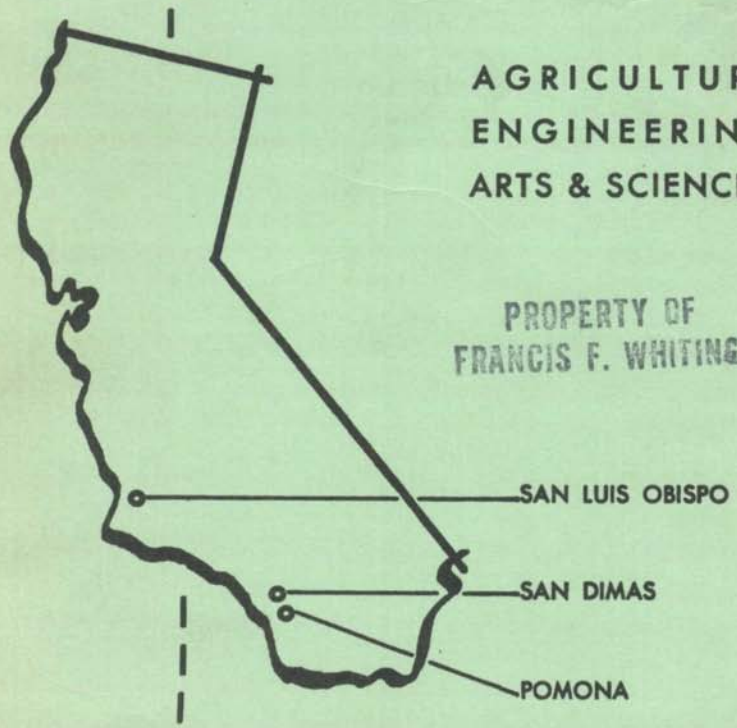
1958-59 CATALOG

CALIFORNIA STATE POLYTECHNIC COLLEGE

Bulletin



AGRICULTURE
ENGINEERING
ARTS & SCIENCES

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FRANCIS F. WHITING

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 53, and at Kellogg-Voorhis, page 208.

Engineering, at San Luis Obispo, page 95, and at Kellogg-Voorhis, page 239.

Arts and Sciences, at San Luis Obispo, page 137, and at Kellogg-Voorhis, (including business), page 258.

Does the college offer nondegree occupational curricula? Page 54.

Can I meet the requirements for admission? Page 29.

May a student transfer from another college? Page 30.

What fees are charged? Page 32. At Kellogg-Voorhis Campus, page 207.

Where can I obtain board and room? Pages 14, 15, At Kellogg-Voorhis Campus, pages 203, 207.

What scholarships are available to freshmen? Pages 22-24 and page 206.

Does the college have an ROTC unit? Page 21.

What services does the college maintain for students?

Counseling and testing, page 21.

Advising, page 22.

Health, page 22.

Assistance in finding part-time employment, pages 22, 204.

Loan funds, at San Luis Obispo, page 27, at Kellogg-Voorhis, page 204.

Placement at graduation, page 22.

CALIFORNIA STATE POLYTECHNIC COLLEGE BULLETIN

SAN LUIS OBISPO CAMPUS

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KELLOGG-VOORHIS CAMPUS
POMONA-SAN DIMAS

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CATALOG ISSUE
1958-1959

SERIES 38, No. 3 JULY, 1958 PUBLISHED QUARTERLY

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CALIFORNIA STATE POLYTECHNIC COLLEGE

ACADEMIC CALENDAR—1958-59

(All Dates Inclusive)

SUMMER QUARTER, 1958 (San Luis Obispo Only)

Four-week Term

June 19	Thursday	Guidance testing of new students
June 23	Monday, 8 a.m.	Registration and scheduling of all students
June 24	Tuesday	Classes begin for all students
June 27	Friday	Last day to return registration books Last day to add or drop courses without penalty Last day to enroll for four-week term
July 4	Friday	Independence Day—academic holiday
July 17-18	Thursday-Friday	Final examinations

Six-week Term

July 17	Thursday	Guidance testing of new students
July 21	Monday, 8 a.m.	Registration and scheduling of all students
July 22	Tuesday	Classes begin for all students
July 25	Friday	Last day to add or drop courses without penalty Last day to return registration books Last day to enroll for six-week term
August 28-29	Thursday-Friday	Final examinations

FALL QUARTER

September 15	Monday	Beginning of academic year (faculty only)
September 16	Tuesday	Guidance testing of new students *
September 19	Friday	Arrival date for new students previously tested
September 20	Saturday	Registration and scheduling of new students
September 22	Monday	Registration and scheduling of old students
September 23	Tuesday	Classes begin for all students
September 30	Tuesday	Last day to enroll for fall quarter Last day to return registration books Last day to add courses
October 13	Monday	Last day classes may be dropped without penalty
October 27-November 1		Midterm examinations
November 11	Tuesday	Veterans' Day—academic holiday
November 26 (noon)-November 29		Thanksgiving—academic holiday
December 6	Saturday	Prescheduling for winter quarter
December 8-12	Monday-Friday	Final examinations
December 12	Friday	End of fall quarter
December 15-January 1		Christmas—academic holiday

* Guidance tests for new students are given during the spring and summer on May 16, August 1, and August 22. Also tests may be taken at regular quarter registration periods on March 20, June 19, and July 17.

ACADEMIC CALENDAR—1958-59—Continued

WINTER QUARTER

January 2	Friday	Guidance testing of new students
January 5	Monday, 8 a.m.	Registration and scheduling of old students
	1 p.m.	Registration and scheduling of new students
January 6	Tuesday	Classes begin for all students
January 13	Tuesday	Last day to enroll for winter quarter Last day to return registration books Last day to add courses
January 26	Monday	Last day classes may be dropped without penalty
February 9-14		Midterm examinations
March 7	Saturday	Prescheduling for spring quarter
March 12-17	Thursday-Tuesday	Final examinations
March 17	Tuesday	End of winter quarter
March 18	Wednesday	Academic holiday

SPRING QUARTER

March 19	Thursday	Guidance testing of new students
March 23	Monday	Registration and scheduling of all students
March 24	Tuesday	Classes begin for all students
March 31	Tuesday	Last day to enroll for spring quarter Last day to return registration books Last day to add courses
March 27-29	Friday, Sunday	Easter—academic holiday
April 13	Monday	Last day classes may be dropped without penalty
April 16	Thursday	Last day for acceptance of senior projects without penalty Last day to file for June commencement
April 25	Saturday	Last day to file for master's examinations
May 4-9		Midterm examinations
May 30	Saturday	Memorial Day—academic holiday
June 6-11	Saturday-Thursday	Final examinations
June 13	Saturday	End of spring quarter, commencement
June 14	Sunday	End of academic year (faculty only)

TENTATIVE SUMMER QUARTER, 1959 (San Luis Obispo Only)

Four-week Term

June 18	Thursday	Guidance testing of new students
June 22	Monday, 8 a.m.	Registration and scheduling of all students
June 23	Tuesday	Classes begin for all students
July 4	Saturday	Independence Day—academic holiday
July 16-17	Thursday-Friday	Final examinations

Six-week Term

July 16	Thursday	Guidance testing of new students
July 20	Monday, 8 a.m.	Registration and scheduling of all students
July 21	Tuesday	Classes begin for all students
August 27-28	Thursday-Friday	Final examinations

1958

JANUARY

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1959

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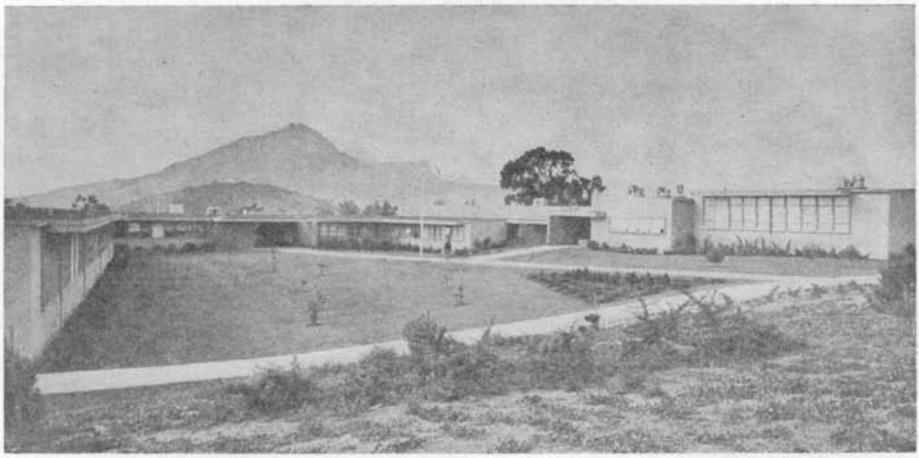
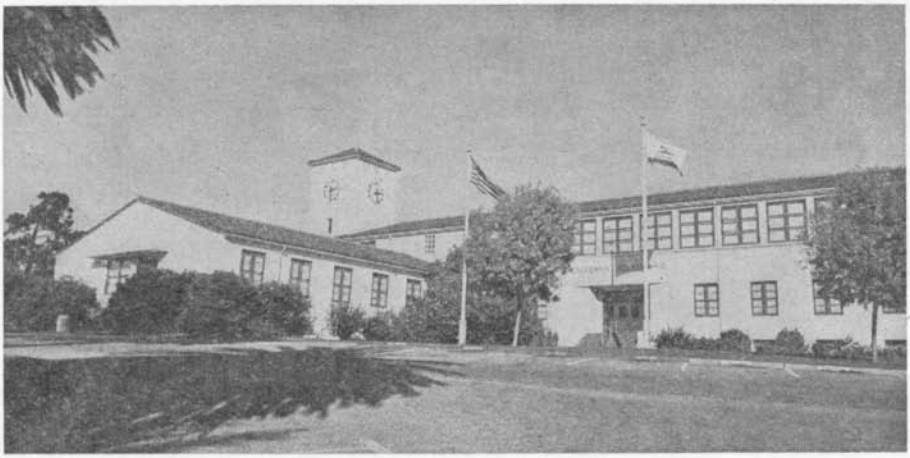
ADMINISTRATION



Science Building

Dexter Memorial Library



Administration Building

ADMINISTRATION

STATE BOARD OF EDUCATION

William L. Blair (President)	Pasadena
Wilber D. Simons (Vice President)	Redding
Byron H. Atkinson	Los Angeles
William N. Bucknam	Ceres
Raymond J. Daba	Atherton
Dr. Mabel E. Kinney	Los Angeles
Mrs. Michaela Mathiesen	Fresno
Mrs. Eva C. Noland	Salinas
Max Osslo	San Diego
William G. Werner	Alameda
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
C. O. McCorkle	Administrative Dean, Instruction
Harold O. Wilson	Administrative Dean, Student and College Affairs
George G. Clucas	Administrative Dean, Finance and Development
Clyde P. Fisher	Executive Secretary, President's Cabinet
Eugene E. Brendlin	Foundation Manager

SAN LUIS OBISPO CAMPUS

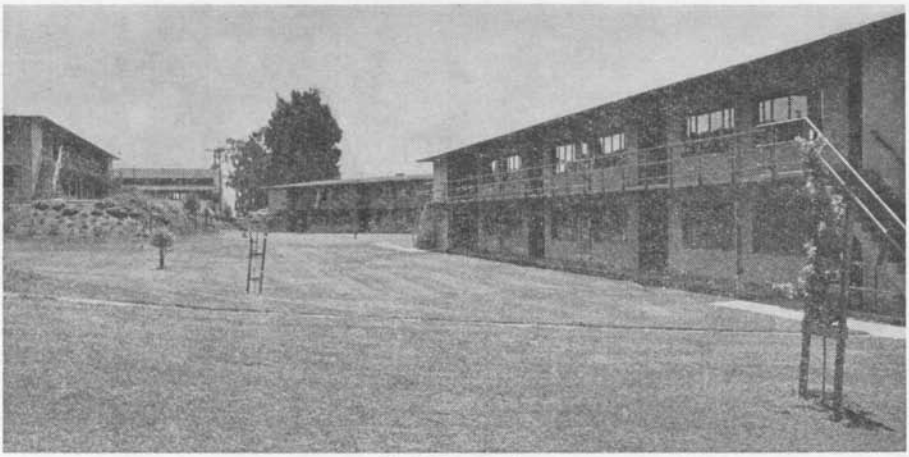
Everett M. Chandler	Dean of Students
Harry A. Grace	Associate Dean (Counseling and Testing)
Harold P. Hayes	Dean, Engineering Division
LeRoy B. Hughes	Director of Athletics
Robert E. Kennedy	Dean, Arts and Sciences Division
Thomas A. Lambre	Registrar
John D. Lawson	Associate Dean (Activities)
E. D. Lovett	College Physician
Douglass W. Miller	Director of Public Relations
Mary Etta Murray	Associate Dean (Women)
Donald S. Nelson	Business Manager
Eugene Rittenhouse	Placement Officer
Vard M. Shepard	Dean, Agricultural Division
C. Paul Winner	Associate Dean (Admissions and Records)

KELLOGG-VOORHIS CAMPUS

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)
Emmett P. Long	Registrar
Thomas H. McGrath	Dean of Students
Robert L. Maurer	Acting Head, Arts and Sciences Division
J. Claude Scheuerman	Business Manager
William C. Tesche	Assistant to the President

GENERAL INFORMATION

Women's Dormitory



Men's Dormitories

Library Patio

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.

World War II activity of the college included national defense and war production training, the food production war training program for California, and preflight naval aviation training. More than 3,600 naval aviation cadets were trained on the campus at the United States Naval Flight Preparatory School, January, 1943, to November, 1944. Another 1,100 trainees received instruction in a Naval Academic Refresher Unit operated from July, 1944, to February, 1946.

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, English, 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 under the Kellogg-Voorhis division of the catalog.

BUILDINGS AND EQUIPMENT—SAN LUIS OBISPO CAMPUS

On Campus Housing—Men

The San Luis Obispo campus has six two-story dormitory buildings, 10 single-story dormitories, a two-wing resident unit with adjoining recreational hall, and five student cottages located at the various agricultural units. A total of 1,037 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 many private homes and apartments which have been inspected and approved by the college. Well over half of Cal Poly's students live in such off-campus facilities.

On Campus Housing—Women

Chase, Jespersen, and Heron are the women's residence halls. They are well located, attractive, newly furnished, and near the dining hall. One hundred sixty-four women can be accommodated in these units. Under adult supervision the halls provide 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.

Family Housing

There are 75 one- and two-bedroom dwellings used to house families with children. Also lists of apartments, houses, and facilities suitable for married students are maintained.

Cafeterias

Two campus cafeterias, which serve three meals a day, six days a week and one meal on Sunday, accommodate 2,000 students per meal.

Health Center

The campus Health Center is equipped with examination and treatment rooms, and hospital beds for both men and women. Four full-time college physicians, four full-time nurses, and X-ray and laboratory technicians provide 24-hour medical service.

Athletic Facilities

College athletic facilities include a 10-acre athletic field, with a field house providing locker and shower facilities. The gymnasium provides ample space for handling physical education classes and minor sports. An indoor swimming pool is complete with heating, filtration, and chlorinating equipment. Close to the gymnasium is a football field with permanent grandstand and bleachers seating 5,500 persons. Six tennis courts are available for varsity and recreational use.

Administration Building

Constructed in 1942, 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.

Library

The Walter F. Dexter Memorial Library, completed in 1949, 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.

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.

Science and Classroom Building

Twelve general-purpose classrooms and 27 fully equipped laboratories are shared by the Agriculture and Arts and Sciences Divisions. The laboratories provide facilities for instruction in soil science, veterinary science, botany, zoology, bacteriology, chemistry, and physics.

Classroom Buildings

Other major buildings in the central campus area are devoted primarily to classroom and laboratory use.

AGRICULTURAL INSTRUCTION BUILDINGS AND FACILITIES

Well distributed over the campus and farm are the major structures devoted to agricultural instruction. These include the following:

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.

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 20 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.

ENGINEERING INSTRUCTION BUILDINGS AND FACILITIES

The major buildings utilized for engineering laboratories and shops are concentrated in the central campus area. These include the following:

Aeronautical Engineering Buildings

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

Architectural Engineering Buildings

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

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.

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.

Industrial Engineering Department

Laboratories, shops, and offices are housed in an entire wing of the Air Conditioning and Refrigeration Building.

Machine and Welding Shops

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

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.

Printing Laboratories and Shops

A basement wing of the Administration Building and the entire basement of the Agricultural Education Building house the Printing Department; laboratories and facilities divided into composing room, pressroom, stereotyping room, and bindery.

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 operates under a lease agreement made through the State Departments of Education and Finance. The provisions of this lease 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 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, castration equipment, stock horses, etc., is available.

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

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 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 Horticulture 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.

STUDENT ORGANIZATIONS AND ACTIVITIES (SAN LUIS OBISPO)

The college provides an integrated program of classroom and laboratory instruction, gainful employment, and extracurricular 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. There is also a council of the various clubs and campus organizations. 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 Health and 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. Medals 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 once 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; a Poly Royal pictorial; and the Freshman Handbook.

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 on the San Luis Obispo campus cover all departments and activities, and the opportunity exists for every student to take an active part in club life. The presidents of the various social clubs and societies form an interclub council which has direct representation in student government. There are approximately 20 departmental clubs and about 28 social clubs and societies. These numbers do not include dormitory clubs for students residing in dormitories, which number 12.

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 Territory of Hawaii.

Region at Large, comprising the 47 other states, Alaska, 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 *Green and Gold*. This is one of the official publications 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

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 quarters 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.

IN-SERVICE TRAINING IN AGRICULTURE

The college plays an active role in the in-service training of teachers of vocational agriculture by providing instructional staff and facilities for workshops and training programs cooperatively 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 and workshop programs and conferences such as: Physical Education Workshop, School Lunch Program, Driver Education Workshop, California Nurserymen's Refresher Short Course, California Implement Dealers Short Course, California Beekeepers Association, California Hereford Breeders Association, Livestock Judging Conference, Soil Conservation Service Special Courses, and "College of Fairs."

RESERVE OFFICERS TRAINING CORPS

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 172.

STUDENT PERSONNEL SERVICES

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 staff of two counselors is provided. A well-equipped test center, under the direction of the Test Officer, is available to assist the students and counselors.

Advising

Each freshman 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

A regular student pays a $3 fee per quarter for medical service. The medical service is 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 three 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 business men 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

FRESHMAN SCHOLARSHIPS

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 applicant for these scholarships must be approved by the high school principal and one other instructor.

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.

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.

Earth Equipment Corporation Scholarship

The Earth Equipment Corporation makes available one $500 scholarship for a high school graduate who enrolls as 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.

Knudsen Creamery Company of California Scholarship

The Knudsen Creamery Company 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.

The Overland Scholarship in Agricultural Journalism

Awarded by the end of the first quarter of the regular school year, the Overland scholarship is an outright grant of $250 to an agricultural journalism major chosen from among applicants possessing a past school and/or work record indicating success in the agricultural journalism field and who exhibits proved need for the scholarship to remain in school or to complete special training of particular use to an agricultural journalist. The scholarship was established by Mr. Ben Overland, Hanford rancher, as a step toward developing "trained voices" equipped to interpret more adequately the farm to the city and the city to the farm.

Sandercock Scholarship

One $2,000 scholarship is awarded by Mr. Warren W. Sandercock of San Luis Obispo. The award is paid at the rate of $500 per year for a four-year period with only one award in effect during the period. Eligible students must be residents of either Kern County or San Luis Obispo County. The Sandercock award is based on need for financial assistance, demonstrated ability to profit from college instruction, and leadership and general interest in school or civic activities.

Sears, Roebuck and Company Statewide Scholarship Awards

Sears, Roebuck and Company offers a total of 14 scholarships to California State Polytechnic College in two different groups; 13 of these are "statewide scholarships," the other a "sophomore scholarship" award.

Deeply cognizant of the necessity of developing trained agricultural leadership in the Nation, and recognizing the splendid results in this field now being accomplished by the college, Sears, Roebuck and Company wishes to broaden the availability of such training by offering scholarships to needy California farm boys of good character and capabilities who might otherwise be unable to enter college.

In carrying out this policy, Sears, Roebuck and Company has granted to California State Polytechnic College 13 scholarships of $200 each to be awarded to first-year students who enroll in agriculture or agricultural journalism for each school year.

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 May 1st.

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. The first scholarship is to be awarded to a freshman student in the spring of 1957; in the spring of 1958 to a freshman and a sophomore; in the spring of 1959 to a freshman, sophomore and junior; and in the spring of 1960 and each year thereafter to a freshman, sophomore, junior, and senior.

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 Scholarship

Approximately 40 Wrasse scholarships in the amount of $500 each are available annually to freshmen and advanced students enrolled at either campus. 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 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 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

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 Fertilizer Association Scholarships

Two $100 scholarship awards are made available at the San Luis Obispo campus and two $100 scholarship awards are made available at the Kellogg-Voorhis campus. One award at each campus is given to an outstanding student of junior or senior standing who is majoring in crops production. The second award at each

campus is given to an outstanding student of junior or senior standing who is majoring in soil science.

Harry Huston Scholarship in Agriculture

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

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 made to the junior student in architectural engineering, who in the opinion of the staff, has presented the best problem during the year.

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.

Philip R. Park, Incorporated, Scholarships

The Philip R. Park Company of San Pedro will award two $100 scholarships to two worthy young men who have completed two years of outstanding work at this school in animal husbandry, dairy husbandry, or poultry production.

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 and one $100 scholarship 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 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 $150 scholarship. This scholarship is awarded to a student of outstanding ability in extracurricular activities. This student must maintain a better than average record and must have at least junior standing the fall 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 $250 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.

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.

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 $200 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.

Carl Raymond Gray Scholarships

Four Carl Raymond Gray $100 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 15th. 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 Califonia 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

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.

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.

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.

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.

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, the counseling center, and his departmental adviser. 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 take guidance tests consisting of a college aptitude or ability test, a vocational interest test, and a personal inventory. Also 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. All new students in the Agriculture Division (except dairy manufacturing) take an agriculture mechanics test, and students in animal husbandry take an animal husbandry information test. Students entering the major in elementary education are given an additional test in penmanship by the Education Department. Refresher courses, which carry no college credit, are provided for students who need to "brush up" before enrolling in regular college work.

To conform to admission requirements, a student must submit an application for admission and transcripts of all previous high school and college training, including available test data. Housing, if space is available, will be arranged on the basis of information furnished with the application for admission.

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.

ADMISSION REQUIREMENTS

Admission to Undergraduate Standing

HIGH SCHOOL GRADUATES

For admission to a state 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 (seven Carnegie units) 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 (five Carnegie units) 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, if in the judgment of the appropriate college authorities, he gives promise of being able to succeed in college.

Admission to a state college shall be limited to the number of students for whom facilities and competent instructors are available to provide opportunity for an adequate college education. The Director of Education after consultation with the president of a state college shall determine the number of students for whom there are available facilities and competent instructors at the college.

ADULT SPECIAL STUDENTS

An applicant who has attained the age of 21 years and is not a high school graduate may be admitted to a state college as an adult special student provided that he demonstrates to the proper college authorities ability to profit from college work. If such a student completes with a grade point average of 2.0 (grade of C on a five-point scale) or better a program of 36 quarter units of residence work in basic courses leading to a degree, he shall not be required to remove entrance deficiencies.

ADVANCED UNDERGRADUATE STANDING—BACHELOR OF SCIENCE PROGRAM

Bachelor of science degree candidates must complete the required curriculum as stated in Section 920 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 accredited four-year colleges will be given full credit for such courses as may be applicable to the pattern of course work in the California State Polytechnic College curriculum followed.

Students Who Transfer From Accredited Degree Granting Colleges and Universities

An applicant who has earned credit in accredited degree granting colleges and universities may be admitted to a state 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 probation, if in the opinion of the proper college authorities he can succeed in college.

Students Who Transfer From Unaccredited Colleges and Universities

An applicant who has attended a nonaccredited college or university may be admitted to a state college if he meets the standards listed above for transfers from degree granting colleges and universities, but credit earned in nonaccredited colleges and universities may be counted toward graduation requirements only after he has earned 36 quarter units with at least a C average.

Students Who Transfer From Junior Colleges

An applicant who has earned credit in a junior college may be admitted to a state college if he meets the standards previously listed in this section. If the applicant was ineligible for admission to a state college on the basis of his high school record he must, as a condition to admission to a state college, 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 state college authorities for admission to the college on probation when the facts in the case seem to warrant such action.

ADVANCED UNDERGRADUATE STANDING—BACHELOR OF EDUCATION PROGRAM

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.

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. Meet requirements of personal qualifications and general training as specified in Title 5, California Administrative Code, Sections 933 and 934.
4. Have the general elementary credential as his curricular objective.

Admission to Graduate Study

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."

TRANSFER CREDIT

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

No limit is placed upon the number of transferable credits from an accredited 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. 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.

Individuals transferring from other colleges or universities will be admitted on a probationary basis at California State Polytechnic College if they have been on probation at the college or university last attended.

FEES AND EXPENSES

STATE FEES AND DEPOSITS

Materials and service fee (quarter)	
Each student enrolled for less than 4 units	$6.00
Each student enrolled from 4 to not over 6 units	10.00
Each student enrolled for over 6 units	13.00
Each student enrolled in summer quarter	13.00
Nonresident tuition:	
Each nonresident student enrolled for 15 units or more (per quarter)	60.00
Each nonresident student enrolled for less than 15 units (per quarter per unit)	4.00
Breakage deposit (year)	10.00
(Refundable to student when he leaves college less any charges against him)	
Late registration fee	2.00
Late return of registration cards fee	2.00
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	2.00
Credential fee (for each credential)	4.00

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 (all degrees)	10.00
(Must be paid at time application for graduation is submitted)	

NOTE: Fees for the summer quarter are the same as fees 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 (subject to change) ..... $175.00-$180.00

NOTE 1: Room and board must be paid quarterly in advance.

NOTE 2: Students are required to furnish bed linen and blankets.

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 pay from $265 to $315, 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.†

Breakage deposit (per year)	$10.00
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)	13.00
Room and board (18 meals per week)	180.00
Books and supplies (estimated)	50.00 *
Weekend meals (estimated $15 per month)	45.00
Laundry (estimated $10 per month)	30.00
	$339.00

* 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.

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.

GENERAL REGULATIONS

MATRICULATION

Matriculation refers to the complete process of being admitted to the college as a candidate for a degree or credential and requires that the student present a completed application for admission and transcripts of his previous academic training including transcripts from high school and each college attended.

Each regular student (one who is registered for 7 units or more) must complete the matriculation process. Limited students (those registered for 6 units or less) may if they wish complete the matriculation process. Matriculated students may, during a given quarter (summer quarter excepted), register as limited students by payment of the proper limited student fees.

Each student, matriculated or nonmatriculated, must complete Form SC-50, Statement of Residence, in advance so that the student's residence status can be determined prior to the date registration fees will be paid.

REGISTRATION PROCEDURE

A "Permit to Register" is prepared by the Registrar's Office for each student who has been accepted to register as a regular student. Regular students are required to register as majors in a specific department of the college even though they may not intend to meet curriculum requirements.

Registration dates are clearly shown in the college calendar which is placed in the front of this catalog. "Incoming (new) students" are those students who have not completed the series of placement tests required by the college. Unless there is good reason to register late, students should register for each quarter on the date shown in the college calendar.

Each student should obtain a copy of the quarter class schedule before attempting to register. Instructions for registration will be provided for each student. These instructions if read carefully by the student will prevent many problems that might otherwise arise in the registration procedure.

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

Students take the following steps in completing registration, making certain that the program followed each quarter meets the requirements listed for the major curriculum chosen:

1. Obtain set of registration instructions.
2. Obtain quarter class schedule.
3. Clear through registration line:
   a. Receive Permit to Register.
   b. Pay registration fee.
   c. Pay medical fee, post office box fee.
   d. Purchase activity card.
   e. Complete guidance tests. (Incoming students only, Counseling Center)
   f. Complete health examination. (Medical Center)
   g. Report to departmental adviser to plan program and complete registration forms.
   h. Submit completed registration forms to the Recorder's Office on dates shown in registration instructions.

The registration procedure for limited students is available from the Registrar's Office.

CHANGE OF CURRICULUM

Students who find that they are in a curriculum which does not provide the kind of training for which they have the greatest aptitude are encouraged to transfer to another curriculum as soon as the condition becomes apparent. Students must contact 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 academic 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.

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 Recorder's Office.

CHANGE OF STUDY LIST

A period of eight calendar days, starting with the first day that classes are held each quarter, will be allowed for making necessary program changes. Students who desire to change their programs after they have returned their registration books, must complete a "Change of Program Permit" form obtained at the Recorder's Office.

After the eight-day period, courses may be added by completing a "Petition to Add a Course" which requires the approval of the dean of the division in which the course is offered, and is subject to acceptance by the instructor involved. Physical education and music activities courses may be added, however, and changes of program involving refresher courses in English, mathematics, and chemistry may be made after the eight-day period through the Recorder's Office by completing a "Change of Program Permit."

A period of 21 calendar days is allowed to withdraw from courses without penalty. Students who desire to withdraw from a course may do so by obtaining a "Permit to Withdraw From a Course" from the Recorder's Office. This permit must be properly filled out by the student and signed by the instructor. Before signing, the instructor will indicate 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.

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.

Students who withdraw from college prior to the end of the quarter shall 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.

Public Law 16 veterans must contact their Veterans Administration Training Officer before making any changes in their program.

CLASS ATTENDANCE

Students are expected to be regular in attendance in order to keep the quantity and quality 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 or quarter grade point averages.

A student who is disqualified will be so notified.

A student who is disqualified will not be readmitted 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
W—Withdrew from course without failure
NR—No report received from instructor

Grade points are assigned to the various grades 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 by 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 class work, but final examination not taken.
2. Passing in class work completed and in final examination, but some assigned work not completed.

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

A student may repeat a course 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 Recorder's Office at the end of the quarter; otherwise, grades will be sent to students through their campus mail boxes.

MAXIMUM AND MINIMUM LOAD

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 less than 7 units 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 346 must enroll for a minimum of 12 quarter units to receive full subsistence pay. Veterans enrolled under Public Law 16 must enroll for a minimum of 16 units and cannot change their courses or major unless permission is received from their Veterans Administration Training Officer.

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 (B average) for the school year. 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 Recorder'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 to obtain credit by examination in subject matter fields in which he is especially qualified through previous training or experience. 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 knowledges and skills as those students who successfully complete the course are required to possess. 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 either the bachelor of science or the master of arts degree.

Detailed instructions for applying for credit by examination may be obtained from the Recorder'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.
3. In allowing for credit for in-service 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

Eligibility matters are under the jurisdiction of a faculty committee. In general, 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 or 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

All women students not living at home 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
100-199—Freshman courses
200-299—Sophomore courses
300-399—Junior courses
400-499—Senior 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.

SYMBOLS

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

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

DEGREES AND CREDENTIALS

Curricula are offered at California State Polytechnic College leading to graduation with the two-year technical certificate or the degrees of bachelor of science, bachelor of education, or master of arts.

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, 316, 411, 412; 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, 204, 208; Chem 206, 321, 322, 323, 324, 325, 326
3-12 units of Life Science from Bact 221; Bio 101, 102, 103, 104, 110, 127, 128, 129, 230; Bot 121, 122; Zoo 131, 132, 238

Literature, Philosophy, or the Arts (9 units)

9 units from Literature, Philosophy, and Fine or Practical Arts: Eng 106. At least 3 units from Eng 211, 212, 213, 311, 312, 313; Phil 201. Not more than 3 units from AE 121, 122; AC 121, 129; MS 141, 142, 144, 151, 152; Weld 151, 152; Arch 244, 245; ME 121; 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 102, 103, 108, 109, 111, 112, 117, 121, 122; Sp 201; Eng 301; Ec 301; Actg 121; Psy 202; Art (6 units); Arch 141; Music (6 units); Senior Project

BACHELOR OF EDUCATION

Graduation requirements for the bachelor of education degree are listed later in this section with the requirements for the General Elementary Credential.

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 concentrations 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. English
5. Mathematics
6. Physical education
7. Physical sciences
8. 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 Coordinator 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

An undergraduate student at the San Luis Obispo Campus of the California State Polytechnic College may apply for graduate standing if he is within 12 units of graduation and if his cumulative grade point average is 2.0 or better. This will permit him to take for graduate credit courses which meet graduate criteria and are not used to meet requirements for his Bachelor of Science degree. Graduate credit will not be given for any courses taken prior to admission to graduate standing.

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 after the date of establishing graduate standing. At least 15 of these units must be in 500 series (graduate) courses.
   b. A total 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 teaching before completing the work for the master's degree.
7. Following successful completion of the comprehensive examinations the candidate must make application for graduation in the Recorder's Office. This must be done prior to the last date for filing such applications, as shown in the college calendar.

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, English, Life Sciences and General Science, Mathematics, Physical Education, Physical Science and General Science, Social Science
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 the college aptitude test.
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 Department of Education 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 cadet teachers that continuing evaluations will be made of their performance.

The fifth-year training 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 training 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

Trainees for this credential proceed through the same selection process as for other teacher candidates. Student teaching consists of assignment to a selected local training 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: Major, 60 units; 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.

* 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 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 a four-year college course leading to the bachelor of science degreee, including a minimum of 44 units in education as follows:

1. Principles of Elementary Education	3
2. Educational Psychology	3
3. Child Growth and Development	3
4. Elementary School Curriculum Construction	3
5. Elementary School Methods	18
6. Elementary School Directed Teaching	12

IV. 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 36 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	12

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:

	Quarter units
1. Principles of Secondary Education	3
2. Educational Psychology	3
3. Adolescent Psychology (or Child 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."

* Students who have had five units of Educational Psychology may omit this requirement.

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, English, 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 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 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:

	Quarter units
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.

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-one quarter units of professional work in education, including:

	Quarter units
1. Principles of Secondary Education	3
2. Educational Psychology	3
3. Adolescent Psychology (or Child 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.

* 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.

† Students who have had five units of Educational Psychology may omit this requirement.

‡ 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.

III. A four-year college course with a bachelor's degree in agriculture including:

	Minimum quarter units
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.

V. One year of graduate work including:

	Minimum quarter units
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

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. Horticultural 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:

	Quarter units
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	

* 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.

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

PLACEMENT OF TEACHERS

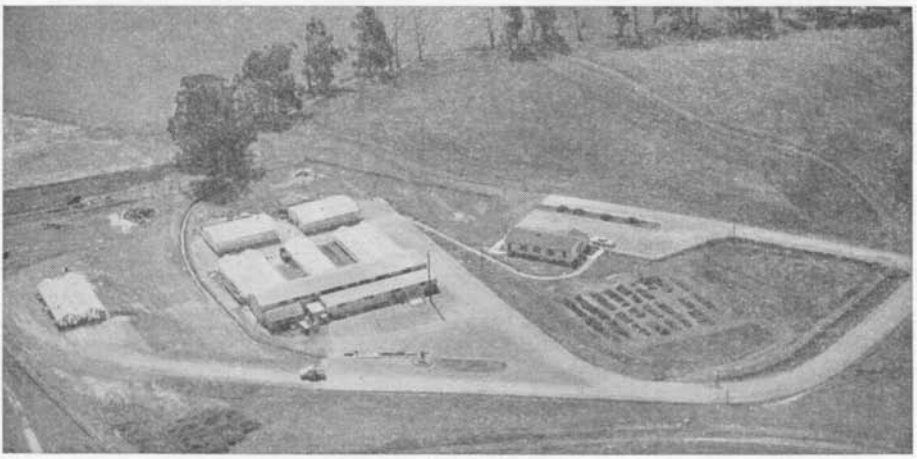
Every candidate for a credential must register with the Placement Office before or during the last quarter prior to completion of the credential requirements, but no later than March 1st. Registration includes the preparation of personal data, the submission of photos, and the listing of references for 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

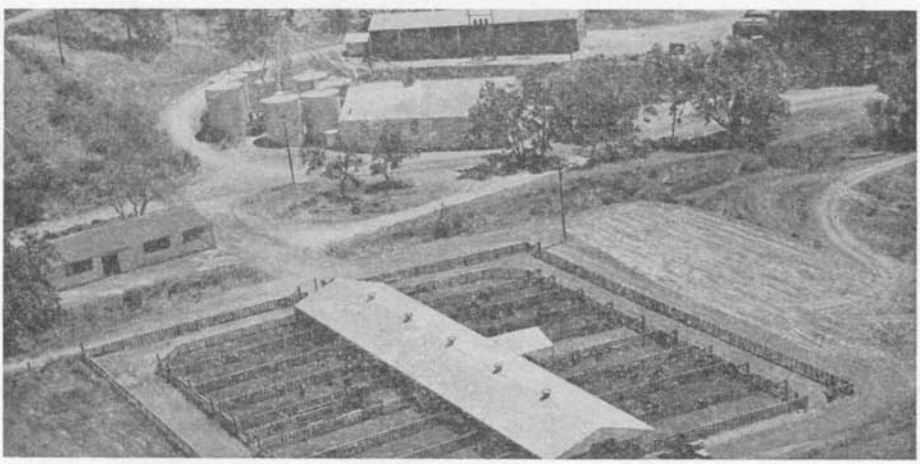
Since student teaching for the General Elementary Credential is normally assigned in the junior year, these candidates should follow the placement procedure outlined above no later than the third week of the winter quarter of the senior year.

THE AGRICULTURAL DIVISION

Agricultural Engineering Unit



Ornamental Horticulture Unit



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.

All 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 over-all 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 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 Engineering, Mechanized Agriculture, Animal Husbandry, Field Crops Production, Truck Crops Production, Fruit Production, Dairy Husbandry, Dairy Manufacturing, Farm Management, Ornamental Horticulture, Poultry Husbandry, and Soil Science. 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 college-wide 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 Engineering, Animal Husbandry, Dairy Husbandry and Manufacturing, Farm Management, Field, Fruit, and Truck Crops, 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.

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. With the exception of Mechanized Agriculture, 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	2	
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	4	6
	16½	16½	16½
Sophomore			
Sheep Husbandry (AH 221)	4		
Commercial Beef Production (AH 222)		4	
Market Swine (AH 223)			4
Farm Machinery (AE 221, 223)		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 being 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 towards 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 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		Thomas E. Wales

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	
Agricultural Surveying I (AE 131)			2
Farm Tractors (AE 241)	2		
Engineering Drafting (ME 121, 122, 123)	2	2	2
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, 118)		5	5
Language Communication (Eng 104, 105, 106)	3	3	3
Health Education (PE 107)	2		
Physical Education (PE 141, 142, 143)	½	½	½
	16½	18½	18½
Sophomore			
Agricultural Surveying II (AE 132)		2	
Farm Machinery (AE 221, 223)	3		2
Rural Electrification (AE 224, 225)		2	2
Farm Structures (AE 231)	2		
Principles of Irrigation (AE 236)			4
Public Speaking (Sp 201)		2	
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
* Electives	2		3
	17½	16½	18½

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

Junior	F	W	S
Hydraulics (AE 312)		3	
Advanced Farm Machinery (AE 321) or Hydrology (AE 315)	3		
Agricultural Surveying III (AE 331)	2		
Farm Power (AE 334, 335, 336)	2	2	3
Soil Conservation (SS 202)		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		
†Economics Elective			3
Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
* Electives			4
	17	18	17
Senior			
Senior Project (AE 461, 462)	2	2	
Undergraduate Seminar (AE 463)			2
Farm Structures (AE 433)	3		
Equipment Engineering (AE 421) or Irrigation Engineering (AE 414)		3	
Agriculture Machine Design (AE 422) or Conservation Engineering (AE 437)			3
Principles of Accounting (Ec 301, 302)	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
* Electives	3	7	6
	17	18	17

CURRICULUM IN MECHANIZED AGRICULTURE

Freshman			
Introduction to Agricultural Engineering (AE 100)	1		
Agricultural Mechanics (AE 128)		2	
Farm Construction and Maintenance (AE 129)			2
Agricultural Surveying I (AE 131)			2
Farm Tractors (AE 241)	2		
Agricultural Mathematics (Math 102, 103)		3	3
Language Communication (Eng 104, 105, 106)	3	3	3
Engineering Drafting (ME 121, 122)	2	2	
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)	½	½	½
	16½	16½	16½

† To be selected from Ec 306, 316, 411, 412 or FM 310, 322.
* 12 units of electives shall be selected from courses in the Agricultural Division.

Sophomore	F	W	S
Agricultural Surveying II (AE 132)		2	
Farm Machinery (AE 221, 223)	3		2
Farm Engines (AE 220)	3		
Rural Electrification (AE 224, 225)		2	2
Farm Structures (AE 231, 232)	2		2
Irrigation (AE 240)			4
Public Speaking (Sp 201)		2	
Principles of Economics (Ec 201, 202)	3	3	
Welding (Weld 151, 152, 254)	1	1	1
General Botany (Bot 121)		4	
Agricultural Mathematics (Math 114, 115)	3	3	
Sports Education (PE 241, 242, 243)	½	½	½
* Electives			5
	15½	17½	16½
Junior			
Farm Equipment Projects (AE 244)	3		
Farm Power (AE 335)		2	
Parts and Inventory Control (AE 322)		2	
Report Writing (Eng 301)			3
Farm Records (FM 321)	3		
Farm Credit (FM 310)			3
Physics (Phys 131, 132)	4	4	
Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Soil Conservation (SS 202)		3	
* Electives	3	2	6
	17	17	16
Senior			
Senior Project (AE 461, 462)	2	2	
Undergraduate Seminar (AE 463)			2
Advanced Farm Machinery (AE 321)	3		
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 Management (FM 322)		4	
* Electives	6	7	8
	17	16	16

DESCRIPTIONS OF COURSES IN AGRICULTURAL ENGINEERING

AE 1 Preparatory Agricultural Mechanics (2)

Identification, care and fitting of common tools. Development of essential tool skills. Selection and use of tools and hardware. Sheetmetal work. Cold metal work. Wood joints. Fundamental farm shop work for students whose previous training is inadequate for AE 121. 1 lecture, 1 laboratory.

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. Prerequisite: AE 1 or passing score on placement test.

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

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. For Agricultural Engineering majors. 1 lecture, 1 laboratory. Prerequisite: AE 1 or passing score on placement test.

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 I (2)

Use and care of typical surveying instruments. Chains, levels, alidades, transits. The principles of chaining and differential leveling. 1 lecture, 1 laboratory. Prerequisite: Math 102 or 117 (concurrently).

AE 132 Agricultural Surveying II (2)

Transit surveys. Closed traverses. Centerline surveys. Plane co-ordinates. Marking grade and setting slope stakes. 1 lecture and 1 laboratory. Prerequisite: AE 131 and trigonometry.

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 224 Rural Electrification (2)

Fundamentals of wiring farm buildings and farmstead wiring layout. Materials, code regulations, electrical measurements and rates applicable to various farm uses. Basic concepts of electric circuits and units. 1 lecture, 1 laboratory. Prerequisite: Math 118 or 115 (concurrently).

AE 225 Rural Electrification (2)

Electric motors and protective devices for farm use. Identification, selection, installation, and maintenance of various types. Operating characteristics and drives. 1 lecture, 1 laboratory. Prerequisite: AE 224

AE 229 Surveying (2)

Selection, care and use of tapes, levels and transits, land measurement by tape and stadia; practice in differential, profile, and contour leveling; topographic mapping. 1 lecture, 1 field period. Prerequisites: ME 121, Math 117

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. Foundations. 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 132

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 121, 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. Prerequisites: AE 237, Math 117

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; determination of true-North line. Public lands survey and county records. 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, SS121

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 244 Farm Equipment Projects (3)
Principles, materials and construction of specialized agricultural equipment. 1 lecture, 2 laboratories. Prerequisite: AE 122 or 128

AE 312 Hydraulics (3)
Static and dynamic characteristics of liquids in open and closed channels. 3 lectures. Prerequisite: Phys 132, Math 203

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 Advanced Farm Machinery (3)
Management and operation of the farm machinery repair shop. Inspection, overhaul, and adjustment of all types of farm machinery. 1 lecture, 2 laboratories. Prerequisite: AE 221, 223

AE 322 Parts and Inventory Control (2)
Parts study and inventory controls of practical parts departments for farm equipment dealers. Administrative and operating functions of the parts department. 1 lecture, 1 laboratory.

AE 331 Agricultural Surveying III (2)
Land grading calculations. Mass diagram. Determination of desired grades for irrigation and drainage. Use and development of contour maps. 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 414 Irrigation Engineering (3)
Hydraulic characteristics of open ditches, pipes, sprinklers, and pumps. 2 lectures, 1 laboratory. Prerequisites: AE 236, 312

AE 421 Equipment Engineering (3)
Design and construction of specialized farm equipment. 1 lecture, 2 laboratories. Prerequisites: ME 123, MS 144, 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 437 Conservation Engineering (3)
The principles, practices, and application of engineering methods to soil and water conservation. 2 lectures, 1 laboratory. Prerequisites: AE 315, 331, 414, SS 202

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	LaVern Bucy	Ralph Hoover
Richard Birkett	Spelman Collins	Richard Johnson
Emmett Bloom	Frank W. Fox, Jr.	Harry B. McLachlin
Thomas P. Brannum	William Gibford	Thomas Meyer
	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	2	
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
Agricultural Project Records (FM 100)		1	
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		
Electives	3		
	16½	15½	16½

Junior	F	W	S
* Swine Husbandry (AH 321)	4		
* 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	3	3	2
	17	16	17
Senior			
Senior Project (AH 461, 462)	2	2	
Undergraduate Seminar (AH 463)			2
Animal Nutrition (AH 402)		3	
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	6	5
	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 (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 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 carred 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 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. Preparations 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 nonanimal 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 II (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 (4)

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. 3 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. 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. Prerequisites: 24 units of animal husbandry

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 (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 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.

DAIRY HUSBANDRY AND MANUFACTURING DEPARTMENT

Acting Department Head, Harmon Toone

Jack L. Albright Kenneth D. Boyle Russell Nelson
Elmer D. McGlasson

Instruction offered by the Dairy Husbandry and Manufacturing Department has two primary objectives:

1. To train students for the efficient and economical production of dairy products and the management, feeding, and breeding of dairy cattle.
2. To train students in the processing, distribution, and sale of the various dairy products.

Dairy husbandry and dairy manufacturing are closely related and many dairy enterprises combine the production, processing, and distribution phases of the industry. Although dairy majors elect to specialize either in husbandry or manufacturing, the curricula are so arranged that a student automatically receives considerable concentration in the other field. Selection of specific elective courses in the biological sciences will provide the dairy husbandry or dairy manufacturing major with the background needed to enter the field of public health sanitation.

Graduates who specialize in dairy production find employment as farmers, farm foremen, farm managers, feed salesmen, fieldmen, herdsmen, vocational agricultural teachers, and in numerous other positions related to dairy production. Graduates who major in dairy manufacturing find placement as dairy plant foremen, superintendents, salesmen, dairy inspectors, fieldmen, testers, etc.

The college dairy farm maintains an outstanding breeding herd of the Guernsey, Holstein, and Jersey breeds of approximately 175 head. It includes several national champion producing cows, leading show animals, and noted sires.

Dairy buildings, erected in 1953, for care and housing of the herd include a 24-stanchion milk barn, calf and cow shelter barns, bull pens, and an insemination laboratory. A large judging pavilion is provided for judging work. A 12-student housing unit is on the site to house the students working at the dairy. Modern equipment includes a pipeline milker unit and a bulk trailer tank. A dairy cattle farm of 400 acres provides facilities for students with dairy projects. This farm accommodates 100 head of project cattle owned and cared for by students. There are two 12-student dormitories at this project farm.

A well-equipped dairy laboratory and college creamery is operated under commercial conditions with various dairy products tested, processed, and sold. Deliveries are made to the college cafeterias and student store.

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 DAIRY HUSBANDRY

Freshman	F	W	S
Elements of Dairying (DH 121)	4		
Market Milk (DM 132)			4
Dairy Cattle Judging (DH 142)		2	
Feeds and Feeding (AH 101)	2		
Feeding Dairy Cattle (DH 102)		2	
Agricultural Mechanics (AE 121, 122)		2	2
Language Communications (Eng 104, 105, 106)	3	3	3
Agricultural Mathematics (Math 102, 103)	3		3
Project Records (FM 100)			1
Physical Education (PE 141, 142, 143)	½	½	½
General Zoology (Zoo 131, 132)		4	4
General Botany (Bot 121)	4		
Health Education (PE 107)		2	
	16½	15½	17½

Sophomore	F	W	S
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
Electives	5		6
	17	16	16
Senior			
Breeding and Selection of Dairy Cattle (DH 422)		3	
Senior Project (DH 461, 462)	2	2	
Undergraduate Seminar (DH 463)			2
Animal Nutrition (AH 402)		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
Agricultural Biochemistry (Chem 328)	4		
Family Relations (Psy 206)			3
Electives	4	5	5
	17	16	16

CURRICULUM IN DAIRY MANUFACTURING

Freshman			
Elements of Dairying (DH 121)	4		
Feeding Dairy Cattle (DH 102)		2	
Market Milk (DM 132)			4
Ice Cream Making (DM 133)		4	
Anatomy and Physiology (VS 123)			3
Feeds and Feeding (AH 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			3
	16½	17½	17½

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

Sophomore	F	W	S
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
Steam Boilers and Equipment (AC 237)	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		3	
	16½	17½	16½
Junior			
Condensed and Dry Milk (DM 331)	4		
Dairy Inspection (DM 332)		2	
Creamery Records (DM 336)			3
Literature	3		
Principles of Economics (Ec 201, 202)	3	3	
Agricultural Marketing (FM 304)			3
Accounting (Ec 301, 302)	3	3	
American Government (Pol Sc 301)		3	
Growth of American Democracy (Hist 304)			3
Agricultural Biochemistry (Chem 328)	4		
Electives		5	7
	17	16	16
Senior			
Creamery Management (DM 433)	4		
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 (Ec 411)	3		
Industrial Relations (Ec 412)		3	
U. S. in World Affairs (Hist 305)		3	
Electives	4	7	11
	16	15	16

DESCRIPTIONS OF COURSES IN DAIRY HUSBANDRY

DH 102 Feeding Dairy Cattle (2)

Balancing dairy cattle rations. Feeding practices and nutritional requirements. 2 lectures. Prerequisite: AH 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 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 422 Breeding and Selection of Dairy Cattle (3)

Evaluation of inherited characters in dairy cattle from an economic standpoint. Proving and selecting sires and dams. 2 lectures, 1 laboratory. 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. Offered in odd-numbered years.

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 Creamery 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. Offered in even-numbered years.

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 Daniel C. Chase

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
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	4	8
	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	
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	4
	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.

Junior	F	W	S
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
Principles of Accounting (Ec 301, 302)	3	3	
General Business Administration (Ec 306)			3
General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Descriptive Statistics (Math 211)	3		
Statistical Methods (Math 322)		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)	2	2	2
Senior Project (FM 461, 462)	2	2	
Undergraduate Seminar (FM 463)			2
Commercial Law (Ec 316)		3	
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
* Other Agricultural courses and electives	3	3	6
	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 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 laboratory. To be taken only by technical students.

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 laboratories. Prerequisite: FM 101B. To be taken only by technical students.

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 3 different trips. Prerequisite: Sophomore standing.

* 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 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: Ec 301 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 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 laboratory. Prerequisite: FM 321 or Ec 301 and 302

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 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 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 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 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 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, measuring economic effect of breed improvement. 2 lectures, 1 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. Minimum of one week will be spent in evaluation and analysis of data gathered on the trip. 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 laboratory. Prerequisite: Ec 301, 302

FM 460 Management Participation on College Farm (2)

Two areas considered: (1) Limited management and recordkeeping participation on resources presently used for production instruction. (2) Complete management participation on a small farm near the college. Where possible, students will live at farm. Total credit limited to six units. Prerequisite: Junior standing, seniors preferred.

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

Stanton Gray	Oscar Reece	John Talbott
Reynold Lonborg	Howard Rhoads	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 crop land 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	
Agricultural Surveying I (AE 131)	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
	17½	16½	17½

Sophomore	F	W	S
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
Electives	3		2
	16½	17½	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
	17	16	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
	15	16	16

CURRICULUM IN FRUIT PRODUCTION

Freshman			
Pomology (FP 131, 132)	4	4	
Nut Crops and Small Fruits (FP 133)			4
Agricultural Surveying I (AE 131)	2		
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
	17½	16½	17½

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

Sophomore	F	W	S
Viticulture (FP 231)	4		
Fruit Plant Propagation (FP 232)		4	
Orchard Management (FP 236)			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
Electives	3		2
	16½	17½	16½
Junior			
Deciduous Disease and Pest Control (FP 234)	4		
Citrus and Avocado Fruit Production (FP 332)		4	
Irrigation (AE 240)			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
Electives	2	8	4
	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

Freshman			
Commercial Truck Crops Production (TC 124)	4		
Winter Truck Crops Production (TC 125)		4	
Warm Season Truck Crops Production (TC 126)			4
Agriculture Mechanics (AE 121, 122)	2	2	
Agricultural Surveying I (AE 131)	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
	17½	16½	17½

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

Sophomore	F	W	S
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
Electives	3		2
	16½	16½	16½
Junior			
Truck Crop Marketing (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
Agriculture Biochemistry (Chem 328)		4	
Electives	5	6	8
	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.

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. 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 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 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)

Marketing, processing, and handling fruit and fruit products. Field trips to processing centers. 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 Truck Crops Marketing (4)

Marketing methods of vegetable crops, sources of information, market news service operation, transportation, storage requirements, distribution system for handling of 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.

ORNAMENTAL HORTICULTURAL 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, coldframes, 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

Freshman	F	W	S
Nursery Practice (OH 121)	4		
Ornamental Shrubs (OH 122)		4	
Floriculture (OH 123)			4
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
Elective	2		
	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 I (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
	16½	16½	16½

Junior	F	W	S
* Landscape Management (OH 337)	4		
* Advanced Plant Propagation (OH 338)		4	
* Landscape Design (OH 322)			4
Fertilizers (SS 221)		4	
Principles of Accounting (Ec 301, 302)		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
Commercial Law (Ec 316)		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 125 Flower Arrangement (4)

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

OH 220 Farm Home Planning (3)

Landscape layouts for rural homes, farm yards, and buildings. Placing of roadways, drives, walks, trees, shrubs, and lawns. For students other than ornamental 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 Design and 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, 221

OH 226 Herbaceous Landscape Plants (4)

The identification, habits of growth, and landscaping uses of ornamental annuals and herbaceous perennials commonly grown for California landscape. 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 General Nursery Practices (3)

For nonhorticulture majors. A general course in ornamental horticulture with emphasis upon nursery operations. 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 and the application of these principles in solving of landscape design problems. 2 lectures, 2 laboratories. Prerequisites: OH 122, 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 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: OH 121, 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 industry; current experimental and research findings as applied to production and marketing. 3 lectures.

POULTRY HUSBANDRY DEPARTMENT

Department Head, Richard I. Leach

Bernie Bailey Albert L. Carter

The poultry industry has developed rapidly in all its phases in California, creating an increasing demand for young men trained in the modern techniques of the industry. The function of this department is to prepare students for the various major fields of commercial poultry production, poultry allied services, and poultry marketing in California. Many graduates return to their home ranches or businesses, start their own poultry ranch or marketing organization; others find employment in egg-producing plants, turkey ranches, hatcheries, feed and supplies sales and services, or in processing plants, and in vocational 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 complete two or more commercially productive projects, which give him additional experience in the field in which he is most interested.

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

Freshman	F	W	S
Poultry Industry and Breeds (PH 121)	4		
Poultry Brooding (PH 122)		4	
Poultry Feeding (PH 123)			4
Agricultural Mechanics (AE 121, 122)		2	2
Farm Tractors (AE 241)			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
	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
Agricultural Surveying I (AE 131)	2		
Soils (SS 121)			4
Livestock Hygiene and Sanitation (VS 202)		3	
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	5	4
	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)			3
* Economics Elective		3	
U. S. in World Affairs (Hist 305)	3		
Family (Relations (Psy 206)			3
Agricultural Biochemistry (Chem 328)		4	
Electives	8	5	8
	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 Raymond V. Leighty
Lisle R. Green

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 senior year, specialize in one of two occupational areas: technical soils or soil conservation.

Facilities of the department have been expanded to provide sufficient laboratory and field house space and equipment to meet the needs of the program. 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

Freshman	F	W	S
Soils (SS 121)	4		
Soil Management (SS 122)		4	
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			5
	15½	16½	16½
Sophomore			
Fertilizers (SS 221)	4		
Soil Conservation (SS 202)		3	
Range Management (SS 223)			4
General Fruit Production (FP 230)		4	
Agricultural Surveying I (AE 131)		2	
Farm Tractors (AE 241)			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
	17½	16½	16½

Junior	F	W	S
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		
General Dairy Husbandry (DH 230)			4
* Optional Courses			3
	17	17	17
Senior			
Farm Management I (FM 322)	4		
Agricultural Resources (FM 305)		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		
* Optional Courses	6	3	
Electives		3	6
	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 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

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

* Students electing to specialize in Soil Conservation must select 12 units from the following courses: AE 132, 437, AH 101, 102, 402, Bot 343, Bio 433, OH 220, PH 230, and CP 221, 321.

Students electing to specialize in Technical Soils must select 12 units from the following courses: Zoo 131, Bio 225, Bot 322, Phys 131, PSc 209, Chem 331, 332, 432, Math 201, and Eng 301.

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

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. Prerequisite: SS 122

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 321, Chem 325

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. 2 lectures, 2 laboratories. Prerequisites: Bact 221, SS 121

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 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 332

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 trial plot areas 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

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 proper prerequisites.

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

DESCRIPTIONS OF COURSES IN VETERINARY SCIENCE

VS 100 Principles of Livestock Hygiene and Sanitation (5)

Functional physiology, livestock disease control, and internal and external parasites causing economic loss in livestock. 4 lectures, 1 laboratory. To be taken by technical students only, in substitution for VS 123, 202, and 203

VS 123 Anatomy and Physiology (3)

Anatomy and the related physiological functions of 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. 3 lectures. Prerequisite: Bact 221

VS 203 Animal Parasitology (2)

External and internal parasites causing economic loss in livestock. Life cycles and control of parasites. 2 lectures. Prerequisites: Zoo 131, 132

VS 231 Poultry Anatomy and Physiology (3)

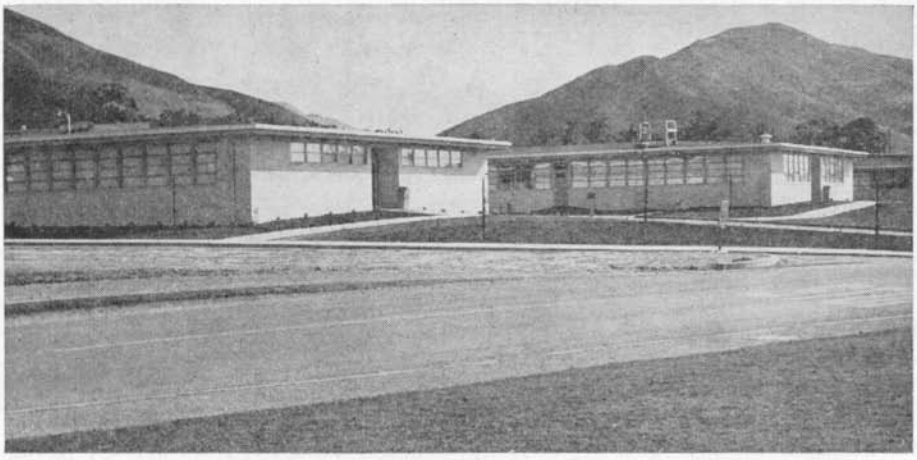
Introduction to the anatomy and related physiological functions of domestic poultry. Methods of poultry autopsy. 2 lectures, 1 laboratory. Prerequisite: Zoo 131 or Bio 100

VS 303 Poultry Hygiene and Diseases (3)

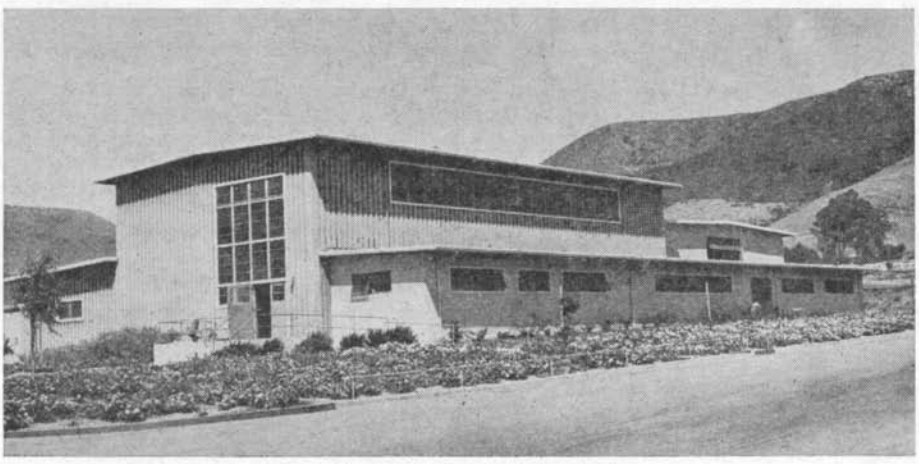
Flock health problems encountered by the poultryman. Methods of poultry parasite and disease control. 3 lectures. Prerequisite: VS 231

THE ENGINEERING DIVISION

Air Conditioning Building



Engineering Building



Mechanical Engineering Laboratory

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 in 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.

Area	*Freshman*	*Sophomore*	*Junior*	*Senior*
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

William A. Coleal
Lester W. Gustafson
Roy F. Metz
Leo F. Philbin
Clifford J. Price
George A. Rathert
Don W. Smith
William J. Werback

The four-year curriculum in aeronautical engineering is offered to prepare students in the basic principles and skills required in the design, manufacture, maintenance, and testing of aircraft, missiles, 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.

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 knowledge.

CURRICULUM IN AERONAUTICAL ENGINEERING

Freshman	F	W	S
Aircraft Power Plants (Aero 121)	4		
Airframe Construction (Aero 122)		4	
Aircraft Control Systems (Aero 123)			4
History of Aviation (Aero 108)	1		
Machine Shop (MS 141, 142, 144)	1	1	1
Welding (Weld 151, 152, 153)	1	1	1
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			3
Engineering Drafting (ME 121, 122, 123)	2	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
	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
Calculus (Math 202, 203)	3	3	
General Physics (Phys 133)	4		
Descriptive Geometry (ME 125)			3
Engineering Statics (Phys 201)	3		
Engineering Dynamics (Phys 202)		3	
Sports Education (PE 241, 242, 243)	½	½	½
Electives		2	2
	17½	18½	18½

Junior	F	W	S
Elementary Aerodynamics (Aero 301, 302)	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 (PolSc 301)			3
Principles of Economics (Ec 201)			3
Public Speaking (Sp 201)			2
Family Relations (Psy 206)			3
Electives	4		
	17	17	17
Senior			
Aircraft Design Layout (Aero 444, 445, 446)	3	3	3
Aerodynamics (Aero 404, 405)	3	3	
Aircraft Propulsion Systems (Aero 421, 402)	4	3	
Aeronautical Electives		3	3
Senior Project (Aero 461, 462)	2	2	
Undergraduate Seminar (Aero 463)			2
Industrial Management (Ec 411)	3		
U. S. in World Affairs (Hist 304)	3		
Growth of American Democracy (Hist 305)		3	
Literature			3
Electives			6
	18	17	17

DESCRIPTIONS OF COURSES IN AERONAUTICAL ENGINEERING

Aero 108 History of Aviation (1)

History of mechanical flight, historical flights, and personalities. Development of the science of aviation to its present state. 1 lecture.

Aero 121 Aircraft Power Plant Fundamentals (4)

Theory of operation and fundamental principles of the aircraft power plant and its parts. Nomenclature, types, functions and design features. Familiarization with laboratory equipment, tools, procedures and techniques. 2 lectures, 2 laboratories.

Aero 122 Airframe Construction Fundamentals (4)

Tools, techniques, and procedures used in the manufacture and maintenance of aircraft structures. Practice in sheet metal forming and riveting and other manufacturing operations. Basic theory of flight. 2 lectures, 2 laboratories.

Aero 123 Aircraft Control Systems (4)

Fundamental principles of aircraft control systems; electrical accessories; hydraulic circuits; flight characteristics; interpretation of test data. 2 lectures, 2 laboratories.

Aero 202 Gas Thermodynamics (3)

Energy and continuity of fluids. Equations of state. Entropy. Gas processes. Ideal cycle applications to nozzles, compressors, engines, etc. 3 lectures. Prerequisites: Math 201, Phys 132

Aero 205 Aircraft Strength of Materials (3)

Loads, reactions, equilibrium and stability. Stress and strain in tension, compression and shear. Trusses and shear webs. Shear flow in airplanes. 3 lectures. Prerequisite: Math 201

Aero 206 Aircraft Strength of Materials (3)

Torsion, bending. Shear, movement, slope and deflection of simple beams. Shear center and unsymmetrical bending in airplanes. 3 lectures. Prerequisite: Aero 205

Aero 211 Aircraft Materials and Processes (3)

Characteristics of metallic and nonmetallic materials used in aircraft construction. Heat treatment, corrosion prevention, finishing, fabrication methods, manufacturing processes. 3 lectures.

Aero 222 Aircraft Hydraulics (3)

Elementary principles of fluid flow. Viscosity, friction, laminar and turbulent flow. Analysis and functions of typical hydraulic units and systems. 2 lectures, 1 laboratory. Prerequisite: Phys 131

Aero 229 Aircraft Strength of Materials Laboratory (2)

Physical properties of metals used in aircraft. Tension, compression, bending, shear, and torsion tests of metal members. Tests of bolted and riveted connections. 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 drawings of typical aircraft parts: sheet metal parts, machined parts, castings, forgings, extruded and rolled shapes, and assemblies. Includes dimensioning, notes, title blocks, and material, fastener and process callouts used in the aircraft industry. Includes freehand pictorial sketching. 1 laboratory. Prerequisite: ME 122

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 202

Aero 302 Elementary Aerodynamics (3)

Propeller theory, propeller selection methods, aircraft propulsion methods, basic performance problems. Special performance problems. 3 lectures. Prerequisite: Aero 202

Aero 324, 325 Aircraft Stress Analysis (4) (4)

Airplane load factors, V-N envelopes, tabular computations of shear and moments, beam deflections, analysis of continuous beams, bending of thin web beams, torsion of open and closed sections, design of box beams, buckling of thin metal sections, tension field beams, truss analysis. 3 lectures, 1 laboratory. Prerequisite: Aero 206

Aero 344, 345, 346 Aircraft Detail Design (2) (2) (2)

Detail and assembly drawings of typical aircraft parts are drawn from data taken from layout drawings and sketches furnished by the designer. Parts include fuselage, wings, tail, landing gear, control systems, equipment, armament, electrical and hydraulic systems. Calculations and use of handbooks. 2 laboratories. Prerequisites: Aero 244, 245, 246

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 402 Aircraft Propulsion Systems (3)

Analysis of reciprocating, turboprop, turbojet, pulsojet, athodyd, and rocket aircraft engines with respect to fuel burning, performance, gas turbine thermodynamic analysis, and structural and mechanical requirements. 3 lectures. Prerequisite: Aero 421

Aero 404 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 302

Aero 405 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 404

Aero 406 Aerodynamics (3)

Two-dimensional analysis of supersonic flow, flow in a duct, normal shocks, Prandtl-Meyer expansion and oblique stock, thin airfoils, transonic conditions, supersonic wind tunnels, and test methods. 3 lectures. Prerequisite: Aero 302

Aero 407 Introduction to Advanced Aerodynamics (3)

Euler's equation of motion, use of potential and stream functions, circulation and vorticity, theory of the two-dimensional airfoil, lifting line theory of the finite wing. 3 lectures. Prerequisites: Math 316, Aero 302

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 409 Aircraft Flight Testing (3)

Flight test instrumentation, determination of airspeed, altitude, temperature, loads, stability and control, and engine performance characteristics of the airplane in flight, methods of analysis of flight test data. 3 lectures. Prerequisite: Aero 404

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 302

Aero 412 Missiles (3)

Extension of aeronautical engineering principles to rockets and missiles; theory of design; propulsion systems; flight characteristics; controls. 3 lectures.

Aero 421 Aircraft Propulsion Systems (4)

Analysis of reciprocating, turboprop, turbojet, pulsojet, athodyd, and rocket aircraft engines with respect to requirements, thrust, propeller characteristics, utilization of available energy, and charge handling. Aviation fuel characteristics: hydrocarbons, rocket propellants and atomic fuel. Laboratory tests, in performance, fuel consumption, and efficiencies of the above engines. 3 lectures, 1 laboratory. Prerequisite: Aero 202

Aero 444, 445, 446 Aircraft Design Layout (3) (3) (3)

Layouts with preliminary design calculations, line drawings, diagrams, and layout of the airplane in general including its respective sections. Careful design investigation given to major fittings and installations. Experimental and production design. 3 laboratories. Prerequisite: Aero 346

Aero 457, 458, 459 Aeronautical 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 302

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. Minimum 120 hours total time.

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, Norman Sharpe

Theodore G. Graves J. A. Hayes Robert G. Rendall
James M. McGrath

Refrigeration is involved in installations from the size of the household refrigerator to the large cold storage warehouse and in applications from the simple chilling of food to the production of dry ice. Refrigeration and steam are a part of nearly all complete air conditioning systems. Air conditioning applications extend from simple comfort heating and cooling to complex industrial processing. Air conditioning is essential in all factories dealing with textiles, paper, tobacco, flour, bakery goods, explosives, and other hygroscopic materials. Suitable air conditions must be maintained in such widely differing applications as submarines, atmospheric test chambers, and airplanes. Refrigeration and air conditioning are essential industries both in time of peace and in time of national emergency.

This department prepares students for the planning, inspecting, testing, and selling of refrigerating, heating, and air conditioning equipment and systems. Graduates find employment in the fields of quick freezing, cold storage, steam heating, comfort air conditioning, industrial air conditioning, design and testing of air conditioning equipment for atmospheric test chambers, airplanes, submarines, etc.

This department has modern, well-equipped laboratories with a combined floor area of more than 8,000 square feet, with equipment valued conservatively at $100,000. Its two drafting rooms are well equipped and have a combined floor area of 2,000 square feet. The application aspect is emphasized in all laboratory and drafting work.

CURRICULUM IN AIR CONDITIONING AND REFRIGERATION ENGINEERING

Freshman	F	W	S
Air Conditioning Drafting (AC 121, 122, 123)	3	3	3
Piping Assembly (AC 124)	2		
Duct Construction (AC 125, 126)		2	2
Welding Survey (Weld 157)			2
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			3
General Physics (Phys 131, 132)		4	4
Applied Biology (Bio 110)	3		
Language Communication (Eng 104, 105, 106)	3	3	3
Health Education (PE 107)	2		
Physical Education (PE 141, 142, 143)	½	½	½
	18½	17½	17½
Sophomore			
Heating and Ventilating (AC 201, 202, 203)	2	3	3
Tests and Measurements (AC 231, 233)	2		2
Refrigeration Maintenance (AC 232)		2	
Strength of Materials (ME 202)			3
General Chemistry (Chem 321, 322, 323)	4	4	4
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	
Sound (Phys 212)		3	
Public Speaking (Sp 201)			2
Sports Education (PE 241, 242, 243)	½	½	½
	18½	18½	17½

Junior	F	W	S
Thermodynamics of Refrigeration (AC 301, 302, 303)	5	3	3
Engineering Laboratory (AC 331, 332, 333)	2	2	2
Heating System Design (AC 341, 342)	2	2	
Refrigerating System Design (AC 343)			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)	3		
Heat Transfer (ME 313)			3
Water Supply and Building Sanitation (ME 331)			4
Principles of Economics (Ec 201)		3	
Electives		3	
	16	17	18
Senior			
Air Conditioning Engineering (AC 401, 402, 403)	3	3	3
Refrigerating System Design (AC 441)	2		
Air Conditioning System Design (AC 442, 443)		2	2
Senior Project (AC 461, 462)	2	2	
Undergraduate Seminar (AC 463)			2
Family Relations (Psy 206)			3
American Government (PolSc 301)	3		
Literature	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
Commercial Law (Ec 316)		3	
Electives	4	4	4
	17	17	17

DESCRIPTION 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 (3) (3) (3)

Principles and practice of mechanical and architectural drafting applied to the installation of equipment, piping, and sheet metal. 1 lecture, 2 laboratories.

AC 124 Piping Assembly (2)

Materials and techniques used in refrigerant, steam, brine, and water piping. 1 lecture, 1 laboratory.

AC 125, 126 Duct Construction (2) (2)

Materials and techniques of low and high velocity duct construction. 1 lecture, 1 laboratory. Prerequisite: AC 121. Concurrent: 122, 123

AC 129 Sheet Metal Shop Practice (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 and electrical students. 1 lecture, 1 laboratory.

AC 201, 202, 203 Heating and Ventilating (2) (3) (3)

The study of heating and ventilating equipment and its application to homes, industrial and public buildings. Lectures. Prerequisite: Phys 132. Concurrent: Chem 321, 322, 323

AC 204 Heating and Ventilating (4)

A survey of heating and ventilating equipment and its application to homes, industrial and public buildings. Primarily for mechanical engineering majors. 4 lectures. Prerequisite: Phys 132

AC 231, 233 Tests and Measurements (2) (2)
Instrumentation and fundamental tests on heating, ventilating, refrigerating, and air conditioning systems. 1 lecture, 1 laboratory. Prerequisite: Phys 132. Concurrent: AC 201

AC 232 Refrigeration Maintenance (2)
The operation and maintenance of refrigerating systems. 1 lecture, 1 laboratory. Prerequisites: AC 124, Phys 133

AC 237 Dairy Boilers and Steam Equipment (2)
The operation and maintenance of steam equipment as applied to the dairy industry. For dairy manufacturing and dairy husbandry majors. 2 lectures.

AC 238, 239 Dairy Refrigeration (2) (2)
The operation and maintenance of refrigeration equipment as applied to the dairy industry. For dairy manufacturing and dairy husbandry majors. 2 lectures.

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. Prerequisites: AC 123, 126

AC 301, 302, 303 Thermodynamics of Refrigeration (5) (3) (3)
The thermodynamic principles involved in the following refrigerating systems: single stage compression, multiple stage cascade, multiple stage compound, air cycle and absorption systems. 5 lectures, fall; 3 lectures, winter and spring. Prerequisites: AC 203, Phys 133, Chem 323. Concurrent: ME 311, 313

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. For architectural engineering students. 3 lectures.

AC 331, 332, 333 Engineering Laboratory (2) (2) (2)
Laboratory tests in dynamics, thermodynamics, fluid flow, heat transfer, sound and vibration applied in the testing of heating, ventilating, refrigerating, and air conditioning systems. 1 lecture, 1 laboratory, fall and winter; 2 laboratories, spring. Prerequisites: AC 203, 233. Concurrent: AC 301, 302, 303; ME 311, 313; Phys 212

AC 341, 342 Heating System Design (2) (2)
Individual project work in the planning of commercial and industrial heating systems. 2 laboratories. Prerequisites: AC 126, 203; Phys 212

AC 343, 441 Refrigerating System Design (2) (2)
Individual project work in the planning of single and multiple stage refrigerating systems. 2 laboratories. Prerequisite: AC 302

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, 402, 403 Air Conditioning Engineering (3) (3) (3)
Engineering principles applied to the design of the component parts of commercial and industrial air conditioning systems. 3 lectures. Prerequisites: AC 203, 303

AC 442, 443 Air Conditioning System Design (2) (2)
Individual project work in the planning of commercial and industrial air conditioning systems. 2 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)
Individual reports on important research in the refrigeration and air conditioning fields. 2 lectures.

ARCHITECTURAL ENGINEERING DEPARTMENT

Department Head, George J. Hasslein

William H. Brown	Kenneth R. Holmes	Kenneth E. Schwartz
R. L. Graves, Jr.	Hans Mager	Wesley S. Ward
Anatol Helman	William R. Phillips	Robert E. Williams
	Rudolph A. Polley	

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 area each year to inspect outstanding buildings and construction projects.

CURRICULUM IN ARCHITECTURAL ENGINEERING

Freshman	F	W	S
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, 118)	5	5	
Calculus (Math 201)			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		
	17½	18½	18½
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
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	3		3
	18½	18½	16½

Junior	F	W	S
Air Conditioning Systems (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
Commercial Law (Ec 316)			3
Public Speaking (Sp 201)		2	
	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
	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 tracing to completing light-construction working drawings including the solving of detailing problems. 3 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.

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

* 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 four units of electives; and Structural Design (Arch 451, 452, 453) for Architectural Design (Arch 441, 442, 443).

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. Prerequisites: Arch 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 2 laboratories.

Arch 401 Structural Design (2)
Stress analysis of long-span structures. Haunched members. 2 lectures. Prerequisite: Arch 316

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

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

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. Prerequisites: 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. Prerequisites: Arch 316, 343

Arch 454 Office Practice (2)
Architectural office administration and procedures in the development of architectural and structural drawings. 2 laboratories. Prerequisite: Arch 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. Prerequisites: 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. 2 meetings. Prerequisite: Arch 462

ELECTRICAL ENGINEERING DEPARTMENT

Department Head, Fred W. Bowden

Warren R. Anderson, Richard K. Dickey, George S. Furimsky, S. C. Gupta, Alexander Landyshev, Jan T. van Asperen, Harry R. West

The Electrical Engineering Department, in addition to providing the training for students majoring in electrical engineering, offers courses for students majoring in other engineering departments. Graduates from the department will find employment opportunities in such fields as application, production, and sales engineering; in some phases of personnel work; or in management.

The laboratories are well equipped with machines and instruments. The shop facilities simulate conditions found in industry. Laboratory work in the department is designed to develop self-confidence and technical ability in the student, as well as to illustrate theory. It is in the laboratory that the "learning-by-doing" principle is most clearly exemplified. The principles and practice of mathematics and physical science are carefully integrated with the theory and practice of electrical engineering so that the graduate will have a quantitative understanding of the subject. Throughout the program stress is put on the teaching of the language of the engineer, visualization and physical concepts. The "upside-down" principle provides motivation for the student and provides a foundation for the advanced courses necessary to the electrical engineer.

CURRICULUM IN ELECTRICAL ENGINEERING

Freshman	F	W	S
Electric Technology (EE 101, 102, 103)	2	2	2
Electric Shop (EE 141, 142, 143)	2	1	1
Orientation (EE 151)	1		
Electric Laboratory (EE 152, 153)		1	1
Drafting (ME 121, 122)	2	2	
Electrical Drafting (EE 146)			1
Machine Shop (MS 142)			1
Welding (Weld 151, 154)	1	1	
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			3
General Physics (Phys 131, 132)		4	4
Applied Biology (Bio 110)			3
Health Education (PE 107)	2		
Physical Education (PE 141, 142, 143)	½	½	½
	15½	16½	16½
Sophomore			
Electric Machines (EE 201)	2		
Direct Current Machinery (EE 202, 203)		2	2
Electric Shop (EE 241, 242, 243)	1	1	1
Fundamentals of Electrical Engineering (EE 212, 213)		3	3
Fundamentals of Measurements (EE 245)	1		
Electrical Laboratory (EE 246)		1	
Electrical Laboratory (EE 249)			1
Machine Shop (MS 144)	1		
Elementary Engineering Problems (Math 213)			2
Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
Physics of Electricity and Magnetism (Phys 204)	4		
Engineering Statics (Phys 201)	3		
Engineering Dynamics (Phys 202)		3	
Language Communications (Eng 104, 105, 106)	3	3	3
Principles of Economics (Ec 201)		3	
Sports Education (PE 241, 242, 243)	½	½	½
Electives			2
	18½	19½	17½

Junior	F	W	S
Electric Circuits (EE 301, 309)	3	3	
Circuits Laboratory (EE 341, 353)	1	1	
Power Transmission (EE 306)			3
Electric Machines (EE 303)			3
Electric Machine Laboratory (EE 342)			1
Industrial Electronics (EL 311, 312)		2	2
Industrial Electronics Laboratory (EL 352)			1
Differential Equations (Math 317)	2		
Mathematical Analysis of Electric Networks (Math 319)		3	
General Chemistry (Chem 321, 322)	4	4	
Strength of Materials (ME 202, 203)		3	3
Strength of Materials Laboratory (ME 249)			1
Public Speaking (Sp 201)	2		
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
Electives	4		
	19	19	17
Senior			
Senior Project (EE 461, 462)	2	2	
Undergraduate Seminar (EE 463)			2
Electric Machines (EE 401)	3		
Servomechanisms (EE 402)			3
Electrical Engineering Design (EE 423)		5	
Electric Machine Laboratory (EE 441)	1		
Electrical Laboratory (EE 442)			1
Industrial Electronics (EL 313)	2		
Industrial Electronics Laboratory (EL 353)	1		
Thermodynamics (Phys 306)	3		
Industrial Heat Transfer (ME 313)		3	
Power Plant Laboratory (ME 352)		1	
Fluid Flow (ME 311)	3		
Family Relations (Psy 206)	3		
Industrial Relations (Ec 412)		3	
Literature			3
Business Statements (Ec 416)			1
Electives		4	6
	18	18	16

DESCRIPTIONS OF COURSES IN ELECTRICAL ENGINEERING

EE 101, 102, 103 Electric Technology (2) (2) (2)

Elements of electricity. Simple electric and magnetic circuits. Elements of D. C. machines, their application and operation. Elements of alternating current. 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 Electric Shop (2)

Wiring materials and how to handle them. Use of hand tools. Shop practice. 2 laboratories.

EE 142, 143 Electric Shop (1) (1)

Direct and alternating current machine windings. Machine construction. 1 laboratory.

EE 146 Electrical Drafting (1)

Drawing of electric circuits and machines. Use of standard electrical symbols. 1 laboratory. Prerequisite: ME 122, EE 102

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, write reports. Elementary work with rheostats, potentiometers, resistances, meters. Common characteristics of direct current motors and generators. 1 laboratory. Prerequisite: EE 101, 102

EE 201 Electric Machines (2)

Elements of alternating current machines, their application and operation. 2 lectures. Prerequisite: EE 103

EE 202, 203 Direct Current Machinery (2) (2)

Theory and practice of direct current generators, motors, and special machines. 2 lectures. Prerequisite: EE 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 nonelectrical engineering majors. 3 lectures. Prerequisite: Math 201, Phys 133

EE 212, 213 Fundamentals of Electrical Engineering (3) (3)

Electric circuits and parameters. Direct current networks. Introduction to network theorems. Energy sources. Magnetic circuits. Alternating current circuits and parameters. Single phase circuits. Symbolic treatment. Polyphase circuits. 3 lectures. Prerequisites: Math 201, Phys 204

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 Electric Shop (1)

Trouble shooting. Repair, reconnection, etc., of motors. Winding transformer coils, armature coils. Use of growler in testing windings. Baking and treating coils. 1 laboratory.

EE 242 Electric Shop (1)

Single phase transformers. Voltage relationships and connections in polyphase synchronous generators and in single and polyphase induction motors. Labeling of terminals and connections in accordance with A.S.A. standards. 1 laboratory. Concurrent: EE 202

EE 243 Electric Shop (1)

Commercial steady state performance tests for direct current motors and generators. 1 laboratory. Concurrent: EE 203

EE 245 Fundamentals of Measurements (1)
Calibration and use of electrical measuring instruments. 1 laboratory. Prerequisite: EE 103

EE 246, 249 Electrical Laboratory (1) (1)
Selected laboratory exercises in electrical engineering. 1 laboratory.

EE 247 Electrical Drafting (1)
Drawing of electric circuits and machines. Use of standard electrical symbols. 1 laboratory. Prerequisite: EE 146

EE 251 Electrical Engineering Laboratory (1)
Use of electric meters. Experiments and exercises involving direct and alternating current circuits and machines. 1 laboratory. Concurrent: EE 207

EE 252 Electrical Engineering Laboratory (1)
Experiments and exercises involving electric machines and their controls. Installation practices. 1 laboratory. Concurrent: EE 208

EE 301 Electric Circuits (3)
Alternating current networks and network theorems. Coupled circuits. Impedance transformation. Nonsinusoidal waves. 3 lectures. Prerequisite Phys 204

EE 303 Electric Machines (3)
Extension of circuit theory to machines. Theory and operation of transformers. Induction machines. Single-phase machines. 3 lectures. Prerequisite: EE 301

EE 305 Rotating and Magnetic Amplifiers (3)
Characteristics of non-vacuum-tube amplifiers. Application and analysis. 3 lectures. Prerequisites: EE 203 and EE 301; or EE 313 and EL 301

EE 306 Power Transmission (3)
The power transmission line. Power systems. Stability problems. 3 lectures. Prerequisite: EE 309

EE 309 Electric Circuits (3)
Transients. Circuits with distributed constants. Transmission line theory. 3 lectures. Prerequisites: EE 301, Math 317

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 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 Circuits Laboratory (1)
Study of electric circuits in the laboratory. 1 laboratory. Concurrent: EE 301

EE 342 Electric Machine Laboratory (1)
Study of transformers and induction machines. 1 laboratory. Concurrent: EE 303

EE 353 Circuits Laboratory (1)
Continued study of electric circuits in the laboratory. 1 laboratory. Prerequisite: EE 341

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 Electric Machines (3)

Salient and nonsalient pole synchronous machines. Operating problems of motors. Parallel operation of generators. Transients in alternating current machines. 3 lectures. Prerequisite: EE 303

EE 402 Servomechanisms (3)

Principles of closed loop control systems. Analysis of transfer functions. Corrective networks. Stability criteria. 3 lectures. Prerequisites: Math 317, a course in Electrical Machines, and a course in AC Electrical Circuits.

EE 407 Power System Analysis (3)

Components of a power transmission system. Equivalent circuits. Sequence impedance of transformers and transmission lines. Symmetrical components. Faults and sudden loads. 3 lectures. Prerequisites: EE 306, EE 303

EE 423 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 nonelectrical phenomena. Transducers. Transmission systems. Recorders. Theory and operation. 2 lectures, 1 laboratory. Prerequisites: EE 309, EL 312

EE 431 Introduction to Analog Computers (4)

General background. Theory of operation. Fields of application. Laboratory work with typical computers. 2 lectures, 2 laboratories.

EE 432 Digital Computers (4)

Field of useful applications. Theory of operation. Programing techniques. Laboratory experience in computer operation. 2 lectures, 2 laboratories.

EE 441 Electric Machine Laboratory (1)

Advanced machine laboratory arranged for individual study. 1 laboratory. Concurrent: EE 401

EE 442 Electrical Laboratory (1)

Advanced servomechanisms laboratory arranged for individual study. 1 laboratory. Concurrent: EE 402

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.

ELECTRONIC ENGINEERING DEPARTMENT

Department Head, Clarence Radius

Stephen Breida, Jr.	Clifford E. Fisher	Fred H. Steuck
Charles F. Brown	Harold J. Hendriks	James R. Wills
Clifford B. Cloonan	Irvin J. Kogan	Harry K. Wolf
Jerry L. Dillion	A. R. B. Pavey	Howard Zimmerman
	Eric R. Perkins	

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 engineering courses which begin in the second year. This plan provides (1) an opportunity to explore the field before undertaking any 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 and physics.

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 investigations, 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 five laboratories, a shop, several auxiliary rooms, and mobile facilities for antenna studies. A large number of commercial electronic and communications units, standard and precision laboratory measuring equipment, and an ample supply of electronic system components are available for experimental study. The very nature of the physical components and the characteristics of the instrumentation make possible a high degree of simulation of actual industrial setups in the department's laboratories and shops.

The department has two organized clubs: a student branch of the Institute of Radio Engineers, and an Amateur Radio Club which operates the college station, W6BHZ.

CURRICULUM IN ELECTRONIC ENGINEERING

Freshman	F	W	S
Radio Technology (EL 101, 102, 103)	3	3	3
Radio Shop (EL 141, 142, 143)	2	2	2
Machine Shop (MS 142, 144)		1	1
Welding Survey (Weld 141, 142)		1	1
Sheet Metal Shop (AC 129)	2		
Engineering Drafting (ME 121, 122)	2	2	
Drafting for Electronics (EL 146)			2
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			3
General Physics (Phys 131, 132)		4	4
Applied Biology (Bio 110)	3		
Health Education (PE 107)			2
Physical Education (PE 141, 142, 143)	½	½	½
	17½	18½	18½

Sophomore	F	W	S
Instrumentation Technology (EL 201)	3		
Instrumentation Laboratory (EL 241)	1		
Introductory Circuit Analysis (EL 205, 206)		3	3
Introductory Circuits Laboratory (EL 245, 246)		1	1
Physical Electronics (EL 208, 209)		3	3
Physical Electronics Laboratory (EL 248, 249)		1	1
Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
Physics of Electricity and Magnetism (Phys 204)	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)	½	½	½
Electives			3
	17½	17½	17½
Junior			
Alternating Current Circuits (EL 301, 302)	3	3	
Communication Networks (EL 303)			3
Alternating Current Circuits Laboratory (EL 341, 342)	1	1	
Communication Networks 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
Electric Machines (EE 313)		3	
Engineering Materials (ME 314)			3
Differential Equations (Math 317)	2		
General Chemistry (Chem 321, 322)	4	4	
Heat (Phys 301)	3		
Principles of Economics (Ec 201)		3	
Industrial Management (Ec 411)			3
Literature			3
	17	18	17
Senior			
Microwave Principles (EL 401, 402)	3	3	
Pulse and Digital Circuitry (EL 404, 405)	3	3	
Advanced Electronic Laboratory (EL 441, 442, 443)	1	1	1
Electronic Systems Engineering (EL 406)			3
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 (Ec 416)	1		
Electives	3	4	7
	19	16	16

DESCRIPTIONS OF COURSES IN ELECTRONIC ENGINEERING

EL 101, 102, 103 Radio Technology (3) (3) (3)

Fundamentals and applications of electricity to radio. Adapted to the needs of the radio service man, electronic technician, and commercial radio operator. Descriptive background for later engineering courses. 3 lectures.

EL 123 Electronic Analysis (2)

Fundamentals and applications of electronics. Principles, operation, and testing of basic electronic components. 1 lecture, 1 laboratory.

EL 131, 132, 133 Electronic Technology (3) (3) (3)
Fundamentals and application of electricity to radio. Emphasis is on basic circuits, instruments, construction, service and repair. 2 lectures, 1 laboratory.

EL 141, 142, 143 Radio Shop (2) (2) (2)
Directed assignments facilitating an understanding of the operation and construction of radio receivers and amplifiers. Use of test equipment in the adjustments of these units. 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 Instrumentation Technology (3)
The purpose of this course is to familiarize the student with the operational characteristics, functional circuit diagrams, and use of the more important electronic instruments. 3 lectures. Prerequisites: EL 103, 143; Math 118; Phys 131

EL 205, 206 Introductory Circuit Analysis (3) (3)
Magnetic parameters and circuits. Direct current networks. Introduction to network theorems. Energy sources. Alternating current parameters and circuits. Physical basis for magnetic and electric phenomena. 3 lectures. Prerequisite: EL 201, Math 201, Phys 204

EL 208, 209 Physical Electronics (3) (3)
Physical and electrical characteristics and mathematical analysis of the fundamental electron tubes. Introduction to solid state electronics, semiconductors and transistors. 3 lectures. Prerequisites: EL 201, Math 201, Phys 204

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 Instrumentation Laboratory (1)
Directed experiments investigating construction and use of electronic instruments used to measure voltage, current, waveform, power, frequency, phase, etc. 1 laboratory. Concurrent: EL 201

EL 245, 246 Introductory Circuits Laboratory (1) (1)
Selected laboratory experiments in the subject matter of EL 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, 302 Alternating Current Circuits (3) (3)
Steady state alternating current circuit analysis and synthesis. Nonsinusoidal analysis. An introduction to Fourier integral, complex frequency plane and Laplace transformation. 3 lectures. Prerequisites: EL 206, Math 316

EL 303 Communication Networks (3)
Analysis and synthesis of frequency selective networks and filters. Circuits with distributed parameters. The general transmission line equations. High frequency 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 voltage amplifiers. Class C power amplifiers, loading and coupling networks. Radiofrequency 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 311, 312, 313 Industrial Electronics (2) (2) (2)

Analysis of vacuum and gas-filled electron tubes with associate circuits with emphasis on control circuits. Course designed for electrical engineering majors. 2 lectures. Prerequisite: EL 206 or EE 213 or equivalent

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. Prerequisites: EE 207, 208

EL 341, 342 Alternating Current Circuits Laboratory (1) (1)

Experimental study of alternating current network characteristics with special emphasis on the capabilities and limitations of some standard commercial instruments. 1 laboratory. Concurrent: EL 301, 302

EL 343 Communication Networks Laboratory (1)

Experimental study of filters and transmission lines. Use of transmission line charts. Use of transmission lines as circuit elements. 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-RETMA procedures. 1 laboratory. Concurrent: EL 304

EL 345 Radio Engineering Laboratory (1)

Experimental determination of the important operating characteristics of tuned radiofrequency voltage and power amplifiers and radiofrequency oscillators. Performance testing of radio receivers in accordance with standard IRE-RETMA 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 converters circuits. Standard performance test. 1 laboratory. Concurrent: EL 306

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 control, and radiofrequency heating equipment. 1 laboratory. Concurrent: EL 311, 312, 313

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 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 Principles (3) (3)

Generation of microwaves by transit time devices. Analysis of the propagation of electromagnetic waves in guides treated in the scalar form. Properties of microwave components and radiating structures. 3 lectures. Prerequisites: EL 303, 306

EL 403 Electromagnetic Fields (3)

Development of Maxwell's equations in vector form. Waves in dielectric and conducting media. Power flow in Poynting vector. Electromagnetic waves in rectangular and circular waveguides. Analysis of radiating systems. 3 lectures. Prerequisite: EL 402 or consent of instructor.

EL 404, 405 Pulse and Digital Circuitry (3) (3)

Graphic and analytical analysis of pulse generators, wave-shaping circuits, timing circuits, delay circuits. Application of Laplace transforms to several types of circuits. Introduction to the basic circuits of digital computers. 3 lectures.

EL 406 Electronic Systems Engineering (3)

Analysis and synthesis of specific electronic systems such as pulsed circuits in television receivers, transmitters, and radar systems. Application of transistors to electronic systems such as digital computers. Theory and application of the DC analog computer. 3 lectures. Prerequisite: EL 404

EL 412 Computer Engineering (3)

Essentials of analog and digital computers, fields of application of each type. Emphasis on systems engineering. 2 lectures, 1 laboratory.

EL 413 Control Systems Engineering (3)

Fundamentals of feedback. Transfer functions for some common control system components. Stability and corrective networks. Analysis through use of the Laplace transform. 2 lectures, 1 laboratory.

EL 441, 442, 443 Advanced Electronic Laboratory (1) (1) (1)

Advanced laboratory study dealing with pulse and microwave circuits. Work takes on the aspects of project engineering. 1 laboratory. Concurrent: EL 401 series and EL 404 series

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

George E. Hoffman George W. Cockriel

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

Freshman	F	W	S
Business Procedures (IE 131, 132, 133)	2	2	2
Machinery Analysis (IE 121)	2		
Electrical Analysis (EE 122)		2	
Electronic Analysis (EL 123)			2
Sheet Metal (AC 129)			2
Welding (Weld 151, 154, 155)	1	1	1
Machine Shop (MS 141, 142, 144)	1	1	1
Engineering Drafting (ME 121, 122, 123)	2	2	2
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			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)	3	3	3
Calculus (Math 202, 203)	3	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		
Principles of Accounting (Ec 301, 302)		3	3
Applied Biology (Bio 110)			3
Sports Education (PE 241, 242, 243)	½	½	½
Electives	1	2	1
	17½	18½	17½
Junior			
Production Planning (IE 321, 322)	3	3	
Production Control (IE 332, 333)		3	3
Strength of Materials (ME 202, 203)	3	3	
Introduction to Machine Design (ME 323)			3
Electrical Engineering (EE 207, 208)	3	3	
Electrical Engineering Lab (EE 251, 252)	1	1	
Electronics in Engineering (EL 321)			3
Electronic Engineering Lab (EL 354)			1
General Chemistry (Chem 321, 322)	4	4	
Thermodynamics (ME 301)	3		
Literature			3
American Government (Pol Sc 301)			3
Electives	1	1	2
	18	18	18

Senior	F	W	S
Sales Engineeering (IE 401)		3	
Production Management (IE 421, 422, 423)	3	3	3
Time and Motion Study (IE 431)	3		
Senior Project (IE 461, 462)	2	2	
Undergraduate Seminar (IE 463)			2
Fluid Flow (ME 311)	3		
Water Supply and Building Sanitation (ME 331)			4
Mechanical Design (ME 427, 428, 429)	2	2	2
Commercial Law (Ec 316)		3	
Family Relations (Psy 206)			3
Growth of American Democracy (Hist 304)	3		
U. S. in World Affairs (Hist 305)		3	
Electives	1	2	2
	17	18	16

DESCRIPTIONS OF COURSES IN INDUSTRIAL ENGINEERING

IE 121 Machinery Analysis (2)

A study of the materials and components of machines, mechanisms, and structures, including general principles of manufacture and assembly. Lab work consists of assembly of the machine to study the individual components. 1 lecture, 1 laboratory.

IE 131, 132, 133 Business Procedures (2) (2) (2)

Principles of organization and functions of a business office; basic organization charts; fundamentals of office systems and equipment. Purchasing, receiving, and inventory procedures. 1 lecture, 1 laboratory.

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 Manufacturing Processes (3) (3)

A study of equipment and special tools used in mass production including review of alternative methods of design, construction, and application of tooling for punch press, machine tool, forging, welding, and foundry operations. 2 lectures, 1 laboratory. Prerequisite: MS 144

IE 223 Manufacturing Processes (3)

Principles and technical fundamentals of processes that are a part of production and manufacturing. Surface conditioning, washing, degreasing, plating, heat treatment. 2 lectures, 1 laboratory.

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, 322 Production Planning (3) (3)

Product development, production analysis, sales forecasting, selection and utilization of plant equipment, material flow principles, material handling, plant layout. 2 lectures, 1 laboratory. Prerequisite: IE 233

IE 332, 333 Production Control (3) (3)

Organization of control, scheduling of production, routing of operations and processing, dispatching and expediting, reporting procedures. Materials planning procurement and control. Quality control organization for inspection raw materials, work-in-process and finished products. 2 lectures, 1 laboratory. Prerequisite: IE 321

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 401 Sales Engineering (3)

Fundamentals and principles of engineering sales. Basic salesmanship; service functions related to sales engineering, management of a sales force, training, compensation, quotas, costs, and budgets. 3 lectures. Prerequisite: Senior standing

IE 421, 422, 423 Production Management (3) (3) (3)

Principles of organization and administration; interdepartment relationships; cost and budgetary controls; personnel relations; job evaluations; wage incentives; plant maintenance, industrial safety; plant protection. 2 lectures, 1 laboratory. Prerequisite: IE 322, 333

IE 431 Time and Motion Study (3)

Methods of stopwatch time and motion study. Techniques of establishing efficient operation in assembly line stations through the use of methods-time-measurement systems. Practical exercises to develop proficiency. Includes the theory and practice of incentive systems. 2 lectures, 1 laboratory. Prerequisites: IE 322, 333

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. 2 lectures. Prerequisite: Senior standing.

MACHINE SHOP DEPARTMENT

Chairman, Francis F. Whiting

Ellard W. Betz — Douglas L. Keith — C. C. Richards
Richard E. Hall — 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 tool room. 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, 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. 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 242 Toolroom Practice (1)

Advanced instruction on machine tools and methods peculiar to the toolroom. Engraving machine operations, use of precision instruments, and heat-treating operations. 1 laboratory. Prerequisite: MS 241

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. 2 lectures, 1 laboratory. Prerequisite: ME 323 or Aero 346

MECHANICAL ENGINEERING DEPARTMENT

Department Head, Morris P. Taylor

Arvid Ackerman	Robert P. Jensen	R. Howell Reece
Robert W. Adamson	Robert M. Johnston	R. Wallace Reynolds
James G. Andresen	Richard T. Kombrink	Edward O. Stoffel
Chester O. Bishop	Thomas B. Mixon	Lyman Stoker
Earl R. Hesch	Leon F. Osteyee	John K. Zaiser
Harry J. Jackson	Derek John Price	

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.

Senior students have an opportunity to select senior elective courses which most closely follow their own field of major interest. Students are encouraged to take two of these elective sequences and thereby broaden their employment possibilities.

The Powerplant and Mechanical Engineering Laboratory contains modern laboratory equipment, and diesel, natural gas, and steam power units driving electric generators.

The Materials Testing Laboratory contains complete facilities for the determination of the strength, hardness, and other physical properties of engineering materials.

The Fluids Laboratory provides facilities for studying characteristics of fluids and hydraulic equipment.

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 121, 122, 123)	2	2	2
Mechanical Engineering Lab (ME 144, 145, 146)	1	1	1
Oxyacetylene Welding (Weld 151, 152)	1		1
Metallic Arc Welding (Weld 154, 155)	1		1
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			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	18½	18½
Sophomore			
Engineering Surveying (AE 237, 238)		2	2
Water Supply and Building Sanitation (ME 331)		4	
Kinematics (ME 223)	3		
Descriptive Geometry (ME 125)	3		
Heating and Ventilating (AC 204)			4
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
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
	18½	18½	18½

Junior	F	W	S
Strength of Materials (ME 203)	3		
Strength of Materials Lab (ME 249)		1	
Introduction to Machine Design (ME 323)			3
Fluid Flow (ME 311, 312)	3	3	
Fluid Flow Lab (ME 345)		1	
Thermodynamics (ME 301, 302, 303)	3	3	3
Chemistry (Chem 321, 322, 323)	4	4	4
American Government (Pol Sc 301)		3	
Growth of American Democracy (Hist 304)			3
Electronics in Engineering (EL 321)	3		
Electronics Engineering Lab (EL 354)	1		
Principles of Economics (Ec 201)			3
Electives		2	1
	17	17	17
Senior			
Senior Project (ME 461, 462)	2	2	
Undergraduate Seminar (ME 463)			2
Mechanical Design (ME 427, 428, 429)	2	2	2
* Senior Electives	3	3	3
† Industrial Relations (Ec 412)	3		
Family Relations (Psy 206)			3
U. S. in World Affairs (Hist 305)		3	
Literature			3
Electives	6	6	3
	16	16	16

DESCRIPTIONS OF COURSES IN MECHANICAL ENGINEERING

ME 121 Engineering Drafting (2)

Use of drafting equipment. Freehand lettering. Pictorial drawing. 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. Developments of surfaces. 1 lecture, 1 laboratory. Prerequisite: ME 121

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. Prerequisite: ME 122

ME 125 Descriptive Geometry (3)

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. 1 lecture, 2 laboratories. Prerequisite: ME 121

ME 126 Descriptive Geometry (3)

Solutions to typical drafting room problems by graphical methods of multiview projection. Rotation method. Delineation, intersections, and development of curved surfaces: cylinders, cones, spheres, warped surfaces. 1 lecture, 2 laboratories. Prerequisite: ME 125

* Senior electives:
Machine Design (ME 401, 402, 403)
Tool Design (MS 421, 422, 423)
Industrial Piping Design (ME 424, 425, 426)
Fabrication Methods and Design (Weld 434, 435, 436)

† Industrial Management (Ec 411) may be substituted.

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 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 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 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.

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 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. Symbols and notes. 1 lecture. Prerequisite: ME 122

ME 223 Kinematics (3)

The study of motion in machine parts. Displacements, velocities, and accelerations in linkage, cams, gears, and other mechanisms. 2 lectures, 1 drafting laboratory. Prerequisites: 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 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, 303 Thermodynamics (3) (3) (3)

Solution 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, psychrometrics, and heat transfer. 3 lectures. Prerequisites: Phys 132, Math 203; concurrent· Chem 321, 322, 323

ME 311 Fluid Flow (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: Phys 201; concurrent: Phys 202

ME 312 Fluid Flow (3)

and supersonic. Liquids in open channels. Pumps, turbines, fluid drive mechanisms. Fluid resistance, dynamic lift, and propeller action. Compressible flow, subsonic 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 311

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 321 Instruments and Controls (3)

Operating principles of measuring and recording instruments. Fundamentals of control systems; control elements; control systems as used in industry. Laboratory work consists of study, repair, and calibration of various instruments and control elements. 2 lectures, 1 laboratory. Prerequisites: ME 311, 345

ME 323 Introduction to Machine Design (3)

Design of machine elements, including fastening devices, shafts, couplings, belts, pulleys, wire rope, and chain drives. Consideration of design factors such as material stress concentrations, tolerances, and allowances. 2 lectures, 1 computation period. Prerequisite: ME 202; concurrent: ME 203

ME 331 Water Supply and Building Sanitation (4)

Application of hydraulics and pneumatics in plumbing systems for design of water and waste collection pipe layouts. Fire systems. Health hazards of cross connections. 3 lectures, 1 laboratory. Prerequisites: Phys 132, ME 123

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)

Flow in pipes and open channels, measuring devices, pumps, and pump accessories. 1 laboratory. Prerequisite: ME 311

ME 346 Temperature Measurement (1)

Fundamentals of pyrometry with emphasis on thermocouples and meters. Industrial problems and applications of temperature measurements. 1 laboratory and discussion period.

ME 348 Metallography (3)

Preparation, examination, and testing of metallic commercial specimens using microscope. Heat treatment and effect of microstructure on physical and mechanical properties. 2 lectures, 1 laboratory. Prerequisite: Chem 321

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 306 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, 403 Machine Design (3) (3) (3)

Nonlinear and nonmetallic springs, force and press fits, instability of thin sections, hydraulic controls and torque convertors. Stresses in high-speed rotors, dynamics of cam motions, balancing problems. Vibration analysis. 3 lectures. Prerequisites: ME 201, 311, 323

ME 411 Heat Power (3)

Application of thermodynamics to actual power cycles. Turbine theory. Modern combustion gas and vapor powerplants and auxiliaries. Economics of power generation. 3 lectures. Prerequisite: ME 303

ME 412 Heat Power (3)

Fuels, fuel systems, aspiration, combustion, detonation; mechanism, lubrication, and performance of internal combustion engines. 3 lectures. Prerequisite: ME 303

ME 424, 425, 426 Industrial Piping Design (3) (3) (3)

Fundamentals of the design of high temperature piping systems from the standpoint of flexibility. Application of expansion joints, expansion loops, and spring hangers; and methods of obtaining flexibility in the design layout. Flange design, insulation, heat transfer. A problem course using examples drawn from the petroleum refining industry. 2 lectures, 1 laboratory. Prerequisites: ME 203, 311

ME 427, 428, 429 Mechanical Design (2) (2) (2)

Design of basic machine and structural elements such as gears, keys and couplings, shafts, bearings, brakes, clutches. Balancing of rotating masses and design of welded parts. Machine and assembly drawing organization. Methods of preparing contracts and specifications. 1 lecture, 1 laboratory. Prerequisites: Math 203, Phys 202, ME 323

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. 1 lecture, 1 field trip. Prerequisites: ME 144, 145, 146, 311

ME 435 Petroleum Production—Drilling (2)

Engineering factors governing modern deep-hole petroleum drilling. Problems attendant to the rotary rig and its auxiliary equipment. A comparison of steam, sparkplug, and electric rigs. Practical problems dealing with drilling mud, casing, cementing, and directional drilling. 1 lecture, 1 problem period. Prerequisites: Phys 201, ME 133

ME 436 Petroleum Production—Pumping (2)

Engineering factors governing modern petroleum pumping. Sucker rod single and multiple systems, rodless systems, and other pumping systems. Calculations for a unit pumping installation including consideration of subsurface pressure, gas and water ratio, fluid level, and equipment cost. 1 lecture, 1 problem period. Prerequisites: Phys 201, ME 311

ME 445 Heat Power Laboratory (1)

Experimental evaluation of operating characteristics and performance of heat power apparatus such as compressors, engines, turbines, boilers, and their auxiliaries. Formal engineering reports. 1 laboratory. Prerequisite: ME 303

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

Lawrence H. Eckrote H. E. Howe Milan Steffel
C. Herold Gregory 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, 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 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
Press and Composing Room Problems (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
	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
	17½	17½	17½
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
	17	17	17
Senior			
Printing Office Management (Pr 401)		1	
Cost and Estimating (Pr 426)	2		
Cost and Estimating (Pr 411, 412, 413)	1	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 (Ec 411)	3		
Industrial Relations (Ec 412)		3	
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
Electives	4	2	1
	18	18	18

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. 1 lecture, 1 laboratory.

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 Press and Composing Room Problems (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. 3 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. Prerequisites: 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. Prerequisites: 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 (1)

Office problems, methods and procedures. Job tickets, time systems, inventory control, cost accounting, page costs, circulation systems. Correlation of management and production. 1 lecture. Prerequisite: Senior standing

Pr 411, 412, 413 Cost and Estimating (1) (1) (1)

Estimating and pricing all types of printing, office procedures, purchasing, writing instructions. 1 laboratory. Concurrent: Pr 426

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: 1 lecture, 2 laboratories. Pr 422, 423: 3 laboratories.

Pr 426 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 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. Darkroom techniques, mixing chemicals, and developing film. 1 lecture, 2 laboratories. Prerequisite: Pr 233

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. 1 lecture, 1 laboratory. Prerequisite: Senior standing

WELDING DEPARTMENT

Chairman, Richard C. Wiley

Ray Allen — Enrico Bongio — Glenn E. Seeber — C. W. Shoop

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. For students who wish to enter the welding industry in design, sales production, or inspection, there is set up within the framework of the Mechanical Engineering Department a sequence of senior electives in welding engineering.

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 141 Welding Survey (1)

Basic oxyacetylene welding techniques designed for radio and electronic industry students. Deals with equipment used, applications, safety, and limitations. Includes fusion welding and brazing of light-gauge sheet metal. 1 laboratory.

Weld 142 Welding Survey (1)

Continuation of Weld 141, theory and application of resistance welding, and further use of the oxyacetylene flame, including silver brazing, and flame cutting. 1 laboratory. Prerequisite: Weld 141

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)

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 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

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 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

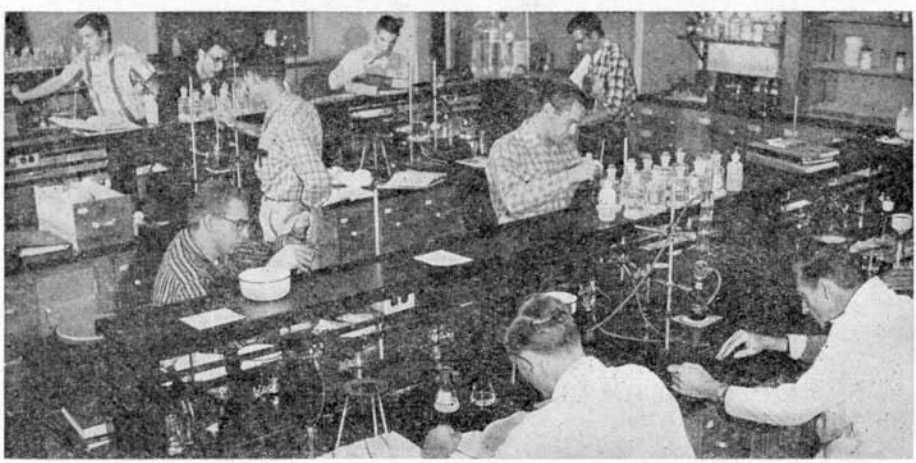
Weld 436 Fabrication Methods and Design (3)

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

THE ARTS AND SCIENCES DIVISION

Home Economics

Elementary Education



Physical Sciences

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 English, 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 any of the teaching fields in which a credential may be earned.

The major departments of the Arts and Sciences Division are Agricultural Journalism, Biological Sciences, Education, English and Speech, Home Economics, Mathematics, Physical Education, Physical Sciences, and Social Sciences. Two additional departments which provide services to the entire student body are Military Science and Tactics and Music.

AGRICULTURAL CHEMISTRY

(See Physical Sciences)

AGRICULTURAL EDUCATION

(See Education)

AGRICULTURAL JOURNALISM DEPARTMENT

Department Head, Kenneth Kitch

John R. Healey Loren L. Nicholson Douglass W. Miller

The college offers the State's only major in agricultural and agricultural-community journalism. Major students train for jobs as writers, editors, advertising men (or combinations of these) on staffs of daily and weekly papers, consumer and trade magazines in agricultural or allied fields, radio stations with farm programs, advertising agencies, and departments merchandising agricultural products or services. They also train for jobs as direct-by-mail advertising and sales specialists, public relations directors, community or trade association organizers and secretaries, and free-lance writers.

While many of the "ordinary" fields of journalism tend to be overcrowded, there is a definite shortage of journalists with an agricultural background.

The college's Agricultural Division and Printing Department give students in this department accessory training seldom found elsewhere. Students not only learn ordinary techniques but gain firsthand experience in publishing production methods and costs as well as broad, practical experience in modern applied agricultural ideas and processes.

Journalism major students will be expected to serve as staff members on the school newspaper, various school magazines, the student news bureau, news and

photographic field teams requested by fairs, expositions, and agricultural conferences and conventions, and will be given opportunities to cover frequent assignments for trade and consumer publications, press associations, and newspapers.

In addition to completing the 198 units required for a degree, the student majoring in journalism will complete a minimum eight weeks' noncredit internship in a publishing, radio, advertising, or public relations organization under circumstances approved by the head of the Journalism Department and under supervision of the department's faculty. It is presumed that internships generally will take place during summer quarters.

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, publicity, public relations, publications, and photography. By selecting proper electives, students may prepare themselves for journalistic careers related to home economics.

CURRICULUM IN AGRICULTURAL JOURNALISM

* Freshman	F	W	S
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Agricultural Mathematics (Math 102, 103)		3	3
General Biology (Bio 101, 102, 103) or equivalent	3	3	3
Elementary Typography (Pr 121)	3		
Elementary Display (Pr 122)			3
Mathematics for Printers (Math 105)		3	
† Agriculture Electives	4	4	4
Electives	4	1	
	17½	17½	16½
Sophomore			
Principles of Economics (Ec 201, 202)	3	3	
Agricultural Resources (FM 305)			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
† Agriculture Electives	4	4	4
	16½	17½	16½
Junior			
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
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
† Agriculture Electives	4	4	4
Electives	2		
	15	16	18

* Unless already acceptable typists, majors will be required to take Jour 140 and/or 141 during their freshman year.

† In addition to 9 required units in Agriculture, FM 304, FM 305 and FM 403, the student shall elect a minimum of 36 additional units in agriculture with 12 from an approved major sequence. No more than 24 units will be taken in any one agricultural field, except with permission of the department head.

Senior	F	W	S
Agricultural Prices (FM 403)			3
Agricultural Marketing (FM 304)	3		
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	
Electives	5	5	10
	16	15	16

DESCRIPTIONS OF COURSES IN AGRICULTURAL JOURNALISM

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.

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. 1 lecture, 2 laboratories.

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 laboratory. Prerequisites: 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, particularly agricultural magazines. 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. 1 lecture, 2 laboratories. Prerequisites: 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 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 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. Prerequisites: Jour 151, 152, 153, and 251, 252, 253 or equivalent experience.

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. Prerequisites: Jour 233, 421

Jour 404 The Farm Feature (2)

Emphasis on presentation of agricultural news and farm life features to suit interests of rural readers. Recommended as an elective for all agricultural journalism majors and for all prospective agricultural teachers. 2 lectures.

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. Prerequisites: 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 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 with special attention to those in the agricultural and allied 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 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 publications into the public relations picture; financing. 1 lecture, 2 laboratories. Prerequisite: instructor's approval.

BIOLOGICAL SCIENCES DEPARTMENT

Department Head, Glenn A. Noble

John H. Applegarth	R. C. Hatfield	Robert J. Rodin
H. Edwin Cott	Robert F. Hoover	Aryan I. Roest
Frederick M. Essig	C. Dennis Hynes	David H. Thomson
Emily Hartman	David H. Montgomery	William Thurmond
	Richard A. Pimentel	

The curriculum in the biological sciences is designed to fulfill the following objectives: to give students majoring in the various agriculture departments the necessary botanical and zoological background for an understanding of the biological principles underlying their practical work; to train students who plan to teach the life sciences in secondary schools; to provide the necessary basic course work for students who plan to enter such fields as biological survey, wild life management, conservation, entomology, plant pathology, laboratory work, agricultural inspection, public health sanitation, museum work, pest control, and fish and game; and to give the courses which fulfill the general education requirements in biology.

The department laboratories are equipped with the most modern instruments and are well supplied with laboratory materials. Whenever possible, fresh specimens are used. The work is 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 the flora and fauna of both Southern and Northern California.

CURRICULUM IN BIOLOGICAL SCIENCES

Freshman	F	W	S
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 Zoology (Zoo 131, 132, 133) or General Botany	4	4	4
[2] General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Electives	4	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, 123) or General Zoology	4	4	4
General Bacteriology (Bact 221)			4
Genetics (Bio 303)	3		
Literature	3		
Literature, Art, or Music		3	3
Public Speaking (Sp 201)			2
Family Relations (Psy 206)		3	
[3] Group Electives	3		3
Electives		4	
	16½	17½	16½

[1] Math 102, 103 or Math 117, 118 will substitute.
[2] Chem 321, 322, 323 will substitute for Chem 324, 325.
[3] See listing of group electives following this curriculum.

Junior	F	W	S
General Psychology (Psy 202)		3	
Microtechnique (Bio 225)		3	
* General Physical Science (PSc 101, 102)	4	4	
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
Senior Project (Bio 461)			2
† Group Electives	6	4	3
Electives	3		8
	16	17	16
Senior			
Agricultural Biochemistry (Chem 328)		4	
Senior Project (Bio 462)	2		
Undergraduate Seminar (Bio 462)			2
† Group Electives	4	3	4
Electives	9	9	10
	15	16	16

Group Electives

Thirty units will be selected from the following groups with a minimum of 6 units from each group:

Group I		*Units*
Chem 329	Agricultural Biochemistry	(4)
Zoo 237, 238, 239	Human Anatomy and Physiology	(3) (3) (3)
Zoo 323	Embryology	(4)
Zoo 326	Comparative Anatomy of Vertebrates	(4)
Bot 322	Plant Physiology	(3)
Bot 426	Mycology	(3)
SS 121	Soils	(4)
Bio 423	Plant and Animal Cytology	(4)

Group II		*Units*
Bact 222	Dairy Bacteriology	(4)
Bact 333	Sanitary and Industrial Bacteriology	(3)
Bot 223	Plant Pathology	(4)
Ent 126	General Entomology	(4)
SS 422	Soil Microbiology	(3)
VS 202	Livestock Hygiene and Sanitation	(3)
VS 203	Animal Parasitology	(2)
Zoo 422	Histology	(4)
Zoo 425	Parasitology	(4)

Group III		*Units*
Bio 325	Plant and Family Ecology	(3)
Bot 235	Families of Agricultural Plants	(4)
Bot 343	Taxonomy of Higher Plants	(3)
Ent 331	Insect Taxonomy	(3)
SS 223	Range Management	(4)
Zoo 225	Vertebrate Field Zoology	(4)
Zoo 236	Invertebrate Zoology	(4)
Zoo 433	Wildlife Management	(4)

* Phys 131, 132, 133 will substitute for the eight units of physical science.
† See listing of group electives following this curriculum.

Group IV		*Units*
AH 101, 102	Feeds and Feeding	(2) (2)
AH 304	Animal Breeding	(3)
AH 402	Animal Nutrition	(3)
Bio 141, 142, 143	Biological Techniques	(2) (2) (2)
Bio 400	Special Problems for Advanced Undergraduates	(1-2)
Bot 238	Native Plant Materials	(3)
CP 123	Forage Crops	(4)
CP 304	Plant Breeding	(3)
CP 321	Crop Disease and Pest Control	(3)
FP 234	Deciduous Disease and Pest Control	(4)
OH 327	Diseases and Pests of Ornamental Plants	(3)
VS 231	Poultry Anatomy and Physiology	(3)
VS 303	Poultry Hygiene and Disease	(3)
SS 123	California Soils	(3)
SS 202	Soil Conservation	(3)
SS 321	Soil Classification	(4)

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: None, but recommended are Chem 324, 325, and Bact 221

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. Prerequisites: 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)

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 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.

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, 142, 143 Biological Techniques (2) (2) (2)

Preparation of plant and animal specimens for display or study purposes. Sample techniques: Collecting, preserving, casting, molding, taxidermy, skeletons, herbaria, microtechnique. 2 laboratories. Prerequisites: Bot 121 or Zoo 131

Bio 225 Microtechnique (3)

Methods of preparing plant and animal tissues for microscopic study. 1 lecture, 2 laboratories. Prerequisite: Consent of instructor.

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 Plant and Animal Ecology (3)

Response of plants and animals to their environment. 2 lectures, 1 laboratory. Prerequisite: Bot 122 or Bot 236 or Zoo 132

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 permission of the instructor.

Bio 423 Plant and Animal Cytology (4)

Detailed study of animals and plant cells, structurally and functionally. 2 lectures, 2 laboratories. Prerequisite: Zoo 133

Bio 433 Wildlife Management (4)

General principles, problems, and techniques of wild life 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)

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.

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 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 238 Native Plant Materials (3)

Identification, habits of growth, cultural requirements and landscape use of native California plants suitable for landscape purposes. 2 lectures, 1 laboratory. Prerequisite: Bot 121

Bot 322 Plant Physiology (4)

Functions of plants and plant organs. 3 lectures, 1 laboratory. Prerequisites: 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 236

Bot 426 Mycology (3)

Morphological, cultural and pathological characteristics of fungi. 2 lectures, 1 laboratory. Prerequisite: Bot 122 or consent of instructor.

Bot 590 Seminar in Botany (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 ENTOMOLOGY

Ent 126 General Entomology (4)

Generalized study of insects; life histories; economic importance and control. Insect collection required. 3 lectures, 1 laboratory.

Ent 331 Insect Taxonomy (3)

Orders and principal families of insects. Systematic entomology applied to field and laboratory identification of major insect pests of the main crop and ornamental plants. 2 lectures, 1 laboratory. Prerequisite: Ent 126

Ent 590 Seminar in Entomology (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 ZOOLOGY

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)

Reproduction, embryology and genetics in vertebrate animals. General taxonomy, economic zoology, ecology and evolution. 2 lectures, 2 laboratories. Prerequisite: Zoo 131

Zoo 133 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: Zoo 132

Zoo 226 Vertebrate Field Zoology (4)

Identification, life histories, and economic importance of vertebrates, especially birds and mammals. Field work emphasized. 2 lectures, 2 laboratories. Prerequisite: Zoo 132 or Bio 129

Zoo 236 Invertebrate Zoology (4)

Study of the invertebrate groups of animals with emphasis on taxonomy, structure, distribution and economic importance. 2 lectures, 2 laboratories, and field work. Prerequisite: Zoo 133

Zoo 237 Human Anatomy (3)

Structural aspects of the organ systems of man. 2 lectures, 1 laboratory. Prerequisite: Zoo 132. Recommended: Psc 103 and Chem 326

Zoo 238 Human Physiology (3)

Human cellular organization and function. Functions of respiratory, circulatory, digestive, and excretory systems. Intermediary mechanisms. 2 lectures, 1 laboratory. Prerequisite: Zoo 237

Zoo 239 Human Physiology (3)

Functions of skeletal, muscular, and nervous systems. Endocrine glands and hormonal activity. Reproduction and development. Human body and defense against disease. 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 and Bio 303 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 economic importance. 2 lectures, 2 laboratories. Prerequisite: Zoo 132. Recommended: Zoo 133

Zoo 590 Seminar in Zoology (1-3)

Arrangements to be made with department head. 1 to 3 units in one quarter, maximum of 6 units. Prerequisite: Graduate standing.

CHEMISTRY

(See Physical Sciences)

EDUCATION DEPARTMENT

Department Head, Walter P. Schroeder

Dale W. Andrews	Ralph C. Collins	James A. Langford
William W. Armentrout	J. Cordner Gibson	Lewis W. Lewellyn
Herbert H. Burlingham	Norman S. Gould	Paul V. Robinson
Arthur G. Butzbach	John A. Heinz	William P. Wewer
Marjorie Cass		J. Barron Wiley

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.

The teacher training 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. The preparation of teachers in this field is co-operatively carried out by the departments of the Agricultural Division and by the Education Department.

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 training 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 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. In his third year, after having taken some basic courses in psychology and teaching methods, he does his supervised 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, 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
* Agricultural Science	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	4
Political and Industrial 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	6
	16½	18½	17½
Junior			
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
Senior Project (Ed 461)			2
Safety and First Aid (PE 121)	2		
Audiovisual Instruction (AV 431)	3		
Educational Psychology (Ed 312)	3		
Principles of Elementary Education (Ed 302)	3		
Child Growth and Development (Ed 304)		3	
Survey of Elementary School Methods (Ed 330)		5	
Student Teaching (Ed 331)			12
† Electives	3	5	
	17	16	14
Senior			
U. S. 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		
Elementary School Social Science, Arithmetic and Science (Ed 435)		6	
‡ Elementary School Teaching Methods		3	3
Undergraduate Seminar (Ed 463)			2
† Electives	5	5	11
	16	17	16

* A general course in agriculture to be approved by adviser.
† Of the 49 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)

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. 2 lectures.

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 Growth and Development of the Child (3)

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

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 and social studies; preparation for student teaching. 5 lectures. Prerequisite: Ed 312

Ed 331 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. Requires approval of candidate by a teacher education committee.

Ed 353 Fieldwork With Youth Groups (2)

Work with groups of children such as Boy Scouts, Campfire Girls, recreational groups. Leadership, human relations, adjusting to different personalities, skills in group management. Serves to appraise professional aptitude. 2 laboratories. 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.

* Required for elementary education students if penmanship test indicates need for remedial work.

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 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 in the Secondary Schools (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 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. 4 lectures, 2 laboratories. 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 435 Elementary School Social Science, Arithmetic, and Science (6)

Methods and materials for teaching social studies, science, and arithmetic; proper placement of content; handling individual differences. Includes the use of audiovisual aids and evaluation in these areas. 4 lectures, 2 laboratories. Prerequisite: Ed 304 and 330

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 laboratory.

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. Offered only in summer quarter.

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. Offered only in summer quarter.

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. Prerequisite: Valid general credential. Offered only in summer quarter.

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. Offered only in summer quarter.

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. Offered only in summer quarter.

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. Offered only in summer quarter.

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. Offered only in summer quarter.

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. Offered only in summer quarter.

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. Offered only in summer quarter.

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 530, the two courses constituting a full load for the quarter.

Ed 581 Graduate Seminar in Education (3)

Group study of contemporary teaching problems in the secondary school. 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. Offered only in summer quarter.

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 Vocational Agriculture (5)

Planning daily lessons, teaching units and source units. Class demonstrations and practice in specific teaching skills and techniques. Planning and practice coordinated 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. 3 lectures, 1 laboratory 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. 1 lecture, 2 laboratories.

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. 1 lecture, 2 laboratories.

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 laboratory. Prerequisities: 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 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 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 sales approach, stimulating sales interest, clinching the sale, and followup. Selling that serves customers; gaining employment and promotion; hiring and promoting techniques in business and industry; leadership in industrial relations. 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 Head, David M. Grant

Paul B. Anderson
Robert L. Andreini
John R. Banister
Samuel I. Bellman
Sydney R. Bobb
Robert O. Boothe
Marvin D. Brown
Evelyn K. de Voros
G. Alvin Foote
Mead R. Johnson
Miles B. Johnson
Ena Marston
Edgard V. Meyer
Byrd Price
John P. Riebel
Herbert L. Smith

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 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.

The major in English fits in with Cal Poly's unique program of training teachers by means of practical and "learn by doing" experiences to take their places in schools and communities. Specifically, the integration of composition, literature, speech, and journalism provides a vital language communications core, for all are concerned with providing an understanding of how language has developed, how language is used, and how language may be used. Other vocational objectives of the English curriculum include industrial positions in the writing of training and expository materials, business and professional writing, and radio and television writing. Either as an adjunct to other majors or through careful choice of electives, the program in English will provide a variety of specific occupational opportunities.

CURRICULUM IN ENGLISH

Freshman	F	W	S
Language Communication (Eng 104, 105, 106)	3	3	3
History of Civilization (Hist 101, 102, 103)	3	3	3
* Natural Science	4	4	4
Physical Education (PE 141, 142, 143)	½	½	½
Basic Mathematics (Math 111, 112)		3	3
Health Education (PE 107)			2
Electives	7	3	1
	17½	16½	16½
Sophomore			
American Literature (Eng 311, 312, 313)	3	3	3
Journalism Practice (Jour 251, 252, 253)	2	2	2
Reporting (Jour 202)	3		
* Natural Science	3		
Public Speaking (Sp 201)		2	
General Psychology (Psy 202)		3	
Principles of Economics (Ec 201)		3	
Editing and Copy Desk (Jour 233)			3
Family Relations (Psy 206)			3
Sports Education (PE 241, 242, 243)	½	½	½
English, Speech, Journalism Electives	3	3	3
Electives	2		3
	16½	16½	17½

* Of the 15 units of Natural Science at least 3 units are to be taken in a Life Science and 3 units in a Physical Science.

Junior	F	W	S
Advanced Composition (Eng 314)	3		
American Government (Pol Sc 301)	3		
Argumentation and Persuasion (Sp 304)	2		
Economics		3	
Editorial and Feature Writing (Jour 302)		3	
Growth of American Democracy (Hist 304)		3	
Advanced Public Speaking (Sp 303)			2
Introduction to Radio and TV Programing (Sp 306)			3
Senior Project (Eng 461)			2
English, Speech, Journalism Electives	3	3	3
* Electives	6	4	6
	17	16	16
Senior			
Radio and TV Laboratory (Sp 451, 452, 453)	2	2	2
English Literature (Eng 411, 412)	3	3	
Philosophy, Art, or Music	3		
Senior Project (Eng 462)	2		
Undergraduate Seminar (Eng 463)		2	
Public Relations (Jour 412)		3	
U. S. in World Affairs (Hist 305)			3
State and Local Government (Pol Sc 401)			3
English, Speech, Journalism Electives			2
* Electives	6	6	6
	16	16	16

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 principal types of literature. 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.

* Teaching majors elect Educational Psychology (Ed 312), Principles of Secondary Education (Ed 301), and Teaching Plans and Techniques (Ed 403) in the Junior and Senior years.

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

* Offered in odd-numbered years.

† 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 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.

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 Programing (3)

Fundamentals of adapting materials for presentation on radio and television. Production of special types of programs. 3 lectures. Prerequisite: Sp 201

† Offered in even-numbered years.

*** Sp 347 Creative Dramatics (2)**

The preparation, casting, and presentation of simple dramatic forms using minimal staging. May be repeated for not more than six 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 six 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 laboratory.

* Offered in odd-numbered years.

HOME ECONOMICS DEPARTMENT

Department Head: Marjory M. Elliott

John L. Jenkins Ann Westsmith

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 institutional 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

Freshman	F	W	S
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 Everyday Life (Art 231)		3	
Family Meals (HE 121)		3	
Clothing Selection and Construction (HE 131)	3		
Home Furnishings (HE 142)		2	
Housing and Home Management (HE 123)			3
Problems of the Beginning Family (HE 103)	2		
Electives	3	2	7
	16½	16½	17½
Sophomore			
General Psychology (Psy 202)	3		
Sports Education (PE 241, 242, 243)	½	½	½
Principles of Economics (Ec 201)			3
Human Physiology (Zoo 238)		3	
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	4	5
	16½	17½	16½

Junior	F	W	S
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
	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
	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 one-hour laboratories.

HE 123 Housing 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 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. Alteration of ready-to-wear garments. 1 lecture, 2 laboratories.

HE 142 Home Furnishings (2)

Constructing and renovating 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 laboratory.

HE 231 Household Equipment (3)

Efficient selection, use, and maintenance of common types of household equipment. Simple repairs and adjustments. 2 lectures, 1 laboratory. Prerequisites: 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 nursery school 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. Prerequisites: 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. Prerequisites: HE 142, Art 321, Arch 312

HE 332 Refinishing Techniques (2)

Refinishing 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)

Application of the theory of color and design to costume planning and construction. Special emphasis on suitability of fabric to pattern design. Fundamentals of tailoring applied to construction of individually designed costumes. 1 lecture, 2 laboratories. Prerequisites: 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. Prerequisites: HE 221, 203

HE 423 Home Management (4)

Living in home management residence, counseling with students in HE 123, and analysis of case studies. 1 lecture, 3 laboratories. Prerequisites: Senior standing, permission of instructor.

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. Prerequisites: HE 321, Chem 206

HE 442 Tailoring (2)

Selection and construction of garments requiring tailoring techniques. 2 laboratories. Prerequisite: HE 333 or permission of instuctor.

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. Prerequisite: HE 462

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

Jack Allen	John Gilbert	John A. Manning
William O. Buschman	Jesse B. Goode	David E. Moe
Philip R. Coffin	Robert D. Gordon	Janice Schenk
James T. Culbertson	Charles J. Hanks	Chester H. Scott
Charles A. Elston	W. Boyd Judd	Ralph E. Weston
Oswald J. Falkenstern	George C. Laumann	Arthur D. Wirshup
Volmar A. Folsom	Harold T. Lawrence	John A. Woodworth
Thomas E. Gartland	George R. Mach	W. Saxon Wraith

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

Freshman	F	W	S
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			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
	17½	17½	17½
Sophomore			
Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
General Psychology (Psy 202)		3	
General Physics (Phys 133 or 204)	4		
Principles of Economics (Ec 201)	3		
Economics		3	3
Sports Education (PE 241, 242, 243)	½	½	½
Literature	3		
Literature, Art, or Music		3	3
Family Relations (Psy 206)		3	
† Mathematics Electives			2
* Electives	4	2	5
	17½	17½	16½

* Fifteen units must be selected from approved skills courses.
† Fifteen units must be selected from approved applied mathematics courses.

Junior	F	W	S
Differential Equations (Math 317)	2		
Math. Analysis of Engineering Problems (Math 318 or 319)		3	
Introduction to Theory of Equations (Math 307)	3		
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
General Chemistry (Chem 321)	4		
Senior Project (Math 461)			2
* Mathematics Electives		3	6
† Electives	5	7	5
	17	16	16
Senior			
Senior Project (Math 462)	2		
Undergraduate Seminar (Math 463)			2
* Math Electives	3	6	3
† Electives	10	9	10
	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 Methematics I (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 II (3)

Logarithms and elementary slide rule, exponents, trigonometric functions, with applications. Use of grouping symbols, linear equations including graphing, algebraic fractions, and fractional equations. 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 111 Basic Mathematics for General Education (3)

Proportion, variation, units of measurement, slide rule, and probability as applied to biological sciences, physical education, and social sciences. 3 lectures. Prerequisite: Satisfactory score on placement examination or Math 7 or 103 or 121

Math 112 Basic Mathematics for General Education (3)

Elements of trigonometry, analytic geometry, and statistics as applied to biological sciences, physical education, and social sciences. 3 lectures. Prerequisite: Math 111

* Fifteen units must be selected from approved applied mathematics courses.
† Fifteen units must be selected from approved skills courses.

Math 114 Agricultural Mathematics III (3)

An abridged course covering selected topics from trigonometry and intermediate algebra designed for those students who take no mathematics beyond Math 201. 3 lectures. Prerequisite: Math 103

Math 115 Agricultural Mathematics IV (3)

Inequalities and roots of equations. The geometry of the straight line, conic sections, and such higher plane curves as are needed in Math 201. 3 lectures. Prerequisite: Math 114

Math 117 Mathematics for Engineers (5)

Function concept and symbols, rectangular and polar co-ordinates, trigonometric functions, linear functions, analytic geometry of straight lines, algebraic, graphical, and determinant solutions of systems of linear functions, elementary theory of equations, and exponential and logarithmic functions. 5 lectures. Prerequisite: Math 7 or satisfactory score on placement examination.

Math 118 Mathematics for Engineers (5)

Analysis of trigonometric functions, applications of trigonometry to triangles and vectors, complex numbers, conic sections, discussion of loci of higher plane curves, sequences, binomial formula, and an introduction to statistics. 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 Differential and Integral Calculus (3)

Interpretation of derivative, limits, integration as process of summation. Definite integral. Differentiation and integration of polynomial functions with applied problems involving: moments, centroids, areas, volumes, velocity, acceleration, and maxima and minima. 3 lectures. Prerequisite: Math 118 or 115

Math 202 Differential and Integral Calculus (3)

The derivative in the analysis of algebraic, exponential, trigonometric, and logarithmic functions. Related time-rate problems such as circular motion, velocity, and acceleration in parametric form, and projectile problems. 3 lectures. Prerequisites: Math 201 and 118

Math 203 Differential and Integral Calculus (3)

Integration of algebraic and transcendental functions by formula, trigonometric substitution, parts, partial fractions, and tables. Methods used in approximate integration, evaluating indeterminate forms, infinite series, and improper integrals. Applied problems using algebraic and transcendental functions. 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 probability curve, simple linear correlation. 3 lectures. Prerequisite: Math 103 or 117 or 112 or 122

Math 213 Elementary Engineering Problems (2)

Selected problems from engineering fields which are solvable by the methods of elementary mathematics. Selection of topics from the following: 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, and an introduction to programming. 3 lectures. Prerequisite: Math 217

Math 304 Programing 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 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 312 Matrix Analysis of Electric Networks (2)

Definition and fundamental operations with matrices. Application of matrix transformations and inversions to electric networks. 2 lectures. Prerequisite: Math 316

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)

Infinite series, gamma functions, Bessel functions, Laplace transforms, the Heaviside operator, and elliptic integrals. 3 lectures. Prerequisite: Math 317

Math 319 Mathematical Analysis of Engineering Problems (3)

Infinite series, Fourier series, Fourier integral, partial differential equations, and line integral. 3 lectures. Prerequisite: Math 317

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 activity period. 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 four 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 213 and 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 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)

Discussions by students through seminar methods of new developments in the fields of their specific interests.

Math 501 Noneuclidean Geometry (3)

Introduction to geometries based upon postulates other than those of Euclid. Presents a viewpoint of geometry valuable to persons interested in mathematics, in teaching mathematics, and allied fields. 3 lectures. Prerequisite: Math 317

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)

Fundamental ideas underlying such fields of mathematics as theory of numbers, set theory, projective geometry, and topology. Ideas which are of particular significance to students and teachers of mathematics and physical science. 3 lectures. Prerequisite: Graduate standing.

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. One, two, or three lectures. Prerequisite: Instructor's approval.

MILITARY SCIENCE AND TACTICS DEPARTMENT

Department Head, Col. Wilford E. H. Voehl

Capt. Robert J. Shively Maj. Earl W. Fletcher Capt. Roland A. Kline

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 gradua-

tion, 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 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; school of the soldier (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; crew-served weapons and gunnery; school of the soldier (drill). May be substituted for PE 241, 242, 243. Two lectures. One hour and 20 minutes field instruction. Prerequisite: MS I 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.

*** MS&T 301-302-303 (MS III) Advanced Course (3) (3) (3)**

Leadership; military teaching methods; branches of the Army; small unit tactics and communication; exercise of command (drill). Four 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)**

Command and staff; the military team; training management; estimate of the situation and combat orders; military intelligence; supply and evacuation; motor transportation; troop movements; military administration; military justice; the role of the United States in world affairs and the present world situation; leadership; officer indoctrination; exercise of command (drill). Four lectures. One hour and 20 minutes field instruction. Prerequisite: MS III or equivalent.

* 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
Clarence J. Caughran

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, 241, 242, 243, 341, 342, 343, 441, 442, 443 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.

Mu 144, 145, 146, 244, 245, 246, 344, 345, 346, 444, 445, 446 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.

Mu 147, 148, 149, 247, 248, 249, 347, 348, 349, 447, 448, 449 Brass, String or Woodwind Choir (1) (1) (1)

Open to qualified players. Rehearsal and public performances in trios, quartets, and quintets. 1 laboratory. Perequisite: Permission of the instructor.

Mu 151, 152, 153, 251, 252, 253, 351, 352, 353, 451, 452, 453 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.

Mu 154, 155, 156, 254, 255, 256, 354, 355, 356, 454, 455, 456 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.

Mu 157, 158, 159, 257, 258, 259, 357, 358, 359, 457, 458, 459 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.

Mu 161, 162, 163, 261, 262, 263, 361, 362, 363, 461, 462, 463 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.

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	William R. Hicks	Thomas J. Lee
Ann P. Boukidis	LeRoy B. Hughes	Howard O'Daniels
Sheldon Harden	James J. Jensen	Alice J. Reynolds
	Edward J. Jorgensen	

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.

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

Freshman	F	W	S
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
	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
	17½	17½	15½

Junior	F	W	S
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 334W)		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 laboratory.

PE 123 Swimming and Water Sports Theory and Practice (2)

Supervision of pool activities. Swimming instruction and safety. 1 lecture, 1 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, Ed 431.

PE 126 Introduction to Recreation (3)
Games and activities suitable for a community recreation program. 1 lecture, 2 laboratories.

PE 141 Physical Education (½)
Fundamentals of sports and games. 2 laboratories.

PE 142 Physical Education (½)
Tumbling and apparatus work; basic sports; gymnastics and calisthenics. 2 laboratories.

PE 143 Physical Education (½)
Sports activities; physical tests; progressive activities. 2 laboratories.

PE 144, 145 Beginning Swimming (½) (½)
Beginning swimming for all who do not pass college swimming test. 2 laboratories.

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 laboratories.

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 laboratory.

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 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 laboratories.

PE 242 Sports Education (½)
Training and competition in seasonal sports such as basketball, badminton, volleyball, boxing, and wrestling. 2 laboratories.

PE 243 Sports Education (½)
Training and competition in seasonal sports such as tennis, track, cross country running, softball, archery, and soccer. 2 laboratories.

PE 245 Advanced Swimming and Lifesaving (½)
Lifesaving techniques. Qualified students may obtain Red Cross Water Safety Instructor's cards. 2 laboratories.

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 laboratories.

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 laboratory.

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 laboratories.

PE 255W Apparatus and Gymnastics (2)

Progression and teaching techniques in tumbling and gymnastic stunts. 1 lecture, 1 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 laboratory.

PE 323M Baseball Coaching Theory and Practice (2)

Fundamentals of the sport; methods of teaching team play in these activities. 1 lecture, 1 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 laboratory.

PE 331M Techniques of Officiating (2)

Techniques 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 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 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 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 laboratories.

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 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. 2 lectures, 1 laboratory.

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 laboratory.

PE 446W, 447W, 448W Teaching Progression in Dance (2) (2) (2)
Teaching progression in dance: folk, contemporary, and social. 2 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	Herbert R. Kabat	J. Robert Saunders
Paul R. Bryson	Bruce Kennelly	Alfred W. Simon
Robert H. Frost	Vance D. Lewis	Howard Walker
Lewis E. Hammitt	Theodore Matthew	Omer K. Whipple
Robert E. Holmquist	T. M. Rickansrud	Lester V. Whitney
Ray J. Holt	Arthur Z. Rosen	Hewitt G. Wight
A. L. Houk		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 agricutural 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, 118)	5	5	
Differential and Integral Calculus (Math 201)			3
General Chemistry (Chem 321, 322, 323)	4	4	4
General Physics (Phys 131, 132)		4	4
	16½	17½	16½

Sophomore	F	W	S
Principles of Economics (Ec 201)	3		
Literature or Philosophy			3
Engineering Drafting (ME 121) or elective		2	
Sports Education (PE 241, 242, 243)	½	½	½
Family Relations (Psy 206)		3	
Differential and Integral 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		
Engineeering Statics (Phys 201)	3		
Electrical Circuits (Phys 206)			3
Electrical Measurements Laboratory (Phys 256)			1
Light (Phys 223)			3
* Electives		7	3
	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
[2]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, 301, 403, Math 316, Chem 327, 328, 332, 343, 433.
[1] Agricultural Mechanics (AE 121) will substitute.
[2] Math 117 and 118 may be substituted for Math 102, 103, 114, 115.

Sophomore	F	W	S
Quantitative Analysis (Chem 331, 332)	4	4	
Organic Chemistry (Chem 326)			4
General Physics (Phys 131, 132)		4	4
Construction of Laboratory Glassware (Chem 342)		1	
[2]Mathematics (Math 114, 115, 201)	3	3	3
[3]Engineering Drafting (ME 121)	2		
Sports Education (PE 241, 242, 243)	½	½	½
[4]Restricted Electives	4	4	3
Electives	3		2
	16½	16½	16½
Junior			
General Physics (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		
Special Problems for Advanced Undergraduates (Chem 400)			2
[4]Restricted Electives		3	
	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		
Growth of American Democracy (Hist 304)	3		
U. S. in World Affairs (History 305)		3	
[4]Restricted Electives	3	3	4
Electives	2	4	6
	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)

[2] Math 117 and 118 may be substituted for Math 102, 103, 114, 115.
[3] May be substituted by Lit., Phil., Art, or Music.
[4] See list of restricted electives.
[5] To be selected from Ec 202, 316, 411, 412 or Pol Sc 401.
[6] To be selected from Eng 211, 212, 213, 311, 312, 313, Phil 201.

Pesticides
- General Botany (Bot 123)
- General Entomology (Ent 126)
- Plant Pathology (Bot 223)
- Insect 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 Undergraduates (Bio 400)

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 322)
- Differential and Integral Calculus (Math 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 commoner 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. Prerequisites: 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 precipitimetry, 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 133, Math 201

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; magnetostatics, electrostatics, and current electricity. 3 lectures, 1 recitation, 1 laboratory. Prerequisite: Math 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. Prerequisites: 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. Prerequisites: 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. Prerequisites: Phys 131, Math 201

* Not offered 1958-59.

Phys 206 Electrical Circuits (3)

Direct current, alternating current, and electronic circuits. 3 lectures. Prerequisites: 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 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. Prerequisites: 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 256 Electrical Measurements Laboratory (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. Prerequisites: Phys 133 or 204, Math 203

Phys 306 Thermodynamics (3)

Solution of basic problems dealing with forms of energy, thermodynamic coordinates, first and second laws of thermodynamics, gas laws, energy equations, reversible nonflow processes of gases, Carnot cycle. 3 lectures. Prerequisites: Phys 132, Math 201

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)

Fundamental atomic particles, mass-energy equivalence, the nuclear atom, electromagnetic radiation effects, X-ray phenomena, De Broglie waves. 3 lectures. Prerequisites: Phys 133 or 204, Math 203

Phys 402 Modern Physics (3)

Structure of the nucleus, isotopes, natural radioactivity, induced nuclear disintegrations, transuranic elements, nuclear reactions. 3 lectures. Prerequisite: Phys 401

Phys 403 Applied Nuclear Physics (4)

Neutron physics, nuclear fission and reactors, tracer techniques, and selected applications in engineering, chemistry, and biology. 3 lectures, 1 demonstration-recitation period. Prerequisite: Phys 402

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. Given in odd-numbered years.

PSc 216 Astronomy (3)

Astronomical properties of the earth, solar system, stars, and galaxies. Principles and methods of astronomical investigation. 3 lectures. Given in even-numbered years.

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

J. D. Avary
Ralph W. Dilts
Michel N. Franck
Hugh E. Law
Dorothy McLinn
Thomas F. Nolan
Michael J. O'Leary
Phillip W. Payton
Dominic B. Perello
M. Eugene Smith
Calvin Strother

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

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 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
	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
	16½	17½	15½

* Of the 52 units of electives, 24 will require approval of department head.

Junior	F	W	S
*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 (Geo 308)		3	
Commercial Law (Ec 316)			3
Descriptive Statistics (Math 211)	3		
Senior Project (Soc Sc 461)			2
†Electives	2	3	1
	17	15	15
Senior			
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
Accounting (Ec 301, 302 or Ec 411, 412)	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)

The financial, market, agricultural, and industrial structure of the American economy; an overview of the economy with emphasis upon gross national product. 3 lectures. Prerequisite: sophomore standing

Ec 202 Principles of Economics (3)

Introductory analytical economics. Price determination under free competition, imperfect competition, partial monopoly, and complete monopoly. Costs of the factors of production; effective combination of the factors of production. 3 lectures. Prerequisite: Ec 201

Ec 213 Economic Problems (3)

The relationship between the consumption and production of goods and the satisfaction of human wants. Problems of exchange, national and international. Public regulation. 3 lectures. Prerequisite: Ec 201

Ec 301, 302 Principles of Accounting (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 laboratory.

Ec 306 General Business Administration (3)

Forms and structure of business enterprises; techniques of office organization and administration. Business and personnel relationships with emphasis on commerce and agriculture. 3 lectures.

* Hist 304 will not substitute for any part of this requirement.
† Of the 52 units of electives, 24 will require approval of department head.

Ec 316 Commercial Law (3)

The principles of contracts, the sale of personal property, negotiable instruments, and the sale of real property. 3 lectures. Prerequisite: Ec 201

Ec 317 Commercial Law (3)

Mortgages, bailments, partnerships, insurance, agency, employment. 3 lectures. Prerequisites: Ec 201, 316

Ec 411 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. Prerequisite: Ec 201

Ec 412 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. Prerequisite: Ec 201

Ec 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.

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. Prerequisites: 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 301, 302, 303 United States History (3) (3) (3)

A comprehensive survey of the development of the United States from the fifteenth 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. Prerequisites: Eng 105, Pol Sc 301, Hist 304

Hist 411, 412 History of the Pacific Area (3) (3)

General survey of international 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. Prerequisites: 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. Prerequisites: 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. Prerequisites: 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. Prerequisites: Graduate standing and major in social sciences. Maximum of 6 units may be earned.

DESCRIPTIONS OF COURSES IN GEOGRAPHY

Geog 221 Political and Industrial Geography (3)

Elements of geography primarily for the elementary school teacher; map reading and making; the effect of geography upon industry and agriculture. 2 lectures, 1 laboratory.

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.

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. Prerequisites: 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 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. Prerequisites: 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. Prerequisites: Admission to teacher education program and graduate standing.

TECHNICAL ARTS DEPARTMENT

The objectives of the Technical Arts Department are to prepare students for employment in industrial sales and service, industrial operations, technical writing, industrial arts teaching, and allied fields.

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, socially oriented graduate.

The program is recommended for individuals who have a strong interest in technology coupled with an ability to deal with people.

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 chapter on degrees and credentials in this catalog 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.

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, 118)		5	5
Machine Shop (MS 141-142, MS 143-144, MS 145-146)	2	2	2
Welding (Weld 151-152, 154, 155)	2	1	1
Sheet Metal Shop Practice (AC 129)	2		
Engineering Drafting (ME 121, 122, 123)	2	2	2
Mechanical Technology (ME 134, 135)		3	3
Health Education (PE 107)	2		
Physical Education (PE 141, 142, 143)	½	½	½
	16½	16½	16½
Sophomore			
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	
Electronic Technology (EL 131, 132, 133)	3	3	3
Electric Machines (EE 133)			3
Technical Sketching (TA 244)	3		
Sports Education (PE 241, 242, 243)	½	½	½
	18½	16½	16½

** Industrial Sales and Service Option*

Junior (Major courses not offered in 1958-59)			
Principles of Economics (Ec 201)	3		
Principles of Accounting (Ec 301, 302)		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
Electives			3
	16	16	15

Senior (Major courses not offered in 1958-59)	F	W	S
Commercial Law (Ec 316)	3		
Industrial Management (Ec 411)		3	
Industrial Relations (Ec 412)			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
Senior Electives	6	5	6
Electives	3	3	3
	17	16	17

**** Industrial Arts Teaching Option***

Junior (Major courses not offered in 1958-59)			
Graphic Arts (TA 147, 148)	3	3	
Woodworking (TA 141, 142, 143)	3	3	3
General Chemistry (Chem 321, 322)	4	4	
General Psychology (Psy 202)	3		
Educational Psychology (Ed 312)			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
Electives	2	4	6
	18	17	18

Senior (Major courses not offered in 1958-59)			
Student Teaching (Ed 430)	9		
Principles of Economics (Ec 201)		3	
Audiovisual Instruction (AV 431)		2	
Senior Project (TA 461, 462)		2	2
Undergraduate Seminar (TA 463)			2
Evaluation in Secondary Education (Ed 504)			3
Counseling and Guidance (Ed 503)		3	
General Metalwork (TA 245)		3	
Materials and Techniques for Teaching General Drafting (TA 435D)	3		
Materials and Techniques for Teaching General Metalworking (TA 435M)		3	
Materials and Techniques for Teaching General Woodworking (TA 435W)			3
Restricted Electives			6
	12	16	16

* A student entering the Industrial Sales and Service option, even as a transfer, should not expect to complete all requirements for graduation until June 1960.

** A student entering the Industrial Arts Teaching option, even as a transfer, should not expect to complete all requirements for graduation until June, 1961.

SPEECH
(See English)

DESCRIPTIONS OF COURSES IN TECHNICAL ARTS

TA 141 Woodwork (3)
Introduction to tools, machines and materials in the field of woodworking. 3 laboratories.

TA 142 Woodwork (3)
Cabinetwork and furniture construction. Operation and care of woodworking machines. Painting, finishing and refinishing. 3 laboratories. Prerequisite: TA 141

TA 143 Woodwork (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 142

TA 147, 148, 149 Graphic Arts (3) (3) (3)
Introduction to graphic arts; hand composition, platen press work, 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 (3)
Sketches of industrial products and mechanical parts using perspective, isometric, and oblique projection. Shading. Basic design. 3 laboratories. Prerequisite: ME 121, 122

TA 245 General Metalworking (3)
Advanced and correlated skills from unit shop fields. Art metal, foundry and other units not covered in previous courses. 3 laboratories. Prerequisites: MS 145, 146, Weld 152, 155, AC 129

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 321, 322, 323 Mechanical Systems (3) (3) (3)
Case history study of mechanical systems from operational and service viewpoint; air conditioning and refrigeration, petrochemical processing, materials handling, manufacturing processes, powerplants and others. 2 lectures, 1 laboratory.

TA 331, 332, 333 Electrical Systems (3) (3) (3)
Case history study of electrical systems from operational and service viewpoints; data processing, powerplants, electrical distribution, ore refining, automation and others. 2 lectures, 1 laboratory.

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 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. Prerequisites: ME 121, 122, 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. Prerequisites: 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. Prerequisites: MS 145, 146, Weld 152, 155, AC 129, TA 245

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. Prerequisites: TA 141, 142, 143

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.

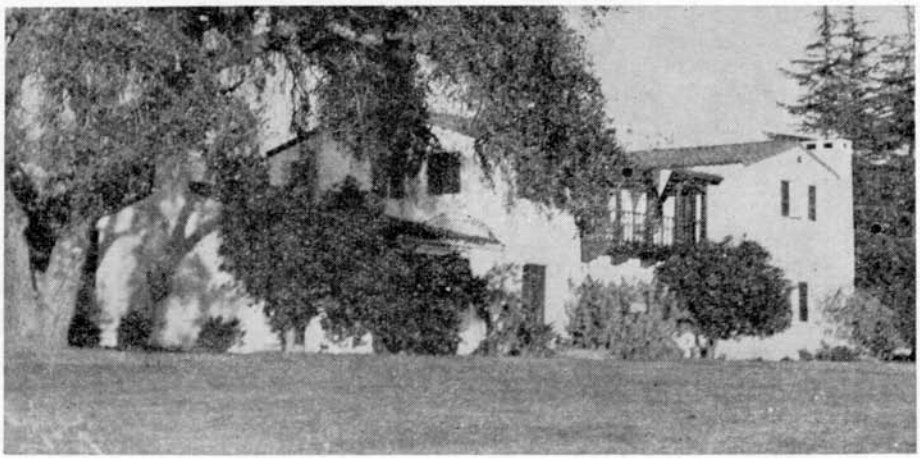
TA 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of professional papers on technical arts. 2 meetings.

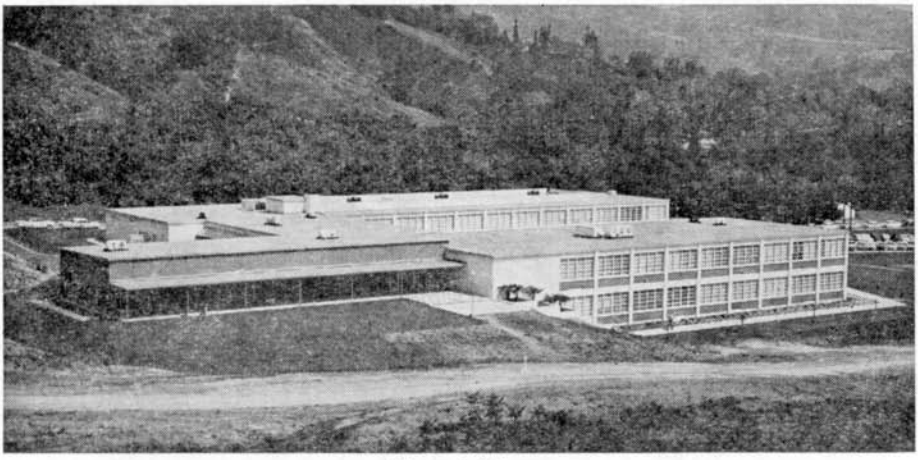
KELLOGG-VOORHIS CAMPUS

KELLOGG UNIT
POMONA

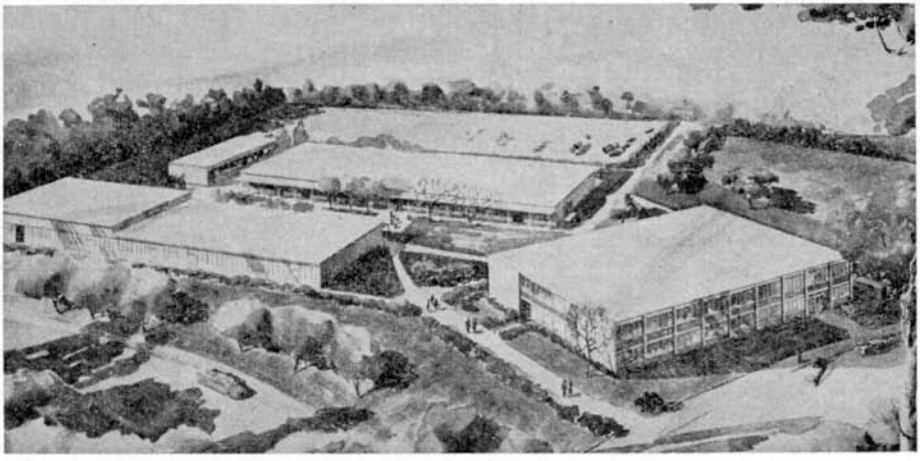
VOORHIS UNIT
SAN DIMAS



Residence Hall



Science Building



Engineering Center

KELLOGG-VOORHIS CAMPUS

CALIFORNIA STATE POLYTECHNIC COLLEGE

POMONA — SAN DIMAS

INTRODUCTION

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 Kellogg-Voorhis Campus and the San Luis Obispo Campus are one institution following the educational philosophy long established at San Luis Obispo. In the case of agriculture the majors are in accordance with the needs of the area and the climatic conditions to be found in Southern California.

The Agricultural Division gives four-year programs leading to the bachelor of science degree in six majors. They are agricultural management and sales, animal husbandry, fruit production, general crops production, horticultural services and inspection, and ornamental horticulture including 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 the first three years of work in aeronautical, electronic, industrial, and mechanical engineering. Senior course work leading to the bachelor of science degree in each of the four majors will be added in 1959. See Engineering Division Section, page 239, for information relative to planning courses and individual student counseling.

The Arts and Science Division offers major programs in biological sciences, English, mathematics, physical education, physical sciences, and social sciences. It is anticipated that fifth year courses will be provided eventually so that students in the Arts and Sciences Division may complete requirements for the general secondary credential. In addition to its major departments, the division has departments of music, and psychology and visual arts.

In the field of business, major offerings are provided in accounting, business administration, and marketing and sales.

Women students will not be admitted during the 1958-59 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 at the Kellogg Unit. The Science Building, the first completed structure, was put into

use in the fall of 1956, and the major instructional operation of the southern campus is now carried on at the Kellogg Unit. To the offerings of the Agricultural Division, which have been expanded steadily since their inception, the college has now added majors in engineering and in arts and sciences.

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 Unit 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 Unit provide not only the major campus site but also field and laboratory facilities for study and project work in all of the majors in agriculture. On this unit are found commercial-size activities in fruits and field crops, animal production including feeds and pastures, poultry production, and ornamental horticulture. In addition, the college leases 278 acres of farmland from the Pacific State Hospital, 1½ miles from the Kellogg Unit, 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 Unit, where certain classes, especially in field laboratory work in agriculture, are offered. Student housing is also located at the Voorhis Unit. Administration and student personnel offices are in the Science Building at the Kellogg Unit. A multimillion-dollar expansion program is under way and it is anticipated that some $24,000,000 will be spent for new facilities at the Kellogg Unit in the next five years.

Library

Library services are available on both campuses. The main library is in the Science Building at the Kellogg Unit. A reading and reserve room is maintained at the Voorhis Unit. The library collection includes basic books plus specialized documentary and periodical materials in support of all the majors offered.

Classrooms

The 75,000-square-foot Science Building contains modern (1955-56 construction) class and lecture rooms, laboratories, and audiovisual services in addition to the library and administration offices. Additional classrooms are available at the Voorhis Unit. Description of specialized agricultural facilities may be found under the Agricultural Division heading.

Engineering Buildings

The new engineering buildings are at the Kellogg Unit 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.

Physical Education and Athletics

New physical education and athletic facilities, covering 38 acres, have been completed at the Kellogg Unit. These include a gymnasium with related classrooms and offices, also fields for football, track, baseball and other sports. A five-acre playfield is also maintained at the Voorhis Unit for intramural and recreational activities.

Cafeterias

A 25,000-square-foot cafeteria is in operation at the Kellogg Unit and seats 210 students. It also includes a snack bar, outside patio, and a dining room for staff and special groups. A cafeteria is also available at the Voorhis Unit.

Housing

Ten stucco buildings designed in the traditional early California mission style and one two-story frame structure serve as men's residence halls. These dormitories serve single students and are located at the Voorhis Unit. On this same campus are housing units for married students and their families, consisting of one double-story and three single-story structures equipped with all the necessary facilities for family life. They house a total of 30 families. All units have living room, kitchenette and bath. Sixteen have two bedrooms and 14 have one bedroom. The project is landscaped, including a fenced-in play area for children.

Chapel

Occasional nonsectarian services are held in the Voorhis Chapel, and many student and community weddings take place there during the school year. The architectural style of the chapel was patterned after the old Spanish missions.

Health Center

The temporary campus health center is located behind the Science Building at the Kellogg Unit. A graduate nurse is in attendance. Part-time physician's services are available. There is also a part-time health center located at the Voorhis Unit.

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 BODY GOVERNMENT

Student body 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.

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 and held in conjunction with Poly Vue, 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

A regular student pays a $3 fee per quarter for medical service. The service includes treatment by a physician for minor injuries and diseases. It does not include hospitalization, major surgery, or X-ray.

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 business men 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.

Leopold Edward Wrasse Loan Fund

This fund is available to students under the same terms and conditions as listed for the San Luis Obispo campus.

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

In addition to the scholarships listed in the General Information section of this catalog, several scholarships have been established on the Kellogg-Voorhis Campus.

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.

ADMISSIONS AND GENERAL REGULATIONS

Admission requirements, registration procedure, admission with advanced standing, credit by examination, scholarships, special instructional services, graduation requirements, and teaching credential requirements are the same for the Kellogg-Voorhis Campus as for the San Luis Obispo Campus of the college. Complete information on these subjects may be found in the General Information, Admissions, and General Regulations sections of this catalog.

REGULATIONS

The following regulations apply to students at the Kellogg-Voohis Campus in the same manner as to students on the San Luis Obispo Campus: Change of Curricula, Change of Program, Class Attendance, Grading System, Minimum Grade Requirements, Maximum and Minimum Loan, Credit for Military Service. (See section of this catalog on General Regulations.)

Eligibility for Intercollegiate Athletics

Eligibility at the Kellogg-Voorhis Campus is determined on the same basis as at the San Luis Obispo Campus including the application of the California Collegiate Athletic Association rules with the following exceptions:

1. Any varsity competition at California State Polytechnic College prior to September, 1958, or at any four-year college with a male enrollment of less than 750 students shall not count as part of the three years of varsity competion allowed.
2. A transfer student from a four-year college shall have completed 36 quarter units of work at California State Polytechnic College or at a junior college or at a combination of the two in order to be eligible for varsity competition.
3. Any student must have earned a number of grade points at least equal to 10 less than twice the number of units attempted.

FEES AND EXPENSES

State Fees and Deposits

Materials and service fee (quarter)	
Each student enrolled for less than 4 units	$6.00
Each student enrolled from 4 to not over 6 units	10.00
Each student enrolled for over 6 units	13.00
Each student enrolled in summer quarter	13.00
Nonresident Tuition:	
Each nonresident student enrolled for 15 units or more (per quarter)	60.00
Each nonresident student enrolled for less than 15 units (per quarter per unit)	4.00
Breakage deposit (year)	10.00
(Refundable to student when he leaves college less any charges against him)	
Late registration fee	2.00
Late return of registration cards fee	2.00
Course challenge 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	2.00
Credential fee (for each credential)	4.00

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 the summer quarter are the same as fees for the other quarters.

Living Expenses

FOR STUDENTS LIVING IN CAMPUS RESIDENCE HALLS

Room and evening meals, per quarter (subject to change) $100.00

(Must be paid quarterly in advance; students are required to furnish bed linen, blankets and pillows. Meals include evening dinner Monday through Friday at Voorhis Unit. Breakfast and lunch are available at the Kellogg Cafeteria 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 $185 to $235, 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.†

Breakage deposit (per year)	$10.00
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)	13.00
Room and required evening meals per quarter	100.00
Books and supplies (estimated)	50.00 *
Meals in addition to board plan (estimated per quarter)	125.00
Laundry (estimated $10 per month)	30.00
	$339.00

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

Instruction

Instruction on the Kellogg-Voorhis Campus of the California State Polytechnic College is primarily confined to six 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 production 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.

	Freshman	*Sophomore*	*Junior*	*Senior*
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.

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 packing house 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 three glasshouses, two lathhouses, two screenhouses, two propagation houses, and numerous hotbeds and coldframes.

Students majoring in horticultural 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 houses.

The facilities of the Soil Science Department include a soils laboratory equipped with modern soil testing equipment as well as a field house 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.

Agricultural mechanics shops have facilities for training students in mechanical skills, such as farm machinery operations and repair, farm building construction, welding, wiring, and plumbing. There are two main buildings given over to shop work. The first is a two-story structure, 160 feet long and 40 feet wide, which serves as the center for farm power and machinery, carpentry, plumbing, and rural electric wiring projects. The second is a welding shop, equipped with acetylene and arc stations.

College 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 MANAGEMENT AND SALES DEPARTMENT

Department Head, Robert Lloyd

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 flow of agricultural products through processing and distribution channels to the ultimate consumer.

The Agricultural Management and Sales program is a business-type college program built upon a firm agricultural foundation. It is designed to train students for such positions as: owner, manager, supervisor of related agricultural businesses, agricultural sales-service, marketing specialist, real estate appraiser, and government 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.

Metropolitan Los Angeles with its industrial activity serving agriculture and one of the Nation's largest agricultural markets provides excellent opportunity for student field study and work experience.

Students majoring in other departments will find excellent elective courses in this program to supplement their major field of study.

CURRICULUM IN AGRICULTURAL MANAGEMENT AND SALES

Freshman	F	W	S
Introduction to Business (AMS 101)	3		
Office Organization and Operation (OM 102)		3	
Language Communication (Eng 104, 105, 106)	3	3	3
Health Education (PE 107)	2		
Business Mathematics (Math 108, 109)		3	3
Physical Education (PE 141, 142, 143)	½	½	½
General Biology (Bio 101)	3		
† General Physical Science (PSc 101, 102)		4	4
General Psychology (Psy 202)			3
*Electives	5	4	3
	16½	17½	16½
Sophomore			
Business Organization and Management (AMS 201)	3		
Salesmanship (AMS 202)		3	
Job Instruction Training (AMS 203)			1
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	5	4
	16½	17½	16½

* Twenty-four elective units are to be selected from courses in agricultural production majors at the direction of the head of the Agricultural Management and Sales Department.

† Chem 324, 325, 326 may be substituted for PSc 101, 102, 103.

Junior	F	W	S
Credits and Collections (AMS 301)	3		
Stock and Inventory Control (AMS 302)		3	
Business and Sales Finance (AMS 303)			3
Merchandising, Advertising and Promotion (AMS 305)		3	
Agricultural Marketing (FM 304)	3		
Descriptive Statistics (Math 211)			3
Human Relations (Psy 304)	3		
Economic Problems (Ec 213)			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	4
	16	16	16
Senior			
Administration and Business Management Problems (AMS 401)	3		
Insurance and Taxation (AMS 411)	3		
Personnel Management and Industrial Relations (AMS 402)		3	
Wholesaling and Retailing (AMS 412)		3	
Transportation Practices and Policies (AMS 416)			3
Senior Project (AMS 461, 462)	2	2	
Undergraduate Seminar (AMS 463)			2
Cost and Payroll Accounting (Actg 303)			3
Report Writing (Eng 301)	3		
U. S. in World Affairs (Hist 305)			3
Advanced Public Speaking (Sp 303)		2	
* Electives	6	6	5
	17	16	16

DESCRIPTIONS OF COURSES IN AGRICULTURAL MANAGEMENT AND SALES

AMS 101 Introduction to Business (3)

The field and scope of agricultural business. Fundamental concepts, tools, and practice. 3 lectures.

AMS 201 Business Organization and Management (3)

Forms and problems of agricultural business organization and operation. Functions and fundamental skills of business management. 3 lectures.

AMS 202 Salesmanship (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.

AMS 203 Job Instruction Training (1)

The skills of foremanship and on-the-job supervision. Operations and problems of supervision. 1 lecture.

AMS 301 Credits and Collections (3)

Principles and techniques of reducing credit risks. Sources of credit information, credit terms, laws relating to credit instruments. Collection problems and techniques. 3 lectures.

AMS 302 Stock and Inventory Control (3)

Techniques of stock room and warehouse operation. Inventory management, purchasing and receiving documents, record keeping, and materials handling problems. 2 lectures, 1 laboratory.

* Twenty-four elective units are to be selected from courses in agricultural production majors at the direction of the head of the Agricultural Management and Sales Department.

AMS 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.

AMS 305 Merchandising, Advertising, and Promotion (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.

AMS 401 Administration and Business Management Problems (3)

Fundamentals of executive leadership and policymaking in an expanding economy. Specific administration and management problems as they may be correlated to the aims and goals of business. Relationship of business policy and public relations. 3 lectures.

AMS 402 Personnel Management and Industrial Relations (3)

Employer-employee relationships. Manpower utilization and management. Labor relations and principles of collective bargaining. 3 lectures.

AMS 411 Insurance and Taxation (3)

Application of principles of insurance and taxation to specific agricultural situations. Emphasis upon insuring business risk, health and accident, social security, and workman's compensation. Federal, state, and local tax policies. Employer and employee taxes. 3 lectures.

AMS 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.

AMS 416 Transportation Practices and Policies (3)

A study of the principles of transportation and the functions of the traffic manager. Detailed examination of various regulations, documents, and rate structures of the different means of transport. 3 lectures.

AMS 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.

AMS 463 Undergraduate Seminar (2)

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

ANIMAL HUSBANDRY DEPARTMENT

Department Head, Weslie Combs

Thomas Anderson David Cramer Jack Gesler
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	
General Zoology (Zoo 131, 132)		4	4
Physical Education (PE 141, 142, 143)	½	½	½
Electives	4		
	16½	17½	15½
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	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 Botany (Bot 121)		4	
Sports Education (PE 241, 242, 243)	½	½	½
General Bacteriology (Bact 221)		4	
Health Education (PE 107)	2		
	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.

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[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 AMS 201, 303, 401, 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. Prerequisite: 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 of fleeces on the basis of grade, class, yield, quality, etc. Preparation for intercollegiate judging contests. 2 laboratories. Prerequisite: AH 232

AH 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.

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. Prerequisite: 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, AH 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.

FRUIT PRODUCTION DEPARTMENT

Department Head, Albert E. Canham

Harry L. Maltby Lloyd Newell

An industry as economically valuable 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 the 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 of the handling and marketing of California-grown fruit is made easily accessible through the college-owned citrus packing house and local fruit processing plants, and marketing organizations.

The purpose of the fruit production program is to prepare students for occupations as orchard operators or managers. Placement opportunities also exist in closely related fields serving the fruit industry. These include work as laboratory and field technicians with agencies of the state, county, and federal governments; agricultural teaching; and employment by fruit processing and marketing organizations, fruit tree nurseries, pest control companies, agricultural contractors, and insecticide, fertilizer and equipment companies.

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)		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 Botany (Bot 121, 122)	4	4	
General Entomology (Ent 126)			4
Project Records (FM 100)	1		
	16½	16½	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.

Junior	F	W	S
Citrus and Avocado Marketing (CF 301)	3		
Packinghouse Management (CF 322)		4	
Orchard Management (CF 323)			4
General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Family Relations (Psy 206)		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	
	17	17	16
Senior			
Special Problems (CF 400)		2	
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
U. S. in World Affairs (Hist 305)			3
Agricultural Biochemistry (Chem 328)	4		
Electives	8	6	7
	17	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: Bot 121

CF 221 Citrus Pest Control (4)

Recognition of citrus pests, damage, seasonal habits in relation to control. Control methods and materials. Spray rig operation, tree 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: Bot 121, Ent 126

CF 226 Citrus Diseases (4)

Diseases of citrus under California conditions, their symptoms and methods of control. 3 lectures, 1 laboratory. Prerequisites: Bot 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: Bot 121

CF 246 Fruit Propagation (1)

Topworking and grafting fruit plants. Types of grafts used, selection of grafting wood, inarching, and bridge grafting, 1 laboratory. Prerequisite: Bot 121

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, 222, 226

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 223, 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, 222, 223, 226

CF 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: Bot 322

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.

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.

FP 131 Pomology (4)

Commercial deciduous fruits and nuts. Varieties, production areas, seasonal cultural practices and problems. 3 lectures, 1 laboratory. Offered even-numbered years.

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: Bot 121. 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 even-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 odd-numbered years.

FP 234 Deciduous Disease and Pest Control (4)

Studies and field identification of diseases and insect pests of deciduous trees. Field application of control materials. 3 lectures, 1 laboratory.

GENERAL CROPS DEPARTMENT

Department Head, Robert L. Procsal

Frederick D. Pettem Staley Pitts

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		
General Botany (Bot 121, 122)	4	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)	½	½	½
	16½	16½	16½
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)	½	½	½
	15½	17½	15½
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	5	2
	17	16	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
	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

CP 321 Crop Pest Control (4)

Methods of recognizing and combatting 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 122, 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

* To be selected from advanced economics or management and sales courses with the approval of the adviser.

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 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.

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.

HORTICULTURAL SERVICES AND INSPECTION DEPARTMENT

Department Head, Edward C. Appel, Jr.

Kenneth R. Hobbs Lloyd Newell

The Horticultural 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 HORTICULTURAL 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		
General Botany (Bot 121, 122)		4	4
Approved Plant Production Course	4	4	4
	16½	16½	16½
Sophomore			
Economic Insect Pests (SI 228, 229)		3	3
Plant Identification (SI 224)	4		
Pest Control Materials (SI 231)		4	
Weed Control (SI 226)			3
Rodent Control (SI 223)			3
Principles of Economics (Ec 201, 202)	3	3	
Pest Control Equipment (AE 233)			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		4
	15½	16½	16½

Junior	F	W	S
* 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	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
Family Relations (Psy 206)			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
Report Writing (Eng 301)			3
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	9	8
	17	17	16

DESCRIPTIONS OF COURSES IN HORTICULTURAL 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 mammals injurious to agricultural crops and structures including introduced rats and mice, ground squirrels, pocket gophers, moles, native rats and mice. Identification, seasonal history, and economic importance. Control methods and materials, their uses and precautions. Related laws and regulations. 2 lectures, 1 laboratory. Prerequisite: SI 101

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. Prerequisites: Bot 122, Ent 126

SI 226 Weed Control (3)

Collection, preservation, and identification of common weeds found in agricultural crops, industrial and residential areas. Primary and secondary noxious weeds and seeds; their habits of growth, seasonal history, and most effective methods and materials for control. Related laws and regulations. 2 lectures, 1 laboratory. Prerequisites: SI 101, Bot 122

* Students wishing to specialize in Structural Pest Control will substitute for the courses indicated, the following: SI 332, 333, 334, 446, Path 335, AMS 201, 202, ME 121, Actg 121, 122, Bus 301, and 302.

† Two applied plant pathology courses to be selected with approval of major adviser.

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.

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.

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

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. Prerequisites: SI 325, Ent 126, Path 223

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.

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, habitats; 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 orthopods 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 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.

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.

ORNAMENTAL HORTICULTURE DEPARTMENT

Department Head, Oliver A. Batcheller

Warren Asa — Jere S. French — James M. Griffin
Howard O. Boltz — Richard A. Moore

The Ornamental Horticulture Department is divided into two majors: ornamental horticulture and landscape architecture.

The function of the major in ornamental horticulture is to train men for positions in the ornamental horticultural industry and allied fields. 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 managerial and operational positions in general nursery work, specialized growing, greenhouse management, flower production, and for civil service positions; some may choose to take graduate work preparatory to teaching ornamental horticulture.

The major in landscape architecture prepares men for all phases of the landscape industry including landscape architecture, landscape contracting, and related fields. The rapidly expanding population in California has resulted in an increased demand for the services of landscape architects and contractors. Graduates have a choice of positions from a wide area: as landscape architects they may establish their own private offices or take employment with firms of landscape architects or contractors, preparing plans and specifications, supervising construction and planting for residential developments and public agencies; or as employees of public departments such as schools, parks and recreation, highways and planning agencies. As landscape contractors they may establish their own private businesses or secure employment with landscape contracting firms as designer-supervisors, estimators, landscape salesmen, or construction foremen.

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. For students in landscape architecture 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.

Part-time employment and summer jobs in the ornamental horticulture and landscape industries after one or two years of training, provide 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		
General Botany (Bot 121, 122)	4	4	
General Entomology (Ent 126)			4
Project Records (FM 100)	1		
	16½	16½	16½

Sophomore	F	W	S
Ornamental Trees (OH 221)	4		
Specialized Plant Propagation (OH 222)		4	
Principles of Landscape Design (LA 224)	4		
Landscape Design of Small Homes (LA 225)		4	
Planting Design (LA 226)			3
Herbaceous Landscape Plants (OH 321)			4
Principles of Economics (Ec 201, 202)	3	3	
Salesmanship (AMS 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			1
	17½	17½	16½
Junior			
Greenhouse Design and Management (OH 323)		4	
Commercial Cut-flower Growing (OH 334)	4		
Flower Shop Operations (OH 339)			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	
Electives	2	2	4
	17	16	16
Senior			
Genetics (Bio 303)			3
Agricultural Biochemistry (Chem 328)		4	
Fruit Production (FP 230 or FP 136)	4		
Undergraduate Seminar (OH 463)			2
Senior Project (OH 461, 462)	2	2	
* Economics	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
Electives	7	7	8
	16	16	16

CURRICULUM IN LANDSCAPE ARCHITECTURE

Freshman			
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Health Education (PE 107)	2		
Ornamental Shrubs (OH 122)		4	
Landscape Construction (AE 124, 125)	2	2	
Electricity and Plumbing (AE 122)			2
General Botany (Bot 121)	4		
Agricultural Mathematics (Math 102, 103)		3	3
Nursery Practices (OH 121)			4
Landscape Drafting (LA 141)	3		
Theory of Design (LA 141, 142)		3	3
Electives	3	1	1
	17½	16½	16½

* Three units to be selected from: FM 304, 403, Bus 301.

Sophomore	F	W	S
Principles of Landscape Design (LA 224)	4		
Landscape Design of Small Homes (LA 225)		4	
Planting Design (LA 226)			3
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)	½	½	½
Farm Surveying (AE 131, 132)		2	2
Electives			2
	17½	15½	17½
Junior			
Park Design (LA 324)	4		
Landscape Design of Suburban Properties (LA 326)			4
Landscape Construction Drawing (LA 338, 339)		4	4
Native Plant Materials (OH 236)			3
Public Speaking (Sp 201)	2		
Advanced Public Speaking (Sp 303)		2	
Soils (SS 121)		4	
Fertilizers (SS 221)			4
Modern Literature (Eng 211)	3		
Landscape Contracting (LA 331, 332)	3	3	
American Government (Pol Sc 301)	3		
Electives	1	3	2
	16	16	17
Senior			
Advanced Landscape Design (LA 435)		4	
History and Literature of Landscape Architecture (LA 424)	3		
Turf Maintenance and Management (OH 333)			4
Senior Project (LA 461, 462)	2	2	
Undergraduate Seminar (LA 463)			2
Farm Records (FM 321)	3		
Business Law (Bus 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	
Electives	5	2	8
	16	15	17

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 122

OH 230 General Nursery Practices (3)

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

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, 223

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, 123, 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, 224

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, Bot 122

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, 122, 224, 226, 221, 321

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 351 Special Ornamental Horticultural Problems (1-3)

Special advanced work in the ornamental horticultural field, of a technical and professional nature, to further qualify advanced students in the field. Hours to be arranged. Limited to advanced students.

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.

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. 2 lectures, 2 laboratories.

LA 225 Landscape Design of Small Homes (4)

Adaptation of landscape design principles to the garden layout of residential properties. Each student designs and renders in color a minimum of four small home properties. 2 lectures, 2 laboratories. Prerequisite: LA 224

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: LA 122, 221

LA 241 Perspective (2)

Mechanical and sketching perspective. 2 laboratories.

LA 242, 243 Delineation (2) (2)

Three-dimensional representation using different media which enables a student to express his ideas visually. 2 laboratories.

LA 324 Park Design (4)

Application of design principles to more specialized landscape problems of parks, schools, and public institutions. 2 lectures, 2 laboratories. Prerequisites: LA 224, 225

LA 326 Landscape Design of Suburban Properties (4)

Design principles are applied in the solving of landscape problems dealing with large residential developments. 2 lectures, 2 laboratories. Prerequisites: LA 224, 225

LA 331 Landscape Contracting (3)

Practice in handling men and applying approved techniques in landscape construction. Cost finding and estimating for the landscape trade. 2 lectures, 1 laboratory. Prerequisites: AE 124, 125, Math 102, 103, AE 131, 132

LA 332 Landscape Contracting (3)

Practice in handling men and applying approved techniques in landscape construction. Contract writing and legal aspects of landscape contracting. 2 lectures, 1 laboratory. Prerequisites: LA 331, Math 102, 103, AE 131, 132

LA 338 Landscape Construction Drawing (4)

Construction problems involving the preparation of plans for grading, drainage and irrigation, staking, including the writing of specifications. 2 lectures, 2 laboratories. Prerequisite: LA 324 or 326

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 324 or 326

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 435 Advanced Landscape Design (4)

A study of the relationship of buildings and building groups to irregular topography and the further development of the land and elements thereon. A study of professional methods is undertaken in connection with the problems. 2 lectures, 2 laboratories. Prerequisites: LA 338, 339

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.

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.

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		
Soil Conservation (SS 222)		3	
General Field Crops (CP 230)	4		
California Soils (SS 123)			3
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	
Electives			5
	15½	15½	16½
Sophomore			
Fertilizers (SS 221)	4		
Soil Management (SS 122)			4
Range Management (SS 223)		4	
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
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
	17½	17½	16½

Junior (San Luis Obispo)	F	W	S
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		
General Dairy Husbandry (DH 230)			4
* Optional Courses			3
	17	17	17
Senior (San Luis Obispo)			
Farm Management I (FM 322)	4		
Agricultural Resources (FM 305)			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		
* Optional Courses	6	3	
Electives		3	6
	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 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

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

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. Identification of important range plants. 3 lectures, 1 laboratory. Prerequisite: SS 121

SS 230 General Soils (4)

General properties of soils including common soil management, fertility, and conservation practices. Nonsoils majors. 3 lectures, 1 laboratory.

* Students electing to specialize in Soil Conservation must select 12 units from the following courses: AE 132, 437; AH 101, 102, 402; Bot 343; Bio 433; OH 220; PH 230; CP 221, 321.

Students electing to specialize in Technical Soils must select 12 units from the following courses: Zoo 131; Bio 225; Bot 322; Phys 131; PSc 209; Chem 331, 332, 432; Math 201; Eng. 301.

RELATED AGRICULTURAL COURSES

In addition to courses within major departments of study, there are certain fields of agriculture, including agricultural mechanics, poultry, and soils, which 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

Leo P. Gorman Albert E. Kattenhorn 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)

House wiring practices, types of material use, 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. Oxyacetylene cutting. 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.

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, and commercial fertilizer equipment. 1 lecture, 1 laboratory. Prerequisite AE 122

AE 222 Farm Machinery (2)

Selection, operation, and adjustment of haying, harvesting, cultivating, spraying, and dusting equipment. For students majoring in the crops and fruit production fields. 1 lecture, 1 laboratory. Prerequisite: AE 221

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 122

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, diesel, and butane 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

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. A general course for other than dairy majors. 3 lectures, 1 laboratory.

DESCRIPTIONS OF COURSES IN POULTRY INDUSTRIES

Frederick D. Davis

PI 131 Poultry Production (4)

Poultry industry in Southern California. Breeds and strains for egg and meat production. Types of housing. Poultry as a sideline with other crop and livestock enterprises. 3 lectures, 1 laboratory.

PI 132 Fryer Production (4)

Fryer production and problems in Southern California. Emphasis on peculiarities of housing, feeding, climatic management and marketing peculiar to Southern California conditions. 3 lectures, 1 laboratory. Prerequisite: PI 131

PI 133 Egg Production (4)

Aspects of egg production in cages in Southern California. Suitable strains for cage production. Feed formulations, culling and egg quality problems. Los Angeles Market requirements. 3 lectures, 1 laboratory. Prerequisite: PI 131

PI 136 Turkey Production (4)

Turkey production in Southern California desert regions. Emphasis upon strains, housing, management and climatic problems. Marketing and financial practices. 3 lectures, 1 laboratory. Prerequisite: PI 131

PI 231 Poultry Products (3)

Conditions surrounding the production and marketing of poultry meats and eggs in Southern California. Emphasis on assembly, processing, grading, selling and storage methods. 3 lectures.

PI 232 Egg Wholesaling (4)

Survey of the purchase, processing and sale of eggs in quantity to include: candling, grading, packaging, costs, equipment, sanitation regulations, labor management. Preparation of byproducts. Principal dealers. 3 lectures, 1 laboratory. Prerequisite: PI 131

PI 233 Poultry Meat Wholesaling (4)

The purchase, processing and sale of poultry to include: grading, packaging, costs, equipment, sanitation regulations, labor management, and preparation of byproducts. 3 lectures, 1 laboratory. Prerequisite: PI 231

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

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 cooperatively and otherwise. Structure and functions of the markets. Emphasis on distribution of California farm products. 3 lectures. Prerequisite: Ec 201

FM 321 Farm Records (3)

The fundamental processes of recordkeeping 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

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.

AERONAUTICAL ENGINEERING DEPARTMENT

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; a smoke tunnel for visual observation of flow phenomena; and a supersonic, "blow-down" wind tunnel capable of producing velocities up to Mach 3.59 over small test shapes. Schlerien 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
Aircraft Machinery and Structures (Aero 124, 125, 126)	3	3	3
Aeronautical Laboratory (Aero 144, 145, 146)	1	1	1
Engineering Drafting (ME 121, 122)	2	2	
Descriptive Geometry (ME 125)			3
Machine Shop (MS 144, 145)	2	2	
Sheet Metal Laboratory (MS 155, 156)		1	1
Welding (Weld 144, 145)	1	1	
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			3
General Physics (Phys 131)			4
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
	17½	18½	18½
Sophomore			
Aircraft Drafting (Aero 247, 248)	2	2	
Engineering Statics (ME 201)	3		
Engineering Dynamics (ME 204)		3	
Strength of Materials (ME 202, 203)		3	3
Kinematics (ME 223)			3
Electrical Engineering (EE 231)			3
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
Literature		3	
Health Education (PE 107)	2		
Sports Education (PE 241, 242, 243)	½	½	½
	17½	18½	18½
Junior			
Aerodynamics (Aero 301, 302)	3	3	
Aircraft Stress Analysis (Aero 327, 328)	3	3	
Aircraft Detail Design (Aero 344, 345, 346)	2	2	2
Strength of Materials Laboratory (ME 249)	1		
Thermodynamics (ME 301)	3		
Electrical Engineering (EE 232)	3		
Electronic Engineering (EL 222, 223)	3	3	
Chemistry (Chem 321, 322)		4	4
Applied Biology (Bio 110)			3
Growth of American Democracy (Hist 304)			3
Electives		3	3
	18	18	15
Senior (Major Courses Not Offered 1958-59)			
Aircraft Design Layout (Aero 444, 445, 446)	3	3	3
Aerodynamics (Aero 404, 405)	3	3	
Aeronautical Laboratory (Aero 457, 458)	2	2	
Aircraft Propulsion Systems (Aero 421, 422)	4	3	
Senior Project (Aero 461, 462)	2	2	
Undergraduate Seminar (Aero 463)			2
Heat Transfer (ME 313)	3		
* Industrial Relations (Ec 412)			3
Family Relations (Psy 206)			3
U. S. in World Affairs (Hist 305)		3	
Electives			6
	17	16	17

* Industrial Management (Ec 411) may be substituted.

DESCRIPTIONS OF COURSES IN AERONAUTICAL ENGINEERING

Aero 124, 125, 126 Aircraft Machinery and Structures (3) (3) (3)

Theory of operation and fundamental principles of the aircraft powerplant and accessory machinery. Tools, techniques, and procedures used in the manufacture and maintenance of aircraft structures. Aircraft structural processes and materials. Basic theory of flight. 2 lectures, 1 laboratory. Prerequisite: Math 117, 118, or higher must be taken concurrently with Aero 125 and Aero 126

Aero 144, 145, 146 Aeronautical Laboratory (1) (1) (1)

Basic aeronautical engineering experiments. Pressure, temperature, weight, rotative speed, fluid properties, gas analysis. Engine performance. Maintenance work on powerplants and related aircraft accessories. 1 laboratory.

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 247, 248 Aircraft Drafting (2) (2)

Execution of detail drawings of typical aircraft parts: sheet metal parts, machined parts, castings, forgings, extruded and rolled shapes, and assemblies. Includes dimensioning, notes, title blocks, and material, fastener and process callouts used in the aircraft industry. Includes freehand pictorial sketching. 2 laboratories. Prerequisite: ME 122, MS 155

Aero 301, 302 Aerodynamics (3) (3)

The atmosphere, dynamics, and thermodynamics of air, air speed determinations, types of fluid flow, fluid friction, airfoil theory, wing theory, lift, induced drag, parasite drag, power. Propeller theory, propeller selection methods, aircraft propulsion methods, basic performance problems. Special performance problems. 3 lectures. Prerequisite: Math 316

Aero 327, 328 Aircraft Stress Analysis (3) (3)

Design procedure layout, critical load conditions, influence lines, analysis of beams by moment area, successive integration, and moment distribution methods. Design of simple beams. Torsional combined stresses. Trusses and frames. 2 lectures, 1 laboratory. Prerequisite: ME 203

Aero 344, 345, 346 Aircraft Detail Design (2) (2) (2)

Detail and assembly drawings of typical aircraft parts are drawn from data taken from layout drawings and sketches furnished by the designer. Parts include fuselage, wings, tail, landing gear, control systems, equipment, armament, electrical and hydraulic systems. Calculations and use of handbooks. 2 laboratories. Prerequisite: Aero 248

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 404, 405 Aerodynamics (3) (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. Two-dimensional analysis of supersonic flow, flow in a duct, normal shocks, Prandtl-Meyer expansion and oblique stock, thin airfoils, transonic conditions, supersonic wind tunnels, and test methods. 3 lectures. Prerequisite: Aero 302

Aero 421, 422 Aircraft Propulsion Systems (4) (3)

Analysis of reciprocating, turboprop, turbojet, pulsojet, athodyd, and rocket aircraft engines with respect to fuel burning, performance, gas turbine thermodynamic analysis, and structural and mechanical requirements. 2 lectures, 2 laboratories; 2 lectures, 1 laboratory. Prerequisite: ME 301

Aero 444, 445, 446 Aircraft Design Layout (3) (3) (3)

Layouts with preliminary design calculations, line drawings, diagrams, and layout of the airplane in general including its respective sections. Careful design investigation given to major fittings and installations. Experimental and production design. 1 lecture, 2 laboratories. Prerequisite: Aero 346

Aero 457, 458 Aeronautical Laboratory (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 302

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. Minimum 120 hours total time. Prerequisite: senior standing and Aero 146

Aero 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent engineering developments. 2 lectures. Prerequisite: Senior standing.

ELECTRONIC ENGINEERING DEPARTMENT

George A. Mellard 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 engineering courses which begin in the second year. This plan provides (1) an opportunity to explore the field before undertaking any 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 and physics.

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 investigations, 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 two student organizations: a student branch of the Institute of Radio Engineers, and an amateur radio club.

CURRICULUM IN ELECTRONIC ENGINEERING

Freshman	F	W	S
Radio Technology (EL 101, 102, 103)	3	3	3
Radio Shop (EL 141, 142, 143)	2	2	2
Drafting for Electronics (EL 146)			2
Engineering Drafting (ME 121, 122)	2	2	
Machine Shop (MS 151, 152)	1		1
Welding (Weld 144)	1		
Sheet Metal (MS 155)	1		
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			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
	18½	19½	18½

Sophomore	F	W	S
Radio Transmitter Technology (EL 201)	3		
Television Technology (EL 202)		3	
Electronic Control Technology (EL 204)			3
Transmitter Shop (EL 241)	1		
Television Shop (EL 242)		1	
Electronic Control Shop (EL 243)			1
Electron Tubes (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
Welding (Weld 145)	1		
Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
Physics of Electricity and Magnetism (Phys 204)	4		
Health Education (PE 107)			2
Sports Education (PE 241, 242, 243)	½	½	½
	16½	16½	16½
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
Electric Machines (EE 313)		3	
Thermodynamics (ME 301)	3		
Engineering Materials (ME 314)			3
Differential Equations (Math 317)	2		
Chemistry (Chem 321, 322)	4	4	
Applied Biology (Bio 110)			3
* Industrial Relations (Ec 412)			3
Principles of Economics (Ec 201)		3	
	17	18	17
Senior (Major courses not offered 1958-59)			
Pulse Techniques (EL 404)	3		
Microwave Components (EL 401)		3	
Electromagnetic Fields (EL 402)	3		
Servomechanisms (EL 411)			3
Advanced Electronic Laboratory (EL 441, 442, 443)	1	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		5	7
	17	18	17

* Industrial Management (Ec 411) may be substituted.
† Heat Transfer (ME 313) is recommended.

DESCRIPTIONS OF COURSES IN ELECTRONIC ENGINEERING

EL 101, 102, 103 Radio Technology (3) (3) (3)

Fundamentals and applications of electricity to radio. Adapted to the needs of the electronic technician and commercial radio operator. Descriptive background for later engineering courses. 2 lectures, 1 computation session. Prerequisite: Math 117 concurrent with EL 102

EL 141, 142, 143 Radio Shop (2) (2) (2)

Directed assignments facilitating an understanding of the operation and construction of radio receivers and amplifiers. Use of test equipment in the adjustments of these units. 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 Transmitter Technology (3)

Principles, operation, and maintenance of transmission equipment adapted to the needs of the commercial radio operator and field technician. 3 lectures. Prerequisite: EL 103

EL 202 Television Technology (3)

Principles, operation, and maintenance of television system equipment. Detailed study of the television system. Adapted to the needs of the television technician. 3 lectures. Prerequisite: EL 103

EL 204 Electronic Control Technology (3)

Operational study of electronic control circuits such as those used in resistance welding, photoelectric devices, motor speed controls, induction and dielectric heaters. Adapted to the needs of the electronic technician. 3 lectures. Prerequisite: EL 103

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. Prerequisite: 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 and 1 laboratory. Prerequisite: 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 Transmitter Shop (1)

Practical studies in the operation, adjustment, and maintenance of transmission equipment adapted to the needs of the commercial radio operator and the field technician. 1 laboratory. Concurrent: EL 201

EL 242 Television Shop (1)

Practical studies in the adjustment and maintenance of circuits used in television systems. Television antenna systems. Adapted to the needs of the television technician. 1 laboratory. Concurrent: EL 202

EL 243 Electronic Control Shop (1)

Practical studies in the operation, adjustment, and maintenance of electronic control circuits such as used in resistance welding, photoelectric devices, motor speed controls, induction and dielectric heaters. 1 laboratory. Concurrent: EL 204

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, Math 316

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 radiofrequency voltage amplifiers. Class C power amplifiers, loading and coupling networks. Radiofrequency 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 311, 312, 313 Industrial Electronics (2) (2) (2)

Analysis of vacuum and gas-filled electron tubes and associated circuits with emphasis on control circuits. 2 lectures. Prerequisite: EE 313 or equivalent.

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 radiofrequency 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-RETMA procedures. 1 laboratory. Concurrent: EL 304

EL 345 Radio Engineering Laboratory (1)

Experimental determination of the important operating characteristics of tuned radiofrequency voltage and power amplifiers and radiofrequency oscillators. Performance testing of radio receivers in accordance with standard IRE-RETMA 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 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 status 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. Prerequisite: EL 306, 402

EL 402 Electromagnetic Fields (3)

Static and quasi-static fields; laws of Coulomb, Gauss, Ohm, Faraday, Ampère; 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 411 Servomechanisms (3)

Principles of closed loop control systems. Analysis of transfer functions. Corrective networks. Stability criteria. 3 lectures. Prerequisites: EL 303, 304

EL 441, 442, 443 Advanced Electronic Laboratory (1) (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.

INDUSTRIAL ENGINEERING DEPARTMENT

Robert G. Winterbourne

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

Freshman	F	W	S
Business Procedures (IE 101, 102)	3		3
Machinery Analysis (IE 121, 122, 123)	1	1	1
Engineering Drafting (ME 121, 122, 123)	2	2	2
Machine Shop (MS 144, 145, 245)	2	2	2
Welding (Weld 144, 145)	1	1	
Language Communication (Eng 104, 105, 106)	3	3	3
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			3
Office Organization and Operations (OM 102)		3	
General Physics (Phys 131)			4
Physical Education (PE 141, 142, 143)	½	½	½
	17½	17½	18½
Sophomore			
Production Tooling (IE 221, 222)	3	3	
Engineering Statics (ME 201)	3		
Strength of Materials (ME 202, 203)		3	3
Engineering Dynamics (ME 204)		3	
Strength of Materials Laboratory (ME 249)			1
Sheet Metal (MS 155, 156)	1	1	
Welding (Weld 146)	1		
Calculus (Math 202, 203)	3	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
American Government (Pol Sc 301)			3
Health Education (PE 107)	2		
Sports Education (PE 241, 242, 243)	½	½	½
	17½	17½	16½
Junior			
Production Planning (IE 321, 322)	3	3	
Production Control (IE 332, 333)		3	3
Electrical Engineering (EE 231, 232, 233)	3	3	3
Thermodynamics (ME 301)	3		
Fluid Mechanics (ME 311)		3	
Heat Transfer (ME 313)			3
Mechanical Design (ME 427, 428, 429)	2	2	2
Applied Biology (Bio 110)			3
Chemistry (Chem 321, 322)	4	4	
Growth of American Democracy (Hist 304)	3		
Electives			3
	18	18	17

Senior (Major courses not offered 1958-59)	F	W	S
Engineering Sales (IE 401)	3		
Chemical Processes (IE 412)		3	
Production Management (IE 421, 422, 423)	4	4	4
Time and Motion Study (IE 431)	3		
Production Laboratory (IE 444)	2		
Senior Project (IE 461, 462)	2	2	
Undergraduate Seminar (IE 463)			2
Business Law (Bus 301)			3
Advanced Technical Writing (Eng 319)		2	
U. S. in World Affairs (Hist 305)			3
Family Relations (Psy 206)			3
Literature		3	
Electives	3	3	3
	17	17	18

DESCRIPTIONS OF COURSES IN INDUSTRIAL ENGINEERING

IE 101, 102 Business Procedures (3) (3)

Principle of organization and functions of a business office; basic organization charts; fundamentals of office systems and equipment. Purchasing, receiving, and inventory procedures. 2 lectures, 1 laboratory; 3 lectures.

IE 121,122, 123 Machinery Analysis (1) (1) (1)

A study of the materials and components of machines, mechanisms, and structures, including general principles of manufacture and assembly. Lab work consists of assembly of the machine to study the individual components. 1 laboratory.

IE 221, 222 Production Tooling (3) (3)

A study of equipment and special tools used in mass production including review of alternative methods of design, construction, and application of tooling for punch press, machine tool, forging, welding, and foundry operations. 2 lectures, 1 laboratory. Prerequisite: MS 245

IE 240 Additional Engineering Laboratory (1-2)

Total credit limited to four units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

IE 321, 322 Production Planning (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 222

IE 332, 333 Production Control (3) (3)

Organization of control, sales forecasting; scheduling of production, routing of operations and processing, dispatching and expediting, reporting procedures. Materials planning procurement and control. Quality control organization for inspection of raw materials, work-in-process and finished products. 2 lectures, 1 laboratory. Prerequisite: IE 222

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 401 Engineering Sales (3)

Fundamentals and principles of engineering sales. Basic salesmanship; service functions related to sales engineering, management of a sales force, training, compensation, quotas, costs, and budgets. 3 lectures.

IE 412 Chemical Processes (3)

Principles and technical fundamentals of chemical processes that are a part of production and manufacturing. Surface conditioning, washing, degreasing, plating, heat treatment. 2 lectures, 1 laboratory. Prerequisite: IE 333

IE 421, 422, 423 Production Management (4) (4) (4)

Principles of organization and administration; interdepartment relationships; cost and budgetary controls; personnel relations; job evaluation; wage incentives; plant maintenance, industrial safety; plant protection. 3 lectures, 1 laboratory. Prerequisite: IE 333

IE 431 Time and Motion Study (3)

Methods of stopwatch time and motion study. Techniques of establishing efficient operation in assembly line stations through the use of methods-time-measurement systems. Practical exercises to develop proficiency. Includes the theory and practice of incentive systems. 2 lectures, 1 laboratory. Prerequisites: IE 322, 333

IE 444 Production Laboratory (2)

A study of the 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. Prerequisite: IE 222, MS 245

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

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 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, die-casting machines, plastics presses, and die-sinking machines are provided for engineering students taking advanced courses.

DESCRIPTIONS OF COURSES IN MACHINE SHOP

MS 144 Machine Shop (2)

Fundamentals of bench and drill press work; lathe operation; tool grinding. 2 laboratories.

MS 145 Machine Shop (2)

Lathe operation including chuck work and internal thread cutting. 2 laboratories. Prerequisite: MS 144

MS 151 Machine Shop (1)

Fundamentals of lathe operation including turning between centers, thread cutting, and chuck work. Also, feeds, speeds, and tool grinding. 1 laboratory.

MS 152 Machine Shop (1)

Fundamentals of shaping, milling, grinding, sawing, and drilling machines. 1 laboratory. Prerequisite: MS 151

MS 155 Sheet Metal Shop (1)

Familiarization with basic sheet metal techniques, selection of materials, use and care of tools and equipment. 1 laboratory.

MS 156 Sheet Metal Shop (1)

Application of the basic techniques to those which would be found in industry. Use of the punch press and other sheet metal power machinery. 1 laboratory. Prerequisite: MS 155

MS 240 Tool Room Practice (1-2)

Advanced instruction on machine tools and methods peculiar to the tool room: universal cylindrical, surface, and tool and cutter grinding, fundamentals of turret lathes, milling and engraving, use of precision instruments, and heat treating. Total credit limited to 2 units. 1 or 2 laboratories. Prerequisite: MS 245

MS 245 Machine Shop (2)

Operation of power hacksaw, radial drill, contour saw, shapers, milling machines, grinders, and production tooling. 2 laboratories. Prerequisite: MS 145

MECHANICAL ENGINEERING DEPARTMENT

Department Head, Walter E. Holtz

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

Freshman	F	W	S
Engineering Drafting (ME 121, 122, 123)	2	2	2
Power Generation (ME 131, 132, 133)	3	3	3
Mechanical Engineering Lab (ME 144, 145, 146)	1	1	1
Machine Shop (MS 144)		2	
Sheet Metal (MS 155, 156)	1	1	
Welding (Weld 144, 145, 146)	1	1	1
Mathematics for Engineers (Math 117, 118)	5	5	
Calculus (Math 201)			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)	½	½	½
	18½	18½	17½
Sophomore			
Engineering Statics (ME 201)	3		
Strength of Materials (ME 202, 203)		3	3
Engineering Dynamics (ME 204)		3	
Kinematics (ME 223)	3		
Strength of Materials Lab (ME 249)			1
Electrical Engineering (EE 231)			3
Machine Shop (MS 145, 245)	2	2	
Calculus (Math 202, 203)	3	3	
Differential Equations (Math 316)			3
General Physics (Phys 132, 133)	4	4	
Principles of Accounting (Actg 121)			3
Principles of Economics (Ec 201)			3
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
Sports Education (PE 241, 242, 243)	½	½	½
	18½	18½	16½

Junior	F	W	S
Thermodynamics (ME 301, 302)	3	3	
Fluid Mechanics (ME 311)	3		
Industrial Heat Transfer (ME 313)			3
Machine Design (ME 324, 325, 326)	3	3	3
Mechanical Systems in Buildings (ME 334, 336)	3	3	
Electronic Engineering (EL 222, 223)	3	3	
Electrical Engineering (EE 232, 233)	3	3	
General Chemistry (Chem 321, 322)		4	4
Technical Writing (Eng 219)			3
Applied Biology (Bio 110)			3
	18	19	16
Senior (Major courses not offered 1958-59)			
Mechanical Vibrations (ME 423)	3		
Tool Design (ME 431, 432)	3	3	
Production Design (ME 438, 439)		3	2
Mechanical Engineering Laboratory (ME 444)	2		
Senior Project (ME 461, 462)	2	2	
Undergraduate Seminar (ME 463)			2
Chemical Processes (IE 412)		3	
* Industrial Relations (Ec 412)		3	
U. S. in World Affairs (Hist 305)	3		
Family Relations (Psy 206)			3
Literature			3
Electives	3	3	6
	16	17	16

DESCRIPTIONS OF COURSES IN MECHANICAL ENGINEERING

ME 121 Engineering Drafting (2)

Use of drafting equipment. Freehand lettering. Pictorial drawing. 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 (3)

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. 1 lecture, 2 laboratories. Prerequisite: ME 121

ME 131,132,133 Power Generation (3) (3) (3)

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.

* Industrial Management (Ec 411) may be substituted.

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 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. Prerequisites: 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

ME 204 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: ME 201, Math 202

ME 223 Kinematics (3)

The study of motion 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 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 (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. Prerequisites: Phys 132, Math 203; concurrent: Chem 321, 322

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 201; concurrent: ME 204

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 and ME 311 or Aero 302

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 324, 325, 326 Machine Design (3) (3) (3)

Design of basic machine and structural elements such as gears, keys and couplings, shafts, bearings, brakes, clutches. Balancing of rotating masses and design of welded parts. Machine and assembly drawing organization. Methods of preparing contracts and specifications. 2 lectures, 1 laboratory. Prerequisite: ME 203, ME 204

ME 334, 336 Mechanical Systems in Buildings (3) (3)

Theory and application of plumbing systems, water supply, waste disposal, compressed air and other piping systems, heating, refrigeration and air conditioning. 3 lectures. Prerequisite: Phys 131

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 powerplants 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 423 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. Prerequisites: ME 326, Math 316

ME 431, 432, 433 Tool Design (3) (3) (3)

Design of manufacturing tools such as jigs, fixtures, and dies. Materials, tolerance balancing, and toolroom methods as design factors. 1 lecture, 2 laboratories. Prerequisite: ME 326

ME 438, 439 Production Design (3) (2)

Design of machinery and components parts from the viewpoint of production problems involved. Study of design features which best accommodate welding, machining, castings, and other production processes. 1 lecture, 2 laboratories; 1 lecture, 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 302, ME 313, concurrent ME 423

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

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.

DESCRIPTION OF COURSES IN WELDING

Weld 144 Welding Survey (1)

Basic oxyacetylene techniques. Deals with equipment used, applications, safety and limitations. Includes 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 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

RELATED ENGINEERING COURSES

In addition to courses within major departments of study, there are additional service courses necessary to provide a well rounded engineering curriculum.

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; Phys 204 may be taken concurrently with EE 212

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

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, elementary education, English, mathematics, physical education, physical sciences, and social sciences. These programs offer opportunities in both elementary and 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 graduates for specific nonteaching jobs in its area in keeping with the college's philosophy of occupational education. The Departments of Music and Psychology and Visual Arts provide supporting courses and work 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, marketing and sales, and office management. The latter curriculum provides for specialization in secretarial services. Each of these majors is planned to provide degree-level education leading to specific occupations in many aspects of business and commerce.

ACCOUNTING DEPARTMENT

Acting Department Head, George E. Carlberg

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 uses 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 serves the needs of students in engineering and agriculture who desire training in accounting. Classrooms and laboratories in a new business building, to be occupied in 1959, will be furnished with modern equipment of the type used in industry. Southern California industrialization and the concentration of large manufacturing plants convenient to the campus provide excellent opportunity for field study and work experience.

CURRICULUM IN ACCOUNTING

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		
Typewriting (OM 141, 142)	1	1	
Introduction to Business (Bus 101)	3		
Principles of Accounting (Actg 121, 122)	3	3	
Intermediate Accounting (Actg 123)			3
Office Organization & Operation (OM 102)		3	
Business Mathematics (Math 108, 109)		3	3
Public Speaking (Sp 201)			2
Accounting Machines (Actg 141)			2
Electives	4	3	3
	16½	16½	16½

Sophomore	F	W	S
Principles of Economics (Ec 201, 202)	3	3	
Sports Education (PE 241, 242, 243)	½	½	½
Business Organization & Management (Bus 201)	3		
Records for Small Business (OM 103)	3		
Cost & Payroll Accounting (Actg 221)	3		
Advanced Cost Accounting (Actg 222)		3	
Tax Accounting (Actg 203)			3
Business Correspondence (Eng 218)		3	
* Literature, Philosophy, Art or Music		3	3
Data Processing Methods (Actg 231)			3
Family Relations (Psy 206)			3
Electives	4	4	4
	16½	16½	16½
Junior			
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
Auditing (Actg 321)	3		
Credits & Collections (OM 301)	3		
Purchasing & Inventory Control (OM 302)		3	
Business Law (Bus 301, 302)		3	3
Advanced Public Speaking (Sp 303)			2
Business Statements (Bus 212)			1
* Natural Sciences	3	3	3
Electives	5	5	5
	17	17	17
Senior (Major courses not offered in 1958-59)			
Banking and Finance (Bus 408)	3		
Descriptive Statistics (Math 211)	3		
* Natural Sciences	3	3	
Accounting Systems (Actg 401)		3	
Investment Principles (Bus 404)		3	
Analysis of Investments (Bus 405)			3
Budgeting (Bus 406)			3
Insurance Principles (Bus 403)			3
Senior Project (Actg 461, 462)	2	2	
Undergraduate Seminar (Actg 463)			2
Electives	5	5	5
	16	16	16

DESCRIPTIONS OF COURSES IN ACCOUNTING

Actg 121, 122 Principles of Accounting (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 laboratory.

Actg 123 Intermediate Accounting (3)

Preparation of financial statements, including valuation and presentation, analytical practices, reports, ratios and measurements necessary in the preparation of statements. 2 lectures, 1 laboratory. Prerequisite: Actg 122

Actg 141 Accounting Machines (2)

A laboratory course designed to give actual experience in the use of machines found in typical accounting situations. 2 laboratories.

Actg 203 Tax Accounting (3)

Principles of taxation as applied to business, structures of tax forms and records necessary to satisfy governmental requirements. 3 lectures. Prerequisite: Actg 122

* To be selected from the General Education List.

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 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 laboratory. Prerequisite: Actg 221

Actg 231 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 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 203

Actg 321 Auditing (3)

Auditing standards and techniques. Preparation of audit reports and statements. Ethical and legal responsibilities of the auditor. 2 lectures, 1 laboratory. Prerequisite: Actg 222

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 401 Accounting Systems (3)

The installation and operation of accounting systems in business, with special attention to internal control. 3 lectures. Prerequisite: Actg 321

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.

BIOLOGICAL SCIENCES DEPARTMENT

Department Head, John F. Lamiman

Howard S. Brown, Jerome E. Dimitman, Jack L. Erspamer, Vernon L. Gregory, Harold L. Lint, Ormond G. Mitchell

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 fish and wild life conservation, entomology, food and drug act enforcement, plant pathology, and laboratory and museum work. (4) To give the courses which fulfill the general education requirement in life science.

The departmental laboratories, located in the Science Building, have the latest scientific equipment and are well supplied with laboratory materials. 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
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 Zoology (Zoo 131, 132, 133)	4	4	4
[2] General Inorganic Chemistry (Chem 324, 325)	4	4	
Organic Chemistry (Chem 326)			4
Electives	4	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, 123)	4	4	4
General Entomology (Ent 126)		4	
Genetics (Bio 303)	3		
Literature	3		
Literature, Art, or Music		3	3
Public Speaking (Sp 201)			2
Descriptive Statistics (Math 211)			3
Family Relations (Psy 206)		3	
[3] Group Electives	3		4
	16½	17½	16½
Junior			
General Psychology (Psy 202)		3	
Microtechnique (Bio 225)		3	
[4] General Physical Science (PSc 101, 102)	4	4	
American Government (Pol Sc 301)	3		
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
Bacteriology (Bact 221)			4
Senior Project (Bio 461)			2
[3] Group Electives	6	4	3
Electives	3		4
	16	17	16

[1] Math 102, 103 will substitute.
[2] Chem 321, 322, 323 will substitute for Chem 324, 325.
[3] See listing of group electives following this curriculum.
[4] Phys 131, 132, 133 will substitute.

Senior (Major courses not offered in 1958-59)	F	W	S
Agricultural Biochemistry (Chem 328)		4	
Senior Project (Bio 462)	2		
Undergraduate Seminar (Bio 463)		2	
[3] Group Electives	4	3	3
Electives	9	7	13
	15	16	16

Group Electives

Thirty units will be selected from the following groups with a minimum of 6 units from each group.

Group I		*Units*
Chem 329	Agricultural Biochemistry	(4)
Zoo 236	Invertebrate Zoology	(4)
Zoo 237, 238, 239	Human Anatomy and Physiology	(3) (3) (3)
Zoo 323	Embryology	(4)
Zoo 326	Comparative Anatomy of Vertebrates	(4)
Bot 322	Plant Physiology	(3)
Bot 335	Plant Anatomy	(4)
PSc 209	Geology	(3)
SS 121	Soils	(4)
Group II		
Path 223	General Plant Pathology	(4)
Path 324	Advanced Plant Pathology	(4)
VS 203	Animal Parasitology	(3)
Zoo 425	Parasitology	(4)
Zoo 435	Arthropod Vectors	(3)
Group III		
Bio 321	Conservation of Natural Resources	(3)
Bio 325	Plant and Animal Ecology	(3)
Bot 343	Taxonomy of Higher Plants	(3)
Ent 331	Insect Taxonomy	(3)
Ent 334	Advanced Entomology	(3)
SS 223	Range Management	(4)
Zoo 226	Vertebrate Field Zoology	(4)
Zoo 329	Ornithology	(3)
Group IV		
AH 101, 102	Feeds and Feeding	(2) (2)
AH 304	Animal Breeding	(3)
AH 402	Animal Nutrition	(3)
Bio 141, 142, 143	Biological Techniques	(2) (2) (2)
Bio 400	Special Problems for Undergraduates	(1-2)
CP 304	Plant Breeding	(3)
CP 230	General Field Crops	(4)
FP 230	General Fruit Production	(4)
TC 230	General Truck Crops	(4)
SI 101	Agricultural Law and Procedure	(3)
SS 123	California Soils	(3)
SS 222	Soil Conservation	(3)

DESCRIPTION OF COURSE 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. Prerequisite: Bot 121 or Zoo 131, or Chem 321 or 324

[3] See listing of group electives following this curriculum.

DESCRIPTIONS OF COURSES IN BIOLOGY

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 environments; 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 104 General Life Science (4)

A general survey of living things and life processes common to plants and animals. The importance of biology to daily living. Application of biological principles of health and heredity; conservation and appreciation of nature. 3 lectures, 1 laboratory.

Bio 110 Applied Biology (3)

Biology of man with application to engineering and industry. 3 lectures.

Bio 141, 142, 143 Biological Techniques (2) (2) (2)

Preparation of plant, animal and insect materials for display, study or teaching purposes. 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: 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: Bot 121 or Zoo 131

Bio 314 Teaching Elementary School Science (3)

Organizing the science program; teaching procedures; the 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 the 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 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 425 Principles of Evolution (3)

Theories, concepts and mechanisms of evolution in plants and animals. 3 lectures. Prerequisite: Bio 303, Bot 334, Zoo 226, 326

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.

DESCRIPTIONS OF COURSES IN BOTANY

Bot 121 General Botany (4)
Introduction to structure and functions of seed-bearing plants. 2 lectures, 2 laboratories.

Bot 122 General Botany (4)
Nature and relationships of plant groups from bacteria to angiospermae; emphasis on nonseed-bearing 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 236 Families of Flowering Plants (3)
Recognition of the major orders and families of flowering plants. 2 lectures, 1 laboratory. Prerequisite: Bot 122

Bot 307 Economic Botany (2)
Sources and uses of plant products used by man. 2 lectures. Prerequisite: Bot 122

Bot 322 Plant Physiology (3)
Functions of plants; water relations, metabolism, and plant growth. 2 lectures, 1 laboratory.

Bot 329 Grass Identification (2)
Structure and variation in grasses. Use of a key in identification. Recognition of tribes of the grass family. Use of vegetative characters in the identification of common hay and pasture grasses. 2 laboratories. Prerequisite: Bot 122

Bot 334 Plant Morphology (3)
Evolution of the plant kingdom as illustrated by the comparative morphology of representatives of the 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, and field work. Prerequisite: Bot 122

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 insect 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 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)

Cells, tissues, and organ systems of vertebrates; emphasis on man and domestic animals. 2 lectures, 2 laboratories.

Zoo 132 General Zoology (4)

Reproduction, embryology, and genetics in vertebrate animals. General taxonomy, economic zoology, ecology, and evolution. 2 lectures, 2 laboratories. Prerequisite: Zoo 131

Zoo 133 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: Zoo 132

Zoo 226 Vertebrate Field Zoology (4)

Identification, life histories and economic importance of vertebrates, especially birds and mammals. Field work emphasized. 2 lectures, 2 laboratories, and fieldwork. Prerequisite: Zoo 132

Zoo 236 Invertebrate Zoology (4)

Study of the invertebrate groups of animals with emphasis on taxonomy, structure, distribution and economic importance. 2 lectures, 2 laboratories, and field work. Prerequisite: Zoo 133

Zoo 237 Human Anatomy (3)

Structural aspects of the organ systems of man. 2 lectures, 1 laboratory. Prerequisites: Zoo 132. Recommended: Chem 326 and PSc 103

Zoo 238 Human Physiology (3)

Human cellular organization and function. Functions of respiratory, circulatory, digestive and excretory systems. Intermediary mechanisms. 2 lectures, 1 laboratory. Prerequisite: Zoo 237

Zoo 239 Human Physiology (3)

Functions of skeletal, muscular and nervous systems. Endocrine glands and hormonal activity. Reproduction and development. Human body and defense against disease. 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 and Bio 303 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 329 Ornithology (3)

Identification, structure, physiology, ecology, behavior and economic importance of birds, especially of the Pacific Coast Region. 1 lecture, 2 laboratories or field exercises and field project. Prerequisite: Zoo 132 and consent of instructor.

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 histories, control distribution and economic importance. 2 lectures, 2 laboratories. Prerequisite: Zoo 132. Recommended: Zoo 133

Zoo 435 Arthropod Vectors (3)

Role of insects, mites, ticks, and other arthropods in causation and transmission of diseases. Classification, stucture, and life history of arthropods and parasites. 2 lectures, 1 laboratory. Prerequisite: Zoo 425

BUSINESS ADMINISTRATION DEPARTMENT

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. Men and women 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, etc. 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 own relationships in society and responsibilities as a citizen in a community.

Because of its location near many industrial areas, the Kellogg Unit affords unique opportunity for visits to industrial concerns and correlation of classroom information with observations of on-the-job activities. Excellent facilities will be provided in the new business classroom building which is under constructon.

CURRICULUM IN BUSINESS ADMINISTRATION

	F	W	S
Freshman			
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Introduction to Business (Bus 101)	3		
Office Organization & Operation (OM 102)	3		
Business Mathematics (Math 108, 109)	3	3	
Health Education (PE 107)		2	
Typewriting (OM 141, 142)		1	1
Principles of Economics (Ec 201, 202)		3	3
Business Organization & Management (Bus 201)			3
Public Speaking (Sp 201)			2
Electives	4	4	4
	16½	16½	16½
Sophomore			
Sports Education (PE 241, 242, 243)	½	½	½
Marketing Principles (Mktg 201)	3		
Family Relations (Psy 206)	3		
Business Law (Bus 301, 302)	3	3	
* Literature, Philosophy, Art or Music	3	3	
Business Correspondence (Eng 218)		3	
Principles of Accounting (Actg 121, 122)		3	3
American Government (Pol Sc 301)			3
Descriptive Statistics (Math 211)			3
Advanced Public Speaking (Sp 303)			2
Business Statements (Bus 212)			1
Electives	4	4	4
	16½	16½	16½

* To be selected from the General Education List.

Junior	F	W	S
Growth of American Democracy (Hist 304)	3		
Principles of Advertising (Mktg 204)	3		
Transportation & Traffic Management (Bus 304)	3		
* Natural Sciences	3	3	3
U. S. in World Affairs (Hist 305)		3	
Production Management (Bus 305)		3	
Sales Management (Mktg 301)		3	
Managerial Accounting (Bus 306)			3
Personnel Management & Industrial Relations (Bus 402)			3
Public Relations (Jour 412)			3
Electives	5	5	5
	17	17	17
Senior (Major courses not offered in 1958-59)			
Budgeting (Bus 406)	3		
Government Control & Regulation of Business (Bus 407)	3		
Investment Principles (Bus 404)	3		
Analysis of Investments (Bus 405)		3	
Banking & Finance (Bus 408)		3	
* Natural Sciences		3	3
Insurance Principles (Bus 403)			3
Administration & Management Problems (Bus 401)			3
Senior Project (Bus 461, 462)	2	2	
Undergraduate Seminar (Bus 463)			2
Electives	5	5	5
	16	16	16

DESCRIPTIONS OF COURSES IN BUSINESS ADMINISTRATION

Bus 101 Introduction to Business (3)

Same as AMS 101.

Bus 201 Business Organization and Management (3)

Same as AMS 201.

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: Ec 201, 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 Production 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

* To be selected from the General Education List.

Bus 307 Time and Motion Studies (3)

The use of time and motion studies in a manufacturing concern. Types of studies available and their various benefits. 3 lectures. Prerequisite: Bus 305

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 401 Administration and Management Problems (3)

Same as AMS 401.

Bus 402 Personnel Management and Industrial Relations (3)

Same as AMS 402.

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

Bus 406 Budgeting (3)

Preparation and structure of budgets. Their effective administration. 3 lectures.

Bus 407 Government Control and Regulation of Business (3)

Federal and local regulations that relate to business, including those applicable to competition, pricing, mergers, failures, patents, and copyrights. 3 lectures.

Bus 408 Banking and Finance (3)

Monetary and banking principles as they apply to the problems of financing businesses including promotion, types of organization, long- and short-term capital, dividends, involvements, and expansion. 3 lectures.

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 himself 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 mehods 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, English, 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 1958-59

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 125, 126)		4	2
Art Materials and Skills (Art 234)			3
[1] Agricultural Science			4
	16½	16½	15½

[1] A general course in Agriculture to be approved by the adviser.

Sophomore	F	W	S
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 and Adolescent Psychology (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 (SSc 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 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 teachng 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 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.

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

ENGLISH AND SPEECH DEPARTMENT

Acting Department Head, Ben Siegel

Virginia H. Adair William D. Schenck Robert O. Young
Frank A. Tennant

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 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.

The major in English has been developed to conform to the Cal Poly pattern of teacher education. Teachers are trained by means of practical and learn-by-doing experiences to serve California's public schools and communities. The integration of composition, literature, speech, and journalism gives the student a language communications core from which he may go in whatever direction he wishes to meet the curricular needs of the school in which he is employed. The English curriculum provides the student with an understanding of the nature of language and its development along with the basic skills required of today's teacher of English. In addition, the curriculum will train students for industiral positions in the writing of training and expository materials, business and professional materials, and radio and television scripts. As an adjunct to other majors or through careful choice of electives, the English major provides a variety of specific occupational opportunities.

CURRICULUM IN ENGLISH

Freshman	F	W	S
Language Communication (Eng 104, 105, 106)	3	3	3
History of Civilization (Hist 101, 102, 103)	3	3	3
[1] Natural Sciences	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Introductory Journalism (Jour 201)	3		
[2] Mathematics		3	3
Health Education (PE 107)			2
Electives	4	4	2
	16½	16½	16½
Sophomore			
American Literature (Eng 311, 312, 313)	3	3	3
Sports Education (PE 241, 242, 243)	½	½	½
[1] Natural Sciences	3	3	
General Psychology (Psy 202)	3		
Public Speaking (Sp 201)		2	
Principles of Economics (Ec 201)		3	
Technical Writing (Eng 219)			3
Family Relations (Psy 206)			3
English, Speech, and Journalism Electives	3	3	2
Electives	4	2	5
	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 a physical science.
[2] To be taken from the General Education list.

Junior (Major courses not offered in 1958-59)	F	W	S
Advanced Composition (Eng 314)	3		
American Government (Pol Sc 301)	3		
Problems in Speech Development (Sp 302)	2		
[2] Economics		3	
[3] Growth of American Democracy (Hist 304)		3	
Advanced Public Speaking (Sp 303)		2	
U. S. in World Affairs (Hist 305)			3
Argumentation and Persuasion (Sp 304)			2
English and Speech Electives	3	5	5
[4] Electives	6	4	7
	17	17	17
Senior (Major courses not offered in 1958-59)			
English Literature (Eng 411, 412, 413)	3	3	3
Philosophy, Art, or Music	3	3	
Senior Project (Eng 461, 462)	2	2	
Public Relations (Jour 412)		3	
Undergraduate Seminar (Eng 463)			2
[4] Electives	8	5	11
	16	16	16

DESCRIPTION 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 104 Language Communication (3)

Oral and written expression. Language review. The sentence. Reading and writing short essays and reports. Use of references. 3 lectures. Prerequisite: Satisfactory score in placement examination or Eng 4

Eng 105 Language Communication (3)

Oral and written expression. Principles of organization. The paragraph. Methods and techniques of exposition. Analysis. 3 lectures. Prerequisite: Eng 104

Eng 106 Language Communication (3)

Oral and written communication skills. Argumentation, description, narration taught through examples of literary and mass media materials. Business letters. 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 stories, plays, and poems which are suitable for language instruction in the elementary grades. 3 lectures. Prerequisite: Eng 106 or permission of the 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

[3] Social Studies teaching minors may take Hist 301, 302, 303 instead.
[4] Teaching majors elect Psy 312, Ed 301, and Ed 403 in Junior and Senior years.

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 218 Business Correspondence (3)
Practice in routine and special forms of business correspondence; letters of application, inquiries, questionnaires; the psychology of modern business correspondence practice. 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 and intensive 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 are 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. Study of current practices in written composition. 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 411 English Literature (3)
Selected readings in English literature from the beginnings to the Seventeenth Century. Emphasis upon its place in the secondary school curriculum. 3 lectures. Prerequisite: Eng 106

Eng 412 English Literature (3)
Selected readings in English literature of the Seventheenth and Eighteenth Centuries. Emphasis upon its place in the secondary school curriculum. 3 lectures. Prerequisite: Eng 411

Eng 413 English Literature (3)
Selected readings in English literature from the Nineteenth Century to the present. Emphasis upon its place in the secondary school curriculum. 3 lectures. Prerequisite: Eng 412

Eng 415 The Modern Novel (3)

Readings in representative contemporary novels with special emphasis upon their origins, content, form, and style. 3 lectures. Prerequisite: 6 units of literature courses.

Eng 433 The Short Story (4)

Selected short stories to demonstrate characteristics of form, content, style, and plot. Assignments in the writing of short stories. 3 lectures, 1 laboratory. Prerequisite: 6 units of literature courses.

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)

Oral presentation of facts and opinion; training in critical listening. Experiences in practical speaking situations such as business reports, sales talks, interviews, panels, discussion groups, and parliamentary meetings. 2 lectures. Prerequisite: Eng 105

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)

Problems in parliamentary law and formal discussion. Specialized speaking situations in business, engineering, and agriculture. Attention 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. 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 347 Creative Dramatics (2)

Preparation, casting, and presentation of simple dramatic forms using minimal staging. May be repeated for not more than six units. 2 laboratories. Prerequisite: Sp 201

Sp 351, 352, 353 Debate (1) (1) (1)

Techniques of debate; organizing and staging debates; participation in debates and speaking contests. 1 laboratory. May be repeated for not more than six units. Prerequisite: Sp 304

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)

Credit arranged for students holding editorial and other positions on college publications or student news bureau. 1-2 laboratories. Prerequisite: permission of the instructor.

Jour 201 Introductory Journalism (3)

Introduction to journalism, survey of its history, study of techniques of writing the news story. 3 lectures.

Jour 202 Reporting (3)

Application of newswriting 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 251, 252, 253 Journalism Practice (1-2) (1-2) (1-2)

Credit arranged for students holding editorial and other positions on college publications or student news bureau. 1-2 laboratories. Prerequisite: permission of the instructor.

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 elsewhere. Positions to be filled by the student will be of a more highly responsible nature than in preceding practice work. 1-2 laboratories. Prerequisite: Jour 151, 152, 153 and 251, 252, 253

Jour 407 Secondary School Journalism (3)

Teaching journalism in the secondary school. School publications including newspaper and yearbook. Staffing, managing, producing, and financing. 3 lectures. Prerequisites: Jour 201 and 3 units of Journalism Practice.

Jour 412 Public Relations (3)

Methods employed in dissemination of public information by business, agricultural, industrial, educational, and governmental organizations. Survey of media used, techniques commonly employed, formation and measurement of public opinion. 3 lectures.

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 laboratory.

MARKETING AND SALES DEPARTMENT

CHARLES F. MEALS

The curriculum in Marketing and Sales 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.

A new business building, complete with the latest equipment of the types used by business, is scheduled for completion in the fall of 1959. Location of the campus in the Los Angeles metropolitan area furnishes many possibilities for work experience and observation.

CURRICULUM IN MARKETING AND SALES

Freshman	F	W	S
Language Communication (Eng 104, 105, 106)	3	3	3
Physical Education (PE 141, 142, 143)	½	½	½
Office Organization and Operation (OM 102)	3		
Typewriting (OM 141, 142)	1	1	
Principles of Economics (Ec 201, 202)	3	3	
Business Mathematics (Math 108, 109)	3	3	
Salesmanship (Mktg 202)		3	
Descriptive Statistics (Math 211)			3
Introduction to Business (Bus 101)			3
Economic Geography (Geog 312)			3
Health Education (PE 107)			2
Electives	3	3	2
	16½	16½	16½
Sophomore			
Sports Education (PE 241, 242, 243)	½	½	½
American Government (Pol Sc 301)	3		
Business Organization and Management (Bus 201)	3		
Business Correspondence (Eng 218)	3		
Principles of Advertising (Mktg 204)	3		
Public Speaking (Sp 201, 203)	2	2	
Practice of Advertising (Mktg 205)		3	
Family Relations (Psy 206)		3	
Principles of Accounting (Actg 121, 122)		3	3
* Literature, Philosophy, Art or Music		3	3
Marketing Principles (Mktg 201)			3
Merchandising and Sales Promotion (Mktg 206)			3
Business Statements (Bus 212)			1
Electives	2	2	3
	16½	16½	16½

* To be selected from the General Education list.

Junior

Growth of American Democracy (Hist 304)	3		
Sales Management (Mktg 301)	3		
Advanced Composition (Eng 314)	3		
Business Law (Bus 301, 302)	3	3	
* Natural Sciences	3	3	3
U. S. in World Affairs (Hist 305)		3	
Wholesale and Industrial Marketing (Mktg 302)		3	
Technical Writing (Eng 219, 319)		3	2
Retail Store Management (Mktg 303)			3
Transportation and Traffic Management (Bus 304)			3
Insurance Principles (Bus 403)			3
Electives	2	2	3
	17	17	17

Senior (Major courses not offered in 1958-59)

Budgeting (Bus 406)	3		
Credits and Collections (OM 301)	3		
Advanced Statistics (Math 322)	3		
Market Analysis and Research (Mktg 401)		3	
Interpretation of Business Data (Mktg 402)		3	
* Natural Sciences		3	3
Public Relations (Jour 412)			3
Banking and Finance (Bus 408)			3
Senior Project (Mktg 461, 462)	2	2	
Undergraduate Seminar (Mktg 463)			2
Electives	5	5	5
	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 202 Salesmanship (3)

Same as AMS 202.

Mktg 204 Principles of Advertising (3)

Technical, economic, and professional aspects of advertising. Campaign organization for effective advertising. 3 lectures.

Mktg 205 Practice of Advertising (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 Merchandising and 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 301 Sales Management (3)

Organization and operation of sales forces. Determination of market potentials. Methods of remuneration. 3 lectures. Prerequisite: Mktg 206

Mktg 302 Wholesale and 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.

* To be selected from the General Education list.

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 204

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

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 Undergradute Seminar (2)

Study and discussion by students of recent developments in the students' major fields. 2 meetings. Prerequisite: Senior standing or special permission.

MATHEMATICS DEPARTMENT

Acting Department Head, Wallace A. Raab

Cameron C. Bogue, Myron S. Dendurent, Kenneth B. Kriege, William C. McIntosh, William C. Paugstat

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 111.

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)	½	½	½
Mathematics for Engineers (Math 117, 118)	5	5	
* Biological Science	3	3	
General Physics (Phys 131, 132)		4	4
Differential and Integral Calculus (Math 201)			3
Health Education (PE 107)			2
† Electives	5	1	4
	16½	16½	16½
Sophomore			
Sports Education (PE 241, 242, 243)	½	½	½
General Physics (Phys 133 or 204)	4		
Principles of Economics (Ec 201)	3		
Literature	3		
Differential and Integral 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
	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.

Junior	F	W	S
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
Historical Survey of Civilization (Hist 107)			3
‡ Mathematics Electives	3	3	3
† Electives	6	8	5
	17	17	17
Senior (Major courses not offered in 1958-59)			
Senior Project (Math 461, 462)	2	2	
Undergraduate Seminar (Math 463)			2
‡ Mathematics Electives	3	6	3
† Electives	11	8	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. Prerequisite: Satisfactory score on placement examination.

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 coordinates, plotting curves, expanding and factoring polynomials. 3 lectures. Prerequisite: Math 102

Math 104 Computation and Slide Rule (1)

Operation of the slide rule and methods of computation used in engineering and business. 1 lecture. Prerequisite: Math 103, 109, or 117

Math 108 Business Math I (3)

Arithmetic operations, algebraic operations, percentage, simple interest, discounts, business graphs, business statistics. 3 lectures. Prerequisite: Satisfactory score on placement examination or Math 1

Math 109 Business Math II (3)

Algebraic operations, compound interest, annuities, sinking funds, amortization, insurance, stocks and bonds, probability. 3 lectures. Prerequisite: Math 108

† 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 111 Basic Mathematics for General Education (3)

Proportion, variation, units of measurement, slide rule, and probability as applied to biological sciences, physical education, and social sciences. 3 lectures. Prerequisites: Satisfactory score on placement examination or Math 1

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 111

Math 114 Agricultural Mathematics III (3)

An abridged course covering selected topics from trigonometry and intermediate algebra designed for those students who take no mathematics beyond Math 201. 3 lectures. Prerequisite: Math 103

Math 115 Agricultural Mathematics IV (3)

Inequalities and roots of equations. The geometry of the straight line, conic sections, and such higher plane curves as are needed in Math 201. 3 lectures. Prerequisite: Math 114

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.

Math 118 Mathematics for Engineers (5)

Analytic geometry and an introduction to calculus. 5 lectures. Prerequisite: Math 117

Math 125 Arithmetic for Elementary Teachers I (4)

Number concept; fundamental operations; percent; universal arithmetic; various measurement systems and their use. Achievement and remedial tests. 3 lectures, 1 laboratory. Prerequisite: Satisfactory score on placement examination or Math 1

Math 126 Arithmetic for Elementary Teachers II (2)

The content of arithmetic instruction in the elementary grades; analysis of text books and supplementary materials available to the teacher; observation of arithmetic instruction at various grade levels. 2 lectures. Prerequisite: Math 125 or equivalent.

Math 201, 202, 203 Differential and Integral Calculus (3) (3) (3)

A unified treatment of analytic geometry and differential and integral calculus. 3 lectures. Prerequisite: Math 118 or 115

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, 109, 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 programing. 3 lectures. Prerequisite: Math 217

Math 304 Programing 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 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. Prerequisite: Math 126 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

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, gamma functions; Bessel functions, Laplace transforms, the Heaviside operator, and elliptic integrals. 3 lectures. Prerequisite: Math 317

Math 319 Mathematical Analysis of Engineering Problems (3)

Infinite series, Fourier series, Fourier integral, partial differential equations, and line integral. 3 lectures. Prerequisite: Math 317

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 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 four units. 1 or 2 lecture-discussions. 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; 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 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 317

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 students' particular interests. 2 lecture-discussions.

MUSIC DEPARTMENT

Chairman, Lowell K. Weeks

Courses in the Music 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.

DESCRIPTIONS OF COURSES IN MUSIC

Mu 141, 142, 143, 241, 242, 243, 341, 342, 343, 441, 442, 443 Dance Orchestra (2) (2) (2)

Limited to those who have had considerable experience playing musical instruments. The orchestra student has an opportunity to play for college entertainments, dances, community programs, and radio broadcasts. 2 laboratories.

Mu 147, 148, 149, 247, 248, 249, 347, 348, 349, 447, 448, 449 Brass, String, or Woodwind Choir (1) (1) (1)

Open to qualified players. Rehearsal and public performance in trios, quartets, and quintets. 1 laboratory.

Mu 151, 152, 153, 251, 252, 253, 351, 352, 353, 451, 452, 453 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 laboratory.

Mu 154, 155, 156, 254, 255, 256, 354, 355, 356, 454, 455, 456 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 laboratories.

Mu 157, 158, 159, 257, 258, 259, 357, 358, 359, 457, 458, 459 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 laboratories.

Mu 161, 162, 163, 261, 262, 263, 361, 362, 363, 461, 462, 463 Choir (1) (1) (1)

A cappella singing for both men and women. Standard choir repertory. Formal concerts presented each school year. 1 laboratory.

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.

OFFICE MANAGEMENT DEPARTMENT

The Office Management curriculum permits students to emphasize either office management functions or secretarial services, depending on their occupational intentions. The former will stress administrative phases of office work, and the place of the office manager as part of the management team. The latter will stress skill in secretarial services and the operation of office machines and equipment, but at the same time will cover important aspects of office management, 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 private secretary, head of stenographic department, 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 "learn-by-doing" methods. Instructors are chosen on the basis of their actual work experience as well as their educational and teaching backgrounds.

A new business building on the Kellogg Campus, scheduled for completion in September, 1959, will be fully equipped with the office machines used in business, so that students will be thoroughly familiar with the equipment they will be called upon to use.

CURRICULUM IN OFFICE MANAGEMENT

Major Not Offered in 1958-59

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		
Typewiting (OM 141, 142, 143)	1	1	1
Shorthand (OM 144, 145, 146)	2	2	2
Business Mathematics (Math 108, 109)	3	3	
Principles of Accounting (Actg 121, 122)	3	3	
Accounting Machines (Actg 141)		2	
Intermediate Accounting (Actg 123)			3
Introduction to Business (Bus 101)			3
Office Machines (OM 151)			2
Electives	2	2	2
	16½	16½	16½
Sophomore			
Sports Education (PE 241, 242, 243)	½	½	½
Family Relations (Psy 206)	3		
* Literature, Philosophy, Art or Music	3	3	
Principles of Economics (Ec 201, 202)	3	3	
Records for Small Business (OM 103)		3	
Office Organization & Operation (OM 102)			3
Business Correspondence (Eng 218)			3
Indexing & Filing (OM 231)			2
Business Statements (Bus 212)			1
† Cost & Payroll Accounting (Actg 221)	3		
† Tax Accounting (Actg 203)		3	
† Credits & Collections (OM 301)			3
‡ Advanced Typewriting (OM 241, 242, 243)	1	1	1
‡ Advanced Shorthand (OM 244, 245, 246)	2	2	2
‡ Transcription Practice (OM 251, 252, 253)	1	1	1
† Electives	4	4	4
‡ Electives	3	3	3
	16½	16½	16½

* To be selected from the General Education list.
† For students emphasizing Office Management courses.
‡ For students emphasizing Secretarial Services courses.

Junior	F	W	S
American Government (Pol Sc 301)	3		
Business Organization & Management (Bus 201)	3		
Data Processing Methods (Actg 231)	3		
* Natural Sciences	3	3	3
Public Speaking (Sp 201, 303)		2	2
Descriptive Statistics (Math 211)		3	
Growth of American Democracy (Hist 304)		3	
U. S. in World Affairs (Hist 305)			3
Purchasing & Inventory Control (OM 302)			3
† Banking and Finance (Bus 408)	3		
† Budgeting (Bus 406)		3	
† Transportation & Traffic Management (Bus 304)			3
‡ Cost and Payroll Accounting (Actg 221)	3		
‡ Tax Accounting (Actg 203)		3	
‡ Credits & Collections OM 301)			3
Electives	2	3	3
	17	17	17
Senior			
Personnel Management & Industrial Relations (Bus 402)	3		
Insurance Principles (Bus 403)	3		
Business Law (Bus 301, 302)		3	3
* Natural Sciences		3	3
Advanced Statistics (Math 322)			3
Senior Project (OM 461, 462)	2	2	
Undergraduate Seminar (OM 463)			2
† Investment Principles (Bus 404)	3		
† Analysis of Investments (Bus 405)		3	
‡ Advanced Composition (Eng 314)	3		
‡ Secretarial Procedures (OM 401)		3	
Electives	5	5	5
	16	16	16

DESCRIPTIONS OF COURSES IN OFFICE MANAGEMENT

OM 102 Office Organization and Operation (3)

Basic office procedures and practices. Knowledge and techniques necessary to work in or manage a business office. 2 lectures, 1 laboratory.

OM 103 Records for Small Businesses (3)

A study of records necessary for operating small businesses. Forms and tabulations encountered in small business including those for sales, income, Social Security, and withholding taxes. 3 lectures.

OM 141, 142, 143 Typewriting (1) (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.

OM 144, 145, 146 Shorthand (1) (1) (1)

The most effective secretarial techniques for recording and transcribing dictation. 2 laboratories.

OM 151 Office Machines (2)

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. 2 laboratories.

* To be selected from the General Education list.
† For students emphasizing Office Management courses.
‡ For students emphasizing Secretarial Services courses.

OM 231 Indexing and Filing (2)

Training in the various standard systems of filing, indexing, and coding. 1 lecture, 1 laboratory.

OM 241, 242, 243 Advanced Typewriting (1) (1) (1)

Further practice to increase speed and accuracy. 3 one-hour periods. Prerequisite: OM 143

OM 244, 245, 246 Advanced Shorthand (2) (2) (2)

Practice to increase speed and accuracy in the use of shorthand. 2 laboratories. Prerequisite: OM 146

OM 251, 252, 253 Transcription Practice (1) (1) (1)

Special practice in accurate and rapid transcription of information from dictating machines. 3 one-hour periods. Prerequisite: OM 143

OM 301 Credits and Collections (3)

Same as AMS 301.

OM 302 Purchasing and Inventory Control (3)

The management of procurement, movement and storage of materials, and maintenance of adequate stocks. 3 lectures.

OM 347, 348, 349 Shorthand Machines (2) (2) (2)

Training in the use of machines for taking dictation. Includes instruments such as Stenotype and Stenograph. 2 laboratories. Prerequisite: OM 143, 146

OM 400 Special Problems for Advanced Undergraduates (1-2)

Individual or group investigation of problems in the areas of office management and secretarial services. Total credit limited to four units with not more than two units in any one quarter. Prerequisite: Senior standing or consent of instructor.

OM 401 Secretarial Procedures (3)

Introduces standard office routines. Includes information on office ethics and attitudes, as well as personal qualities expected in a secretary. 3 lectures.

OM 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.

OM 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.

PHYSICAL EDUCATION DEPARTMENT

Department Head, Magnus Syverson

Robert B. Stull Donald E. Warhurst

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 $800,000 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 1958-59

Freshman	F	W	S
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		
Community 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
	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 255W)		2	
School and Community Health Education (PE 203)	2		
Public Speaking (Sp 303)	2		
Family Relations (Psy 206)			3
Electives		2	2
	17½	17½	15½

Junior	F	W	S
Physical Education Activity (PE 341, 342, 343)	1	1	1
American Government (Pol Sc 301)	3		
Literature	3		
Techniques of Officiating (PE 331)	2		
Educational Psychology (Psy 312)		3	
Teaching Elementary School Physical Education (PE 314)		3	
Kinesiology (PE 302)		2	
Literature, Art, or Music		3	3
* Growth of American Democracy (Hist 304)			3
Physiology of Exercise (PE 303)			2
† 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
‡ Electives (Men)	6	4	4
‡ Electives (Women)	6	2	6
	17	16	17
Senior (Major courses not offered in 1958-59)			
United States in World Affairs (Hist 305)	3		
Organization and Administration of Physical Education (PE 401)	3		
Methods of Physical Education (PE 403)	3		
Senior Project (PE 461, 462)	2	2	
Undergraduate Seminar (PE 463)			2
Tests and Measurements in Physical Education (PE 425)		3	
School Health Administration (PE 405)		2	
Athletic Training and Massage (PE 432M) (Men majors only)		1	
Corrective Physical Education (PE 406)			2
† 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
‡ Electives (Men)	4	5	11
‡ Electives (Women)	3	4	10
	16	16	16

DESCRIPTIONS OF COURSES IN PHYSICAL EDUCATION

PE 107 Health Education (2)

Personal hygiene and health education; the 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 laboratory.

PE 123 Swimming and Water Sports Theory and Practice (2)

Supervision of pool activities. Swimming instruction and safety. 1 lecture, 1 laboratory.

* Social Science teaching minors should take Hist 301, 302, 303 in lieu of this course.
† Alternative requirements for men and women majoring in physical education.
‡ Teaching majors should elect the following: Art, Music, PE 300, Ed 403, Ed 421.

PE 126 Community Recreation (3)
The supervision and administration of community recreation. Games and activities suitable for a community recreation program. 1 lecture, 2 laboratories.

PE 141 Physical Education (½)
Fundamentals of sports and games. 2 laboratories.

PE 142 Physical Education (½)
Tumbling and apparatus work; basic sports; gymnastics and calisthentics. 2 laboratories.

PE 143 Physical Education (½)
Sports activities; physical tests; progressive activities. 2 laboratories.

PE 144, 145 Beginning Swimming (½) (½)
Beginning swimming for all who do not pass college swimming test. 2 laboratories.

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 laboratories.

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 laboratory.

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 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 speed ball, touch football, golf, swimming, and tennis. 2 laboratories.

PE 242 Sports Education (½)
Training and competition in seasonal sports such as basketball, badminton, volleyball, boxing, and wrestling. 2 laboratories.

PE 243 Sports Education (½)
Training and competition in seasonal sports such as tennis, track and cross-country running, softball, archery, and soccer. 2 laboratories.

PE 245 Advanced Swimming and Lifesaving (½)
Lifesaving techniques. Qualified students may obtain Red Cross Water Safety Instructor's cards. 2 laboratories.

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 laboratories.

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 laboratory.

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 laboratories.

PE 255W Apparatus and Gymnastics (2)

Progression and teaching techniques in tumbling and gymnastic stunts. 1 lecture, 1 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 314 Teaching Elementary School Physical Education (3)

Modern trends in materials and methods for the elementary school physical education program. The use of rhythms and dances, games, calesthenics, self-teaching activities, marching tactics, and miscellaneous activities. 3 lectures. Prerequisite: Psy 305

PE 321 Football Coaching Theory and Practice (2)

Fundamentals and systems of offense and defense, rules of the game. 1 lecture, 1 laboratory.

PE 323 Baseball Coaching Theory and Practice (2)

Fundamentals of the sport; methods of teaching team play in these activities. 1 lecture, 1 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 laboratory.

PE 331M Techniques of Officiating (2)

Techniques 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 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 laboratories.

PE 401 Organization and Administration of Health and Physical Education (3)

Management and control of physical education and health education. Organizing programs in class work 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 School Health Administration (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 422 Basketball Coaching Theory and Practice (2)

Fundamental individual basketball skills. Theories of offensive and defensive team play. 1 lecture, 1 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. 2 lectures, 1 laboratory.

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 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 laboratory.

PE 446W, 447W, 448W Teaching Progression in Dance (2) (2) (2)

Teaching progression in dance: folk, contemporary, and social. 2 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.

PHYSICAL SCIENCES DEPARTMENT

Department Head, Donald E. Rees

G. T. Moran Edward M. Kelly William C. Paugstat

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 program, in high school three semesters of algebra, one of trigonometry, two of geometry, two of physics, and two of chemistry.

CURRICULUM IN PHYSICAL SCIENCES

Freshman	F	W	S
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 Science	3		
Machine Shop (MS 151, 152)	1	1	
Mathematics for Engineers (Math 117, 118)	5	5	
General Physics (Phys 131, 132)		4	4
Differential and Integral Calculus (Math 201)			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		
Differential and Integral 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
Electrical Circuits (Phys 206)			3
Electrical Measurements Laboratory (Phys 256)			1
Light (Phys 223)			3
† Electives	4	5	5
	17½	16½	17½

* To be selected from the General Education list. Teaching majors elect at least 6 additional units in life sciences.

† Twenty-one 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.

Junior	F	W	S
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	
Physical Chemistry (Chem 432)			4
U. S. in World Affairs (Hist 305)			3
Geology (PSc 209)			3
† Electives	6	9	6
	16	16	16

Senior (Major courses not offered in 1958-59)			
* 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
	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 nonmetals. 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-one 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 precipitimetry, redoximetry, alkalimentry, 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 337 Soil Analysis (2)

Chemical analysis as a means of diagnosing problems related to western soils. 1 lecture, 1 laboratory. Prerequisites: 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. Prerequisites: 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 115, 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 206 Electrical Circuits (3)

Direct current, alternating current, and electronic circuits. 3 lectures. Prerequisite: Phys 133 or 204

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 256 Electrical Measurements Laboratory (1)

Selected experiments in electricity and magnetism. 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 condition and radiation. 3 lectures. Prerequisites: Phys 133 or 204, Math 203

Phys 339 Soil Physics (2)

Fundamental aspects of soil physics and its application. 1 lecture, 1 laboratory. Prerequisites: 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. Prerequisites: 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 developments 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 eyes 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.

PSYCHOLOGY AND VISUAL ARTS DEPARTMENT

Acting Chairman, Robert M. Sekerak
Virginia H. Adair Dorothy L. McNeill

This department serves students in all majors by providing beginning and advanced courses to supplement their major courses. Psychology contributes to better understanding of the environment and of the people with whom the student lives and works. Applied courses in psychology help students in business, engineering, and agriculture as well as those in education to learn principles and skills needed in our complex society. Work in audiovisual techniques contributes to the skills of the student who seeks a career in sales or in general business pursuits in addition to its recognized contribution to the teacher-trainee. Art 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 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 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. Picturetaking techniques and darkroom practices. 1 lecture, 1 or 2 laboratories.

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, previewing, 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, previewing, and skill development for business and industry. 2 lectures, 1 laboratory. Prerequisite: Psy 304 or permission of the instructor

DESCRIPTIONS OF COURSES IN PSYCHOLOGY

Psy 1 Remedial Reading (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 Personal Development (2)

Orientation to college. Adjustment from high school to college level of education. Study habits, principles of learning, tools of learning, social adjustment. 2 lectures.

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 304 Human Relations (3)

Understanding human personality; skills in dealing with people, particularly in job situations. Case studies illustrating interpersonal problems. 3 lectures. Prerequisite: Psy 202

Psy 305 Child and Adolescent Psychology (3)

Social, emotional, and intellectual development during childhood and adolescence with particular applications to school situations. Problems of mental hygiene in childhood and adolescence. 3 lectures.

Psy 312 Educational Psychology (3)

Pupil-teacher relationships; promotion learning, mental health, and motivation. growth and development. Individual differences and group interaction. Group methods and classroom observation. 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

SOCIAL SCIENCES DEPARTMENT

Acting Department Head, Hugh O. La Bounty

Gertrude C. Boland George T. Galbreath Elbridge A. Tucker
Werner H. Marti

The Social Sciences Department serves the agricultural, engineering, and arts and sciences divisions 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 better understand himself and others 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
	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 Science	3	3	
Principles of Economics (Ec 201, 202)	3	3	
Family Relations (Psy 206)		3	
Public Speaking (Sp 201, 303)		2	2
Economic Problems (Ec 213)			3
American Government (Pol Sc 301)			3
Descriptive Statistics (Math 211)			3
Electives	1	2	2
	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 a physical science.

[2] To be taken from mathematics courses in the General Education list.

Junior	F	W	S
[3] History of the United States (Hist 301, 302, 303)	3	3	3
[4] Literature	3	3	3
Inter-American Relations (Pol Sc 311)	3		
U. S. in World Affairs (Hist 305)	3		
International Relations (Pol Sc 312)		3	
Geography (Geog 308 or Geog 312)		3	
Comparative Government (Pol Sc 313)			3
Business Law (Bus 301)			3
[5] Electives	5	5	5
	17	17	17
Senior (Major courses not offered in 1958-59)			
Industrial Management (Ec 411)	3		
History of the Pacific Area (Hist 411, 412)	3	3	
Senior Project (Soc Sc 461, 462)	2	2	
Industrial Relations (Ec 412)		3	
State and Local Government (Pol Sc 401)		3	
Social Psychology (Psy 401)			3
Undergraduate Seminar (Soc Sc 463)			2
[5] Electives	8	5	11
	16	16	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 Principles of Economics (3)

How the economic system works. The forces that determine the efficiency of the allocation, utilization, and distribution of resources. The structure of the American economy and its influence on the activities of the individual producer and consumer. 3 lectures.

Ec 202 Principles of Economics (3)

Determinants of national income, output, prices, and employment. Government policy related to agriculture and business. 3 lectures. Prerequisite: Ec 201

Ec 213 Economic Problems (3)

This is a flexible course adjustable to different student needs. Three general areas are covered: (1) Consumer economic problems; e.g., insurance, social security, budgeting, investing, purchasing, etc. (2) The scope of individual and national action with respect to domestic and international economic problems. (3) A study of economic problems in the areas of the various majors. 3 lectures. Prerequisites: Ec 201, 202

Ec 411 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. Prerequisite: Ec 201

Ec 412 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 the U. S. labor movement; current labor legislation. The employment process; job application techniques; personal adjustment to job situations. 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.

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 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 fifteenth 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. Prerequisites: Eng 105, Pol Sc 301, Hist 304

Hist 411, 412 History of the Pacific Area (3) (3)

General survey of international policies and international relations of lands of the Pacific Basin from 1750 to the present. Development of Japan and China and their present-day problems. Growth of United States interests and responsibilities in the Pacific area. 3 lectures.

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 311 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. Prerequisites: 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. Prerequisites: Pol Sc 301, Hist 304

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 the instructor.

Pol Sc 401 State and Local Government (3)

The stucture, function, and problems of state, county, municipal, and district governments. 3 lectures. Prerequisites: Pol Sc 301, Hist 304

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 Political 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

DESCRIPTION OF COURSE IN PHILOSOPHY

Phil 201 Introduction to Philosophy (3)

The relationships among the sciences and between science and philosophy. The principal types of philosophy and 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.

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 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 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. Prerequisites: 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.

DIRECTORIES

DEPARTMENT HEADS AND CHAIRMEN BY DIVISIONS

SAN LUIS OBISPO

AGRICULTURAL DIVISION

Agricultural Engineering	James Merson
Animal Husbandry	Lyman Bennion
Dairy Husbandry and Manufacturing	Harmon Toone, Acting
Farm Management	Edgar Hyer
Field, Fruit, and Truck Crops	William Troutner, Acting
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	Norman Sharpe
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	Morris P. Taylor
Printing	A. M. Fellows
Welding	Richard C. Wiley

ARTS AND SCIENCES DIVISION

Agricultural Journalism	Kenneth Kitch
Biological Sciences	Glenn A. Noble
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. Bowls
Social Sciences	A. Norman Cruikshanks

KELLOGG-VOORHIS

AGRICULTURAL DIVISION

Agricultural Engineering	Haven Q. Conard
Agricultural Management and Sales	Robert Lloyd
Animal Husbandry	Weslie Combs
Fruit Production	Albert E. Canham
General Crops Production	Robert L. Procsal
Horticultural Services and Inspection	Edward C. Appel, Jr.
Ornamental Horticulture	Oliver A. Batcheller
Soil Science	Harry V. Welch, Jr.

ENGINEERING DIVISION

Aeronautical Engineering	
Electrical Engineering	
Industrial Engineering	
Machine Shop	
Mechanical Engineering	Walter E. Holtz
Welding	

ARTS AND SCIENCES DIVISION

Accounting	George E. Carlberg, Acting
Biological Sciences	John F. Lamiman
Business Administration	
Education	
English and Speech	Ben Siegel, Acting
Marketing and Sales	
Mathematics	Wallace A. Raab, Acting
Music	Lowell K. Weeks
Office Management	
Physical Education	Magnus Syverson
Physical Sciences	Donald E. Rees
Psychology and Visual Arts	Robert M. Sekerak, Acting
Social Sciences	Hugh O. La Bounty, Acting

FACULTY

(Number in parentheses indicates year of appointment)
Listed as of February, 1958

McPHEE, JULIAN A. (1933)—President

B.S., University of California, 1917; M.A., 1928; LL.D., Armstrong College, 1951.

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).

ACKERMAN, ARVID A. (1956)—Mechanical Engineering

B.S., California State Polytechnic College, 1956.

Experience: Senior air force inspector, March Air Field Base; manager, Whiz Fish Products Company, Pelican, Alaska.

* 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.

ALBRIGHT, JACK L. (1957)—Dairy

B.S., California State Polytechnic College, 1953; M.S., Washington State College, 1954; Ph.D., 1956.

Experience: Adohr Milk Farm, in charge of show herd; research assistant, State College of Washington, 1952-54; acting instructor, State College of Washington, 1954-55; instructor, California State Polytechnic College, 1955.

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, Shrivenham American University, England; assistant circulation librarian, Oregon State College.

ALLEN, JACK (1956)—Mathematics

B.S., University of Southern California, 1939; M.A., Columbia University, 1950.

Experience: Engineer and research, U. S. Government, Washington, D.C.; civil engineer and design, California state and local government agencies. Registered professional engineer, California.

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.

* Kellogg-Voorhis staff.

ALLEN, 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.

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.

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) ..... Assistant to 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, THOMAS A. (1957) ..... Animal Husbandry

B.A., University of Washington, 1950; B.S., California State Polytechnic College, 1956.

Experience: U. S. Army; assistant to the manager, Taylor Ranch beef cattle feedlot, Ventura.

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.

* Kellogg-Voorhis Staff.

ANDRESEN, JAMES G. (1956) ..... Mechanical Engineering
B.S., California State Polytechnic College, 1956.
Experience: U. S. Army.

ANDREWS, DALE W. (1950) ..... Agricultural Education and Teacher Training
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 critic teacher, Merced Union High School; director of agriculture and critic teacher, Arroyo Grande Union High School, Arroyo Grande; officer, U. S. Marine Corps.

* 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) ..... Testing Officer, Psychology
B.J., University of Missouri, 1939; A.B., Colorado State College of Education, 1940; M.A., Columbia University, 1940; Ed.D., Stanford University, 1953.
Experience: Guidance counselor, Menlo School and Junior College; classification 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.

BAILEY, BERNIE B. (1949) ..... Poultry
B.S., Iowa State College, 1947; M.S., Texas A. & M., 1957.
Experience: Manager, Poultry Farm, North Texas Agricultural College; U. S. Army; poultry supervisor, Iowa Poultry Improvement Association; poultry department supervisor, Texas A. & M.

BANISTER, JOHN R. (1954) ..... English
B.A., University of Santa Clara, 1949; M.A., Stanford University, 1951; additional graduate study, Stanford University.
Experience: Acting instructor, Stanford University, 1950-52; head instructor, Motor Vehicle Accident Prevention Training School, Bainbridge, Maryland, 1952-54.

* Kellogg-Voorhis staff.

* 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.

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.

BELLMAN, SAMUEL I. (1957) ..... English
B.A., University of Texas, 1947; Wayne University, 1951; Ph.D., Ohio State University, 1955.
Experience: Instructor, Ohio State University; instructor, Fresno State College.

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.

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 (1954) ..... 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.

* 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.

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* 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) ..... Ornamental Horticulture

B.S., University of California, 1941; M.S., 1947.

Experience: Landscape architect in private practice; officer, U. S. Army; instructor in mechanical and architectural drawing, University High School, Berkeley, California.

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.

BOOTHE, ROBERT O. (1954) ..... English

A.A., Pasadena City College, 1933; B.A., University of Wisconsin, 1950; M.A., Los Angeles State College, 1953; additional graduate study, University of California at Los Angeles and Los Angeles State College.

Experience: Instructor, El Camino College; instructor, Compton College; free lance journalist and photographer; toolmaker 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; program director, Council of Jewish Women.

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.

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.

* Kellogg-Voorhis staff.

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.

BREIDA, STEPHEN, JR. (1957) ..... Electronic Engineering
B.S.E.E., Drexel Institute of Technology, 1952; M.S.E.E., Purdue University, 1954.
Experience: Engineer, Convair, Frankford Arsenal; graduate assistant, Purdue University; engineering aid, MacBeth Arc Lamp Co.

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.

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, BENJAMIN H. (1954) ..... Mechanical Engineering
B.S. in Trade and Industrial Education, Purdue University, 1949.
Experience: Tooling inspector, Douglas Aircraft Co.; inspector, Houston Corp.; inspector, Allison Division of General Motors Corp.; instructor, Arsenal Technical High School, Indianapolis; U. S. Navy.

BROWN, CHARLES F. (1956) ..... Electronic Engineering
B.S., Arizona State College, 1955.
Experience: Officer, U. S. Navy; duty assignments including communications supervision, Loran specialist, electronics instructor.

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.

* Kellogg-Voorhis Staff.

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.

BUSCHMAN, WILLIAM O. (1956) ..... Mathematics

A.B., Reed College, 1941; M.Ed., University of Oregon, 1947; Ed.D., Oregon State College, 1953.

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.

BURNHAM, KENNETH D. (1953) ..... Biological Sciences

B.S., Roosevelt College, 1948; M.S., State University of Iowa, 1952; additional graduate work, DePaul University and State University of Iowa.

Experience: Instructor and coach, Schiller Park, Illinois, public schools; teaching assistant, State University of Iowa.

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.

* CARLBERG, GEORGE E. (1949) ..... Acting 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.

CARRINGTON, JAMES H. (1943) ..... Agricultural Engineering

Special Vocational Arts Credential, University of California, Los Angeles, 1940; Special Vocational Arts Credentials, University of California, Berkeley, 1941 and 1942.

Experience: Auto mechanic, Los Molinos Garage, Los Molinos; auto shop instructor, Los Molinos High School, Los Molinos.

* Kellogg-Voorhis staff.

CARTER, ALBERT L. (1956) ..... Poultry

B.S., California State Polytechnic College, 1950; M.A., California State Polytechnic College, 1956; additional graduate study, Colorado A & M.

Experience: Director of Vocational Agriculture, Washington Union High School, Centerville, 1951-52; Farm Advisor, University of California, Poultry Specialist, Stanislaus County, 1952-55; farm manager, commercial fruit, nut, and poultry ranch, Escalon, 1955-56.

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.

CAUGHRAN, CLARENCE S., JR. (1956) ..... Music

B.M., University of Miami, Florida, 1948; M.A., Teachers College, Columbia University, 1949; Professional Diploma in Music Education, 1954.

Experience: Director of band, Central High, Fayetteville, Tennessee; assistant in music, University of Miami and Teachers College, Columbia University; associate professor of music, Linfield College, McMinnville, Oregon.

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.

CHASE, DANIEL C. (1954) ..... Farm 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' coordinating 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.

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) ..... Administrative 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.

COFFIN, PHILIP R. (1956) ..... Mathematics

B.S., Marine Eng. Naval Const., 1923.

Experience: United States Navy.

COLEAL, WILLIAM A. (1957) ..... Aeronautical Engineering

B.S., California State Polytechnic College, 1947.

Experience: Flight test engineer, Lockheed Aircraft Corp.; chief project engineer, Edwards Air Force Base; development engineer, General Electric Co., Massachusetts; U. S. Army Air Force; Draftsman, Aero Publishers; Pratt & Whitney Aircraft, Connecticut.

COLLINS, RALPH C. (1955) ..... Coordinator 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. (1949) ..... Animal Husbandry

B.S., Agriculture, University of California, 1925.

Experience: Agriculture instructor, Middletown, Calistoga, and Livermore high schools.

*COMBS, WESLIE (1952) ..... Head, Animal Husbandry Department

B.S., California State Polytechnic College, 1950; M.S., University of Minnesota, 1952.

Experience: Teaching assistant, University of Minnesota; research assistant, University of Minnesota; general farming, Kern County.

* 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.

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.

COTT, HAROLD E. (1955) ..... Biological Sciences

B.S., University of California, Davis, 1948; Ph.D., 1952.

Experience: Teaching assistant, research assistant in entomology, University of California, Berkeley and Davis; associate in zoology, University of California, Davis; specialist in epidemiology, U.S. Navy; associate ecologist, University of Utah, Dugway Project.

* CRAMER, DAVID A. (1956) ..... Animal Husbandry

B.S., Colorado A & M College, 1949; M.S., 1955; additional graduate study, University of Colorado; University of Maryland.

Experience: Manager Cramer Cattle Ranch, Leesburg, Virginia; analytical chemist, Arapahoe Chemical Co., Boulder, Colorado; teaching assistant, University of Colorado; U. S. Navy.

CRUIKSHANKS, ANDREW N. (1947) ..... Head, Social Sciences Department

A.B., University of California, 1931; M.A., Stanford University, 1933; Ed.D., Stanford University, 1957.

Experience: Instructor, social studies and speech, California high schools; director, community forums, adult education, Fort Bragg, California Schools; assistant director, Mediterranean-Middle East Seminar; professional lecturer.

* Kellogg-Voorhis staff.

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.

CURTIS, KATHLEEN L. (1958) ..... Activities Adviser

B.A., The Principia College, 1953; additional study, Michigan State College; graduate study, The Sorbonne, University of Paris.

Experience: Social Director, College Union, Evansville College, Evansville, Indiana, 1953-55; Service Club Recreation and Club Director, U. S. Army Special Services, Etain and Paris, France, 1955-57.

CUTSHALL, LEONARD W., Master Sergeant, U. S. Army (1957)
Military Science and Tactics

Infantry Schools, 1943; Psychological Warfare School, 1954; Kansas City Art Institute, 1934.

Experience: Officer, U. S. Army, World War II; infantry company and battalion commander; administrative officer, infantry regiment and armored infantry battalion; labor relations officer and adjutant, U. S. Army Stockade and Sugamo Prison, Japan; rifle committee chief, division faculty, Fort Ord, California.

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, DONALD F. (1957) ..... Poultry

B.S., Pennsylvania State College, 1933.

Experience: Manager, Sunnybank Poultry Farm, Littleton, Massachusetts; manager, Poultry and Egg Department, Swift & Company, Wilkes-Barre, Pennsylvania; manager, Pennsylvania egg-laying test; district manager, feed division, the Quaker Oats Company; manager, Farm Industries, Inc., Decatur, Alabama; manager, Feed Sales, California Milling Corp., Los Angeles; manager, Feed Department, McKeen's Hatchery, San Luis Obispo.

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.

* 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.

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.

* Kellogg-Voorhis staff.

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.

*DIMITMAN, JEROME E. (1949) ..... Plant Pathology

B.S., University of California at Berkeley, 1943; M.S., University of California, Citrus Experiment Station, Riverside, 1949.

Experience: Citrus production, University of California at Los Angeles; assistant plant pathologist, California State Department of Agriculture; officer, U.S. Navy.

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.

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.

* Kellogg-Voorhis staff.

* 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.

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.

FISHER, CLIFFORD E. (1956) ..... Electronic Engineering

B.A., Adams State College, 1946; B.S., California State Polytechnic College, 1950; M.S., Stanford University, 1951; degree of engineer, Stanford University, 1953.

Experience: Engineer, Stanford Research Institute; Station KGIW, Alamosa, Colorado; U. S. Signal Corps.

FISHER, CLYDE P. (1947) ..... Executive Secretary, President's Cabinet

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.

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) ..... Library

A.B., University of California, 1956; M.S.L.S., University of Southern California, 1957.

Experience: Pilot, U. S. Air Force.

* Kellogg-Voorhis staff.

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.

FOUCHS, LAWRENCE E., Master Sergeant U. S. Army (1957)
Military Science and Tactics

B.S., San Francisco State College, 1951; M.A., 1953.

Experience: Inspector, U. S. Treasury Department; served as a colonel in various duties with Signal Corps, U. S. Army, in Europe, China, Japan and the United States; Colonel USAR.

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.

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.

* FRENCH, JERE STUART (1957) ..... Ornamental Horticulture

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.

FURIMSKY, 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.

* Kellogg-Voorhis staff.

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) ..... Publications, 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.

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, Melfort, Saskatchewan.

* 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.

GILBERT, JOHN (1957) ..... Mathematics
B.S., California State Polytechnic College, 1957.
Experience: Electronics technician, U. S. Navy; engineer, Lockheed Missile Corporation.

GOLD, MARCUS (1947) (1954) ..... Audiovisual Library
B.A., University of California, 1942; B.L.S., 1947; M.S.L., 1954.
Experience: U. S. Army; library, University of California; Audiovisual Librarian, California State Polytechnic College, 1947-52; research assistant, University of California, Berkeley.

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.

* Kellogg-Voorhis Staff.

GORDON, ROBERT D. (1955) ..... Mathematics

B.A., Stanford University, 1932; M.A., 1934; Ph.D., Indiana University, 1948.

Experience: Physical oceanography, Scripps Institute of Oceanography; engineering mathematician, Douglas Aircraft Co.; assistant professor, University of Buffalo; professor, Washington College; associate professor and department chairman, Hampton Institute; instructor, Los Angeles Valley Junior College.

* 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 study, Florida State University.

Experience: Instructor, basic medical sciences, U. S. Army; assistant to counselor of men, University of Southern California; lecturer, University of California Extension.

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.

GRACE, HARRY A. (1957) ..... Associate Dean (Counseling and Testing)

A.B., Ohio State University, 1946; M.A., Teachers College, Columbia University, 1946; Ph.D., 1950.

Experience: Communications and training, Office of Strategic Services; U. S. Army; assistant, Teachers College, Columbia University; assistant professor, University of Illinois and Michigan State University; dean of men, Grinnell College; psychological consultant to industry, government and schools.

GRANT, DAVID M. (1950) ..... Head, 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, 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, T. H.; instructor, Maui High School, Maui, T. H.; teacher, San Francisco, California; lecturer, University of California, Santa Barbara College.

GRAY, STANTON (1940, 1946) ..... Crops

B.S., Agriculture, University of California, 1930.

Experience: Agriculture instructor, Hamilton City, Corning, and Yuba City high schools.

* Kellogg-Voorhis Staff.

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.

* GREGORY, VERNON L. (1953) ..... Curriculum Specialist

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; instructor, zoology, California State Polytechnic College.

* 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. (1957) ..... Electrical Engineering

B.S., University of Punjab, 1951; M.S., University of Punjab, 1953; Electrical Engineering, University of Glasgow, 1957.

Experience: Engineer, Physikalisch-Technische Bundesanstalt, Germany; Pye, Ltd., England; Electricité de France; British Electricity Authority; Theodore Kiepe A.G., Germany.

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.

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.

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.

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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; meat cutter, 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.

HARTMAN, EMILY L. (1957)..... Biological Sciences
A.B., University of Kansas, 1953; M.A., 1955; Ph.D., 1957.
Experience: Teaching assistant, instructor, University of Kansas.

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 Sumner 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 Hospital Corps School Staff; assistant in bacteriology, University of California at Los Angeles; Chief of Laboratories, F.O.D. Assessment Branch, Camp Detrick, Md.

HAUGSTEN, ROBERT C. (1952)..... Equipment Technician, Arts and Sciences Division
B.S., California State Polytechnic College, 1952.

HAYES, HAROLD P. (1952)..... Dean, Engineering Division
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.

HAYES, J. A. (1957)..... Air Conditioning and Refrigeration Engineering
B.S., Massachusetts Institute of Technology, 1933.
Experience: Engineer, St. Louis Board of Education; Brand Air Drier Division; American Wheelabrator Co.; Bell Refrigeration Corp.; Baker Ice Machine Co.; Wright Aeronautical Corp.; John H. Stevens Co.; Carrier Construction Office; Best Foods, Inc.; Officer, U. S. Army; owner, Hayes Engineering Co.

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.

HEINZ, JOHN A. (1953)..... Audiovisual Department
B.A., University of Washington, 1950.
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.

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 and Crops

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.M.R. and merchant marine.

HICKS, WILLIAM R. (1957)—Physical Education

B.S., University of California, Los Angeles, 1953; graduate work, University of California, Los Angeles and Long Beach State College.

Experience: U. S. Army; teacher, Long Beach and Lakewood, California.

* HOBBS, KENNETH R. (1950)—Horticultural Services and Inspection

B.S., Oregon State College, 1946; M.A., 1948; additional graduate work, Oregon State College.

Experience: Technician and curator, Department of Entomology, Oregon State College; agricultural inspector, Los Angeles County Department of Agriculture; inspector, Nursery Service, State Department of Agriculture.

HODNETTE, MILTON G., JR. (1954)—Library

B.A., Colorado College, 1942; M.A., University of Denver, 1951; additional graduate work, Stanford University, University of California and University of Colorado.

Experience: Teacher, Webb School (Tennessee), Elko County (Nevada) High School and Colorado Military School; Documents Librarian and Municipal Reference Librarian, Denver Public Library.

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.

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.

* Kellogg-Voorhis Staff.

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; horseshoer, Porterville, California.

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.

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.

* 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.

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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.

JACKSON, HARRY J. (1953) ..... Mechanical Engineering

B.S., University of Washington, 1947; M.S., Oregon State College, 1951.

Experience: Aircraft Maintenance Office, AAF Twin Engine; instructor, mechanical engineering, University of Idaho; instructor, mechanical engineering, Oregon State College; experimental gas turbine engineer, Solar Aircraft Co. Registered professional engineer, California.

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 Economics

University of Wisconsin, 1923; University of California, 1956.

Experience: Own decorating business; instructor, Adult Education, various California schools.

JENSEN, JAMES J. (1948) ..... Physcial 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.

JOHNSTON, 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.

*KATTENHORN, ALBERT E. (1948)—Agricultural Mechanics

B.S., University of California at Davis, 1935.

Experience: Instructor of agriculture and agricultural mechanics at Point Arena Union High School; Julian Union High School; Escondido Union High School; Welder, Julian Garage; Maintenance Engineer, Wharton Dairies, Escondido, California.

KEITH, DOUGLAS L. (1955)—Machine Shop

A.B., Industrial Arts, Chico State College, 1952; M.A., 1953.

Experience: Machinist, Standard Oil of California; salesman, Standard Stations, Inc.; instructor, Chico State College; assistant, State Compensation Insurance Fund.

* 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)—Dean, Arts and Sciences

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.

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.

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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.

KLINE, ROLAND A., Captain, USA (1956)—Military Science and Tactics

B.S., United States Military Academy, 1946; graduate Artillery Officer Basic and Advanced Courses, The Artillery School, Fort Sill, Oklahoma; Electronics Course, Fort Bliss, Texas; Basic Airborne Course, Fort Benning, Georgia.

Experience: Staff officer and Battery Commander; Division Artillery S-2, 25th Infantry Division, Korea; Assistant G-3 Headquarters Central Command, Japan.

KNOTT, C. E. (1921)—Assistant Dean of Engineering

B.S., University of California, 1916; M.S., 1917.

Experience: Machinist, Pomona Manufacturing Company; substation operator, Pacific Gas & Electric Company, Berkeley; U. S. Army; evaluator, Power Plants and Substations, Pacific Gas & Electric Company, San Francisco; instructor; industrial department, navigation, and physics.

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 Polland; sales engineer, T. H. Creears Corp.; waste disposal plant operator and draftsman, Los Angeles City.

* 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)—Acting 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.

LAMBRE, THOMAS A. (1957)—Registrar

B.S., Miami University, 1953; additional graduate work, Ohio State University and San Jose State College.

Experience: Sales representative, Ohio Bell Telephone Co.; teacher, Columbus, Ohio; teacher, Salinas and Alum Rock, California; instructor, U. S. Navy.

* 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.

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LANDYSHEV, ALEXANDER (1956)—Electrical Engineering

E.E. Degree, University of Vladivostok, Russia, 1927.

Experience: Electrical engineer, Donez Basin Power System, Russia; Energiebauost G.m.b.H., Germany; Brown-Voveri and Co., Germany; U. S. Army Engineers, 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; principal, Cromwell, Kentucky; principal, Jefferson Elementary School, Wayne, Michigan; 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, University 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.A., Baylor University, 1952; M.S., 1953; doctoral candidate, Louisiana State University, 1957, in economics.

Experience: Managerial experience in business; graduate assistant, Louisiana State University; instructor.

LAWRENCE, HAROLD T. (1955)—Mathematics

B.S., Colorado Agricultural College, 1935; M.A. University of Chicago, 1939; additional graduate work, University of Denver, University of Arizona, University of California at Los Angeles.

Experience: Teacher-principal in Illinois; science teacher in Arizona and California 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, Montana; 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; management, 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.

LEIGHTY, RAYMOND V. (1957)—Soil Science

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) ..... Counselor

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.

* 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.

* LLOYD, ROBERT E. (1956) ..... Head, Agricultural Management and Sales Department

B.S., B.Com., University of British Columbia, 1948; M.S., 1950.

Experience: Placement officer, Veterans Affairs Department, Canada; California representative, Washington Cooperative Farmers Association; district representative, San Joaquin Valley Poultry Producers Association; sales representative, C. U. McClellen Laboratories; manager, Sonoma County Cooperative 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.

* LONG, EMMETT T. (1957) ..... Admissions Officer-Registrar

A.B., Pepperdine College, 1945; A.B., University of California, 1946; M.A., 1948; additional graduate study, University of Southern California.

Experience: Instructor, Roosevelt Junior High School, Richmond, California; assistant professor of speech and director of admissions, Pepperdine College, Los Angeles, California; visiting instructor, University of Southern California, Los Angeles State College, Los Angeles City College.

LOPER, WILLARD H. (1955) ..... Agricultural Engineering

B.S., New York College of Agriculture, Cornell University, 1953.

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.

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 Cooperative Association, Education Department, Kansas City, Missouri; U. S. Army; Rich-Con Hardware Company, Sales Department, Kansas City, Missouri.

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McCORKLE, C. O. (1932) ..... Administrative Dean, Instruction

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.

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) ..... 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.

Experience: Senior instructor, Air Force Instructors' Technical School, Chanute Field, Illinois; teacher of industrial art, Los Angeles City Schools; graduate assistant in school administration, Claremont Graduate School; 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 audiovisual education, Claremont Graduate School; 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.

McLACHLIN, HARRY B. (1954) ..... Animal Husbandry

B.S., Agriculture, North Dakota State College, 1930.

Experience: Extension service, extension animal husbandman, North Dakota; U. S. Navy; ranch management in the 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.

* McNEILL, DOROTHY L. (1957) ..... Psychology

B.S., University of Minnesota, 1945; M.S., Illinois State Normal University, 1949; candidate for Ed.D., U. C. L. A.

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.

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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.

* 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.

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.

* 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
B.S., 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.

MATTHEW, 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; officer, U. S. Air Force.

MEACHAM, VERNON H. (1929) ..... Agricultural Education and Teacher Training
B.S., University of California, 1924.
Experience: Agricultural instructor, Gilroy and Manteca High Schools.

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* MEALS, CHARLES F. (1957) ..... Curriculum Specialist, 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.

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.

METZ, ROY F. (1937) ..... Aeronautical Engineering
Cass Technical School of Engineering, 1941; additional study, Pratt-Whitney Corporation; Allison Corporation; certificates by Civil Aeronautics Authority as aircraft and engine mechanic, ground school instructor, and designated examiner and inspector.
Experience: United Air Lines, Mid-Continent Air Lines, and Pan American Air Lines; operator, Pacific Airmotive Corporation, Oakland, California.

MEYER, EDGAR V. (1955) ..... English
B.A., St. Louis University, 1936; M.A., Louisiana State University, 1938; Ph.D., Denver University, 1954.
Experience: Instructor, Xavier University, New Orleans, College of St. Teresa, Winona, Minnesota; Loras College, Dubuque, Iowa; Kansas State College; California public 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.

MILLER, DOUGLASS W. (1953) ..... Public Relations Director and Journalism
B.A., DePauw University, 1916; M.A., University of Wisconsin, 1927; Litt. D., DePauw University, 1941.
Experience: Copywriter, Sidener-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 Southern 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.

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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, Washington 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.

Experience: Laboratory assistant and teaching assistant California State Polytechnic College; teaching fellow, College of the Pacific; staff, Pacific Marine Biological Station, Dillon Beach, California.

* 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 technician, Lane County Planning Commission; designer, W. M. Ruff, Eugene, Oregon; U. S. Army.

* MORAN, GABRIEL T. (1948) ..... Chemistry, Placement Officer

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; District Agricultural Laboratory, Whittier, California.

MORRIS, DON M. (1957) ..... Residence Supervisor-counselor

B.S., California State Polytechnic College, 1952; additional graduate study, California State Polytechnic College.

Experience: Dormitory manager, California State Polytechnic College; officer and pilot, U. S. Navy; Assistant 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 California.

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; 4 years private practice, Pismo Beach, California.

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.

* NALLY, WALLACE E. (1955) ..... Aeronautical Engineering

B.S., Mechanical Engineering, University of Washington, 1954.

Experience: Draftsman, expediter, 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.

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.

* Kellogg-Voorhis staff.

NELSON, DONALD S. (1943) ..... Business Manager

A.B., Stanford, 1930.

Experience: California State Department of Finance, Budgets and Accounts; Comptroller, Fresno State College, Fresno.

* 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.

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 and Political Science

B.S., University of Wisconsin, 1935; M.A., University of Southern California, 1940.

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., at Montevideo, Uruguay; officer, U. S. Navy; vice consul, Department of State, Washington, D. C., at Valparaiso, Chile.

O'DANIELS, HOWARD R. (1933) ..... Accounting, Typing, 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) ..... Mechanical Engineering

B.M.E., Rensselaer Polytechnic Institute, 1945.

Experience: Instructor, Rensselaer Polytechnic Institute; designer, General Electric Company; American Locomotive Co.; ship superintendent, U. S. Naval Shipyard, Bremerton, Washington.

* Kellogg-Voorhis staff.

* 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 analyist and control chemist.

PAVEY, A. R. B. (1957) ..... Electronic Engineering

B.S., University of London, 1956.

Experience: Engineer, Electro-Hydraulics, Ltd.; instructor, Technical Training College; British Royal Navy.

PAYTON, PHILLIP W. (1957) ..... Economics

B.A., Reed College, 1951; Graduate in Agricultural Economics, M.A., Stanford University, 1953-54; additional graduate work toward Ed.D., 1956.

Experience: Instructor, Sacramento Junior College; instructor, San Bernardino Junior College.

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.

PERKINS, ERIC R. (1956) ..... Electronic Engineering

British Higher National Diploma, The Polytechnic, England, 1951; graduate, Institute of Electrical Engineers, England, 1951.

Experience: Systems engineer, Standard Telephones and Cables, Ltd., England; engineer, Guided Weapons Division, English Electric Co., England; engineer, Lane Wells Co.

* 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.

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.

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.

* PITTS, STALEY L. (1953) ..... Crops

B.S., Kansas State, 1939; M.S., University of Southern California, 1951; additional graduate work, University of Southern California.

Experience: Instructor, Ransom High School, Kansas; Instructor, Newton High School, Kansas; instructor and line coach, South Dakota State; assistant professor and line coach, Kansas State; associate professor and line coach, Virginia Polytechnic Institute; vocational agriculture instructor, Corona High School; officer, U. S. Navy.

* Kellogg-Voorhis staff.

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 (1957) ..... English

B.A., Baylor University, 1927; M.A., 1932; additional graduate work, various colleges and universities, 1936-56.

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.

* RAAB, WALLACE A. (1957) ..... Acting Head, Mathematics Department

B.S., Morningside College, 1948; M.A., University of South Dakota, 1949; candidate for Ph.D., Iowa State College.

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.

RATHERT, GEORGE A. (1957) ..... Aeronautical Engineering

B.S., University of Kansas, 1916.

Experience: Chief engineer, Bureau of Aeronautics, U. S. Navy Dept.; assistant professor, Oregon State College; instructor, CWA Adult Education; engineer, Breese Aircraft Corp.; American Eagle Aircraft Corp.; R. V. Aycock Co.; Longren Aircraft Corp.; Empire Gas & Fuel Co.; chief draftsman, U. S. Naval Aircraft Factory.

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.

* Kellogg-Voorhis staff.

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; mechanical design engineer, Bechtel Corporation, San Francisco.

* REES, DONALD E. (1949) ..... Head, Physical Sciences Department

A.B., Whittier College, 1942; M.S., University of Iowa, 1943; Ph.D., 1947.

Experience: Teaching assistant and research fellow, University of Iowa; officer U. S. Navy; group leader, Research Department, Shell Oil Co., Inc.

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.

RENDALL, ROBERT G. (1954) ..... Air Conditioning and Refrigeration Engineering

B.S., in Mechanical Engineering, University of Colorado, 1949; M. of Education, 1951.

Experience: Officer, U. S. Coast and Geodetic Survey; instructor, Del Norte High School, Colorado; design engineer, North American Aviation Corp., Los Angeles, California; U. S. Army.

REYNOLDS, ALICE J. (1955) ..... Physical Education and Health

A.B., Colorado State College of Education, 1940; M.A., 1947; additional graduate work, University of Wisconsin.

Experience: Physical education instructor in elementary and secondary schools of Colorado and California; instructor, Colorado State College of Education; assistant professor, Morris Harvey College; recreation director, Charleston, W. Va.

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.

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.

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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 Manville 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, University of St. Louis, 1942-1943.

Experience: Superintendent of schools and director of Science Department at Rolla, North Dakota; Omemee, North Dakota; Lansing, Iowa; electronics instructor, Advanced Radar School, Truax Field, Madison, Wisconsin.

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, Michigan; 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 technician, 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.

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.

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.

* Kellogg-Voorhis staff.

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.

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.

SAUNDERS, J. ROBERT (1957) ..... Physics
B.S., Monmouth College, 1949; graduate work, Western Illinois State College, Northern Illinois University.
Experience: Instructor in physics, Monmouth and Hinsdale, Illinois, High Schools; safety engineer, Sylvania Electric Products, Inc.; officer, U. S. Army.

*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.

SCHENK, JANICE C. (1955) ..... Mathematics
B.A., Millsaps College, 1947; M.A., University of California, Berkeley, 1955.
Experience: Public health statistician, Ohio State Department of Health and Oklahoma State Department of Health; auditor, U. S. Army; budget and fiscal supervisor, U. S. Air Force; mathematics instructor, U. S. Government; junior mathematician, Battelle Memorial Institute, Columbus, Ohio.

* SCHEUERMAN, J. CLAUDE (1957) ..... Business Manager
A.B., Stanford, 1949.
Experience: Budget analyst, California State Department of Finance, Budget Division.

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.

* Kellogg-Voorhis staff.

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; state-wide counselor, University of Montana.

SEEBER, GLENN E. (1954) ..... Welding

A.B. and M.A. in Biology, Chico State College, 1950.

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.

* SEKERAK, ROBERT M. (1956) ..... Acting Chairman, Psychology and Visual Arts

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

Experience: U. S. Navy; supervising clerk, California State Polytechnic College.

SHARPE, NORMAN (1937) ..... Head, 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.

SHIVELY, ROBERT J., Captain, USAR (1957) ..... Military Science and Tactics

A.B., University of California, Berkeley, 1951; graduate, Ordnance Officers Basic, the Ordnance School, Aberdeen Proving Grounds, Aberdeen, Maryland.

Experience: Company officer, company commander, staff officer, ordnance battalion, Infantry, Korea; procurement officer, procurement control and production officer, U. S. Army Ordnance Districts, Chicago and San Francisco.

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 Head, English and Speech Department

A.B., San Diego State College, 1949; M.A., U. C. L. A., 1950; Ph.D., University of Southern California, 1956.

Experience: Teaching assistant, U. C. L. A., University of Southern California; lecturer, University of Southern California, Chouinard Art Institute; instructor, Los Angeles Evening Adult School.

* Kellogg-Voorhis staff.

SIMON, ALFRED W. (1955)—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 Co.; research physicist, Stewart-Warner Corp., American Harmonica Co., and Naval Ordnance Laboratory; assistant professor, Washington University, St. Louis; associate professor, Tulsa University and Alabama Polytechnic Institute.

* 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.

SMITH, DON W. (1955)—Aeronautical Engineering

B.S., Mechanical Engineering, Valparaiso University, 1952.

Experience: Officer, U. S. Army Air Corps; engineer, Chicago Midway Laboratory, Rockford Clutch Corp., Lockheed Aircraft Corp.

* 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, HERBERT L. (1956)—English and Speech

A.B., San Francisco State College, 1941; M.A., Cornell University, 1950; Ph.D., 1953; additional graduate study, University of Missouri, Brooklyn College, Moreno Institute, New York City.

Experience: Instructor, Cedar Crest College, Allentown, Pa.; Syracuse University; New York State College for Teachers, Albany; University of Maine; professor of English and speech and chairman, Humanities Division, Adrian College.

SMITH, M. EUGENE (1946)—History and Political Science

A.B., University of California, 1934; M.A., 1937; additional graduate study, University of California and University of Oregon.

Experience: Instructor, Piedmont High School, Piedmont, California; officer, U. S. Army.

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.

STEFFEL, MILAN S. (1954)—Printing

B.S. in Printing, California State Polytechnic College, 1954.

Experience: Assistant pressman, World Publishing Co., Buehler Print Craft Co., and International Press, Cleveland, Ohio; pressman, Odd Things Publishing Co., Cleveland; pressman, Commercial Press, New York City; U. S. Army.

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.

* Kellogg-Voorhis staff.

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.

* STRINGHAM, GLEN E. (1955) ..... Agricultural Engineering

B.S., Utah State Agricultural College, 1955.

Experience: Engineer, Conservation and Development Branch, Saskatchewan Department of Agriculture, Regina, Saskatchewan, Canada.

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.

* 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.

TALBOTT, JOHN WILLIAM (1949) ..... Truck Crops and Agronomy

B.S., Agriculture, University of California, Davis, 1949.

Experience: Field assistant, University of California, Davis; general farm work, 76 Ranch, Lemhi, Idaho; fruit sales, College Heights Orange Association, Claremont.

TAYLOR, MORRIS P. (1954-55) (1956) ..... Head, Mechanical Engineering Department

B.A., Stanford University, 1923; M.A., 1925; 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

A.B., University of California at Los Angeles, 1950; M.S., 1953.

Experience: Editor, *Monterey Park Californian;* reporter, *Los Angeles Mirror;* director of press relations, Los Angeles Title Insurance Company; U. S. Army.

* Kellogg-Voorhis Staff.

* TESCHE, WILLIAM C. (1957) ..... Assistant to the President

B.S., University of California, 1918.

Experience: Navy; ranch foreman, Southwest Cotton Co., Arizona; deputy agricultural commissioner, Santa Clara County; agricultural extension service, Los Angeles County; field editor and southern manager, Pacific Rural Press; sales promotion manager, secretary, and general manager, California Walnut Growers Association.

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: Teaching assistant, University of California; instructor, San Mateo Junior College.

TOONE, HARMON (1952) ..... Acting 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.

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, ELBRIDGE A. (1957) ..... Agricultural Economics

B.S., Oklahoma A. & M. College, 1935; M.S., 1936; additional graduate work at Oklahoma A. & M. College and University of California.

Experience: Agent, Oklahoma Agricultural Experiment Station, U. S. Department of Agriculture; associate economist, Bureau of Agricultural Economics, USDA; assistant professor, Oklahoma A. & M. College.

TURNER, PEARL (1951) ..... Library

A.B., San Jose State, 1937; M.S., University of Southern California, 1949; M.L.S., Texas State College for Women, 1951.

Experience: Officer, U. S. Navy; library, Texas State College for Women.

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.

* Kellogg-Voorhis Staff.

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.

WALES, T. E. (1953)—Agricultural Engineering

B.S., University of California, Davis, 1950; M.S., 1953.

Experience: U. S. Navy; engineering aide, University of California, Davis.

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.

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 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)—Head 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.

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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.

WEST, HARRY R. (1956) ..... Electrical Engineering

B.A., University of South Dakota, 1915; M.A., 1916; fellow in physics, University of Michigan, 1917.

Experience: Instructor, University of Pennsylvania; development engineer, General Electric Co.

WESTON, RALPH E. (1948) ..... Mathematics

A.B., Stanford University, 1922; M.A., 1932.

Experience: Electrical engineering; San Joaquin Light and Power Co.; Pacific Gas and Electric Co.; teaching, Stanford University, Chaffee Junior College, Sacramento Junior College, visiting professor mathematics, University of Idaho, Southern Branch; visiting associate professor, aeronautical engineering, 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.

WEWER, WILLIAM P. (1956) ..... Elementary Education

B.S. in Education, State Teachers College, Kutztown, Pennsylvania, 1942; M.A., San Diego State College, 1952; additional graduate study, University of California at Los Angeles.

Experience: Teacher in elementary schools, La Mesa, California; principal, Central Elementary School, Banning, California; teaching assistant, University of California at Los Angeles.

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, THOMAS R. (1956) ..... Library

B.A., San Francisco State College, 1949; M.A., University of Washington, 1952; M.L.S., 1956.

Experience: University of Washington Fisheries-Oceanography Library.

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, 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.

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, United States 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.

WILKINSON, JAMES S. (1954) ..... Off-campus Housing Supervisor and Financial Aid Adviser

B.S., Physical Education, Washington State College, 1936; M.S., Physical Education, University of Oregon, 1941.

Experience: Director of Athletics, Toppenish, Wash., High School; instructor in P. E., University of Oregon; Director of Health and P. E., The Dalles, Oregon, High School; Officer-in-Charge, Ship Handling School USN; Training and Scheduling Officer, Combat Information Center, USN.

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.

* WILLIAMSON, WILLIS N., JR. (1955) ..... Manager, Horse Breeding Program

B.S., California State Polytechnic College, 1953.

Experience: Trainer, stable foreman, California State Polytechnic College, Kellogg Unit, Pomona, California; head of breeding program and sale yearlings, Dr. Frank Porter Miller Ranch, Riverside, California.

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.

WILSON, HAROLD O. (1936, 1946) ..... Administrative 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.

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.

* Kellogg-Voorhis Staff.

* WINTERBOURNE, ROBERT G. (1957) ..... Industrial Engineering

B.S., University of Colorado, 1942; Cert. Metero., University of California, Los Angeles, 1943; M.B.A., University of California, Berkeley, 1947.

Experience: Project engineer, Arabian American Oil Co., Arabia; assistant purchasing agent, Cutter Laboratories, Berkeley; insurance representative, State Compensation Insurance Fund, Los Angeles; buyer expediter, Fluor Corp., Los Angeles; administrative assistant, Aerojet General, Azusa, California.

* 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

B.A., Arizona State College, 1933; M. A., University of Arizona, 1941; Ed.D., University of Southern California, 1953.

Experience: Engineer, Agricultural Adjustment Administration; high school teaching; Signal Corps program.

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.

WRAITH, WEBB SAXON (1957) ..... Mathematics

B.S., University of Santa Clara, 1951; M.A., California State Polytechnic College, 1957.

Experience: Officer, U. S. Army; teaching assistant, 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.

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, Berkeley, 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; physical chemist, U. S. Bureau of Mines, U. S. Department of Agriculture.

YOUNG, ROBERT O. (1957) ..... Journalism

B.A., Pepperdine College, 1952; additional graduate work, U. C. L. A.

Experience: Journalism instructor and director of public relations, Pepperdine College; publicity director, Al Malaikah Shrine; editor, America's Builders.

* Kellogg-Voorhis Staff.

ZAISER, JOHN K. (1957) ..... Mechanical Engineering

B.S., University of Minnesota, 1949.

Experience: Designer-supervisor, Anaconda Copper Mining Co.; Architects Engineers Spanish Bases; North American Aviation, Inc.; engineer, J. W. Galbreath Co.; Bureau of Reclamation; assistant section chief, Naval Civil Engineering Research & Evaluation Lab.

ZIMMERMAN, HOWARD (1955) ..... Electronic Engineering

B.S., Radio Engineering, Indiana Technical College, 1950.

Experience: Radar technician, U. S. Navy; design and repair of electronic devices, self-employed; chief technician and communication field engineer, RCA Service Co.; instructor, Penn-Ohio Technical School.

THE STATE BUREAU OF AGRICULTURAL EDUCATION

The State Bureau of Agricultural Education is a division of the State Department of Education. The bureau has charge of all vocational agriculture instruction in the State offered in public schools at the secondary level. Some of the bureau offices are located on the San Luis Obispo Campus, and the college and its staff participate actively in in-service training for vocational agriculture teachers.

Members of the bureau staff are well informed on activities of the college, and are always willing to discuss the college with prospective students. The State Bureau of Agricultural Education staff directory is listed below:

DIRECTORY STATE BUREAU OF AGRICULTURAL EDUCATION

B. J. McMahon, Chief of Bureau ..... Room 413, State Education Bldg., Sacramento
E. W. Everett, Asst. Chief of Bureau ... Room 413, State Education Bldg., Sacramento
K. B. Cutler, Regional Supervisor ..... 809-C California State Bldg., Los Angeles
E. Dave Graf, Jr., Regional Supervisor
Room 413, State Education Bldg., Sacramento
G. A. Hutchings, Regional Supervisor
California State Polytechnic College, San Luis Obispo
M. K. Luther, Regional Supervisor ..... 809-C California State Bldg., Los Angeles
R. H. Pedersen, Regional Supervisor ..... 2082 Center Street, Berkeley 1
A. G. Rinn, Regional Supervisor ..... 839 North Fulton Street, Fresno
J. E. Walker, Regional Supervisor ..... 47 Warner Street, Chico
H. H. Burlingham, Teacher Trainer
California State Polytechnic College, San Luis Obispo
S. S. Sutherland, Teacher Trainer
University of California, College of Agriculture, Davis
George P. Couper, Special Supervisor
California State Polytechnic College, San Luis Obispo
W. J. Maynard, Special Supervisor ..... 849 Linden Drive, Santa Clara

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