
B.S., M.A., University of Redlands, 1950-1951; additional study, Claremont Graduate School; University of California at Los Angeles.
Experience: Director of Citizenship, Citrus Union High School; Instructor in Social Science, Citrus High School and Junior College; Navy.
- * LACY, MILO G. (1959) Agricultural Business Management
B.S., University of Oregon, 1938; additional work, University of California, Los Angeles.
Experience: Instructor, Long Beach City College; Instructor, Pasadena City College; Retail Marketing Specialist, USDA, Washington, D.C.; General Manager, Richards Market, Newport Beach, California.

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- * LAMIMAN, JOHN F. (1946)..... Head, Biological Sciences Department
B.S., Entomology, University of California, 1922; M.S., Entomology, 1924; Ph.D.,
Entomology, 1931; additional work, University of California, 1939-1940.
Experience: S. A. T. C. (Army) University of California; research assistant in
entomology; instructor in entomology, University of California; entomologist in
Experiment Station.
- * LANDRETH, JAMES R. (1956)..... Assistant to the Dean of the College
B.A., Mexico City College, 1954; M.B.A., Stanford graduate school of Business,
1956.
Experience: Instructor, U. S. Army; Explosive Ordnance Disposal, U. S. Army;
College Personnel Officer, California State Polytechnic College.
- LANDYSHEV, ALEXANDER (1956)..... Electrical Engineering
E.E. Degree, University of Vladivostok, Russia, 1927.
Experience: Electrical engineer, Donez Basin Power System, Russia; Energie-
bauost G.m.b.H., Germany; Brown-Voveri and Co., Germany; U. S. Army En-
gineers, Germany; U. S. Steel Corp., San Francisco; production engineer, Precision
Manufacturing Co.; associate professor, University of California, Berkeley.
- LANGFORD, JAMES A. (1955)..... Elementary Education
A.B., Western Kentucky Teachers College, 1937; M.A., 1947; Ph.D., University
of Michigan, 1953.
Experience: Teacher in elementary and secondary schools in Kentucky; prin-
cipal, Cromwell, Kentucky; principal, Jefferson Elementary School, Wayne, Mich-
igan; assistant professor and supervisor of elementary education, University of
Nevada; communications officer, U. S. N. R.
- LAUMANN, GEORGE C. (1957)..... Mathematics
A.B., Chico State College, 1952; M.A., 1953; additional graduate work, Univer-
sity of Oregon, 1956.
Experience: Instructor, Ordnance Department, United States Army; teacher,
California high schools; instructor, Adult Evening College, Chico.
- LAW, HUGH E. (1957)..... Economics
B.B.A., Baylor University, 1952; M.S., 1953; Ph.D., Louisiana State University,
1959.
Experience: Industrial, managerial and merchandising; Teaching assistant and
instructor, Louisiana State University; Navigator, U. S. Army.
- LAWRENCE, HAROLD T. (1955)..... Mathematics
B.S., Colorado Agricultural College, 1935; M.A., University of Chicago, 1939; ad-
ditional graduate work, University of Denver, University of Arizona, University
of California at Los Angeles.
Experience: Teacher-principal in Illinois; science teacher in Arizona and Cali-
fornia schools; instructor, Citrus Junior College.
- LAWSON, JOHN D. (1951)..... Associate Dean (Activities)
B.S., University of California, Berkeley, 1938; M.Ed., University of California at
Davis, 1955.
Experience: Vocational instructor; officer, U. S. Navy; special supervisor, State
Bureau of Agricultural Education.
- LEACH, RICHARD (1930)..... Head, Poultry Husbandry Department
B.S., Montana State College, 1931.
Experience: Supervisor, feed sales agency, Sweet & Company, Bozeman, Mon-
tana; manager and owner commercial poultry plant, Bozeman, Montana.
- LEBAY, E. LOUIS (1955)..... Agricultural Engineering
B.S., Mechanical Engineering, Michigan State University, 1953; M.S., Mechanical
Engineering, 1955.
Experience: Research engineer, physics and metallurgy, Owens-Illinois Glass Co.,
Toledo, Ohio; concrete masonry construction supervision, Toledo, Ohio; manage-
ment, orchard and general farming enterprise, southern Michigan.
- LEE, THOMAS J. (1952)..... Physical Education and Athletics
B.A., San Jose State College, 1949; M.A., Stanford University, 1950.
Experience: Player-coach, All-American Professional Basketball Team; instructor,
private gymnasium, Oakland; playground director, Hayward Recreation District;
U. S. Army.

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- LEIGHTY, RAYMOND V. (1957)..... Soil Sciences
 B.S., University of Maryland, 1938; M.S., 1940.
 Experience: Supervisory soil scientist (Land Classification and Survey), USDA, Soil Conservation Service, Kentucky; party chief, SCS, Virginia, Georgia. U. S. Army, CE.
- LEWELLYN, LOUIS W. (1957)..... Associate Dean (Counseling and Testing)
 A.B., University of Arkansas, 1933; M.A., Stanford University, 1950.
 Experience: Office manager, Standard Brands Co.; business manager, Southern Pictorial News; personnel training supervisor, Lansburgh and Bros.; officer, U. S. Navy; counselor, San Francisco Unified School District.
- LEWIS, VANCE D. (1946)..... Physics
 A.B., University of California, 1933; M.A., 1940; Ph.D., University of Southern California, 1954.
 Experience: California secondary school administrator; officer, U. S. Navy.
- LINDAMOOD, CHARLES H. (1958)..... English
 Indiana University, 1946-1948; B.A., University of Minnesota, 1949; M.A., Columbia University, 1951; additional graduate work, University of Minnesota, Stanford University, 1957.
 Experience: Teacher, high school, Salinas, California; instructor, University of Minnesota, College of Puget Sound, and Taft College, Ft. Ord, Ft. Lewis and McChord Field, Washington.
- * LINT, HAROLD L. (1947)..... Botany
 B.A., University of California at Los Angeles, 1940; M.A., 1942.
 Experience: Inspector, United States Food and Drug Administration.
- * LISOWSKI, MARTIE L. (1959)..... Librarian
 B.A., University of California, Los Angeles, 1933; M.S. in Library Science, University of Southern California, 1959.
 Experience: Counseling, testing, and special placement, California Department of Employment; evening school instructor, Los Angeles City Schools; Library aide, Los Angeles County Library.
- * LIVINGSTON, ROBERT S. (1959)..... College Physician
 B.S., M.D., Northwestern University, 1946; Residency Training Internal Medicine, California Lutheran Hospital, Los Angeles.
 Experience: University of Southern California, Student Health Service; Private practice; United States Air Force.
- * LLOYD, ROBERT E. (1956)..... Head, Agricultural Business Management
 B.S., University of British Columbia, 1940; B. Com., 1948; M.S., 1950.
 Experience: Placement officer, Veterans Affairs Department, Canada; California representative, Washington Co-operative Farmers Association; district representative, San Joaquin Valley Poultry Producers Association; sales representative, C. U. McClellan Laboratories; manager, Sonoma County Co-operative Growers Association; farming, Sonoma County; senior research assistant, University of California, Davis; Royal Canadian Air Force.
- LONBORG, REYNOLD H. (1946)..... Truck Crops
 B.S., Agriculture, University of California, 1932.
 Experience: Vocational agriculture teacher at Downey and Santa Maria high schools; truck crops production and sales, Santa Maria Valley.
- LOPER, WILLARD H. (1955)..... Agricultural Engineering
 B.S., New York College of Agriculture, Cornell University, 1933.
 Experience: Dairy and general farming, New York; machinist, Westinghouse Electric Corp., Buffalo, New York; mechanic-welder, New York State College of Agriculture, Cornell University; student assistant instructor, Cornell University; salesman, Holz Co., Ukiah, California; journeyman welder, draftsman, Cochran Equipment Company, Salinas, California.
- LOUGHRAN, BERNICE B. (1958)..... Education
 B.S., Newark State Teachers College, 1940; M.A., Ohio State University, 1946; Ed.D., Stanford University, 1958.
 Experience: Elementary school teacher, Southbury, Conn., Santa Barbara, California, and Redwood City, California; elementary art teacher, Irvington, New Jersey; art instructor, Johnson Teachers College, University of Connecticut and Danbury Teachers College.

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- LOVETT, EARL DEAN (1951)..... College Physician
 B.S., M.D., University of Iowa, 1934; additional graduate work, Cook County, Post Graduate School of Medicine, Chicago; University Hospital, Iowa City.
 Experience: Rockford City, Illinois, Hospital; Mary's Help Hospital, San Francisco; Yocom Hospital, Chariton, Iowa; Cherokee State Hospital, Cherokee, Iowa; Virginia Gay Hospital, Vinton, Iowa; private practice, Vinton, Iowa; established Lovett Clinic, Vinton, Iowa.
- * LYNDON, THOMAS J. (1955)..... Librarian
 A.B., University of Denver; M.A. in Librarianship, 1954.
 Experience: First National Bank, Collections Department, Kansas City, Missouri; Consumer's Co-operative Association, Education Department, Kansas City, Missouri; U. S. Army; Rich-Con Hardware Company, Sales Department, Kansas City, Missouri.
- * McCORKLE, C. O. (1932)..... Dean of the College
 B.S., University of California, 1927; M.S., 1937.
 Experience: Director of agriculture and critic teacher, Red Bluff Union High School; executive secretary, California Association Future Farmers of America; assistant teacher trainer, Agricultural Education, Bureau of Agricultural Education; head, Agricultural Division, California Polytechnic; research assistant Giannini Foundation of Agricultural Economics, University of California; instructor, Agricultural Economics; subject matter specialist, Bureau of Agricultural Education, State Department of Education (California); Assistant to the President, Dean of Instruction, California State Polytechnic, Administrative Dean, Instruction.
- * McCORMIC, RALPH C. (1959)..... English and Speech
 B.A., Oklahoma State University, 1947; M.A., Stanford University, 1950; additional graduate study, Stanford University.
 Experience: Temporary instructor, Oklahoma State University; instructor, San Francisco State College; assistant professor, University of Texas; Command Entertainment Director, United States Army in Europe; technical director, Actor's Workshop of San Francisco.
- McGLASSON, ELMER D. (1954)..... Dairy Manufacturing
 B.S., Oklahoma A. & M. College, 1947; M.S., University of Idaho, 1950.
 Experience: Assistant plant manager and in charge of quality control, Beatrice Foods, Oklahoma City, Oklahoma; agriculture instructor, Guthrie, Oklahoma; research assistant, University of Idaho; assistant professor, University of Idaho; instructor, A. & M. College of Texas; Lucerne Milk Co., Washington, D. C.; Swift and Company, Oklahoma City, Oklahoma; U. S. D. A. chemist, Oklahoma City, Oklahoma.
- McGRATH, JAMES M. (1946) Head, Air Conditioning and Refrigeration Engineering
 California Polytechnic, 1935-1938; B.A., Santa Barbara College, 1941; graduate work, Claremont College; M.A., California State Polytechnic College, 1953.
 Experience: Licensed operating engineer, Santa Barbara General Hospital; Hoff General Hospital, U. S. Army; Merchants Ice and Cold Storage, San Francisco; chief engineer, U. S. Army Transport Service; superintendent of machinery, U. S. Naval Yard, Manila, The Philippines; engineering officer, U. S. Navy.
- * McGRATH, THOMAS H. (1956)..... Dean of Students
 California Polytechnic, 1936-39; B.A., Santa Barbara College, 1941; M.A., Claremont Graduate School, 1946; additional graduate work, Claremont Graduate School and University of Southern California.
 Experience: Senior instructor, Air Force Instructors' Technical School, Chanute Field, Illinois; teacher, Los Angeles City Schools; curriculum specialist, State Department of Education, Division of Secondary Education; instructor of psychology and acting dean of men, Mt. San Antonio College; visiting lecturer in education, Claremont Graduate School; instructor of psychology, California State Polytechnic College—K-V Campus; research psychologist and head Training Materials Research Section, U. S. Navy Electronic Laboratory, San Diego; Assistant to the President, Kellogg-Voorhis Campus.
- * McINTOSH, WILLIAM C. (1951)..... Mathematics
 A.B., University of California, 1948; M.A., 1950; additional graduate work.
 Experience: Mathematics and physics teacher, Richmond Union High School; U. S. Navy.

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- * MCLACHLIN, HARRY B. (1954) Head, Animal Husbandry Department
B.S., Agriculture, North Dakota State College, 1930.
Experience: Extension service, extension animal husbandman, North Dakota; U. S. Navy; ranch management, Sacramento Valley.
- MCLINN, DOROTHY (1956) Accounting
C. P. A. Review Course, University of California at Santa Barbara, 1953; licensed as certified public accountant, 1955.
Experience: Accountant, Grand Central Airport, Glendale, California, general and special accounting, including systems and audits; partner, firm of certified public accountants.
- MACH, GEORGE R. (1954) Mathematics
B.A., Iowa State Teachers College, 1950; M.S., State University of Iowa, 1951.
Experience: Officer, U. S. Navy.
- MAGER, HANS (1949) Architectural Engineering
M.S. and C.E., Royal University of Technology, Stockholm, Sweden, 1947.
Experience: Designer of reinforced concrete, Cement Works, Port Kunda, Estonia; designer of highway bridges and administrator, Estonian Highways, Estonia; lecturer, Railway Engineering School, Estonia; constructor of railway bridges, administration of Estonian Railways, Tallinn, Estonia; structural engineer, Building Concern H.S.B., Stockholm, Sweden. Registered Professional Engineer, California.
- MAGUR, LEON W. (1958) Physics
A.A., Contra Costa Junior College; B.S., California State Polytechnic College, 1958; graduate study, California State Polytechnic College.
Experience: Electronic technician.
- * MALTBY, HARRY L. (1955) Fruit Production
A.B., Stanford University, 1929; M.A., 1935; B.S., California State Polytechnic College, 1953.
Experience: Public Safety employee, Long Beach City; co-owner, San Antonio Mines, Lower California; biological control technician, Citrus Experiment Station, Riverside, California.
- MANNING, JOHN H. (1956) Mathematics
A.B., Oakland City College, 1937; M.A., University of Cincinnati, 1939; D.Ed., Pennsylvania State University, 1954.
Experience: Instructor in secondary schools of Ohio and Pennsylvania; U. S. Army Signal Corps; professor at Mansfield, Pennsylvania, State Teachers College.
- MARICONDA, ALEXANDER F., Major, USA (1959) Military Science and Tactics
B.S., Fordham College, 1940; graduate Artillery Officers' Advanced Course, The Artillery School, Fort Sill, Oklahoma; Communications Officers Course, Fort Sill, Oklahoma; Special Weapons Employment Course, Sandia Base, New Mexico; Manpower Management Course, Fort Harrison, Indiana.
Experience: Battery Commander and AAA Staff Officer during WWII, European Theater; Operations and Training Staff Officer, AAA Battalion, Infantry Division and U. S. Army Corps in Germany; Staff and Faculty, U. S. Army Air Defense School, Fort Bliss, Texas; Advisor, Military Assistance Advisory Group, Chinese Army, Taiwan.
- * MARSHALL, ROBERT D. (1957) Librarian
A.B., University of Washington, 1940; B.L.S., University of California, Berkeley, 1953.
Experience: U. S. Army Air Force; social science librarian, University of Oregon.
- MARSTON, ENA LESLIE (1946) English
A.B., Mills College, 1927; A.M., 1928; A.M., Radcliffe College, 1931; additional graduate work at Universities of California, Washington, and Chicago.
Experience: Instructor and administrator at junior colleges in Oregon and Pennsylvania; instructor, Washington State College; assistant professor, Lewis and Clark College.

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- * MARTI, WERNER H. (1956).....History, Political Science
A.B., University of California, Los Angeles, 1943; M.A., Claremont Graduate School, 1951; Ph.D., University of California, Los Angeles, 1953; Will Rogers Fellow, 1949-1953.
Experience: Teacher and counselor, Webb School of California; teaching assistant, University of California, Los Angeles; instructor, University of California, Extension Division, Los Angeles.
- MATHENY, ROBERT (1952).....Agricultural Engineering
Technical Certificate, California State Polytechnic College, 1951.
Experience: International Harvester Company, Des Moines, Iowa; diesel and heavy duty machinery mechanic, Army Air Corps; Allis Chalmers, dealer and sales, Point Arena, California.
- MATHEW, THEODORE (1948).....Chemistry
A.B., University of California, 1922; Chem. Engr., Stanford University, 1930.
Experience: Playground director, Berkeley Recreation Department; instructor in chemistry, Union High School, Richmond, California; instructor in chemistry, Junior College, San Mateo, California; officer, U.S. Army Air Force.
- * MAURER, ROBERT L. (1948).....Acting Dean, Arts and Sciences Division
B.A., Western Reserve University, 1935; M.A., 1936; Ph.D., Ohio State University, 1951.
Experience: Teaching assistant and research fellow, Ohio State University; instructor, Oregon State College; San Luis Obispo Campus of California State Polytechnic College; officer, U. S. Air Force; California Certified Psychologist.
- MEACHAM, VERNON H. (1929).....Agricultural Engineering
B.S., University of California, 1924
Experience: Agricultural instructor, Gilroy and Mateca High Schools.
- * MEALS, CHARLES F. (1957).....Marketing and Sales
B.S., University of Illinois, 1924.
Experience: Account executive, McCann-Erickson, Inc., San Francisco; advertising manager, statistician, corporate secretary, California Walnut Growers Assn., Los Angeles.
- * MELLARD, GEORGE A. (1957).....Electronic Engineering
B.S., Kansas State College, 1947; M.S., Kansas State College, 1952.
Experience: Instructor, Kansas State College; senior resident engineer, Convair, Pomona; engineer, Sylvania, Mountain View, California; officer, U. S. Naval Reserve.
- MERRIAM, JOHN L. (1958).....Agricultural Engineering
B.S., California Institute of Technology, 1938; graduate work, California Institute of Technology.
Experience: Instructor, California Institute of Technology; junior civil engineer, U.S. Army Engineers and private consulting engineers; civil area engineer, Soil Conservation Service, USDA; senior irrigation engineer, Ministry of Agriculture, Kingdom of Saudi Arabia. Registered civil engineer, California.
- MERSON, JAMES F. (1936).....Head, Agricultural Engineering Department
B.A. in Education, San Jose State College, 1932; additional graduate work, University of California and Colorado State College.
Experience: Instructor, agricultural mechanics, Dos Palos and Santa Rosa High Schools.
- MEYER, THOMAS O. (1955).....Animal Husbandry
B.S., State College of Washington, 1949; M.S., 1953.
Experience: Instructor and meats specialist, State College of Washington; assistant animal husbandman, Experiment Station, State College of Washington, Pullman, Washington.

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- MILLER, DOUGLASS W. (1953)..... Publications Manager and Journalism
B.A., DePauw University, 1916; M.A., University of Wisconsin, 1927; Litt.D.,
DePauw University, 1941.
Experience: Copywriter, Sidner-Van Riper Advertising Agency; editorial staff:
Greencastle, Ind., Daily Banner; European Edition, Stars and Stripes; community
newspaper publisher, Syracuse, N.Y., Los Angeles; director of public relations,
Ohio Wesleyan University, Syracuse University, Case Institute of Technology; professor
of journalism, Ohio Wesleyan University, Stanford University, Syracuse
University.
- * MITCHELL, ORMOND G. (1957)..... Biological Sciences
A.B., San Diego State College, 1936; M.S., University of Southern California,
1951; Ph.D., 1957.
Experience: Laboratory associate and field research assistant, University of South-
ern California.
- MIXON, THOMAS B. (1956)..... Mechanical Engineering
B.S., Southwestern Louisiana Institute, 1930.
Experience: Officer, U.S. Air Force, including assignments as: engineering
officer, test pilot, B-29 commander, director of training at Yuma, Arizona, and
director of maintenance at Las Vegas, Nevada.
- MOE, DAVID E. (1957)..... Mathematics
B.S., Missouri Valley College, 1948; M.A., Ph.D., Washington University, 1950-56;
additional graduate work, University of Kansas, University of Kansas City, 1951-52.
Experience: Instructor, University of Kansas City; research associate, Washing-
ton University; assistant professor, Western Reserve University.
- MONTGOMERY, DAVID H. (1956)..... Biological Sciences
B.S., California State Polytechnic College, 1954; M.A., College of the Pacific,
1956; graduate work, Friday Harbor Laboratories, University of Washington.
Experience: Laboratory assistant and teaching assistant California State Poly-
technic College; teaching fellow, College of the Pacific; staff, Pacific Marine
Biological Station, Dillon Beach, California.
- * MOORE, DOUGLAS H. (1958)..... Mathematics
A.B., 1942; M.A., 1949; additional study, University of California, Los Angeles.
Experience: U.S. Air Force; teacher, University High School, Los Angeles; in-
structor, University of California, West Coast University, Los Angeles, research
engineer, North American Aviation, Hughes Aircraft Company, Los Angeles.
- * MOORE, RICHARD A. (1957)..... Ornamental Horticulture
B.S., University of Missouri, 1951; M.L.A., University of Oregon, 1957.
Experience: Landscape architect, St. Louis Park Department; planning tech-
nician, Lane County Planning Commission; designer, W. M. Ruff, Eugene, Oregon;
U.S. Army.
- * MORAN, GABRIEL T. (1948)..... Acting Head, Physical Sciences Department
B.A., Whittier College, California, 1942; graduate work, Whittier College.
Experience: Chemist, American Potash and Chemical Company, Trona, California;
Thompson Products, Bell, California; Paul Dickerson, Chemistry Laboratory; Dis-
trict Agricultural Laboratory, Whittier, California.
- MORRIS, DON M. (1957)..... Assistant Personnel Analyst
B.S., California State Polytechnic College, 1952; additional graduate study, Cali-
fornia State Polytechnic College.
Experience: Dormitory manager, California State Polytechnic College; officer
and pilot, U.S. Navy; residence supervisor-counselor, California State Polytechnic
College.
- MOTT, ROBERT A. (1946)..... Head, Physical Education Department
B.S., University of Akron, 1938; M.A., University of Southern California, 1946;
Ed.D., Stanford University, 1953.
Experience: Physical education instructor and athletic coach, Akron Public
School System; officer, U.S. Navy; teaching assistant, University of Southern Cali-
fornia; visiting professor University of Colorado.

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- MOUNTS, BILLY W. (1956)..... Medical Officer
M.D., Cum Laude, Georgetown University, Washington, D. C., 1950.
Experience: Internship, Fitzsimons General Hospital, Denver; residency, San Luis Obispo General Hospital; four years private practice, Pismo Beach, California.
- * MURPHY, WALTER (1958)..... Machine Shop
B.A., Pasadena Nazarene College, 1959.
Experience: Machine shop instructor, Arroyo High School; El Monte High School; Glendora High School. Lathe operator and experimental machinist, Vard Inc.
- MURRAY, MARY ETTA B. (1956)..... Associate Dean (Women)
A.B., University of Southern California, 1937; A.M., 1938; additional graduate work, University of Southern California and University of Hawaii.
Experience: Instructor, San Bernardino High School, California; instructor and head of language department, El Monte High School, California.
- MUSCUTT, FRANK J., S/FC, USA (1959)..... Military Science and Tactics
Experience: Platoon Sergeant, Infantry Regiment in Korean Campaign; Platoon Sergeant in Germany during occupation duty; Platoon NCO, Battle Group, Fort Lewis, Washington.
- MYERS, THORNTON K. (1959)..... Aeronautical Engineering
B.S., Purdue University, 1935.
Experience: Research engineer, aeronautical engineer, North American Aviation; instructor, Templeton High School.
- * MYLANDER, HARVEY (1958)..... Mechanical Engineering
B.S., 1931, University of Arizona; graduate study, University of Arizona.
Experience: Junior engineer, U.S. Geological Survey; foreign representative, General Electric Company; Pacific Coast manager, American Hoist & Derrick Company; district manager, DeLaval Steam Turbine; consulting hydraulic engineer.
- * NALLY, WALLACE E. (1955)..... Aeronautical Engineering
B.S., Mechanical engineering, University of Washington, 1954.
Experience: Draftsman, expeditor, and planner, Boeing Airplane Co.; engineering aide, Alaska Road Commission; flight test analyst, Boeing Airplane Co.; test engineer, Northrop Aircraft, Inc.
- NELSON, CARL RUSSELL (1949)..... Dairy Husbandry
B.S., Kansas State College, Manhattan, Kansas, 1941; University of Missouri, 1958.
Experience: Instructor, Kansas State College; supervisor, dairy herd and farm management association, Kansas; extension agent, extension dairyman, Kansas; U.S. Public Health Service, dairy inspection; U.S. Army.
- NELSON, DONALD S. (1943)..... Business Manager
A.B., Stanford, 1930.
Experience: California State Department of Finance, Budgets and Accounts; Comptroller, Fresno State College, Fresno.
- * NELSON, EDWARD A. (1958)..... Animal Husbandry
B.S., Utah State Agricultural College, 1952; M.S., 1953; Ph.D., Kansas State College, 1958.
Experience: Manager, B.A.C. Valley Farm, Cedar City, Utah; co-owner and operator of livestock ranch, Cedar City, Utah; graduate research assistant, Kansas State College; U.S. Navy.
- * NEWELL, LLOYD A. (1956)..... Service and Inspection and Fruit Production
B.S., South Dakota State College, 1941.
Experience: Agricultural inspector, Department of Agriculture, San Diego County; instructor I-on-F program, Escondido and El Cajon; instructor adult education, Escondido; deciduous orchard manager, Escondido; livestock superintendent, San Diego, Riverside, and Orange County Fairs; U.S. Marine Corps.
- NICHOLSON, LOREN L. (1956)..... Journalism and Publications
A.B., San Jose State College, 1946; M.B.A., Stanford University, 1947; other study, Stanford-N.B.C. Radio Institute and University of Maryland.
Experience: Advertising sales representative, Watsonville Register-Pajaronian; advertising sales correspondent, Sunset Magazine; advertising director, Redding Record-Searchlight.

- NIELSEN, KEITH E. (1959)**.....English
B.A., Alma College, 1953; M.A., Stanford University, 1959; additional graduate work, Stanford University.
Experience: U.S. Marine Corps; welder; power plant engineer, farmer, neuropsychiatric nursing assistant, U.S. Veterans Administration Mental Hospital; ranger-naturalist, National Park Service; high school teacher, Laingsburg, Michigan.
- NOBLE, GLENN A. (1947)**.....Head, Biological Sciences Department
A.B., M.A., University of California, 1931-1933; Ph.D., Stanford University, 1940.
Experience: Assistant in Zoology, College of the Pacific; instructor, San Francisco City College; consultant in biology, American Military Government in Korea; professor of parasitology, Seoul National University, Korea; Fulbright professor of parasitology, Philippines.
- NOLAN, THOMAS F. (1949)**.....History & Political Science
B.S., University of Wisconsin, 1935; M.A., University of Southern California, 1940; additional study at the University of Zurich, Switzerland.
Experience: Instructor senior high school, Stockbridge, Wisconsin; instructor senior high school, Kaukauna, Wisconsin; instructor, American School, Quito, Ecuador; Economic Analyst, Department of State, Washington, D. C., Montevideo, Uruguay; Officer, U. S. Naval Reserve; Vice-Consul, Department of State, Washington, D.C. at Valparaiso, Chile.
- O'DANIELS, HOWARD R. (1933)**.....Business, Physical Education
Bachelor of Commercial Science, University of Santa Clara, 1931; additional graduate study, University of Southern California.
Experience: Coach, California Polytechnic; officer, U. S. Navy.
- O'LEARY, MICHAEL J. (1951)**.....Sociology and Political Science
A.B., San Francisco State College, 1950; M.A., Stanford University, 1951.
Experience: Property accountant, U.S. Marine Corps Supply Depot; instructor and examiner-specialist, Air Force Radar Technical School; instructor, U. S. Armed Forces Institute.
- OSTEYEE, LEON F. (1957)**.....Acting Dean, Engineering Division
B.M.E., Rensselaer Polytechnic Institute, 1945; M.M.E., 1957.
Experience: Instructor, Rensselaer Polytechnic Institute; designer, General Electric Company; American Locomotive Co.; ship superintendent, U.S. Naval Shipyard, Bremerton, Washington; head of Mechanical Engineering Department, California State Polytechnic College; Registered Professional Engineer, California and New York.
- OVERMEYER, PHILIP H. (1958)**.....Economics
B.S., University of Oregon, 1931; M.S., 1936; Ph.D., University of Minnesota, 1939.
Experience: High school instructor; teaching fellow, University of Minnesota; assistant professor, University of Alabama; federal administrator, WCLC of the National War Labor Board; lecturer, De Paul University; professor, Lewis and Clark College; private arbitrator, labor disputes; public member, Region XIII, Wage Stabilization Board; regional director, Office of the Salary Stabilization; co-ordinator of instruction, Golden Gate College, San Francisco, California.
- * **PARISH, RUSSELL (1958)**.....Chairman Machine Shop Department
B.S., 1932, Oshkosh State Teacher's College, Oshkosh, Wisconsin; Extension Courses, University of Wisconsin, University of Michigan.
Experience: Machine shop instructor at General Motors Institute, Flint, Michigan; management director, General R. R. Signal Corp., Rochester, New York.

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- * PAUGSTAT, WILLIAM C. (1956)..... Mathematics and Physical Sciences
A.A., Upland College, 1950; A.B., Miami University, 1952; M.Sc., Cornell University, 1954.
Experience: Assistant professor of chemistry, Upland College; associated with the Exchange Orange Products Company, Ontario, California, as hesperidin analyst and control chemist.
- PAUTZ, ROLAND K. (1959)..... Poultry
A.A., Clark College, 1955; B.S., Oregon State College, 1957; graduate study at Oregon State College.
Experience: Research assistant, Oregon State College, 1957-59.
- PAYNE, GERTRUDE (1960)..... Library
B.A., Winthrop College, Rock Hill, S.C.; M.A.L.S., University of Denver Library School, Denver, Colorado.
Experience: Queens Borough Public Library, New York, New York; Dania Elementary School Library, Dania, Florida; Los Angeles Public Library; La Habra High School Library, La Habra; Periodicals Librarian, Dominican College, San Rafael.
- PAYTON, PHILLIP W. (1957)..... Economics
B.A., Reed College, 1951; Graduate in Agricultural Economics, M.A., 1953-54, Stanford University; Ed.D., 1959.
Experience: U. S. Air Force, Washington; House Brokers' Clerk, Portland, Oregon; Instructor, Sacramento Junior College; Instructor, San Bernardino Junior College.
- * PENALOSA, FERNANDO (1959)..... Social Sciences
B.A., University of Denver, 1949; M.A., 1950; Ph.D., University of Chicago, 1956; M.A., University of Southern California, 1959.
Experience: United States Army; Mexican Army; Cataloger, University of Chicago Library; junior librarian, Alameda County Library, Oakland, California; cataloger and head of Technical Processes, Fresno State College Library; assistant professor, University of Southern California.
- * PENROD, WM. HENRY (1958)..... Welding Shop
Purdue University.
Experience: Welder, Doak Aircraft Company; welder, Hardmann Tool and Engineering Company; welding supervisor, Precision Sheet Metal; welding supervisor, Airite Products, Inc.
- PERELLO, DOMINIC B. (1954)..... Economics
A.B., University of California, Santa Barbara College, 1951; M.S., University of Wisconsin, 1952; additional graduate study, University of California at Los Angeles
Experience: Officer, U. S. Air Force; partner, Perello and Sons; teaching assistant, University of California at Los Angeles.
- * PETTEM, FREDERICK D. (1953)..... Crops
B.S., University of British Columbia, 1949; M.S., 1951; Ph.D., Rutgers University, 1953.
Experience: Wheat farming, Saskatchewan; plant breeder, Robinson Seed Company, Gridley, California; research assistant, Department of Farm Crops, Rutgers University; teaching and research assistant, University of British Columbia; officer, Royal Canadian Air Force.
- * PFLUEGER, DONALD HOWARD (1952) (1958)..... Social Sciences
B.A., Pomona College, 1949; M.A., Stanford University, 1951.
Experience: U. S. Navy; teacher, Covina High School; instructor, California State Polytechnic College, Kellogg-Voorhis Campus; officer, United States Information Service, Amman, Jordan.
- * Kellogg-Voorhis staff.

- PHILBIN, LEO F. (1948).....Aeronautical Engineering
 B.S., California State Polytechnic College, 1944.
 Experience: Aircraft instructor, Naval Flight Preparatory School; aircraft instructor, Fourth Air Force Headquarters, San Francisco; civilian training administrator, Salinas Army Air Base; training officer, Veterans Administration Office, San Luis Obispo; registrar, California State Polytechnic, San Luis Obispo.
- PHILLIPS, WILLIAM R. (1957).....Architectural Engineering
 B. Arch., University of Southern California, 1952.
 Experience: Draftsman, W. H. Harrison, Architect; Sponseller & Sons; U. S. Engineer Department; engineer, North American Aviation, Inc.; U. S. Army; registered architect, California.
- PIMENTEL, RICHARD A. (1952).....Biological Sciences
 A.B., San Jose State College, 1947; General Secondary Teaching Credential, 1948; M.S., Oregon State College, 1950; Ph.D., 1952.
 Experience: Teaching assistant, Oregon State College; ranger-naturalist, Crater Lake National Park; officer, U. S. Army.
- PLYMALE, HARRY H. (1958).....Veterinary Science
 B.S., Michigan State University, 1954; D.V.M., 1956.
 Experience: United States Department of Agriculture meat inspector, Paso Robles, California; general practice of veterinary medicine.
- POLLEY, RUDOLPH A. (1952).....Architectural Engineering
 A.B., Architecture, University of California, 1927.
 Experience: Draftsman and designer with architects in San Francisco and Santa Barbara; architect engineer for Santa Barbara County, Hancock College, and U. S. Government; private practice as architect in Oxnard, California, Registered architect, California.
- PRICE, BYRD L. (1957).....English
 B.A., Baylor University, 1927; M.A., 1932; additional graduate work, Harvard University, University of Colorado, University of California.
 Experience: Assistant professor, Texas A&M College; assistant professor San Jose State College; instructor, Modesto Junior College.
- PRICE, CLIFFORD J. (1956).....Aeronautical Engineering
 B.S., University College, South Wales, 1932.
 Experience: Lecturer, Municipal College, England; South African Air Force School of Technical Training; Pretoria Technical College, South Africa. Chief technical officer, South African Air Force School; Major, South African Air Force; chief inspector of aircraft accidents and aircraft materials; head of Aircraft Accident Investigation Branch, Division of Civil Aviation, Union of South Africa. Instructor, Northrop Aeronautical Institute.
- PRICE, DEREK JOHN (1957).....Mechanical Engineering
 B.S., California State Polytechnic College, 1954.
 Experience: Engineer, British Columbia Telephone Co.; British Electricity Authority.
- * PROCSAL, ROBERT L. (1949).....Head, General Crops Department
 B.S., California State Polytechnic College, 1946.
 Experience: Borden's Dairy Delivery Service, Oakland; vocational agricultural instructor, El Centro; diversified farming, Imperial County; officer, U.S. Army Air Force.
- * QUANEY, ROBERT (1959).....Industrial Engineering
 B.S.I.E., Stanford University, 1954; additional studies, University of California.
 Experience: Manufacturing engineer, R.C.A., Los Angeles; Manufacturing planner, Lockheed Missile, Van Nuys; co-ordinator of engineering planning, manufacturing research engineer and production planning supervisor, Lockheed Missile, Sunnyvale, California.

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- * RAAB, WALLACE A. (1957)..... Head, Mathematics Department
B.S., Morningside College, 1948; M.A., University of South Dakota, 1949; Ph.D., Iowa State College, 1958.
Experience: Teaching assistant, University of South Dakota; instructor, Eagle Grove Junior College, Iowa State College; mathematician, Naval Ordnance Test Station, Pasadena; senior dynamics engineer, Convair-A Division, General Dynamics Corporation.
- RADIUS, CLARENCE (1946)..... Head, Electronic Engineering Department
B.S., University of Chicago, 1932; graduate work in electronics and communications at University of Chicago, Stevens Institute of Technology.
Experience: Engineer, Radiomarine Corp. of America; head, Department of Audio-Video Technology, RCA Institutes, N.Y.; lecturer in television for NBC in New York, Chicago, Hollywood; registered professional engineer, California.
- RAPP, JOHN B. (1959)..... Aeronautical Engineering
B.S., University of California, 1940.
Experience: Engineer, General Electric Company, Collins Radio Company, United Fruit Company; instructor, Princeton University.
- RASMUSSEN, WILLIAM C. (1959)..... Medical Officer
M.D., University of Kansas, 1944.
Experience: Internship, Bethany Hospital, Kansas City, Kansas; 12 years private practice, Kansas City, Kansas.
- REAGAN, EVELYN D. (1946) (1954)..... Library
B.S., (Lib. Sci.), College of St. Catherine, St. Paul, Minn., 1943.
Experience: Librarian, College of the Holy Cross, Worcester, Mass.; Librarian, Charity Hospital School of Nursing, New Orleans; Cataloger, California State Polytechnic College, 1946-48.
- REECE, OSCAR E. (1956)..... Crops
B.S., Kansas State College, 1931; M.S., University of Minnesota, 1945; Ph.D., 1949.
Experience: Grade school principal, Hopewell and Smith Center, Kansas; agricultural instructor, Norcatur, Hope, and Silver Lake, Kansas; county agricultural agent, Rice County, Kansas; research fellow, University of Minnesota; assistant agronomist USDA, Division of Sugar Plants, Field Office, St. Paul, Minnesota; associate professor of agriculture, Iowa State Teachers College.
- REECE, ROBERT HOWELL (1946)..... Mechanical Engineering
B.S., in mechanical engineering, University of Illinois, 1920.
Experience: Steel plate work estimator, Joseph T. Ryerson & Son, Chicago; City of Chicago water filter plant; Skidmore, Owings and Merrill, Architects and Engineers, Chicago and New York; officer, U.S. Navy; Wurdeman and Becket, Architects and Engineers, Los Angeles, California; senior engineer, Bechtel Corporation, San Francisco.
- REMUND, CLIVE O. (1946)..... Agricultural Engineering
B.S., Agriculture, Utah State Agricultural College, 1931.
Experience: Teacher, Utah high schools; agricultural instructor and critic teacher, California high schools.
- REYNOLDS, R. WALLACE (1953)..... Mechanical Engineering
B.S., California (Pa.) State Teachers College, 1940; M.S., Purdue University, 1946; additional graduate work, University of Pittsburgh and University of Southern California.
Experience: Assistant educational adviser, Civilian Conservation Corps; weight engineer, Douglas Aircraft Co.; ordnance engineer, Naval Ordnance Laboratory; instructor, Purdue University; head, engineering drawing, Washington and Jefferson College; assistant professor, University of Santa Clara; instructor, West Coast University; instructor (part time) UCLA; engineering designer, Hughes Aircraft Co.; consulting work in tool design and machine design.
- RHOADS, HOWARD (1956)..... Crops
B.S., Montana State College, Bozeman, Montana, 1951; M.S., 1952.
Experience: Fieldman, Great Western Sugar Co., Billings, Montana; instructor and assistant, Montana State College, Bozeman, Montana.

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- * RICE, ELMER H. (1959)..... Chemistry
 B.A., Whittier College, 1947; Ph.D., University of Southern California, 1958.
 Experience: Analytical chemist, Truesdail Laboratories; junior research bio-
 chemist, University of California Medical Center.
- RICH, GLENN W. (1953)..... Agricultural Engineering
 B.S., California State Polytechnic College, 1953.
 Experience: Assistant instructor, California State Polytechnic College, San Luis
 Obispo; journeyman carpenter, U.S. Coast Guard.
- RICHARDS, CARLOS C. (1946)..... Machine Shop
 B.A., Santa Barbara State College, 1942.
 Experience: O. C. Field Gasoline Corporation; U.S. Navy.
- RICHARDSON, JOY O. (1948)..... Head, Aeronautical Engineering Department
 B.S., University of Nebraska, 1940; M. of Engr., Yale University, 1942.
 Experience: Instructor, Yale University, New Haven Junior College, New
 Haven, Connecticut; instructor, Orland High School, Orland, California; machine
 designer, Rockbestos Products Corporation; engineer, Marlin Firearms Company;
 Bristol Aeronautical Corporation, New Haven, Connecticut; engineer, Johns Man-
 ville Corporation, Tilton, New Hampshire; vice president and treasurer, Richardson
 Industries, Incorporated, East Haven, Connecticut. Registered professional engineer,
 California.
- RICKANSRUD, TORLEIF M. (1943)..... Physics and Chemistry
 B.A., Luther College, 1922; M.S., Iowa State College, 1940; graduate work, Uni-
 versity of St. Louis, 1942-1943.
 Experience: Superintendent of schools and director of Science Department at
 Rolla, North Dakota; Omemece, North Dakota; Lansing, Iowa; electronics instruc-
 tor, Advanced Radar School, Truax Field, Madison, Wisconsin.
- RICKARD, HERMAN E. (1959)..... Dairy
 B.S., Ohio State University, 1950; M.S., 1954; Ph.D., 1958.
 Experience: Assistant Herdsman, research assistant, in charge of federal dairy
 breeding program, Ohio State University.
- * RIDDLE, JEWEL M. (1959)..... Accounting
 B.A., San Jose State College, 1951; graduate study, Golden Gate College, Univer-
 sity of California, Los Angeles, University of Southern California; CPA, 1957.
 Experience: Instructor, Golden Gate College, Los Angeles Metropolitan College,
 University of California Extension; tax department, Perkins & Trousdale, CPA's;
 staff accountant, Arthur Young & Company, CPA's.
- RIEBEL, JOHN P. (1947)..... English
 B.S., University of Kentucky, 1924; A.B., University of Southern California, 1927;
 M.A., 1928; additional graduate work, University of Illinois.
 Experience: Teaching, Georgia School of Technology; University of Illinois;
 Austin Peay Normal, Clarksville, Tennessee; General Motors Institute, Flint, Michi-
 gan; University of Detroit. Editor and author, L. W. Singer Company; Cadillac
 Motor Car Division; Gladding, McBean & Co.; professional writing.
- * RITCHIE, RALPH W. (1957)..... Electronic Engineering
 B.A., University of California, Santa Barbara, master's candidate, Claremont
 Graduate School, 1957.
 Experience: Technician, Champion Armature Co., Los Angeles; electronic tech-
 nician, U. S. Navy; maintenance electronic technician, University of California,
 Berkeley; assistant professor, chairman, Electronics Department, Chaffey College,
 Ontario.
- RITTENHOUSE, EUGENE A. (1949)..... Placement Officer
 B.S. University of California, Los Angeles, 1947; M.B.A., University of California,
 Berkeley, 1948; additional graduate work, University of California, Berkeley.
 Experience: Bookkeeper, J. J. Elmore Co., Brawley; broker's clerk, Dean Witter
 & Co., Los Angeles; purchasing, War Department, USAAF, Trinidad, B. W. I.;
 U. S. Navy; instructor, social sciences; Administrative Assistant for Personnel, Office
 of the President, California State Polytechnic College.

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- ROBINSON, PAUL V. (1954) Art and Audiovisual Education
 B.S., Ohio State University, 1947; M.A., Teacher's College, Columbia, University, 1949; additional graduate study, University of Southern California.
 Experience: Instructor, Columbus Gallery of Fine Arts; teacher, Bexley, Ohio, High School; instructor, Miami University, Oxford, Ohio; assistant, University of Southern California; lecturer, Los Angeles State College; assistant to training coordinator, Douglas Aircraft Co., Santa Monica.
- * ROCHE, EDWARD TOWNE (1959) Biological Sciences
 B.A., San Diego State College, 1948; M.S., University of Southern California, 1952; Ph.D., University of Southern California, 1957.
 Experience: Teaching assistant and field-laboratory research assistant on Navy and Air Force research projects in Alaska; instructor, Compton College, 1957-59.
- RODIN, ROBERT J. (1953) Biological Sciences
 A.B., University of California, 1943; Ph.D., 1951.
 Experience: Assistant botanist, University of California Herbarium; ranger naturalist, Yosemite National Park; administrative clerk, U. S. Marine Corps; expedition botanist, University of California African Expedition; teaching assistant, University of California; lecturer for extension division, University of California; professor of biology, Forman Christian College, Lahore, Pakistan.
- ROEST, ARYAN I. (1955) Biological Sciences
 B.S., University of Virginia, 1945; B.S., Oregon State College, 1948; M.S., 1949; Ph.D., 1954.
 Experience: Teaching and research assistant, Oregon State College; assistant professor, Central Oregon College; forester, Oregon State Board of Forestry; officer, U. S. Navy.
- ROGALLA, JOHN A. (1959) Farm Management
 B.S. California State Polytechnic College, 1956; M.S., Cornell University, 1958.
 Experience: U. S. Air Force; graduate assistant, Cornell University; material control analyst, Ryan Aeronautical Company.
- ROGERS, LEO E. (1954) Machine Shop
 B.S., in Aeronautical Engineering, California State Polytechnic College, 1950.
 Experience: Instructor, San Luis Obispo High School; engineering aid, Division of Highways, San Luis Obispo.
- ROSEN, ARTHUR Z. (1953) Physics
 A.B., University of California, 1941; Ph.D., 1952.
 Experience: Physicist, University of California Radiation Laboratory; U. S. Navy; teaching and research assistant, University of California; lecturer, University of California, Santa Barbara College.
- * ROWLEY, WILLIAM P. (1958) Agricultural Business Management
 A.B., University of California at Los Angeles, 1933; graduate work, University of Southern California, Los Angeles State College.
 Experience: Case supervisor, California State Relief and Welfare, Los Angeles; field man, U. S. D. A., Agricultural Marketing Administration, Los Angeles and Boise, Idaho; public relations director, Associated Produce Dealers and Brokers of Los Angeles.
- * RYAN, HELEN R. (1958) Librarian
 B.A., University of California, Berkeley, 1955; M.S.L.S., University of Southern California, 1958.
 Experience: Librarian, U. S. Naval Hospital, Corona, California.
- SALO, GLENN W. (1955) Agricultural Engineering
 B.S., Montana State College, 1950; M.S., University of Idaho, 1955.
 Experience: Shops officer, U. S. Air Force; Instructor and assistant Agricultural Engineer, University of Idaho; Research Fellow, University of Idaho.
- SANKOFF, LEO (1946) Agricultural Engineering
 B.S., Agriculture, California State Polytechnic College, 1942; M.A., California State Polytechnic College, 1956.
 Experience: Agricultural instructor, Fillmore High School.

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- SCALES, HARRY H. (1958)..... Education and Psychology
 B.A., Arizona State College, 1934; M.A., Stanford University, 1939; Ed.D., 1950.
 Experience: Teacher and counselor, Santa Barbara Junior College; associate professor and consultant to industry and schools, Michigan State University; aerial navigation training, U. S. Navy; teacher and guidance director, Redlands High School; director of research, Arizona State Department of Education; teacher, Superior and Safford, Arizona, Public Schools.
- * SCHENCK, W. DONALD (1956)..... English
 A.A., Los Angeles City College, 1940; B.A., University of Redlands, 1949; M.A., University of Southern California, 1955; additional graduate study, University of Southern California.
 Experience: Teacher, San Bernardino City Schools; editorial writer, San Bernardino Teacher; editor for personnel department, Convair-Pomona; bandsman, U. S. Army.
- * SCHEUERMAN, J. CLAUDE (1957)..... Business Manager
 A.B., Stanford, 1949.
 Experience: Budget analyst, California State Department of Finance, Budget Division.
- SCHNEIDER, CATHERINE A. (1959)..... Library
 B.A., Library Science, The College of St. Catherine, St. Paul, Minnesota, 1959.
- * SCHNITGER, A. WALLACE (1958)..... Electronics
 B.A., 1947, Occidental College, Los Angeles, California; Post graduate study, California Institute of Technology.
 Experience: Sales engineer, Gerald B. Miller Company, Hollywood, California; research physicist, Fluor Corporation, Los Angeles, California; instructor, Chemical Analysis, Department of Defense; instructor, electronics, U. S. Navy, Monterey, California; self-employed, consulting physicist, Inglewood, California.
- SCHROEDER, WALTER P. (1957)..... Head, Education Department
 B.S., Michigan State University, 1940; M.A., 1947; Ph.D., 1953.
 Experience: Director of adult and vocational education, Olivet Public Schools; assistant professor, vocational education and education, Michigan State University; assistant director of placement, Michigan State University.
- SCHWARTZ, KENNETH E. (1952)..... Architectural Engineering
 B. of Arch., University of Southern California, 1952.
 Experience: Draftsman, Engineering Division, Douglas Aircraft Company, El Segundo; architectural draftsman, A. G. Bailey, Architect, Los Angeles; draftsman and designer, H. W. Underhill, Architect, Los Angeles; designer, Allison and Rible, Architects, Los Angeles. Registered Architect, California.
- SCOTT, CHESTER H. (1952)..... Mathematics
 B.A., Municipal University of Wichita, 1938; electronics diploma, U. S. Navy, 1945; M.S., Montana State College, 1950.
 Experience: Instructor, Sheridan High School, Wyoming; instructor, mathematics and navigation, Civilian Pilot Training School; counselor, Y. M. C. A.; instructor, mathematics, electronics, U. S. Navy; assistant professor mathematics; Montana School of Mines; statewide counselor, University of Montana.
- SEEBER, GLENN E. (1954)..... Welding
 A.B., 1949; M.A., 1950, Chico State College.
 Experience: Instructor in biology and welding, Lassen Union High School and Junior College; welder and foreman, Interstate Steel Co., Chico, California; welder, Anderson's Welding Shop, Chico; welder and foreman, Pollock Shipbuilding Corp., Stockton; locomotive fireman, Western Pacific Railroad.
- * SEELEY, CHARLES (1959)..... Mechanical Engineering
 B.S.A.E., Purdue University, 1956.
 Experience: Instructor, Purdue University; engineer, General Motors, Allison Division, Indianapolis.

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- * SEKERAK, ROBERT M. (1956).....Audio-Visual Co-ordinator
B.A., College of Wooster, 1934; M.A., Ohio State University, 1947; Ed.D., University of Southern California, 1956.
Experience: Instructor and athletic coach, Bedford, Ohio, and Columbus, Ohio, Public Schools; U.S. Navy officer; assistant to supervisor, Radio Education, Long Beach, California, Public Schools; naval representative, Far East Army Headquarters; teaching assistant, A-V Education, University of Southern California.
- SERVATIUS, OWEN L. (1947).....Business
B.S., California State Polytechnic College, 1959.
Experience: Brokers' clerk, Baker-Fentress & Co., Chicago, Illinois; U.S. Navy; supervising clerk, California State Polytechnic College.
- SHARPE, NORMAN (1937).....Air Conditioning and Refrigeration
Engineering Department
B.A., University of California at Los Angeles, 1929; M.A., University of Southern California, 1939.
Experience: Development engineer, Carrier Corporation; design engineer, Carrier Corporation; mathematics instructor, Los Angeles City Schools; design and construction engineer, Luppen and Hawley, Inc.; professional writing. Registered professional engineer, California.
- SHEPARD, VARD M. (1932) (1947).....Dean, Agricultural Division
B.S., University of Minnesota, 1923.
Experience: Agricultural extension service; extension specialist in animal husbandry, University of California; U.S. Navy; instructor, vocational agriculture, Galt and Los Banos High Schools; South St. Paul, San Francisco, and Stockton Union Stockyards.
- SHIELDS, FERN A. (1958).....Library
A.B., Stanford University, 1944; B.L.S., University of California, 1948.
Experience: San Jose State College Library; Army librarian, Europe; Modesto Junior College Library.
- SHOOP, C. W. (1957).....Welding
Experience: Assistant foreman, Chicago Bridge and Iron Co.; erection superintendent, Gulf Ship Building Co.; Henderson Construction Co.; H. K. Ferguson Construction Engineers; Graver Tank & Manufacturing Co.; Nelson Electric & Creosoting Co.; Person Construction Co.
- * SIEGEL, BEN (1957).....Acting Chairman, English and Speech Department
B.A., San Diego State College, 1948; M.A., University of California, Los Angeles, 1950; Ph.D., University of Southern California, 1956.
Experience: Teaching assistant, University of California, Los Angeles, University of Southern California; lecturer, University of Southern California, Chouinard Art Institute; instructor, Los Angeles Evening Adult School; Danforth Fellow, University of Chicago; radio, advertising, and newspaper work.
- * SIMMONS, HAROLD F. (1958).....Mathematics
B.A., 1950; M.A., 1952, University of Wichita; Ph.D., Iowa State College, 1958.
Experience: Teaching fellow, University of Wichita, Wichita, Kansas; graduate assistant, Iowa State College, Ames, Iowa; assistant professor, University of Wichita, Wichita, Kansas.
- SIMON, ALFRED W. (1955) (1959).....Physics
B.S., University of Chicago, 1921; Ph.D., 1925.
Experience: National research fellow in physics, California Institute of Technology; director, Cottrell Research Laboratory, Tennessee Coal, Iron and Railroad Company; research physicist, Stewart-Warner Corporation; American Harmonica Company and Naval Ordnance Laboratory; assistant professor, Washington University, St. Louis; associate professor, Tulsa University and Alabama Polytechnic Institute; Physicist, U.S. Air Force.
- * SKAMSER, HAROLD P. (1958).....Dean, Engineering Division
B.E., Wisconsin State College, 1931; M.A., University of Minnesota, 1945; B.S. E.E., Michigan State University, 1948.
Experience: Assistant Professor, Virginia Polytechnic Institute; Professor, Michigan State University; Engineer, Douglas Aircraft Company, Boeing Aircraft Company, Reo Motors Company, National Iron Company, Northwestern Railroad.

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- * SLIGH, RICHARD C. (1958)..... Industrial Engineering
B.S., 1950, M.A., 1958, Michigan State University, East Lansing, Michigan.
Experience: Shop instructor, Mason High School, Mason, Michigan; drawing instructor, Michigan State University.
- * SMITH, DUDLEY R. (1957)..... Agricultural Engineering
B.S., Cornell University, 1954; additional study, Cornell University.
Experience: Instructor of agricultural engineering, State University of New York, Morrisville.
- SMITH, GEORGIA L. (1955)..... Library
B.A. (Libr. Sci.), North Texas State College, 1951.
Experience: Leveretts Chapel School Library, Overton, Texas; Los Angeles County Law Library; Glendale, California, Public Library.
- SMITH, M. EUGENE (1946)..... History
A.B., University of California, 1934; M.A., 1937; Ed.D., University of Oregon, 1958.
Experience: Instructor and coach, Piedmont High School, Piedmont, California; graduate assistant, Universities of California and Oregon; officer, U.S. Army.
- * SMITH, PENELOPE (1959)..... Librarian
B.A., University of California at Los Angeles, 1958; M.S., Library Science, University of Southern California, 1959.
Experience: Library assistant, Institute of Industrial Relations Library, University of California, Los Angeles.
- SMITH, WARREN T. (1952)..... Assistant Dean of Agriculture
B.S., University of California, 1943; M.S., University of California, Davis, 1953.
Experience: Forester, United States Forest Service; U.S. National Park Service; stores, U.S. Navy (civilian); director of vocational agriculture and critic teacher, Madera Union High School.
- * SQUIRES, DONALD C. (1959)..... Electronic Engineering
B.S.E.E., Milwaukee School of Engineering, 1956; additional studies, Adelphi College, Garden City, New York.
Experience: Associate engineer, American Bosch Arma Corporation; development engineer, Aerojet-General.
- STEFANAC, JOSEPH B. (1958)..... Mathematics
B.S., U.S. Naval Academy, 1926; graduate study, U.S. Naval Post Graduate School and University of California, Berkeley; M.S., Purdue University, 1957.
Experience: Captain, U.S. Navy (retired); instructor, Purdue University; marine engineering and naval construction, Bureau of Ships, Navy Department.
- STEUCK, FRED H. (1947)..... Electronic Engineering
B.S., Iowa State College, 1937.
Experience: Engineer, Nebraska Power Co.; manager, O'Brien Co.; Rural Electric Co-op., Iowa; instructor, Iowa State College; officer, U.S. Navy; registered professional engineer, California.
- STOBBE, ARTHUR J. (1949)..... Library
Ph.B., Marquette University, 1937; B.L.S., Syracuse University, 1947; M.L.S., University of California, 1949.
Experience: Officer, U.S. Army Air Force; art and music librarian, Milwaukee Public Library; reference librarian, Grosvenor Reference Library; research assistant, University of California School of Librarianship; library, Syracuse University.
- STOFFEL, EDWARD O. (1957)..... Mechanical Engineering
B.S., University of Santa Clara, 1950; professional M.E., University of Santa Clara, 1955.
Experience: Engineer, Northrop Aircraft; Robertshaw-Fulton Controls, Norris-Thermador Corp.; chemist, U.S. Industrial Chemicals.
- STOKER, LYMAN P. (1957)..... Mechanical Engineering
B.S., California Institute of Technology, 1924.
Experience: Development engineer, Natural Gas Equipment; officer, U.S. Navy; president and owner, Precision Control Co.; assistant manager, Pacific Gas & Electric Co.; engineer, Union Oil Co.; draftsman, Elect. Products Co.

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- STRIECHERT, GRETCHEN (1958).....Home Economics
 B.S., Oregon State College, 1936; M.S., 1951.
 Experience: Teacher, high schools; home adviser, University of California Agricultural Extension; nursery school supervisor and instructor, Oregon State College; instructor, Modesto Junior College; personnel field counselor, Oregon Shipbuilding Corporation; teacher-counselor, Oregon State School for Girls.
- STROTHER, CALVIN A. (1955).....Economics, Political Science
 A.B., Harvard University, 1947; graduate work, George Washington University, 1948-1950; LL.B., Oklahoma University College of Law, 1953.
 Experience: U.S. Navy; officer, U.S. Capitol Police; law firm associate, Allen & Williams, Lawyers; private law practice; justice of peace, Oklahoma.
- * STULL, ROBERT B. (1947).....Health and Physical Education
 A.B., Whittier College, 1941; M.A., 1947; additional graduate work, University of Southern California.
 Experience: Freshman basketball coach, Whittier College; graduate manager, Whittier College, athletic specialist, U.S. Navy; officer, U.S. Navy; instructor, political science and physical education, Valencia Union High School.
- SYSUM, ROBERT L. (1958).....Welding
 Special courses at Santa Monica City College, 1958, and University of California at Los Angeles, 1958.
 Experience: U.S. Navy; welder, Lennox Furnace Company; repairman, Roy Tarpley, Chem-Therm Distributor; maintenance welder, California State Division of Highways; instructor, Paso Robles School for Boys.
- * SYVERSON, MAGNUS (1957).....Head, Physical Education Department
 B.S., Oregon College of Education, 1942; M.S., University of Oregon, 1950; Ed.D., 1952.
 Experience: Teacher-coach, Newburg and Klamath Falls, Oregon; instructor, Portland State College; assistant professor, University of California at Los Angeles; U.S. Navy.
- TAYLOR, MORRIS P. (1954-55) (1956).....Mechanical Engineering Department
 B.A., Stanford University, 1923; graduate work, Massachusetts Institute of Technology, 1923-24, 1934.
 Experience: Tester, Southern Pacific Co.; research engineer, Fruit Industries, Inc.; engineer, Bureau of Seismology, U.S. Coast and Geodetic Survey; engineer, Southern Pacific Co.; design engineer, Westinghouse Electric Corp.
- * TENNANT, FRANK A. (1955).....English and Journalism
 B.A., University of California, Los Angeles, 1950; M.S., 1953.
 Experience: Editor, Monterey Park Californian; reporter, Los Angeles Mirror; director of press relations, Title Insurance and Trust Company, Los Angeles; United States Army, psychological warfare unit.
- THOMSON, DAVID H. (1946).....Biological Sciences
 B.S., University of Arizona, 1944; M.A., Claremont Graduate School, 1948; additional graduate study, Oregon State College and University of Oregon.
 Experience: Laboratory instructor, Pomona College; ranger-naturalist, Sequoia National Park.
- THURMOND, WILLIAM (1951).....Biological Sciences
 A.B., University of California, 1948; M.A., 1950; Ph.D., 1957.
 Experience: Instructor, San Mateo Junior College; associate in zoology, University of California; instructor, summer session, University of California, 1957-58.
- TOONE, HARMON (1952).....Head, Dairy Department
 B.S., University of Idaho, 1940; M.A., California State Polytechnic College, 1956.
 Experience: Director of vocational agriculture at Moreland, Ucon, and Firth high schools, Idaho; superintendent, Firth High School, Idaho; director of vocational agriculture, Riverdale High School, California; special supervisor, Bureau of Agricultural Education.
- TROUTNER, WILLIAM R. (1942).....Acting Head, Crops Department
 Vocational Certificate, California State Polytechnic College, 1934; B.S., Agriculture, University of California, Davis, 1938.
 Experience: Agriculture instructor, Pomona High School and Junior College; agriculture instructor and critic teacher, San Luis Obispo Senior High School.

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- TRUEX, JOSEPH W. (1954).....Printing
 B.S. in Printing, California State Polytechnic College, 1952.
 Experience: Floorman, San Luis Obispo Telegram Tribune; printer, Santa Maria Advertiser; printer, Williams Press, Flushing, New York; printer, H. W. Wilson Co., New York City; U.S. Navy.
- * TUCKER, DOROTHY McNEIL (1956).....Psychology
 B.S., University of Minnesota, 1945; M.S., Illinois State Normal University, 1949; Ed.D., University of California, Los Angeles, 1959.
 Experience: Recreation director; instructor, Washington Park High School, Racine, Wisconsin, Lincoln College, Western Illinois State College, San Bernardino city schools; counselor, San Bernardino Valley College; California certified psychologist.
- TURNER, PEARL (1951).....Library
 A.B., San Jose State, 1937; M.S. in Education, University of Southern California, 1949; M.L.S., Texas State College for Women, 1951.
 Experience: Teacher in elementary schools, Visalia, Los Angeles, Riverside; officer, U.S. Navy.
- VAN ASPEREN, IR JAN T. (1951).....Electrical Engineering
 Master's Degree in E.E., Technische Hoogeschool, Delft, The Netherlands, 1918.
 Experience: Research, Technische Hoogeschool; Centraal Bruinkool Bureau; electrical engineer, Heemaf, The Netherlands; director of publicity and editor of "Heemafpost," Heemaf, The Netherlands; teacher, Middelbare Technische School Dordrecht, The Netherlands; member, examining committee for welding instructors and supervisors, Dutch Welding Society; member, examining committee for trade school teachers, The Netherlands; lecturer, University of California at Los Angeles; electrical engineer, Inet, Inc., Los Angeles.
- VOEHL, WILFORD E. H., Colonel, USA (1957).....Chairman, Military
 Science and Tactics
 B.S., United States Military Academy, 1934; Command and General Staff College, 1945.
 Experience: Battalion commander and chief of staff Base M during WW II; general staff with troops Far East Command and Korea; G4 and acting chief of staff 3d Inf Div in Korea; AAA Gp commander and chief of staff, Fort Stewart, Georgia.
- VORHIES, RALPH M. (1946).....Crops
 B.S., University of Missouri, 1938; M.A., 1941.
 Experience: Agriculture Instructor at Belton and Couch High Schools, Missouri; instructor, Southeast State Teachers College, Cape Girardeau, Missouri; Officer U.S. Navy.
- WALKER, CLIFFORD L., M.D. (1957).....Medical Officer
 Premedical Education, Fresno State College, 1939-42; M.D., George Washington University, Washington, D.C., 1945.
 Experience: Internship, Los Angeles County Hospital; residency, San Mateo County General Hospital; military service, U.S. Army and U.S. Public Health Service; private practice, Half Moon Bay, California; member, American Academy of General Practice.
- WALKER, HOWARD (1957).....Chemistry
 B.A., New York University, 1947; M.S., 1948; Ph.D., U.C.L.A., 1955.
 Experience: U.S. Public Health Service, postdoctorate fellow, American Meat Institute Foundation, University of Chicago; group leader, Veterans Hospital, Downey, Illinois; research associate, Northwestern University.

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- WALSH, SARAH W. (1958).....Home Economics
A.A., Graceland College, 1950; B.S., Iowa State College, 1952; M.S., University of California, Los Angeles, 1958.
Experience: Design artist, Hallmark Cards, Inc., Kansas City, Missouri; Iowa-Illinois Gas and Electric Company, Davenport, Iowa; teaching assistant, University of California, Los Angeles; teacher, Culver City High School.
- * WANG, MARTIN I. (1959).....Audiovisual
B.A., University of Southern California, 1949; M.S. in Education, University of Southern California, 1950; additional graduate work, University of Southern California.
Experience: Instructor, Torrance, California, Long Beach, California; instructor, El Camino College; teaching assistant and instructor, Audiovisual Education, University of Southern California.
- WARD, CLINTON E., S/Sgt. (1960).....Military Sciences and Tactics
Graduate of Army Language School, Presidio of Monterey (Mandarin Chinese); attended Supply School, Fort Benning, Ga.
Experience: Military Supply; Bn. Supply Sgt., 124th Sig. Bn., Fort Lewis, Washington.
- WARD, WESLEY S. (1954).....Architectural Engineering
B. of Arch., University of Southern California, 1953.
Experience: Engineering assistant, Pacific Telephone and Telegraph Co.; officer, U.S. Air Force; surveyor, City of Santa Ana; design draftsman, Benedict Beckler and Kocher, Architects and Engineers; construction supervisor, Everett E. Parks, Architect. Registered Architect, California.
- * WARHURST, DONALD E. (1957).....Physical Education
A.B., University of California, 1943; M.S., University of Southern California, 1951; additional graduate work, San Francisco State College, University of Nevada, University of California, Fresno State College.
Experience: Teacher, Piedmont High School, Santa Ana High School; coach, Santa Ana High School, San Bernardino Valley College, Modesto High School.
- * WEEKS, LOWELL K. (1947).....Chairman, Music and Art Department
B.A., University of New Mexico, Albuquerque, New Mexico, 1938; graduate work, University of New Mexico, University of Southern California, and Claremont Graduate School.
Experience: Music and English teacher, Los Lunas, New Mexico; Air Force Band Leader, U.S. Army at Albuquerque, New Mexico, Palm Springs, California and Long Beach, California.
- * WELCH, HARRY V., JR. (1947).....Head, Soil Science Department
B.S., University of California at Los Angeles, 1941; M.S., 1953.
Experience: University of California Citrus Experiment Station, Riverside; Farm Security Administration.
- * WELLS, HAROLD F. (1954).....College Librarian
B.A., University of British Columbia, 1951; M.L., University of Washington, 1952.
Experience: Reference assistant, Eastern Washington College of Education; junior librarian, Fresno State College.
- WELLS, PHILIP V. (1959).....Biological Sciences
B.A., Brooklyn College, 1951; M.S., University of Wisconsin, 1955; Ph.D., Duke University, 1958.
Experience: Research assistant, University of Wisconsin; research assistant, Duke University; instructor, University of California at Santa Barbara; U.S. Army.
- WERBACK, WILLIAM J. (1954).....Aeronautical Engineering
B.S. in mechanical engineering, Michigan State College, 1944; M.S. in aeronautical engineering, University of Michigan, 1950.
Experience: Hydrodynamics and flight test engineer, Consolidated Vultee Aircraft Corp.; radio technician, U.S. Navy.

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- * WESSELS, PHILLIP S. (1958)..... Head, Electronics Engineering Department
B.A., 1946, Whittier College; U.C.L.A.; University of Maryland; University of Southern California.
Experience: Test equipment group engineer, Convair, Pomona, California; electronic scientist, Federal Communications Commission; laboratory instructor, University of Southern California.
- * WEST, HOWARD (1959)..... Journalism
B.A., Pepperdine College, 1956.
Experience: Apprentice reporter, Los Angeles Examiner; journalism instructor and acting director of public relations, Pepperdine College; editor, America's Builders; publications consultant, Southland Press.
- WESTON, RALPH E. (1948)..... Mathematics
A.B., Stanford, 1922; M.A., 1932. Additional graduate work: College of Pacific, Stanford University, University of Washington, Oregon State College, University of California.
Experience: Electrical engineering, San Joaquin Light and Power Co., Pacific Gas and Electric Co.; teaching: Stanford University, Chaffee Junior College, Sacramento Junior College, University of Idaho, Southern Branch; University of Southern California.
- WESTSMITH, ANN (1957)..... Home Economics
B.A., Whittier, 1953; graduate work: University of California, Los Angeles, Claremont Graduate School and Whittier.
Experience: Owner, fishing lodge, Bakersfield; teacher, Whittier High School, Santa Fe High School, and San Benito High School and Junior College.
- WHIPPLE, OMER K. (1956)..... Chemistry
A.B., Dartmouth College, 1936; M.A., Columbia University, 1938.
Experience: Biochemical research chemist, Long Island College of Medicine; instructor in chemistry, Norwich University; research chemist, Vermont Bureau of Industrial Research; professor of quantitative analysis, University of Tulsa; chemical consultant, Tulsa, Oklahoma.
- * WHITE, MILTON R. (1959)..... Placement Officer
B.S., California State Polytechnic College, 1950.
Experience: Agricultural consultant, Los Angeles Chamber of Commerce; sales and trade association executive, California Wool Growers Association; sales representative, General Mills, Inc., Larowe; U.S. Marine Corps.
- WHITING, FRANCIS F. (1946)..... Chairman, Machine Shop Department
B.S., Stout Institute, 1931; M.A., University of Minnesota, 1938.
Experience: Teacher, Eau Claire, Wisconsin; teacher, Minneapolis, Minnesota; instructor, Kent State University, Kent, Ohio; assistant professor, University of Minnesota; officer, U.S. Navy.
- WHITNEY, GEORGE W. (1959)..... Metallurgical Engineering
B.S., M.S., University of Michigan, 1924.
Experience: Chemist, American Smelting and Refining; development engineer, Western Electric; plant metallurgist, Yates American Machinery, and Bliss and Laughlin; chief metallurgist, Baash-Ross Tool Company and Continental-Emsco Company. Registered professional engineer, California.
- WHITNEY, LESTER V. (1955)..... Physics
Ph.B., University of Wisconsin, 1930; Ph.M., 1932; Ph.D., 1936.
Experience: Teacher and demonstration assistant, University of Wisconsin; research associate, Wisconsin Natural History and Geological Survey; research in underwater physical measurements and consultant, Woods Hole Oceanographic Institute, Scripps Institution of Oceanography, Marine Biological Laboratory, University of Georgia; sonar and electrofishing research, University of Wisconsin; professor, Southwest Missouri State College.
- WHITSON, MILO E. (1947)..... Head, Mathematics Department
Ph.B., Washburn College, 1937; M.A., George Peabody College for Teachers, 1940; Ed.D., University of Southern California, 1949.
Experience: Teacher and administrator, Kansas; officer, U.S. Navy; lecturer, mathematics, University of Southern California.

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- WIGHT, HEWITT G. (1952)**.....Chemistry
 B.S., University of Utah, 1943; Ph.D., University of California, 1955.
 Experience: Teaching assistant, University of Utah, St. Martin's College, and the University of California; officer, U.S. Army.
- WILEY, J. BARRON (1956)**.....Education
 B.S. in Com., University of Denver, 1940; M.B.A., 1948; graduate study, University of Colorado; Ed.D., Indiana University, 1955.
 Experience: Accounting and business administration, various firms; officer, U.S. Air Force; head, department of business education, Colorado Woman's College; assistant professor of air science, Indiana University.
- WILEY, RICHARD C. (1946)**.....Chairman, Welding Department
 Special engineering courses, Stanford University; industrial arts training, San Jose State College and University of California.
 Experience: Master mechanic and welder, Utah Construction Company; Eaton and Smith, contracting engineers; utilities department of the City of Palo Alto; instructor in welding, Sacramento Junior College; Palo Alto, San Francisco, and San Jose school systems; senior welding engineer, Joshua Hendy Iron Works, Sunnyvale, California; welding inspector, Bechtel Corp., San Francisco, California.
- WILLIAMS, ROBERT E. (1957)**.....Architectural Engineering
 B.S., California State Polytechnic College, 1954.
 Experience: Assistant resident engineer, California Division of Highways; surveyor and designer, Pacific Engineers; Griffith Construction Co.
- WILLS, JAMES R. (1953)**.....Electronic Engineering
 B.S., Southwest Missouri State College, 1951.
 Experience: Instructor, Air Force Technical Schools, Scott Air Force Base, Illinois; Navy radio operator.
- WILLSON, IRWIN A. (1958)**.....Elementary Education
 B.A., University of North Dakota, 1930; M.A., University of Denver, 1940; graduate study, University of Denver, 1948-1958.
 Experience: Teacher, high schools, North and South Dakota; principal and director of elementary education, Canon City, Colorado; counselor, University of Denver; director of curriculum, Stanislaus County Schools, Modesto, California; superintendent of schools, Fall River Mills, California; assistant professor, San Diego State College; associate professor, chairman of the division of education and psychology, director of teacher education, Westmont College.
- WILSON, HAROLD O. (1936, 1946)**.....Dean, Student and College Affairs
 B.S., University of California, 1932; additional study, Fresno State College; graduate study, University of California at Los Angeles.
 Experience: Director of agriculture, Excelsior Union High School, Norwalk; instructor of agriculture and head, Swine Department at California Polytechnic; regional supervisor, agricultural education, State Department of Education, California; dean, Voorhis Unit.
- * WILSON, JOHN J. (1959)**.....Social Sciences
 B.S., Middlebury College, Vermont, 1926; M.A., Claremont Graduate School, 1959; additional graduate work, George Washington University, Washington, D.C.; United States Army Command and General Staff School, United States Air Force State School.
 Experience: Director of Procurement and Production, and Comptroller in United States Air Force.
- WINNER, C. PAUL (1940)**.....Associate Dean (Admissions and Records)
 B.S., Montana State College, 1931.
 Experience: Director of vocational agriculture and critic teacher, Montana and California high schools; teacher trainer of agriculture education.

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- * WINSLOW, DOROTHY V. (1959)..... Physical Science
B.A., University of California, Berkeley, 1957; additional graduate work at University of California, Berkeley.
Experience: Research biochemist, University of California Medical School, San Francisco.
- * WINTERBOURNE, ROBERT J. (1953)..... Voorhis Campus Manager
B.S., California State Polytechnic College, 1950; M.A., 1952.
Experience: Agricultural instructor, Shandon, Moorpark, and Ventura High Schools.
- WIRSHUP, ARTHUR D. (1952)..... Mathematics
B.S., City College of New York, 1931; M.A., Columbia University, 1936; M.S., Oregon State College, 1951; additional graduate study, Oregon State College.
Experience: Teaching fellow in mathematics, Oregon State College; instructor, Multnomah College, Portland, Oregon; radar officer, U.S. Army.
- WOLF, HARRY K. (1942)..... Electronic Engineering
A.B., Arizona State College, 1933; A.M., University of Arizona, 1941; Ed.D., University of Southern California, 1953.
Experience: Engineer for the Agricultural Adjustment Administration, high school teaching, electronics instructor for the Signal Corps, National Bureau of Standards.
- WOODS, LAMOND (1958)..... Animal Husbandry
B.S., California State Polytechnic College, 1958.
Experience: Assistant branch manager, Poultry Producers of Central California; Lake County D.H.I.A. tester; rancher, Kelseyville, California; U.S. Army, 1952-53; herdsman, Hensley Hampshire Hog Ranch, Sanger, California.
- WOODWORTH, JOHN A. (1949)..... Mathematics
A.B. Hastings College, 1939; M.S., University of Southern California, 1948; additional graduate work, University of California, Berkeley.
Experience: Teacher-principal, Nebraska schools; instructor, Baldwin Park, Salinas, Santa Ana Army Air Base; physicist, University of California Radiation Laboratory; principal, Hopland Union High School.
- WORK, LLOYD J. (1958)..... Physics
B.S., California State Polytechnic College, 1954; graduate work, California State Polytechnic College.
Experience: Metallurgical and ore dressing research, mill superintendent, International Metallurgical Chrome Corporation, San Luis Obispo; manager, Castro Mining Company, San Luis Obispo; U.S. Navy.
- WRAITH, WEBB SAXON (1957)..... Registrar
B.S., University of Santa Clara, 1951; M.A., California State Polytechnic College, 1957.
Experience: Officer, U.S. Army; instructor in mathematics, California State Polytechnic College.
- WRIGHT, DOROTHY S. (1946)..... Library
A.B., Occidental College, 1926; library certificate, University of California, 1939.
Experience: Pasadena Public Library; Long Beach School Libraries; Occidental College Library.
- YEATON, ROBERT K. (1958)..... English
B.A., University of California, 1937; graduate study, Los Angeles State College, University of Southern California, Yale, Vienna; Ph.D., Innsbruck, 1950; visiting scholar: Columbia, Teachers College, University of Chicago.
Experience: Rural rehabilitation supervisor, U.S. Department of Agriculture; chief, refugee welfare division, United Nations Relief and Rehabilitation Administration; Greek Mission; field supervisor, International Refugee Organization, American Zone, Austria; foreign student adviser and teacher, Pasadena City College; consultant in community and resources development, Jicarilla Apache Tribe; fellow, Fund for Adult Education.

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YEWDALL, WALTER, JR., 1st Lt., USAR (1959)..... Military Science and Tactics
B.S., University of California at Berkeley, 1955; Graduate Ordnance Officers
Course, Aberdeen Proving Grounds, Maryland.

Experience: Company Officer, Company Commander, Ordnance Company, Ger-
many; Instructor, Military Assistance Advisory Group, Rome, Italy.

YOUNG, CHESTER G. (1954)..... Building Program Specialist
A.B., San Diego State College, 1936; M.S., Stanford University, 1954; additional
graduate study, University of California and San Jose State College.

Experience: Teacher and vice principal, Lemoore Elementary Schools; U.S.
Navy; assistant professor, acting chairman, Mathematics Department, University
of Santa Clara; instructor, mathematics, California State Polytechnic College.

YOUNG, FRANK E. (1956)..... Chemistry
A.B., Colorado College, 1936; M.S., 1938; Ph.D., University of California, Berke-
ley, 1941; additional graduate study, Washington University, St. Louis, Missouri.

Experience: Research chemist, Standard Oil Company of California; instructor
and acting head of chemistry department, College of Puget Sound, Tacoma; phys-
ical chemist, U.S. Bureau of Mines, U.S. Department of Agriculture.

ZOLLARS, ALLEN M. (1959)..... Aeronautical Engineering
B.S., U.S. Naval Academy, 1927; M.S., Massachusetts Institute of Technology,
1933.

Experience: Captain, U.S. Navy; Executive Vice President, Bay City Shovels;
Director of Customer Relations, Chromalloy Corporation.

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