This catalog contains official information concerning the curricula, courses, instructional staff, admission requirements, graduation, and regulations pertaining to all campuses of the college. Students will find that the catalog lists all curricula and courses which meet the following patterns:

1. Four-year occupational programs leading to the bachelor of science degree in 28 major departments in three divisions—agriculture, engineering, and liberal arts.

2. Four and five-year programs leading to the bachelor of science degree and general and special secondary teaching credentials.

3. Two-year technical programs in agriculture leading to technical certificates.

4. Graduate programs leading to master of arts degrees with concentrations in any of six teaching fields.

5. General education subjects which provide the background for intelligent participation in a complex world society.

CORRECTION

After going to press on the text pages of the 1953-54 catalog, notification was received from the Sears Foundation that they were changing the scholarships they offer from twenty-five $100 scholarships to twelve $200 scholarships. This revision relates to the information contained on Page 47 under the heading "Scholarships."
CALIFORNIA STATE POLYTECHNIC COLLEGE BULLETIN

SAN LUIS OBISPO CAMPUS

VOORHIS CAMPUS
SAN DIMAS

KELLOGG CAMPUS
POMONA

CATALOG ISSUE
1953-1954
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CALIFORNIA STATE POLYTECHNIC COLLEGE

ACADEMIC CALENDAR—1953-54
(All Dates Inclusive)

SUMMER QUARTER, 1953

Four Weeks Term

June 26  Friday. Examination of New Students
June 29  Monday, 8 a.m. Registration and Scheduling of Old Students
June 30  Monday, 10 a.m. Registration and Scheduling of New Students
July 4  Tuesday. Classes Begin for All Students
July 13  Monday. Last Day to Enroll for Four Week Term
         Last Day for Returning Registration Cards
         Last Day for Adding Courses
July 24-25  Friday-Saturday. Final Examinations

Six Weeks Term

July 24  Friday. Examination of New Students
July 27  Monday, 8 a.m. Registration and Scheduling of Old Students
         Monday, 10 a.m. Scheduling of New Students
July 28  Tuesday. Classes Begin for All Students
Aug. 3  Monday. Last Day to Enroll for Six-Week Term
         Last Day for Returning Registration Cards
         Last Day for Adding Courses
Sept. 3-4  Thursday-Friday. Final Examinations

FALL QUARTER

Sept. 14  Monday. Beginning of Academic Year (Faculty Only)
Sept. 16  Wednesday. Examination of New Students
Sept. 19  Saturday. Registration and Scheduling of New Students
Sept. 21  Monday. Registration and Scheduling of Old Students
Sept. 22  Tuesday. Classes Begin for All Students
Sept. 29  Tuesday. Last Day to Enroll for Fall Quarter
         Last Day for Returning Registration Cards
         Last Day for Adding Courses
Oct. 14  Wednesday. Last Day Classes May be Dropped Without Penalty
Oct. 26-31  Mon.-Sat. Mid-Term Week
Nov. 11  Wednesday. Armistice—Academic Holiday
Nov. 25 (noon)-28  Thanksgiving—Academic Holiday
Dec. 5  Saturday. Pre-Schedule for Winter Quarter
Dec. 7-11  Mon.-Fri. Final Examinations
Dec. 14-Jan. 3  Christmas—Academic Holiday
ACADEMIC CALENDAR—1953-54—Continued

WINTER QUARTER

Jan. 4 Monday. Examination of New Students
Jan. 6 Wednesday. a.m. Registration and Scheduling of New Students
Jan. 7 Thursday. Registration and Scheduling of Old Students
Jan. 14 Thursday. Classes Begin for All Students
Jan. 28 Thursday. Last Day Classes may be dropped without penalty
Feb. 15-20 Mid-Term Week
March 13 Saturday. Pre-Scheduling for Spring Quarter
March 18-23 Thurs.-Tues. Final Examinations
March 23 Tuesday. End of Winter Quarter

SPRING QUARTER

March 26 Friday. Examination of New Students
March 29 Monday a.m. Registration and Scheduling of New Students
March 30 Tuesday. Classes Begin for All Students
April 6 Tuesday. Last Day to Enroll for Spring Quarter
April 16-18 Easter—Academic Holiday
April 20 Tuesday. Last Day for Dropping Courses Without Penalty
April 22 Thursday. Last Day for Acceptance of Senior Project
May 1 Saturday. Last Day for Filing for Masters Comprehensive Examination
May 3-8 Mid-Term Week
May 31 Monday. Memorial Day—Academic Holiday
June 12-18 Sat.-Fri. Final Examinations
June 19 Saturday. End of Spring Quarter, Commencement
June 20 End of Academic Year (Faculty Only)

TENTATIVE SUMMER QUARTER, 1954

Four Weeks Term

June 25 Friday. Examination of New Students
June 28 Monday 8 a.m. Registration and Scheduling of Old Students
June 29 Tuesday. Classes Begin for All Students
July 5 Monday. Independence Day Holiday
July 22-23 Thurs.-Fri. Final Examinations

Six Weeks Term

July 23 Friday. Examination of New Students
July 26 Monday 8 a.m. Registration and Scheduling of New Students
July 27 Tuesday. Classes Begin for All Students
Sept. 2-3 Thurs.-Fri. Final Examinations
ADMINISTRATION AND FACULTY
ADMINISTRATION

STATE BOARD OF EDUCATION

William L. Blair (President) ............................................................... Pasadena
Byron H. Atkinson ................................................................. Glendale
Mrs. E. T. Hale ................................................................. San Diego
Gilbert T. Jertberg ................................................................. Fresno
Joseph P. Loeb ................................................................. Los Angeles
Thomas J. Mellon ................................................................. San Francisco
Max Osslo ............................................................... San Diego
Mrs. Vivian N. Parks .............................................................. Richmond
Wilber D. Simons ................................................................. Redding
Mrs. E. K. Strong .............................................................. Stanford University

STATE DEPARTMENT OF EDUCATION

Hon. 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
Joel A. Burkman .................................................. Assistant Chief, Division of State Colleges and
Teacher Education
Wesley P. Smith .............................................................. State Director of Vocational Education

COLLEGE ADMINISTRATION

Julian A. McPhee .............................................................. President
Leona M. Boerman ................................................................. Secretary to the President
Harold O. Wilson ................................................................. Executive Dean
C. O. McCorkle ................................................................. Dean of Instruction
Donald S. Nelson ................................................................. Business Manager
Everett M. Chandler ................................................................. Dean of Students
Harold P. Hayes ................................................................. Dean, Engineering Division
Vard M. Shepard ................................................................. Dean, Agricultural Division
Robert L. Maurer ................................................................. Assistant Administrator, Liberal Arts Division
J. Cordner Gibson ................................................................. Executive Dean, Kellogg-Voorhis Campus
Carl England ................................................................. Dean of Agriculture, Kellogg-Voorhis Campus
Henry House ................................................................. Director of Students, Kellogg-Voorhis Campus
Robert E. Kennedy ................................................................. Director of Public Relations
Kenneth E. Young ................................................................. Publications Manager, Kellogg-Voorhis Campus
C. Paul Winner ................................................................. Admissions Officer
Albert J. Aschenbrenner .......................................................... Admissions Officer, Kellogg-Voorhis Campus
Leo F. Philbin ................................................................. Registrar
LeRoy B. Hughes ................................................................. Director of Athletics
E. D. Lovett ................................................................. College Physician
Oberlin B. Nereson ................................................................. Guidance Officer
John D. Lawson ................................................................. Activities Officer
John E. Jones ................................................................. Placement Officer
Francis S. Allen ................................................................. Librarian
Eugene E. Brendlin ................................................................. Foundation Manager
H. Don Watts ................................................................. Housing Manager
A. R. Noggle ................................................................. Cafeteria Manager
# DEPARTMENT HEADS AND CHAIRMEN BY DIVISIONS

## SAN LUIS OBISPO

### AGRICULTURAL DIVISION

<table>
<thead>
<tr>
<th>Department</th>
<th>Chairman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Engineering</td>
<td>James Merson</td>
</tr>
<tr>
<td>Animal Husbandry</td>
<td>Lyman Bennion</td>
</tr>
<tr>
<td>Dairy Husbandry and Manufacturing</td>
<td>George Drumm</td>
</tr>
<tr>
<td>Field, Fruit, and Truck Crops</td>
<td>Paul Dougherty</td>
</tr>
<tr>
<td>Ornamental Horticulture</td>
<td>Howard C. Brown, Acting</td>
</tr>
<tr>
<td>Poultry Husbandry</td>
<td>Richard Leach</td>
</tr>
<tr>
<td>Soil Science</td>
<td>Logan Carter</td>
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<tr>
<td>Veterinary Science</td>
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</table>

### ENGINEERING DIVISION

<table>
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<tr>
<th>Department</th>
<th>Chairman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeronautical Engineering</td>
<td>Lester W. Gustafson</td>
</tr>
<tr>
<td>Air Conditioning and Refrigeration Engineering</td>
<td>Norman Sharpe</td>
</tr>
<tr>
<td>Architectural Engineering</td>
<td>George J. Hasslein</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>Fred W. Bowden</td>
</tr>
<tr>
<td>Electronic and Radio Engineering</td>
<td>Clarence Radius</td>
</tr>
<tr>
<td>Machine Shop</td>
<td>Francis F. Whiting</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>T. J. Zilka</td>
</tr>
<tr>
<td>Printing</td>
<td>A. M. Fellows</td>
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<tr>
<td>Welding</td>
<td>Richard C. Wiley</td>
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</table>

### LIBERAL ARTS DIVISION

<table>
<thead>
<tr>
<th>Department</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Journalism</td>
<td>Kenneth Kitch</td>
</tr>
<tr>
<td>Biological Science</td>
<td>Glenn Noble</td>
</tr>
<tr>
<td>Education and Psychology</td>
<td></td>
</tr>
<tr>
<td>English and Public Speaking</td>
<td>David M. Grant</td>
</tr>
<tr>
<td>Health and Physical Education</td>
<td>Robert Mott</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Harold Davidson</td>
</tr>
<tr>
<td>Music</td>
<td>Woodford E. Bowls</td>
</tr>
<tr>
<td>Physical Science</td>
<td>A. Norman Cruikshanks</td>
</tr>
<tr>
<td>Social Science</td>
<td></td>
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</tbody>
</table>

### KELLOGG-VOORHIS

<table>
<thead>
<tr>
<th>Department</th>
<th>Chairman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Husbandry</td>
<td>Wesley Combs</td>
</tr>
<tr>
<td>Fruit Production</td>
<td>Albert E. Canham</td>
</tr>
<tr>
<td>General Crops</td>
<td>Robert L. Procsal</td>
</tr>
<tr>
<td>Ornamental Horticulture</td>
<td>Oliver A. Batcheller</td>
</tr>
<tr>
<td>Horticulture Services and Inspection</td>
<td>Edward C. Appel, Jr.</td>
</tr>
<tr>
<td>Soil Science</td>
<td>Harry V. Welch, Jr.</td>
</tr>
</tbody>
</table>
FACULTY COMMITTEES

The following faculty committees will serve during the school year, 1953-1954.

SAN LUIS OBISPO

President's Council—McPhee, Chairman; Wilson, Vice Chairman; Brendlin, Chandler, Englund,* Gibson,* Hayes, Kennedy, Maurer, McCorkle, Nelson, Shepard.

California State Polytechnic College Foundation Directors—McPhee, President; Merson, Vice President; C. Jones, Secretary-Treasurer; McCorkle, Gibson,* Zilka, Wilson.

Campus Planning—Cook, Chairman; Hammitt, Lawson, Merson, Ralph W. Miller, Watts, Zilka.

Instructional Planning—McCorkle, Chairman; Cook, Secretary; Allen, Brendlin, Bowden, Carter, Englund,* Grant, Gustafson, Holmquist, R. Johnson, J. Jones, Nereson.

Public Relations—Beck, Chairman; Bloom, Couper, Gould, Kennedy, Landr, Lawson, McGrath, Nereson, Talbot, Whiting, Wineroth, Young.*

Student Personnel—W. Anderson, Chairman; Prouse, Gardner, House,* Longborg, Elston, Robert Miller, Richardson, Watts.

Teacher Education—Maurer, Acting Chairman; Bennion, Bowls, Burlington, Butzbach, Cruikshanks, Dougherty, Englund,* J. Jones, Leach, Mott, Noble, Whitson, Zilka.

KELLOGG-VOORHIS

Dean's Advisory—Gibson, Chairman; Englund, Geiger, House, Kempton, Young.

Instructional Planning—Englund, Chairman; Appel, Aschenbrenner, Batcheller, Canham, Combs, Conard, Hoff, Lamilman, Proesal, Stull, Welch.

Farm Planning—Englund, Chairman; Carlberg, Combs, Hobbs, Griffin, Kattenhorn, Kempton, Lloyd, Phillips.

Student Personnel—House, Chairman; Boltz, Combs, Dimitman, Hobbs, Lloyd, Niles, Phillips, Rees, Stull, Welch.

Public Relations—Young, Chairman; Aschenbrenner, Barnard, Brown, Lint, Moran, Niles, Pflueger, Stuart, Weeks, Wester, Whitehead.

* Kellogg-Voorhis staff.
FACULTY
(Number in parentheses indicates year of appointment)

McPhee, Julian A. (1933) --------------- __________________President
B.S., University of California, 1917; M.A., University of California, 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).

Algeo, John W. (1949) -------------------------------- Animal Husbandry
Experience: U. S. Marine Corps; graduate research assistant, Washington State College.

Allen, Francis S. (1949) ---------------------------------Head Librarian
Litt. B., Xavier University, 1933; B.S. in L.S., University of Illinois, 1941.
Experience: Librarian, Seattle College, officer, U. S. Army; librarian, Shriverham American University, England; assistant circulation librarian, Oregon State College.

Allen, John K. (1952) -------------------------------Veterinary Science
D.V.M., Iowa State College, 1934.

Anderson, Clifford H. (1949) -------------------------------- Mechanical Engineering
B.S., California State Polytechnic College, 1949.
Experience: Engineering trainee, United States Maritime Commission; fireman-watertender, Moore-McCormack Steamship Co., San Francisco; engineer, diesel towboat Viking, Russel Towboat and Moorage Co., Vancouver, Washington; United States Navy; plant operator, City of San Luis Obispo Sewage Disposal Plant.

Anderson, Richard A. (1947) ------------------------Physical Education and Athletics
B.S. in Education, University of Southern California, 1942; M.S. in Education, University of Southern California, 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) -------------------------------- Economics, Accounting
A.B., Pacific Lutheran College, 1940; M.A., Stanford University, 1948; M.B.A., Stanford University, 1952.
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, 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.
ANDREWS, DALE W. (1950) --------------- Agricultural Education and Teacher Training
B.S., University of California, Davis, 1941; graduate work, University of California, Davis, and California Polytechnic College.
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 Science
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.

* ASCHENBRENNER, ALBERT J. (1947) ---------------- English, History, Political Science
A.B., Whitman College, Washington, 1940; M.S., University of Southern California, 1947. Additional graduate work, Montana State University and Claremont Graduate School.
Experience: Custer County High School, Miles City, Montana; Infantry School, Fort Benning, Georgia.

BAILEY, BERNIE B. (1949) -------------------------- Poultry
B.S., Iowa State College, 1947; graduate study, Texas A. & M., 1949
Experience: Manager, Poultry Farm, North Texas Agricultural College; U. S. Army; poultry supervisor, Iowa Poultry Improvement Association; Poultry Department Supervisor, Texas A. & M.

BARKER, MARY LOU (1950) -------------------------- Library
A.B., Nebraska Wesleyan University, 1947; A.B. in L.S., University of Michigan, 1948.
Experience: Junior cataloger, University of Michigan Law Library.

* BARNARD, J. LAURENS (1952): -------------------- Biological Science Department
A.B., University of Southern California, 1949; M.S., 1950; additional graduate work 1950-1952.
Experience: Research Fellow, Allan Hancock Foundation, University of Southern California.

BECK, CARL G. (1932) -------------------------- Accounting and Agricultural Economics
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.

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.

* BATCHELLER, OLIVER A. (1946) ------------------ Head, Ornamental Horticulture Department
B.S., Oregon State College, 1936.
Experience: Assistant farm advisor, Oregon; branch manager California Nursery Company, California; officer, U. S. Army.

* Kellogg-Voorhis Staff.
Bille, Ralph O. (1948) --------------------------------- Agricultural Engineering
B.S., University of Minnesota, 1922; M.S., University of Minnesota, 1940.
Experience: Agriculture instructor in secondary schools, Minnesota; agricultural engineering and industrial arts instructor, State Teachers College, Platteville, Wisconsin.

Blair, Helen B. (1948) --------------------------------- Library
A.B., Louisiana State University, 1940; B.S. in L.S., Louisiana State University, 1942.
Experience: Librarian, Covington High School, Louisiana; cataloger, University of Alabama; cataloger, Tulane University; cataloger, University of Texas.

Bloom, Emmett A. (1946) --------------------------------- Animal Husbandry
B.S. Agriculture, University of California, Davis, 1934.
Experience: Agricultural instructor at Ripon, Laton, and Corning High Schools.

*Boltz, Howard O. (1947) --------------------------------- Ornamental Horticulture
B.S., University of California, 1941; M.S., University of California, 1947.
Experience: Landscape architect in private practice; officer, U. S. Army; instructor in mechanical and architectural drawing, University High School, Berkeley, California.

Bonio, Enrico P. (1948) --------------------------------- Welding
A.B., Chico State College, 1948.

Bowden, Frederick W. (1949) --------------------------------- Head, Electrical Engineering Department
B.S., California Institute of Technology, 1932; M.S. in E.E., California Institute of Technology, 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 Science 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.

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.

Beaustein, Howard H., Captain, USA (1952) --------------------------------- Military Science and Tactics

* Kellogg-Voorhis Staff.
Faculty

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) --------------- Agricultural Economics
B.S., University of Southern California, 1934; M.S., University of Southern California, 1936; graduate work at Columbia, Texas A. & M., and Berkeley.
Experience: Teacher, Garvey School District; instructor, San Diego State College; officer, U. S. Navy.

BROWN, HOWARD C. (1946) --------------- Acting Head, Ornamental Horticulture
B.S., California State Polytechnic College, 1943.

*BROWN, HOWARD S. (1948) --------------- Biological Science
B.A., 1943; M.A., 1948, University of California at Los Angeles.
Experience: Teaching assistant, University of California at Los Angeles; officer, U. S. Marine Corps.

BURKE, THOMAS L., Sergeant US Army (1952) --------------- Military Science and Tactics
Graduate, Noncommissioned Officers School, Trieste; studied at Delehanty Institute, New York City.
Experience: Instructor, Infantry School, Fort Benning, Georgia; instructor, Infantry Training, Fort Ord, California; foreign service France, Germany, Austria.

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.

BUTZBACH, ARTHUR G. (1950) --------------- Education and Psychology
A.B., Stanford University, 1926; M.A., Stanford University, 1929; Ed.D., Stanford University, 1948.
Experience: Teacher and principal, Lower Lake Union High School; assistant professor of education, Drake University and Sacramento State College.

CAMP, MABEL G. (1947) --------------- Recorder
Graduated Secretarial School, Stetson University, Florida; additional study, Stetson University and Fresno State College.
Experience: Teaching, Stetson University; information secretary, Chamber of Commerce, Jacksonville, Florida; secretary, American Trust Co., San Jose; secretary to president, First National Bank, Mountain View; registrar and secretary, Clovis Union High School.

CAMPBELL, ERLE S. (1947) --------------- Agricultural Engineering
Experience: Farm superintendent for California Packing Corporation deciduous fruit orchards, vineyards, and asparagus fields; farm superintendent on diversified hay and stock ranch in Lake County.

*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.

*CARLEBERG, GEORGE E. (1949) --------------- Agricultural Economics
B.S., University of California, 1947; graduate work, University of California at Los Angeles and Claremont College.
Experience: Livestock buyer, Armour & Co.; officer, U.S. Army; field man, Arden Farms Co.

* Kellogg-Voorhis Staff.
CARRINGTON, JAMES H. (1943) ____________________________Machine Shop
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.

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.

CHANDLER, EVERETT M. (1951) ____________________________Dean of Students
A.B., University of California, 1939; additional graduate work, University of California.

CLAY, HENRY P. (1946) ____________________________Agricultural Engineering
B.S., Agriculture, Michigan State College, 1929; one-year test course, General Electric Company.
Experience: Instructor, Michigan State College; United States Department of Agriculture; associate professor, Texas Technological College, Lubbock, Texas.

COCHRAN, JAMES M., Lieutenant Colonel, USA (1952) ____________________________Military Science and Tactics
A.B., University of Utah, 1935; BS, United States Military Academy, West Point, 1939; graduate, Command and General Staff College, 1944.
Experience: Troop commander and unit staff officer; General Staff Corps, War Department General Staff; general staff w/troops, Hq., European Command; associate professor of military science and tactics, University of California, Berkeley.

COLLINS, SPELMAN B. (1940) ____________________________Animal Husbandry
B.S., Agriculture, University of California, 1925.
Experience: Agriculture instructor, Middletown, Calistoga, and Livermore high schools.

* CONARD, HAVEN Q. (1946) ____________________________Agricultural Engineering
B.S., Iowa State College, 1943.
Experience: Teaching, Engineering Drafting Department, Iowa State College; officer, U.S. Air Force.

* 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, 1950-51; research assistant, University of Minnesota, 1951-52.

CULBERTSON, GUY K. (1947) ____________________________Printing
Experience: Journeyman printer, composing room foreman, Deadwood, South Dakota, and Santa Monica and Venice, California; member of committee directing on-the-job apprentice training for International Typographical Union, Southern California.

* Kellogg-Voorhis Staff.
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.

DEAN, ARNOLD M. (1949) Soils
B.S., University of Alberta, Canada, 1943; M.S., University of Alberta, Canada, 1946; Ph.D., University of Wisconsin, 1949.
Experience: Laboratory assistant, Dominion Department of Agriculture, Edmonton, Alberta; teaching assistant, University of Wisconsin; industrial fellowhip, University of Wisconsin.

DENSMORE, RALPH A., Master Sergeant U.S. Army (1952)
Military Science and Tactics
Texas Agricultural and Mechanical College; Command and General Staff School, Fort Leavenworth.
Experience: Officer, U.S. Army; task force commander, Peru; antiaircraft regimental and group commander; assistant inspector general; inspector of nonappropriated funds, inspector general office; chief clerk, Los Angeles Office, Organized Reserve Corps.

DICKSON, BRUCE A. (1952) Soils
B.S.A., University of British Columbia, Canada, 1940; M.S.A., University of British Columbia, Canada, 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.

DILTS, RALPH W. (1946) Social Science
A.B., Montana State University, 1936; M.A., Montana State University, 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.

DOUGHERTY, PAUL (1939) Head, Field, Fruit, and Truck Crops Department
B.S., University of California, 1914.
Experience: Farm advisor, Imperial County; U.S. Army; manager, Modesto Fruit Exchange; agriculture instructor, Washington Union High School, Centerville.

DRUMM, GEORGE M. (1931) Head, Dairy Department
B.S., Kansas State College, 1921; M.S., Iowa State College, 1922.
Experience: Instructor, dairying; University of California; farm manager, Ranch Del Monte, Carmel and Patrick Farms, Salinas.

ELLIS, GERALD E. (1946) Mechanical Engineering
A.B., Santa Barbara State College, 1943; graduate work, Oregon State College, 1948-50.

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.

* Kellogg-Voorhis Staff.
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 Poly-
technic College, Voorhis Unit.

ESSIG, FREDERICK M. (1946) ____________________________ Biological Science
A.B., University of California, 1917; Ph.D., University of California, 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.

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 super-
visor of apprentice training programs; superintendent of printing plants in Kansas
City, Missouri, and Birmingham, Alabama.

FISHER, CLYDE P. (1947) _________________________________ Mathematics
A.B., University of Oklahoma, 1942; M.A., University of Southern California,
1947; additional graduate work, University of California and University of Southern
California.
Experience: Teaching assistant in mathematics, University of Southern California;
officer, U. S. Army.

FOLSOM, VOLMAR A. (1946) ____________________________ Mathematics and Physics
B.S., Iowa State College, 1934; M.E., Colorado University, 1937; additional gradu-
ate work, Southern Methodist University.
Experience: High school and junior college teaching; officer, U. S. Navy; assistant
professor, mathematics, Southern Methodist University.

GARDNER, IRENE (1951) _______________________________ Placement Secretary
Experience: Teaching, Seattle, Washington; Eagle Pass, Texas; and Seward,
Alaska; USO Director of Women's Section, Seward.

GARTER, MORRIS G. (1947) ____________________________ English and Education
A.B., Western Michigan College of Education, 1937; M.A., University of Michigan,
1947.
Experience: Instructor, Michigan high schools; production engineer, Willow Run
Bomber Plant; instructor, Alameda Naval Air Station.

GENTINER, FREDERICK L. (1952) ________________ Library
B.A., Ohio Wesleyan, 1940; B.S. in L.S., George Peabody, 1941; A.M.L.S., Uni-
versity 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,
B.C.; service manager, Tractor and Allied Equipment, limited, Melfort, Saskatchewan.

GIBSON, J. CORNER (1949) __________ Executive Dean, Kellogg-Voorhis Campus
B.S., University of California, 1937.
Experience: Director of vocational agriculture, Downey and Whittier Union High
Schools; U. S. Army; regional supervisor, Bureau of Agricultural Education.

GOULD, NORMAN S. (1950) ____________________________ Education and Psychology
A.B., Pomona College, 1948; M.S., University of Southern California, 1949.
Experience: Instructor, basic medical sciences, U. S. Army; assistant to counselor
of men, University of Southern California; lecturer, University of California Ex-
tension.


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**Gow, Imogene V. (1947)______________________________________** Nurse  
R.N., Union Labor Hospital, Eureka, 1921.  
Experience: In charge floor nurses, Union Labor Hospital; nurse, Stanford Lane, San Francisco; X-ray technician, private duty Eureka and Yreka.

**Grant, David M. (1950)______________________________________** Chairman, English 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)______________________________________** Architectural Engineering  
B.S. in Architecture, University of Kansas, 1948; M. of Architecture and Urban Design, Cranbrook Academy of Art, 1950; additional graduate work, Cranbrook Academy of Art.  

**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.

**Greene, George A., Jr. (1952)______________________________** Mechanical Engineering  
B.M.E., University of Santa Clara, 1950.  
Experience: Test engineer and test shift supervisor, General Electric Company.

**Gregory, C. Herold (1950)____________________________________** Printing  
B.S., California State Polytechnic College, 1952.  

* Griffin, James M. (1949)______________________________________** Ornamental Horticulture  
B.S., California State Polytechnic College, 1949; M.A., California State Polytechnic College, 1952.  

**Gustafson, Lester W. (1947)______________________________** Head, Aeronautical Engineering Department  
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)______________________________________** Aeronautical Engineering  
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.

* Kellogg-Voorhis Staff.
HAMMITT, LEWIS E. (1946) ---------------------------------------- Physics

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.

HARDGROVE, THOMAS H. (1947) _____________________ Mechanical Engineering

HAROLDSON, HUGH W. (1947)------------------------- Mechanical Engineering
B.S., University of California, 1939; graduate work, University of California. Experience: Draftsman and dynamometer car assistant, Southern Pacific Company; engineer, Technical Division, U. S. Maritime Commission. Professional registered engineer, California.

HASSEIN, 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 California architect.

† HATFIELD, R. C. (1949) ---------------------------------- Biological Science
B.S., 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.

HAUGSTEN, ROBERT C. (1952) ------- Equipment Technician, Liberal Arts 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.

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) ------------------------ Audio-Visual Library
HENDRICKS, HAROLD J. (1952) -----------------Electronic and Radio Engineering
B.S., Iowa State College, 1940; M.S., Iowa State College, 1941; graduate study, University of Colorado, 1940.
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.

* HOBBS, KENNETH R. (1950) ------------------Horticultural Services and Inspection
B.S., Oregon State College, 1946; M.A., Oregon State College, 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.

* HOFF, RUTH L. (1951) ------------------------ Librarian
B.S., Friends University, Wichita, Kansas; B.S. in Library Science, University of Illinois; additional graduate work, University of Southern California.
Experience: University of Kansas Library; Los Angeles Public and City School Libraries; Occidental College Library; librarian, Jet Propulsion Laboratory, California Institute of Technology; librarian, Explosives Dept., U. S. Naval Ordnance Test Station, Inyokern, California; assistant librarian, Citrus Experiment Station, University of California, Riverside, California.

HOLMIQUIST, 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.

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 Science
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., Michigan State College, 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) ---------------------------Director of Students
B.S., California State Polytechnic College, 1943.
Experience: Director of vocational agriculture, Brawley Union High School; officer, U. S. Marine Corps.

HUGHES, LEROY BARRY (1950) -------------------Director of Athletics
B.S., University of Oregon, 1931; M.A., Stanford University, 1950.

HUNTER, GEORGE H. (1950) -----------------------Library
Experience: Library, University of Washington.

* Kellogg-Voorhis Staff.
HYER, EDGAR A. (1951) ------------------------------ Agricultural Economics
B.S., Utah State College, 1939; M.S., Utah State College, 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.

JENSEN, JAMES J. (1948) ---------------------------Physical Education and Athletics
A.B., Washington State College, 1935; M.S., Stanford University, 1940.
Experience: Football and track coach, Shelton High School, Washington; history teacher and football and track coach, Santa Rosa High School, Santa Rosa, California; track coach and guidance assistant, Menlo Junior College, Menlo Park, California; U.S. Navy; track coach and instructor in health and physical education, San Francisco Junior College, California.

JOHNSON, RICHARD F. (1950) ------------------------Animal Husbandry
B.S., Iowa State College, 1942; M.S., State College of Washington, 1947.
Experience: U.S. Army; instructor, College of Agriculture and assistant animal husbandman, Experiment Station, State College of Washington, Pullman, Washington.

JOHNSON, ROBERT M. (1946) ------------------------Mechanical Engineering
A.B., Santa Barbara State College, 1937; graduate work at Boeing School of Aeronautics, 1938.
Experience: Meteorology instructor, Randolph Field, Texas; meteorologist, Pan American Airways, New Orleans, Louisiana; meteorologist, Pennsylvania Central Airlines, Pittsburgh, Pennsylvania; draftsman, California State Division of Highways, San Luis Obispo, California.

JONES, JOHN E. (1947) -----------------------------Placement Officer
B.S., California State Polytechnic College, 1947.
Experience: Assistant manager, Service Unit, Union Oil Co.; U.S. Navy; student manager, Associated Students, California State Polytechnic College.

JORGENSEN, EDWARD J. (1947) ----------------------Physical Education and Athletics
B.A., Chico State College, 1938; 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.

KABAT, HERBERT R. (1952) ------------------------Physical Science
B.S., United States Naval Academy, 1938; M.A., Stanford University, 1951; additional graduate work, University of Southern California, Stanford University.
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.

KENNEDY, ROBERT E. (1940) ------------------------Public Relations Director and Journalism

KENNELLY, BRUCE (1947) ---------------------------Chemistry
B.S., University of Kentucky, 1944; M.S., Purdue University, 1946; additional graduate work, Purdue University; Ph.D., Cornell University, 1952.
Experience: Staff members, department of agricultural chemistry, Purdue University.

* Kellogg-Voorhls Staff.
KIPF, MAX A. (1952) ................................................................. Crops
A.B., University of Redlands, 1936.
Experience: Instructor of vocational agriculture, San Bernardino High School;
special supervisor I on F program, Bureau of Agricultural Education; secretary of
San Bernardino County Farm Bureau; president of San Bernardino County National
Farm Loan Association; dairy farmer, citrus farmer.

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 new-
papers; instructor, community high schools, Arlington and Altamont, Kansas; cor-
respondent 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 rela-
tions and advertising counsel, Dallas and San Antonio; news editor, WFFA, Dallas;
editor and managing editor, Southern Seedsman and Sun-Up magazines; freelance
magazine writer.

KNOTT, C. E. (1921) .......................................................... Mechanical Engineering and
Acting Assistant to Dean of Engineering
B.S., University of California, 1916; M.S., University of California, 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; indus-
trial department, navigation, and physics.

*LAMIMAN, JOHN F. (1946) ....................................................... Biological Science
B.S., Entomology, University of California, 1922; M.S., Entomology, University of
California, 1924; Ph.D., Entomology, University of California, 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.

LANDER, J. ROLLIN (1946) ..................................................... Animal Husbandry
B.S., Agriculture, Iowa State College, 1941.
Experience: Tudor Orchards, Yuba City; Frank Cornell Ranch, Salinas; teacher of
veterans' agricultural courses, Gonzales High School.

LANE, MARGARET M. (1949) ...................................................... Library
B.A., Santa Barbara College, 1947; B.L.S., University of California, 1948.
Experience: Library, Santa Barbara Museum of Natural History; acquisition
assistant, Biomedical Library, University of California at Los Angeles.

LANG, CHARLES H. (1950) ......................................................... English and Psychology
B.S., University of Minnesota, 1947; M.A., University of Minnesota, 1949.
Experience: Teacher, coach, public relations director, Sault Ste. Marie, Mich.,
public schools; teacher, Minneapolis public schools; teacher, coach, remedial reading
instructor, Western Military Academy, Alton, Ill.; sports editor, Minneapolis News;
sports publicity director, Minneapolis park board; sports writer, Minneapolis Star,
Minneapolis Tribune, San Luis Obispo Telegram-Tribune.

LAWRENCE, DONALD R. (1952) .................. Air Conditioning and Refrigeration Engineering
B.S., California State Polytechnic College, 1949.
Experience: Design and construction engineer, Baker-Newman Company, Modesto,
California.

LAWSON, JOHN D. (1951) ...................................................... Activities Officer
B.S., University of California, Berkeley, 1938; graduate study, University, 1939.
Experience: Vocational instructor; officer, U. S. Navy; special supervisor, State
Bureau of Agricultural Education.

* Kellogg-Voorhis Staff.
LEAOH, 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.

LEARY, WILLIAM G. (1947) ------------------ English  
A.B., 1936, and M.A., 1938, University of California at Los Angeles; additional graduate work, Universities of Washington, Chicago, and Stanford.  
Experience: Teaching assistant, University of California at Los Angeles; teacher, Kern County Union High School; teaching fellow, University of Washington; officer, U. S. Navy; James Nelson Raymond Scholar, University of Chicago; professional writing.

LEE, THOMAS J. (1952)-----------------------Physical Education and Athletics  
Experience: Player-coach, All-American Professional Basketball Team; instructor, private gymnasium, Oakland; playground director, Hayward Recreation District; U. S. Army.

LEWIS, VANCE D. (1946)----------------------------------Physical Science  
A.B., University of California, 1933; M.A., University of California, 1940; additional graduate work at University of California, University of Miami, University of Southern California.  
Experience: California secondary school administrator; officer, U. S. Navy; laboratory technician, Shell Development Company.

LINT, HAROLD L. (1947)------------------------------------------Botany  
B.A., University of California at Los Angeles, 1940; M.A., University of California at Los Angeles, 1942.  
Experience: Inspector, United States Food and Drug Administration.

LLOYD, JOHN E. (1952)------------------------Fruit Production Department  
B.S., California State Polytechnic College, 1949.  
Experience: Field sales, Shell Ammonia Co., Kern, Fresno, Tulare counties; citrus grove contractor, San Fernando Valley, Los Angeles.

LONBERG, 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.

LOVETT, EARL DEAN (1951)----------------------------------- Health Officer  
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; Yoeom Hospital, Chariton, Iowa; Cherokee State Hospital, Cherokee, Iowa; Virginia Gay Hospital, Vinton, Iowa; private practice, Vinton, Iowa; established Lovett Clinic, Vinton, Iowa.

LOWERY, KENNETH K. (1951)----------------------------------- English  
Experience: English teacher, California high schools; graduate assistant, Whittier College; U. S. Air Force.

MCCALL, ROBERT C., Sergeant, U. S. Army (1952)----------------Military Science and Tactics  
Graduate, Adjutant General School, Camp Lee, Va.; graduate Noncommissioned Officers School, Ford Worden, Wash.  
Experience: U. S. Navy; diesel engineer, Macco Construction, Santa Barbara, California; foreign service, Far East Command.

* Kellogg-Voorhis Staff.
 MCCORKLE, C. O. (1932) --------------------------------- Dean of Instruction
B.S., University of California, 1927; M.S., University of California, 1937.
Experience: Director of agriculture and critic teacher, Red Bluff Union High School; Executive Secretary, California Association Future Farmers of America; assistant teacher trainee, 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).

MCGRATH, JAMES (1946)------------------Counseling, Air Conditioning and Refrigeration
California Polytechnic, 1935-1938; B.A., Santa Barbara College, 1941; additional graduate work, Claremont College.

MCINTOSH, WILLIAM C. (1951)-----------------Mathematics and Physics
A.B., University of California, 1948; M.A., University of California, 1950.
Experience: Mathematics and physics teacher, Richmond Union High School; U. S. Navy.

MCNEELY, GEORGE H. (1948)------------------Animal Husbandry
B.S., Agriculture, University of California at Davis, 1948.
Experience: Teaching assistant and reader, University of California at Davis; Flying Three Ranch, Walnut, California; U. S. Army Air Force.

MAGER, HANS (1949)-----------------------Architectural Engineering

MARSTON, ENA LESLIE (1946)------------------English
A.B., Mills College, 1927; A.M., Mills College, 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.

MARTINSEN, M. C. (1930)------------------Aeronautical Engineering
Mechanic Engineering, California Polytechnic, 1917; Teacher Training, University of California at Los Angeles, 1933; Civil Aeronautics Authority Certificates: aircraft pilot, aircraft and engine mechanic, ground and mechanic school instructor.
Experience: Electrician, Reynolds Electric Company; steam engineer, Union Oil Company; machinist, C. F. Braun Company; owner-operator, automotive-airmotive repair business; mechanic, Lockheed Aircraft Corporation.

MATTISON, 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.

MATTESON, A. GEORGE (1951)------------------Aeronautical Engineering
M.E., Columbia University, special with U. S. Navy, 1922.
Experience: Mechanical engineering and architects' offices; design, aircraft, and engine factories; chief engineering drafting instructor; part-time instruction in flight, drafting, and design practices.

MATTHEW, THOMAS (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.
MATTSON, EDWARD R. (1952) Ornamental Horticulture
B.S., California State Polytechnic College, 1950; M.S., Michigan State College, 1952.
Completed two-year program in ornamental horticulture at Stockbridge School of Agriculture, University of Massachusetts, 1941.

MAUER, ROBERT L. (1948) Assistant Administrator, Liberal Arts 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 Engineering
B.S., University of California, 1924.
Experience: Agricultural instructor, Gilroy and Manteca High Schools.

MEINHART, CHARLES J. (1949) Welding
California State Polytechnic College; certificate of welding, Hobart Welding School, Troy, Ohio.
Experience: U. S. Navy; supervision of erection crew, Marietta Manufacturing Company, P. L. Pleasant, West Virginia; student assistant (welding), California State Polytechnic College; welding instructor, San Luis Obispo High School and Junior College.

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.

MILLER, RALPH B. (1951) Aeronautical Engineering
B.A., Stanford University, 1926; M.E. (aeronautical), Stanford University, 1933.
Experience: Junior aeronautical engineer, National Bureau of Standards; aeronautical engineer, National Advisory Committee for Aeronautics; aerodynamicist, Douglas Aircraft Company; teacher of mathematics, Alliance College; teacher of thermodynamics and strength of materials, Michigan College of Mining and Technology.

MILLER, ROBERT W. (1949) Animal Husbandry

*MORAN, GABRIEL T. (1948) Chemistry
B.A., Whitier College, California, 1942.
Experience: Chemist, American Potash and Chemical Company, Trona, California; Thompson Products, Bell, California; Paul Dickerson, Chemistry Laboratory; District Agricultural Laboratory, Whittier, California.

MOTT, ROBERT A. (1946) Head, Physical Education Department
B.S., University of Akron, 1938; M.A., University of Southern California, 1946; additional graduate work, University of Michigan and Stanford University.
Experience: Physical education instructor and athletic coach, Akron Public School System; officer, U. S. Navy; teaching assistant, University of Southern California.

NEFF, WILLIAM S., JR., Sergeant U. S. Army (1952) Military Science and Tactics
Graduate, Advanced Infantry Training, Camp Haugen, Japan; graduate Noncommissioned Officers School, Camp Roberts, California.
Experience: Instructor Infantry, Honor Guard Company, Tokyo, Japan; instructor Infantry, Division Faculty, Camp Roberts, California.

* Kellogg-Voorhis Staff.
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.

NELSON, DONALD S. (1943) Business Manager
A.B., Stanford, 1930.
Experience: California State Department of Finance, Budgets, and Accounts;
Comptroller, Fresno State College, Fresno.

NERESON, OBERLIN B. (1947) Guidance Officer
B.A., Luther College, 1927; graduate work, Northwestern University, 1930; M.A.,
University of Minnesota, 1939; additional graduate work, University of Southern Cali-
fornia.
Experience: Secondary school administration; psychology instructor, Visalia Col-
lege; officer, U. S. Army.

* NILES, HENRY B. (1951) English
M.A., University of Chicago, 1948; additional graduate work, University of Cali-
fornia at Berkeley.
Experience: Instructor, Oroville High School.

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; profes-
sor of parasitology, Seoul National University, Korea.

NOLAN, THOMAS F. (1949) Social Science and Speech
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, Ecua-
dor; economic analyst, Department of State, Washington, D. C., at Montevideo, Ur-
uguay; officer, U. S. Navy; vice consul, Department of State, Washington, D. C., at
Valparaiso, Chile.

O’DANIELS, HOWARD R. (1933) Economic Analyst
Bachelor of Commercial Science, University of Santa Clara, 1931; additional gradu-
ate study, University of Southern California.
Experience: Coach, California Polytechnic; officer, U. S. Navy.

O’LEARY, MICHAEL J. (1951) English and Speech
Experience: Property accountant, U. S. Marine Corps Supply Depot; instructor and
examiner-specialist, Air Force Radar Technical School; instructor, U. S. Armed Forces
Institute.

PARKER, HARRY (1932) Animal Husbandry
Graduate, Kent College, Canterbury, England, 1918; attended Kingston Agricul-
Experience: Herdsman, Edward Best Shorthorn Ranch, Mount Vernon, New Hamp-
shire; C. A. Smith Hereford Ranch, Chester, West Virginia; Peter Ross Shorthorn
Ranch, Danville, Illinois; William Briggs Hereford Ranch, Dixon, California.

PARKINS, KATHERINE (1951) Library
B.A., Montana State University, 1938; M.A., University of Washington, 1942; M.S.
in L.S., Columbia University, New York, 1942.
Experience: Reference Department, New York Public Library; assistant librarian,
School of Military Government; bibliographer, Military Government Division, War
Department; Army Library Service, Japan; head, binding-photography department,
University of Southern California Library.

* Kellogg-Voorhis Staff.
**PFLUEGER, DONALD H. (1952)**

History, Political Science
A.B., Pomona College, 1949; M.A., Stanford University, 1951; additional graduate work, Claremont Graduate School.

Experience: Instructor and counselor, U. S. Navy; teacher, Covina High School.

**PHILBIN, LEO F. (1948)**

Registrar
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.

**PHILLIPS, LOREN D. (1951)**

Crops and Poultry
B.S., 1939, M.Ed. (Agriculture) 1947, University of California at Davis; additional graduate work, California State Polytechnic College, University of California at Berkeley, and Utah State Agricultural College.

Experience: Agricultural instructor, Point Arena Union High School; head, Agriculture Department, Willits Union High School and Laytonville Union High School; I.O.F.T. instructor, Elk Grove Union High School; head, Agricultural Department, Mt. San Antonio College.

**PIMENTEL, RICHARD A. (1952)**

Biological Science
A.B., San Jose State College, 1947; General Secondary Teaching Credential, San Jose State College, 1948; M.S., Oregon State College, 1950; Ph.D., Oregon State College, 1952.

Experience: Teaching assistant, Oregon State College; ranger-naturalist, Crater Lake National Park; officer, U. S. Army.

**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.

**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.

**Prowse, George D. (1950)**

Physical Education and Athletics
A.B., Stanford University, 1948; M.A., Stanford University, 1950.


**RADIUS, CLARENCE (1946)**

Head, Electronic and Radio 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.

**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.

* Kellogg-Voorhis Staff.
REES, DONALD E. (1949)-------------------------Chemistry and Mathematics
A.B., Whittier College, 1942; M.S., University of Iowa, 1943; Ph.D., University of Iowa, 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.

RICHARDS, CARLOS C. (1946)--------------------------Machine Shop
B.A., Santa Barbara State College, 1942.

RICHARDSON, JOY O. (1948)---------------------------Mechanical Engineering
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.

RICKANESRUD, 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 Rolls, 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., University of Southern California, 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.

RITTENHOUSE, EUGENE A. (1949)---------------------------Industrial Economics
B.S., University of California, Los Angeles, 1947; M.B.A., University of California, Berkeley, 1948; additional graduate work, University of California, Berkeley.

ROGERS, EDWARD P. (1950)-------------------------------Industrial Economics
B.A., University of California, Los Angeles, 1940; graduate work, University of Southern California.
Experience: Plant personnel and labor relations, Lockheed Aircraft Corporation, Burbank; personnel manager, Naco Manufacturing Co., Huntington Park; administrative assistant to director of industrial relations, Pacific Airmotive Corporation, Burbank.

RONEY, ELLIS L. (1948)-------------------------------Electronic and Radio Engineering
Experience: Instructor, Modesto, Grant Union, Sacramento Junior colleges; owner, Ellis L. Roney Radio Service; engineer, Hewlett-Packard Co., Palo Alto; teaching assistant, Stanford University; research, Stanford University.

SANKOFF, LEO (1946)-------------------------------Poultry and Agricultural Engineering
B.S., Agriculture, California State Polytechnic College, 1942.
Experience: Agricultural instructor, Fillmore High School.

* Kellogg-Voorhis Staff.
SCHUYLER, WILLIAM S. (1952) English
A.B., Washington University, 1935; graduate work, Columbia University and Stanford University, 1950-52.
Experience: Radio, advertising, and real estate, in St. Louis, Mo.; dude ranch operator, Santa Fe, N. M.; U. S. Navy; professional writer.

SCOTT, CHESTER H. (1952) Mathematics
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.

SCHWARTZ, KENNETH E. (1952) Architectural Engineering
B. of Arch., University of Southern California, 1952.

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. (1952, 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.

SMITH, JAMES STEEL (1946) English and Art
A.B., University of California, 1934; M.A., University of California, 1936; Ph.D., University of California, 1952.
Experience: Instructor, Red Bluff High School; teaching fellow, University of California; instructor, University of California, Davis; U. S. Army; instructor, Washington State College; professional writing.

SMITH, M. EUGENE (1946) History and Political Science
A.B., University of California, 1934; M.A., University of California, 1937.
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.
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.

STEUCK, FRED H. (1947) Electronic and Radio Engineering
B.S., Iowa State College, 1937.
Experience: Engineer, Nebraska Power Co.; manager, O'Brien Co.; Rural Electric Co-op. Iowa; instructor, Iowa State College; officer, U. S. Navy; registered professional engineer, California.
STOBBE, ARTHUR J. (1949) ----------------------- Library
Ph.B., Marquette University, 1937; B.L.S., Syracuse University, 1947; M.L.S., University of California, 1949.
Experience: Officer, U. S. Army Air Force; art and music librarian, Milwaukee Public Library; reference librarian, Grosvenor Reference Library; research assistant, University of California School of Librarianship; library, Syracuse University.

STOCKING, GORDON G. (1951) Manager, Horse Breeding Program
D.V.M., Michigan State College, 1946; graduate study, University of Kentucky, 1949.
Experience: Resident veterinarian in charge of horse breeding and biological production, Upjohn Richland Farms, Richland, Michigan; assistant head, Department of Veterinary Medicine, Medical Division, Upjohn Company, Kalamazoo, Michigan.

STUART, JOHN ARMISTEAD (1952) English and Social Science
A.B., William Jewell College, 1939; M.A., Northwestern University, 1940; Ph.D., Northwestern University, 1945.
Experience: University tutor, teaching fellow, instructor, Northwestern University; assistant professor, Lawrence College, University of Arizona, Whittier College; editorial assistant, Electrical World, McGraw Hill Publishing Co.

STULL, ROBERT B. (1947) Physical Education and Athletics
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.

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.

TAIRWATER, JESSE W. (1952) Education and Psychology, Counseling
A.B., University of Southern California, 1940; M.S., University of Southern California, 1946; Ed.D., Stanford University, 1951.
Experience: Director, student personnel services, Texas College of Arts and Industries; visiting professor, San Jose State College; Lt. Comdr., Medical Services Corps, USNR; chief, V. A. Guidance Center, UCLA; personnel selector, Lockheed Aircraft Corp.

THOEMKE, GEORGE W., Captain, USAR (1952) Military Science and Tactics
Studied, North Dakota State College; graduate, Officers Candidate School, Ft. Benning, Georgia.
Experience: Rifle platoon leader, World War II, France, Belgium, Luxembourg, and Germany; rifle company commander, Korea; plans and training officer, Training Regiment, Ft. Ord, California.

THOMSON, DAVID H. (1946) Biological Sciences
B.S., University of Arizona, 1944; M.A., Claremont Graduate School, 1948.
Experience: Laboratory instructor, Pomona College; ranger-naturalist, Sequoia National Park.

THURMOND, WILLIAM (1951) Biological Sciences
A.B., University of California, 1948; M.A., University of California, 1950.
Experience: Teaching assistant, University of California; instructor, San Mateo Junior College.

TOONE, HARMON (1952) Agricultural Engineering
B.S., University of Idaho, 1940.
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.

* Kellogg-Voorhis Staff.
† Military leave.
TROUTNER, WILLIAM R. (1942) — Field Crops, Agricultural Inspection
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.

TURNER, ALDEN L. (1946) — Aeronautical Engineering
Graduate, California State Polytechnic College, 1936.
Experience: United Air Services, Ltd.; Stearman Aircraft; Lockheed Aircraft; Hancock College of Aeronautics, Santa Maria, California; ground instructor, U. S. Air Force; officer, U. S. Air Force.

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 "Heemaf-post," 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.

VORHIES, RALPH M. (1946) — Crops
B.S., University of Missouri, 1938; M.A., University of Missouri, 1941.
Experience: Agriculture Instructor at Belton and Couch High Schools, Missouri; instructor, Southeast State Teachers College, Cape Girardeau, Missouri; officer U. S. Navy.

VAN NEST, ISAAC G. (1948) — Air Conditioning and Refrigeration Engineering
Experience: Licensed engineer in Los Angeles in charge of large and small refrigeration and air conditioning plants; ammonia pipe fitter and salesman; refrigeration instructor, U. S. Marine Corps and U. S. Navy.

WALL, EDWARD T. (1951) — Electrical Engineering
B.S.E.E., Purdue University, 1947; M.S.E.E., Lehigh University, 1949; graduate work, University of California.

WATT, DESMOND B. (1952) — Animal Husbandry
B.Sc., University of Alberta, 1947; M.S., Kansas State College, 1949; additional graduate work, Missouri University.
Experience: Graduate assistantship in animal husbandry and meats, Kansas State College, Manhattan, Kansas; frozen foods locker plant operator; instructor Montana State College, Bozeman, Montana; Navy.

* WEEKS, LOWELL K. (1947) — Music, English
B.A., University of New Mexico, Albuquerque, N. M., 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, N. M., Palm Springs, California and Long Beach, California.

* Kellogg-Voorhis Staff.
* WELCH, HARRY V. JR. (1947) ----------------------------- Soil Science
B.S., University of California at Los Angeles, 1941; additional graduate work at University of California at Berkeley and University of California at Los Angeles.
Experience: University of California Citrus Experiment Station, Riverside; Farm Security Administration.

WESTKAMP, KATHRYN (1948) ---------------------------------- Nurse
Attended Akron University. R.N. St Thomas School of Nursing, Akron, Ohio, 1947.
Experience: General duty at St. Thomas School of Nursing.

* WESTER, MARILYN DELOISE (1952) ------------------------ Librarian
B.S., University of Washington, 1939; graduate study, University of California at Los Angeles, 1941; B.A. in Library Science, University of Washington, 1946.
Experience: Public Library, Chula Vista, California; Library Association of Portland, Oregon; "B-29" Committee Central Files, Boeing Aircraft Company, Seattle, Wash.; head of serials division, University of Washington Library, Seattle; catalog librarian, University of Washington Library, Seattle.

WESTON, RALPH E. (1948) ----------------------------- Mathematics
A.B., Stanford University, 1922; M.A., Stanford University, 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.

WHITE, RAYMOND H. (1952) ----------------------------- Veterinary Science
B.S., Utah State Agricultural College, 1939; graduate study, Utah State Agricultural College, 1940-41; D.V.M., New York State Veterinary College, Cornell University, 1949.
Experience: Faculty, Utah State Agricultural College; U. S. Marine Corps; private veterinary practice and state control work, Cedar City, Utah.

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.

WHITSON, MILO E. ----------------------------- Head, Mathematics Department
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, 1952.
Experience: Teaching assistant, University of Utah, St. Martin's College, and the University of California. Officer, U. S. Army.

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.

* Kellogg-Voorhis Staff.
WILSON, HAROLD O. (1936, 1946) ___________________________Executive Dean
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.

WINEROTH, HARRY J. (1949) -----------------------------Graduate Manager and Student Store Manager
B.S., California State Polytechnic College, 1946; graduate work, University of California, Davis, 1947.
Experience: Athletic and welfare director, U. S. Navy; agricultural instructor.

WINNER, C. PAUL (1940) ______________________________Admissions Officer
B.S., Montana State College, 1931.
Experience: Director of vocational agriculture and critic teacher, Montana and California high schools; teacher trainer of agriculture education.

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 and Radio Engineering
B.A., Arizona State College, 1933; M.A., University of Arizona, 1941.
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.

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, KENNETH E. (1951) ________________Curriculum Coordinator, Psychology
A.B., San Francisco State College, 1943; M.A., Stanford University, 1946; Ph.D., Stanford University, 1952.

ZILKA, THOMAS J. (1947) ________________Head, Mechanical Engineering Department
B.S., Oregon State College, 1941; M.S., Oregon State College, 1943.
Experience: Instructor, mechanical and aeronautical engineering, Oregon State College; assistant airworthiness requirements engineer, Boeing Aircraft Co.; assistant professor, aeronautical engineering, Montana State College.

*Kellogg-Voorhis Staff.
THE STATE BUREAU OF AGRICULTURAL EDUCATION

The State Bureau of Agricultural Education is a division of the State Department of Education. The bureau is in charge of all vocational agriculture instruction in the State. Some of the bureau offices are located on the 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___State Department of Education Bldg., Sacramento
E. W. Everett, Assistant Chief of Bureau and
Supervisor Veterans Training___State Department of Education Bldg., Sacramento
H. H. Burlingham, Teacher-Trainer________California Polytechnic, San Luis Obispo
H. F. Chappell, Regional Supervisor Library and Courts Building, Sacramento
George P. Couper, Special Supervisor________California Polytechnic, San Luis Obispo
K. B. Cutler, Regional Supervisor__________800-C California State Building, Los Angeles
B. R. Denbigh, Regional Supervisor________809-C California State Building, Los Angeles
G. A. Hutchings, Regional Supervisor________California Polytechnic, San Luis Obispo
M. K. Luther, Regional Supervisor______________________________
W. J. Maynard, Special Supervisor______________________________
R. H. Pedersen, Special Supervisor______________________________Fresno State College, Fresno
A. G. Rinn, Regional Supervisor______________________________Fresno State College, Fresno
S. S. Sutherland, Teacher-Trainer________________________University of California, Davis
J. Everett Walker, Regional Supervisor________________________208 Sowillenno Ave., Chico
GENERAL INFORMATION
GENERAL INFORMATION

AIMS OF THE COLLEGE

California State Polytechnic College is dedicated to the principle that students need to know the technical and manual processes in agriculture, engineering, and other occupational fields, as well as the theories which govern these processes, and further, that students who intend to become teachers in these and related subjects should master practical techniques in addition to teaching methods.

This phase of occupational training complements the older, more orthodox concept of higher education as a process of developing the mind toward creative thinking. To the theory that higher education should confine itself to broad, cultural training leading to professional careers, the California State Polytechnic College has added a new concept— that of providing occupational training on a college level leading to technical as well as professional careers.

The legislative act which created the California State Polytechnic College in 1901 included the statement that “the purpose of the school is to furnish to young people of both sexes mental and manual training in the arts and sciences, including agriculture, mechanics, engineering, business methods, domestic economy, and such other branches as will fit the students for the nonprofessional walks of life.” It further stated that “this article shall be liberally construed, to the end that the school may at all times contribute to the industrial welfare of the State.”

In carrying out the responsibility of providing California young people with occupational training on a college level, the college:

1. Places major emphasis on instruction rather than on research.
2. Incorporates the philosophies of “learning by doing” and “earning while learning” in a unique project system of instruction.
3. Utilizes an “upside down” educational plan, which is characterized by the grouping of as many technical and job-getting courses in the first two years as possible.

HISTORY

California State Polytechnic 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. The level of instruction was raised in 1927 to that of a junior college.

In 1933, when the school was made a direct administrative branch of the State Department of Education it was changed from a junior college to a two-year and three-year technical college.

In 1936 a degree-transfer program was added, 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.

For a period of 15 years California State Polytechnic gave skills and methods courses for agriculture teacher candidates in cooperation with the University of California, which accepted this credit toward meeting requirements of special teaching credentials in vocational agriculture. When in 1946 the California Legislature authorized state colleges to give a fifth year of instruction, the college expanded its services and was accredited by the State Board of Education to recommend students directly for the special secondary credential in vocational agriculture and the special secondary limited credential in agriculture. Early in 1947 the State Board of Education granted the college the privilege of giving the training for prospective physical education teachers and recommending graduates for the special secondary credential in physical education.

In 1948, the California State Board of Education approved the college to recommend graduates for the general secondary teaching credential in any of the following majors: social studies, mathematics, physical science and general science, life science and general science, agriculture, and physical education.

On October 1, 1949, the college was approved to grant the degree of master of arts with concentrations in agriculture, biological science, mathematics, health and physical education, physical science, and social science.
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 to Voorhis campus 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 $4,000,000, 800-acre Kellogg Arabian Horse Ranch near Pomona. 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 campus, 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 pre-flight 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 North-west Association of Secondary and Higher Schools, and the Western College Association.

The college has been granted regular reaccreditation 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.

**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 campus is near San Dimas in Los Angeles County and close by is the Kellogg campus near Pomona.

Lands of the college total 3,807 acres: San Luis Obispo, 2,850 acres; Voorhis campus, 157 acres; and Kellogg campus, 800 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 campuses will be found under the Kellogg-Voorhis division of the catalog.

**BUILDINGS AND EQUIPMENT**

**Dormitories**

The San Luis Obispo campus has nine two-story dormitory buildings, nine single-story dormitories, a two-wing resident unit with adjoining recreational hall, and two groups of cottages with three units each. A total of 1,250 single students can be accommodated in these on-campus housing units.

**Family Housing**

For married students the college has an on-campus “village” of 75 one- and two-bedroom apartments, and 188 trailers. The trailer areas have central washrooms with modern sanitary facilities. Trailer occupants are eligible for “village” apartments on a priority basis. Domestic pets may not be kept on campus.

**Cafeterias**

Two campus cafeterias serve three meals a day, seven days a week and accommodate 2,000 students per meal.
General Information

Health Center
The campus health center is equipped with examination and treatment rooms. A full-time college physician and two full-time nurses 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, publications offices, student body offices, and student stores are situated in the basement.

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

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.

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: Two agricultural mechanics and farm carpentry laboratory buildings, farm power laboratory, and large farm machinery building.

Beef Unit: Project steer feeding barn, capacity 75 steers; commercial project feeding barn, capacity 175 steers; three barns for breeding beef cattle; 1600 acres range and pasture; judging pavilion.

Central Feed Mill and Storage: Complete feed mill for mixing and processing feeds; bulk storage for 1500 tons of grain; hay barn, 600 tons capacity; hay grinder unit.

Crops Unit: Vegetable packing and grading shed; fruit shed; and bee-keeping laboratory.

Dairy Unit: 30-unit milking barn, shelter feed barn, judging pavilion, calf barn, bull barn, and complete creamery building; project unit milk barn, feed shelter barn, and calf sheds; 600 acres of pasture.

Horse Unit: Thoroughbred and draft horse barns and paddocks.

Ornamental Horticulture Unit: Propagation and storage building; four glass houses, three lath houses, and other propagation units; five acres for storage and growing area; 60 acres of landscaped campus.

Poultry Unit: Central egg house, sales room, and slaughter plant, battery brooder and incubation building; laying trapnest 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.

Slaughter House and Meats Laboratory: Modern slaughter house, coolers, and meat laboratory.

Soils Unit: Soils laboratory and lath house.

Swine Unit: 14-unit central farrowing house; 18-double unit colony houses; five boar units; 16 project feeder units; 30 acres of pasture.
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 overhaul laboratory and shop building; construction shop and hangar, adjacent to college flight strip; aeronautical laboratory; and stress laboratory.

**Architectural Engineering Unit:** Three-building unit, including two large, well-lighted drafting rooms, lecture rooms, and offices.

**Electronic and Radio Unit:** Four laboratories, a shop, stockroom, and offices—entire second floor of the Agricultural Education building.

**Engineering Building:** Laboratories for the Air Conditioning and Refrigeration Department and for the Electrical Engineering Department, opposite wings; faculty offices, classrooms, and a 500-seat assembly room, central section.

**Power Plant:** Central heating and power plant, equipped with internal combustion engines, steam engines, and boilers—used as laboratory by Mechanical Engineering Department.

**Machine and Welding Shops:** Two large, well-equipped, and well-lighted shops with adjacent specialty laboratories.

**Printing Laboratories and Shops:** An entire basement wing of the Administration Building houses adequately equipped printing laboratories such as, composing room, press room, 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 arrangement 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 co-signer 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 Aeronautics Department, operating as a C.A.A. approved repair station, accepts damaged aircraft or engines to be overhauled for their owners, or to be purchased outright and rebuilt by students.

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.
General Information

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 related operations. Students conducting dairy projects carry out their operations on a separate part of the college farm.

The swine herd is the outgrowth of a gift from C. Harold Hopkins, owner of Straloch farm, who gave his entire Poland herd—one of the best in the Western United States. Polands, Berkshires, and Durocs are in the breeding herd. Equipment includes farrowing pens, fattening pens, pig brooders, feeding equipment, etc. Students market between 600 and 700 fat and breeding swine each year.

The sheep flock is principally Hampshire and Southdown, including the sires and dams of many show champions. The sheep unit centralizes the project facilities, which are typical of a large-scale farm enterprise. Students learn shearing and the care of fleeces, 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.

Equipment in ornamental horticulture includes land and buildings already mentioned, garden tractors, and potting and spotting equipment.

The crops department is well equipped with machinery of the types found on mechanized farms in California. Practically all farming operations are carried out by the students in project or class work. Orchards, vineyards, crop land, packing facilities, and marketing facilities are available for instructional purposes.

STUDENT ORGANIZATIONS AND ACTIVITIES

The college provides an integrated program of classroom and laboratory instruction, gainful employment, and extra-curricular activities. The latter are under the direction of an activities officer 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 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, and Poly Royal. There is also a council of the various clubs and campus organizations. There is opportunity for all interested students to participate in student government.

ATHLETICS

Intercollegiate competition centers primarily around the activities of the California Collegiate Athletic Association. This college is a member, together with Santa Barbara College of the University of California, San Diego State College, Los Angeles State College, and Pepperdine College. Competition is maintained in football, basketball, baseball, track, boxing, wrestling, gymnastics, fencing, swimming, water polo, tennis, golf, soccer, and cross country. It is possible to earn a major letter award in any sport. Freshmen compete in varsity sports.

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 nine intercollegiate sports offer opportunity for the more skilled. Intramural teams provide year-around 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 the publications is handled primarily by students of the journalism classes. Among the publications, two are outstanding: El Mustang,
California State Polytechnic College

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, and an invitational track meet with junior college teams competing. 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.

Because California State Polytechnic College is a men's college, it borrows a Poly Royal queen each year from some other California college. In the past, queens have been provided by San Francisco State College, Fresno State College, San Jose State College, San Diego State College, Chico State College, Humboldt State College, and Santa Barbara College.

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 20 social clubs and societies. These numbers do not include dormitory clubs for students residing in dormitories, which number nearly 20.

THE ALUMNI ASSOCIATION

The California State Polytechnic College Alumni Association is divided into seven geographical regions, with a vice 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, Marin, Sonoma, Lake, Mendocino, Del Norte, Humboldt, Contra Costa, Alameda, and San Francisco Counties.

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

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

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

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

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

Affairs of the association are under the supervision of a board of directors, consisting of the president and secretary-treasurer of the state association, the vice president of each region, the past president of the association, and an ex officio member appointed by the president of the college.

To promote further the activities of the association, a committee of 36 has been established, consisting of a chairman appointed by the president of the association, the seven vice presidents, and the four members from each of the regions.

The association publishes The Green and Gold Alumni Review four times each year. This is the official publication of the association aimed at keeping the membership 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.
General Information

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.

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

EXTENSION COURSES

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

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

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 cooperative arrangement with the Bureau of Agricultural Education, some offices of which are located on the campus.

SHORT COURSE AND WORKSHOP PROGRAMS

The college also makes its facilities and instructional staff available for a number of professional improvement short courses and workshop programs, such as: Physical Education Workshop, California Nurserymen's Short Course, Western Fairs Judging Conference, California Implement Dealers Short Course, Livestock Leaders Workshop, etc.

RESERVE OFFICERS TRAINING CORPS

A voluntary Army ROTC unit was established at California State Polytechnic College in 1952. Its "branch-general" military curriculum means the ROTC cadet will be given general Army training without reference to any one branch of the service. For those cadets 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 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 United States Army.

DEFERMENTS

Under the provisions of the Universal Military Training and Service Act—June 1951 (Public Law Number 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. Applicants must be physically qualified for commission in the Organized Reserve Corps.
2. Applicants must have sufficient time remaining in the college as a student to permit completion of the ROTC course.
3. Applicants must apply to the head of the Department of Military Science and Tactics for deferment and appear personally before the faculty deferment board.
4. Applicants must possess the actual or potential mental, moral, and leadership qualities necessary for an officer of the Army.
5. Applicants for deferment must sign a deferment agreement.
6. Applicants must meet the college's minimum academic standards.

Generally, students may apply for deferment, if otherwise eligible, during any quarter of their 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.

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

The Counseling Center, under the supervision of the Guidance Officer, offers service in vocational, educational, and personal counseling in accordance with the needs of the student. A staff of four counselors is provided. A well-equipped test center is available to assist the students and counselors. An occupational library is maintained which contains accurate information concerning the vocations found in west coast industry and agriculture.

Advising

Each freshman student is assigned a freshman 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 assigned a major department adviser who helps the student arrange his instructional program.

Health Service

A student pays a $3 fee per quarter for medical service. The service provided includes a physical examination and all minor and major surgery but does not include the service of any specialists. In addition, the service includes visits to students' homes and first-aid treatment within a radius of five miles of the campus. Diseases of a chronic nature which the student contracted before entering school are not covered. Students may consult the college physician in his office any time by appointment.

The college maintains a well-equipped health center which includes a 16-bed ward and three individual isolation-case rooms. A registered nurse is on duty at all times. In the event that special hospitalization is required, students may enter any one of three hospitals located in San Luis Obispo. The student, in turn, must pay for any 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.
General Information

Placement

A placement service is available to students who have completed a training program. This service is provided jointly by the Placement Office and the department head. All phases of the student's preparation and experience are considered as the basis for making effective placement.

No guarantee of placement is made to any student, but a sincere effort is made to find employment for everyone who shows himself worthy of this service.

The institution 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 often. An effort is made to see whether both employer and employee are satisfied, and whether advancement is being made. Better positions are often found for students who have been doing satisfactory work for a sufficient period to justify advancement.

PART-TIME EMPLOYMENT

In addition to the opportunities for students to earn money through project activities to assist them in meeting expenses, the college has established a policy of giving a maximum number of students experience by employing them to operate the entire campus and farm. The average earning per student is several times as great as in the typical college where regular college employees are employed full-time to do a large part of the kind of work done by students here. During normal years, the college employs very few full-time gardeners or janitors, no dining hall help except cooks, and only two farm foremen who work with students in maintenance, repair, and operation of equipment.

Not only does the college make every effort to place students in employment both on and off the campus, but it seeks to correlate this outside work with the student's major course of study. For example, students of electrical and mechanical engineering aid in operation of the power plant; dairy major students feed and care for the college's dairy herd, milk the cows, and operate the milk plant; students in ornamental horticulture maintain and improve the lawns, trees, and shrubbery.

Also the college works in cooperation with the California State Employment Service and the local townspeople in finding employment for students working their way through school. Usually this employment consists of odd jobs, although some steady part-time work is obtained.

Scholarships

FRESHMAN SCHOLARSHIPS

A number of freshman scholarships are available at California State Polytechnic College for young men 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.

Sears Roebuck and Company State-wide Scholarships Awards

The Sears Roebuck and Company offers a total of 26 scholarships to California State Polytechnic College in two different groups; 25 of these are "state-wide 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, 25 scholarships of $100 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 should 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.

*South San Francisco and Stockton Union Stockyards Company Scholarships*

One annual $100 scholarship is awarded at the Grand National Junior Livestock Exposition on the basis of excellence of performance in the farm home program in the production of beef cattle, sheep, or hogs. Applicants are limited to those participating in this special event.

*Safeway Stores, Inc. Scholarship*

One annual $200 scholarship is awarded at the Grand National Junior Livestock Exposition on the basis of excellence of performance in the farm home program in the production of beef cattle, sheep, or hogs. Applicants are limited to those participating in this special event.

*Bank of America, N. T. & S. A. Scholarship*

One annual $200 scholarship is awarded at the Grand National Junior Livestock Exposition on the basis of excellence of performance in the farm home program in the production of beef cattle, sheep, or hogs. Applicants are limited to those participating in this special event. This scholarship must be used at the California State Polytechnic College or the University of California at Davis.

*Bank of America, N. T. & S. A. Scholarship*

One annual $200 scholarship is awarded at the Grand National Junior Livestock Exposition on the basis of excellence of performance in the farm home program in the production of dairy cattle. Applicants are limited to those participating in this special event. This scholarship must be used at the California State Polytechnic College or the University of California at Davis.

The Poultrymen's Cooperative Association of Southern California Scholarship

One annual scholarship of $100 is awarded to a prospective student who has had an outstanding home farm program in high school, and part of whose home farm program has been with poultry. 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.

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.

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 industries at California State Polytechnic College. Applicant is chosen from the entire State.

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.

*These three scholarships go to outstanding Future Farmers for excellence in production of market livestock—one company giving the award to a beef producer, one to a lamb producer, and one to a swine producer. The type for which the particular scholarship is given rotates annually.*
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.

The W. B. Camp Revolving Scholarships in Agricultural Journalism

W. B. Camp of Bakersfield has established two $250 scholarships to be granted on a loan basis to first-year agricultural journalism majors whose past school and/or work records indicate success in the field and who otherwise would be unable to start and continue training as agricultural journalism majors. A scholarship may be granted at any time during a selected student’s first academic year at the college, in full or less than the $250 amounts, and as an immediate lump sum or as stated payments. Interest of 3 percent starts one year after the student leaves the college, interest and principle reverting to keep the scholarship funds active.

ADVANCED STUDENT SCHOLARSHIPS

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.

John C. Lindsay Award

An annual award of $50 will be made to the junior student in architectural engineering, who in the opinion of the staff has presented the best problem during the year.

Philip R. Park, Incorporated, Scholarships

The Philip R. Park Company of San Pedro, California, 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.

Sears Roebuck and Company Sophomore Scholarship

The 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.

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 extra-curricular 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.

Exchange Club Scholarship

The Exchange Club of San Luis Obispo makes available to the California State Polytechnic College one annual $150 scholarship. This scholarship is awarded to an aeronautics student who has completed two years of satisfactory work in the Aeronautical Engineering Department. The student must maintain a better than average record and must have at least junior standing the Fall quarter following the scholarship award.

OTHER SCHOLARSHIPS

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 4H Club work, including commendable projects. One scholarship is to be awarded to one resident in each of the following counties: Los Angeles,
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.

Student Loan Funds

There are eight student loan funds to provide temporary assistance to worthy students. Loans from these funds are made for varying periods of time and according to regulations determined by a faculty committee. 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.

The Wrasse Fund

The principal source of loans is the Leopold Edward Wrasse Loan Fund, established for the benefit of deserving boys desirous of an education and needing financial assistance. Approximately $5,500 will be available for loans each year with the following general provisions:

1. First preference will be given to graduates of Caruthers High School in Fresno County, second preference to graduates of other high schools in Fresno County, third preference to graduates of California high schools.
2. During the 12-months' period preceding the granting of the loan, the applicant must have earned through his own endeavor at least half of the amount of the desired loan, and must furnish evidence to this effect.
3. Interest will not be charged until graduation, or until the student ends his enrollment. Loans must be repaid within three years after the termination of enrollment.

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.

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.

Student Accommodation Loan Fund

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

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.

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.

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 long-term 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.
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.

Placement tests which are completed by every incoming student are a part of the registration procedure and are given for the purpose of providing information for the student and his departmental adviser who will jointly plan the student's program. The departmental adviser will use placement test results to determine the courses most suited to the student's needs at the time of registration. These are not entrance examinations.

Engineering students complete tests in English, mathematics, and physics, to determine whether or not they qualify for admission to regular courses in English, mathematics, and physics, which are prerequisites to or taken concurrently with work in engineering. Similar tests are given agricultural students to determine their proficiency in English, mathematics, and agriculture. Students majoring in liberal arts are given tests in English and mathematics. 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:

1. As a minimum, have completed the equivalent of 50 semester periods (5 Carnegie units) of course work with grades of A or B on a five-point scale during the last three years in high school; or,
2. Must attain the twentieth percentile on the national norm of a standard college aptitude test; or,
3. Must satisfy the appropriate college authorities that he gives promise of being able to succeed in college.

ADULT SPECIAL STUDENTS

An applicant who has attained the age of 21 years and is not a high school graduate may be admitted 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 1.0 (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 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 intelligent 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 1.0 (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 1.0 (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 upper division credit may be allowed for courses taken 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.

Admission to Graduate Standing

Graduates of this college, and of other institutions having substantially the same requirements for the bachelor's degree, are eligible to apply to the Admissions Office for admission to graduate standing. The purpose of the graduate program at California State Polytechnic College is to serve teachers, or to prepare students for teaching.

For purposes of evaluation, applications must be accompanied by an official transcript of all previous college work. Such evaluation should be accomplished through correspondence previous to registration. After the applicant is issued a permit to register, a committee on graduate study will review the applicant's record and outline a program that will lead to the student's goal. This should be completed before the student registers in any course.

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 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.

CLASSIFICATION OF STUDENTS

Students found inadequately prepared to take the full complement of courses in their selected curriculum will be classified as conditional students. By means of a planned program of tests, guidance, limitation in units, and selection of courses to be taken, conditional students will be assisted to reach full participation in their selected curriculum. As the students pursue the work of their first year, continued assistance will be given toward attainment of the student’s objective.

Students electing to pursue the two-year technical program in agriculture will be classified as technical students. These students will be assisted in planning their programs by their departmental advisers.

GENERAL REGULATIONS

REGISTRATION PROCEDURE

A “Permit to Register” is prepared by the Registrar’s Office for each student who has been accepted to register. 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 fees.
   c. Pay medical fee, post office box fee, board and room.
   d. Purchase activity card.
   e. Complete placement 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.
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. If an individual is on probation in one curriculum and decides to change to another, he will still be on probation under the new choice.

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.

CHANGE OF STUDY LIST

A period of seven days of instruction, starting with the first day that classes are held each quarter, will be allowed for adding courses in making necessary program changes. After this seven-day period, no courses may be added to a student's program unless a request to do so is made by an instructor.

A period of 15 days of instruction 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 Courses" 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 should contact their Veterans Administration Training Officer before making any changes in their programs.

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

Any student who fails to maintain a C average for any quarter (that is, does not have as many grade points as units undertaken) will be placed on probation for the succeeding quarter. Students on probation may have their activities curtailed until such time as their work is brought up to a C average.

Any student will become subject to dismissal from the California State Polytechnic College if he fails to maintain a C average when on probation.

A student doing failing work in any course will receive an unsatisfactory grade report at the six-week mid-term period and will be asked to report to his adviser or the dean of his division for counseling. A student who receives D or F grade notices at the end of the six-week mid-term period will be sent a notice urging that he see his adviser regarding his low standing.
General Regulations

Students who have been dismissed because of low scholarship will not be admitted until at least one full quarter has elapsed and then only under certain conditions. These students must make application for readmission in writing directly to the President of the college. In applying for readmission, students must list reasons why they should be readmitted and present records of courses attempted or activities directed toward improving their chances for scholastic success. Students readmitted will enter on academic probation.

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—Withdrawn 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—3 points
For each unit of Grade B—2 points
For each unit of Grade C—1 point
For each unit of Grade D—0 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 grade points he may have lost by the condition or failure, and in addition 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 before the close of two quarters in residence. In the event this is not done, the course must be retaken.

Grade F indicates failure. It is a record so poor that it can be raised to a passing grade only by repetition of the course. The grade of F shall remain on the permanent record, but the accompanying units attempted will be disregarded if the course is subsequently retaken and passed.

The student may repeat a course in which a final grade of D has been received. The first grade earned for the course will remain on the transcript, but the units attempted will be disregarded for grade point purposes.

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

All students must be classified in one of the major departments of the college.

Students must register for not less than 12 or more than 20 quarter units of work; the only exceptions are made on the joint recommendation of the adviser and the division dean, whose signatures must be obtained by the student as he completes a Petition for Special Consideration. 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.

Minimum load requirements may be waived because of poor health or when only a few credits are needed for graduation. 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 2.0 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, AND AUDITING

Regularly enrolled students are allowed the privilege of taking courses by special examination. Experience or previous training cannot be substituted for college credit. Individuals often enter the college, however, especially qualified in particular subjects. Individuals who feel that they are qualified to take any of the courses offered by special examination may do so under the following regulations:

1. Students desiring credit by examination may request such an examination from the instructor. The instructor has the privilege of including written, oral, or practical tests, or a combination of all three types. A fee of $1 per unit will be charged. The following procedure will be followed in applying for special examinations:
   a. Report to the recorder’s office and secure a special examination petition.
   b. Complete this petition, secure the signature of the instructor of the course, the signature of the registrar, and the signature of the dean of instruction. After the privilege of taking the special examination is granted, the student must pay the special examination fee of $1 per unit, present the approval sheet to the instructor involved, and take the test.
   c. When the special examination petition is returned to the recorder’s office by the instructor, it must be signed in full and must have attached a copy of the examination questions and the written examination, if it is a written examination; a list of skills in which the student was tested, if the examination was a practical examination; or a list of the questions, if the examination was an oral examination.

2. A student may receive a grade no higher than a B as a result of passing a course by examination.

3. When a re-examination is requested for a course, a six-weeks period must elapse before a petition for special examination will be considered.

Units of credit received by special examination may not apply toward the residence requirement for graduation.

Regularly enrolled students are allowed to audit courses if they receive permission from the instructor in charge. Students will not receive units of credit or grades for courses audited.

CREDIT FOR MILITARY SERVICE

1. Nine quarter units of elective credit will be allowed toward graduation to any student 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 conference rule. Salient points are noted below:

1. Competition is open to regularly enrolled students carrying at least 12 units applicable toward an approved objective.
2. Ten or more units and at least 10 grade points must have been earned the last quarter of college residence preceding competition.
3. Freshmen are 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. 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 re-admitted 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.

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.

**SYMBOLS**

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

- Aero—Aeronautical Engineering
- AC—Air Conditioning and Refrigeration Engineering
- AE—Agricultural Engineering
- AH—Animal Husbandry
- SI—Horticultural Services and Inspection
- Arch—Architectural Engineering
- Art—Art
- BSc—Biological Science
- CP—Crops Production
- DM—Dairy Manufacturing
- Ec—Economics
- Ed—Education
- EE—Electrical Engineering
- EL—Electronic and Radio Engineering
- Eng—English
- FP—Deciduous Fruit Production
- Hist—History
- Jour—Journalism
- Math—Mathematics
- ME—Mechanical Engineering
- MS—Machine Shop
- Mu—Music
- OH—Ornamental Horticulture
- PE—Physical Education
- Pol Sc—Political Science
- PH—Poultry Husbandry
- Pr—Printing
- PSc—Physical Science
- Psy—Psychology
- SSC—Social Science
- SS—Soil Science
- TC—Truck Crops
- VS—Veterinary Science
- Weld—Welding

**FEES AND EXPENSES**

**STATE FEES AND DEPOSITS**

<table>
<thead>
<tr>
<th>Item</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory and course fees (quarter)</td>
<td>$6.00</td>
</tr>
<tr>
<td>Breakage deposit (year)</td>
<td>$10.00</td>
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<tr>
<td>(All deposits refundable at end of year if there are no charges against student)</td>
<td></td>
</tr>
<tr>
<td>Late registration fee</td>
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<tr>
<td>Late return of registration cards fee</td>
<td>$2.00</td>
</tr>
<tr>
<td>Transcript fee (no charge for first copy)</td>
<td>$1.00</td>
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<tr>
<td>Evaluation of record fee (nonmatriculated students)</td>
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<tr>
<td>Course challenge by special examination fee (per unit)</td>
<td>$1.00</td>
</tr>
<tr>
<td>Extension course fee (per unit)</td>
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<tr>
<td>Change of program fee</td>
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</tr>
<tr>
<td>Failure to meet administratively required appointment</td>
<td>$2.00</td>
</tr>
<tr>
<td>Credential fee (for each credential)</td>
<td>$4.00</td>
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</tbody>
</table>
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) ............................................. 3.50
Medical fee (per quarter) ................................................................................... 3.00
Graduation fee .................................................................................................... 7.50

( 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.

Living Expenses

FOR STUDENTS LIVING ON CAMPUS

Room, per month (subject to change) ................................................................. $12.00
( Must be paid quarterly in advance; students are required to furnish bed linen and blankets)
Board, average per month (subject to change) .................................................. 42.00
( Must be paid in advance)

TYPICAL STUDENT EXPENSES

Example A

Students living on campus and not enrolled under Public Law 16, 346, or the California Veterans Educational Institute, should be prepared to pay at time of fall 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) ............................................................... $0.50
Medical fee (per quarter) .............................................................................. 3.00
Laboratory and course fee (per quarter) ......................................................... 6.00
Room rent (per quarter) ................................................................................ 36.00
Board (average per month) ............................................................................ 42.00
Books and supplies (estimated) .................................................................... 35.00

$140.00*

Example B

Students living on campus and enrolled under Public Law 16, 346, or the California Veterans Educational Institute should be prepared to pay at time of fall quarter registration:

Post office box rental (per quarter) ............................................................... $0.50
Room rent (per quarter) ............................................................................... 36.00
Board (average per month) ............................................................................ 42.00
Associated student card (fall quarter $7.50; winter and spring quarters, $3.75 each) 7.50
Medical fee (quarter) ..................................................................................... 3.00
†Books and supplies ....................................................................................... 89.00

$89.00*

FAMILY HOUSING

The college foundation has available the following on-campus housing accommodations, all of which are furnished with utilities provided:

Poly View Trailers ......................................................................................... $25 (per month)
Poly Crest Trailers ....................................................................................... 25 (per month)
Vetville, one-bedroom apartments ................................................................. 28 (per month)
Vetville, two-bedroom apartments ................................................................. 32 (per month)

* The student should be prepared to pay approximately the same amount at the time of winter and spring registration, with the exception of deposits which carry through the year.
† If the trainee has a Veterans Administration "letter of entitlement" when he registers, books and supplies will be furnished. If he does not have the "letter of entitlement," the trainee must pay all fees, including those for books and supplies, until the time the letter is presented. A refund will be made to the veteran when the letter is presented. Trainees under the California Veterans Institute purchase their own books and supplies for which they receive an allowance of $10 per month.
DEGREES AND CREDENTIALS

GRADUATION REQUIREMENTS

Degree Curricula

GENERAL REQUIREMENTS FOR GRADUATION

All candidates for the bachelor's 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 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 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 Agricultural and Liberal Arts Divisions must present a minimum of 198 quarter units of credit for graduation.

REQUIRED GENERAL EDUCATION

All candidates for the bachelor's 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 201
- 3 units of Economics and Political Science from Ec 202, 316, 411, 412, Pol Sc 401

Natural Sciences (15 units)
- 12 units of Physical Science from PSc 101, 102, 103, PSc 131, 132, 133 PSc 321, 322, 323, PSc 324, 325,326
- 3 units of Life Science from Bsc 101, 110, 121, 131

Literature, Philosophy, or the Arts (9 units)
- 9 units from Literature and Fine or Practical Arts: Eng 106. At least 3 units from Eng 211, 212, 213, 311, 312. Not more than 3 units from AE 121, 122, AC 121, 120, MS 141, 142, 144, 147, 148, Weld 133, 148, 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 and Hygiene: PE 107

Oral and Written Expression (6 units)
- 6 units of English: Eng 104, 105

Psychology (3 units)
- 3 units of Psychology: Psy 403

Additional Units in General Education (15 units)
- 5 units of Mathematics from Math 102, 103, Math 111, 112, Math 117
- 10 additional units in general education chosen from the above or from courses in the following list: Eng 201, 301, 313, Ec 301, Psy 202, Art 201, Arch 141, BSc 122, 132, Music (6 units), Senior Project.

Technical Curricula in Agriculture

REQUIREMENTS FOR GRADUATION

Students not wishing to enroll for the four-year degree curricula may receive a technical certificate from any agriculture department upon completion of 98 selected units. Students selecting one of these curricula will follow the basic pattern of the
Degrees and Credentials

major field. Elective courses may be selected from other than major departments from any courses in first or second year work.

Students interested in the two-year technical certificate should refer to the introductory statement for the Agricultural Division which describes this program.

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 requirements of both curricula have been met.

A student who desires to submit only one senior project covering two closely related graduation majors must file a petition for special consideration prior to the last date for filing an application for graduation, as shown in the college calendar.

MASTER OF ARTS DEGREE

The California State Polytechnic College offers a master of arts degree in education with concentrations in the fields mentioned below. When a student makes application for admission to graduate work leading to the master of arts degree he indicates the area of concentration. An evaluation of his previous work is made and he is provided with a copy of the requirements he must meet in order to be eligible for the degree.

A graduate committee, consisting of a member from the student's field of concentration, a member from the Education Department (the Agricultural Teacher Trainer for agricultural education majors), and a third member chosen by the first two, shall be assigned to assist each candidate in securing the maximum benefit from his graduate work. The Department of Education member shall act as chairman of each committee.

Fields of Concentration

The program for the master of arts degree allows concentration in any of the following fields:

1. Agriculture
2. Physical Science
3. Biological Science
4. Mathematics
5. Social Sciences
6. Health and Physical Education

A grade-point average of 1.75 in graduate work taken to the date of the evaluation is required for admission to candidacy and a grade-point average of 2.0 is required in all work which is presented in fulfillment of the graduate year requirements. Oral and written comprehensive examinations are given in the spring and summer for candidates who have completed all other requirements. Ordinarily students are expected to complete one year of teaching before completion of the work for the master's degree.

ADMISSION TO GRADUATE COURSES

To be admitted to graduate courses, a student must have graduate standing, and in addition must meet one of the following three criteria:

1. Have a major in the field, or
2. Secure the permission of the department head in which the courses are offered—this permission to be granted whenever inquiry indicates there has been sufficient background for success, or
3. Successfully complete a validating examination in the field of the graduate course.
PREPARATION FOR SECONDARY SCHOOL TEACHING

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

Special Secondary Credential in Vocational Agriculture
Special Secondary Limited Credential in Agriculture
Special Secondary Credential in Physical Education

SELECTION OF TEACHER CANDIDATES

California State Polytechnic College attempts to make a concrete contribution to the public schools' educational program of the State by preparing, in the special and general fields, teachers who will have a practical approach to the real-life social, economic, and political problems of their pupils. The "learn-by-doing" instructional method of the college is designed to prepare teachers to adjust to the needs of the pupils and the community. The practical training of the college instructors themselves integrates directly with the purpose of teacher education.

Selection of candidates to prepare for teaching is accomplished through a three-step process in addition to the personal and individual counseling given by faculty advisers. A faculty Teacher Education Committee functions to establish policies and standards for teacher candidate selection and for the review of the candidate's qualifications. The committee is composed of instructors in professional fields, instructors concerned with supervision of student teaching, representatives of the deans of each of the three major college divisions, the Dean of Students, and other individuals such as the Agricultural Teacher Trainer.

The first step for a student in applying for admission to the teacher education program and for eventually qualifying for a teaching credential is to submit an "application for candidacy for a teaching credential" and show evidence of the likely completion of the requirements for the bachelor of science degree with a grade point average of 1.5. Where graduate work is required for a credential, a grade point average of 1.75 is required for work taken in the graduate year.

Consideration of this application involves a review of the applicant's grade point average, a study of his confidential appraisals, and an examination of accumulated test data. Test results include the areas of academic aptitude, English usage, general culture, and interests. The tests ordinarily will be administered by the college during the course Principles of Secondary Education (Ed. 301). The primary purpose of these tests is to inform the student of his achievement and abilities so that he can build on his strengths and eliminate his weaknesses. A secondary purpose is to help the college to appraise the student for selection, preparation, and placement purposes in order to produce the best possible teacher.

The second formal selective process occurs when the candidate who has previously received approval at the first step, makes application for his student (directed) teaching. A review of the applicant's achievements and progress subsequent to his first approval is made. By this time, the responsible subject matter department head, education department instructor, or the Agricultural Teacher Trainer has had further opportunity to observe and work more closely with the candidate. Only the stronger candidates are selected to enter student teaching.

The vocational agriculture cadet, in addition, must make application for a cadet appointment which is granted by the State Bureau of Agricultural Education only after a full review of the applicant's record, experience, and recommendations.

The third step is the filing of an application for a teaching credential by the candidate. Successful performance in a broad and well-balanced student teaching experience is a major qualification for recommendation. The evaluations and recommendations of the supervising teacher and the administrator in the local training center are important factors in the final decision.

When the candidate is notified by letter that he has been approved, he supplies his credential adviser with:

1. A health certificate (Form 41-3)
2. Application to accompany recommendation for credential (Form 41-16, revised 8-49)
3. A duplicate set of personal identification cards (obtained in college accounting office)
4. A money order for $4 made out to the California State Department of Education.
Degrees and Credentials

SPECIFIC REQUIREMENTS

The Special Secondary Credential in Vocational Agriculture

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

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

Minimum Quarter units

A. Plant Production .............................................. 23
B. Animal Husbandry ............................................ 23
C. Agricultural Mechanics ..................................... 12
D. Agricultural Economics ..................................... 9
E. Elective units in the above four fields.................. 23
F. Thirteen quarter units in education distributed as follows:†
   1. Principles of Secondary Education ...................... 3
   2. Educational Psychology ................................ 5
   3. Teaching Plans and Techniques ....................... 5
   G. Electives as approved by adviser.

IV. One year of graduate work ‡ including:

On Campus (1½ Quarters)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Quarter units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ed 401</td>
<td>Audio-Visual Aids</td>
<td>3</td>
</tr>
<tr>
<td>Ed 503</td>
<td>Guidance in Secondary Schools</td>
<td>3</td>
</tr>
<tr>
<td>Ed 504</td>
<td>Evaluation in Secondary Education</td>
<td>3</td>
</tr>
<tr>
<td>Ed 506 A-B</td>
<td>Adult and Continuation Education</td>
<td>6</td>
</tr>
<tr>
<td>Ed 522</td>
<td>Methods in Teaching Agricultural Mechanics</td>
<td>5</td>
</tr>
<tr>
<td>Ed 524</td>
<td>Problems in Supervising Farm Programs</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>**</td>
<td>** 25</td>
</tr>
</tbody>
</table>

Off Campus (1½ Quarters)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Quarter units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ed 525 A-B</td>
<td>Student Teaching in Vocational Agriculture</td>
<td>12</td>
</tr>
<tr>
<td>Ed 424 A-B</td>
<td>Vocational Agriculture Department Organization</td>
<td>3</td>
</tr>
<tr>
<td>Ed 521 A-B</td>
<td>Curriculum and Methods in Agriculture</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>**</td>
<td>** 20</td>
</tr>
</tbody>
</table>

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. Ornamental Horticulture
      6. Animal Husbandry
      7. Poultry Husbandry
      8. Agricultural Engineering

* Students meeting the requirements for this credential may also be recommended for the General Secondary Credential by meeting general education requirements and the pattern for a teaching minor.
† Education 203, The Teaching of Agriculture, 2 units, is strongly recommended, but not required, in the spring quarter of the sophomore year.
‡ A minimum of 36 quarter units of work approved for graduate credit, taken after the student has been admitted to graduate standing.
B. Twenty-eight quarter units of professional work in education,† including:

<table>
<thead>
<tr>
<th>Quarter units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Principles of Secondary Education</td>
</tr>
<tr>
<td>2. Educational Psychology</td>
</tr>
<tr>
<td>3. Teaching Plans and Techniques</td>
</tr>
<tr>
<td>4. Student Teaching in General Agriculture</td>
</tr>
<tr>
<td>5. Curriculum and Methods in General Agriculture</td>
</tr>
<tr>
<td>6. Elective in Education</td>
</tr>
</tbody>
</table>

C. Other courses in education, the major, or the minor fields as approved by the adviser or Agricultural Teacher Trainer.

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 62 units in health and physical education.

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

<table>
<thead>
<tr>
<th>Quarter units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Principles of Secondary Education</td>
</tr>
<tr>
<td>2. Educational Psychology</td>
</tr>
<tr>
<td>3. Teaching Plans and Techniques</td>
</tr>
<tr>
<td>4. Student Teaching in Physical Education</td>
</tr>
<tr>
<td>5. Curriculum and Methods in Health and Physical Education</td>
</tr>
<tr>
<td>6. Audio-visual Aids</td>
</tr>
<tr>
<td>7. Electives</td>
</tr>
</tbody>
</table>

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

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. A minimum of 15 units in education as follows:

<table>
<thead>
<tr>
<th>Quarter units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Principles of Secondary Education</td>
</tr>
<tr>
<td>2. Educational Psychology</td>
</tr>
<tr>
<td>3. Teaching Plans and Techniques</td>
</tr>
</tbody>
</table>

B. Sixty units of general education from those listed under the heading, “Required General Education.”

III. A. Completion of a teaching major (54 units minimum, of which at least 18 must be taken from junior, senior, and graduate courses) in the field of agriculture, biological science, health and physical education, mathematics, physical science, or social science.

B. Completion of a teaching minor (minimum of 30 units) in a field in which majors are offered.

IV. One full year of graduate work of not less than 36 units, taken in residence after the student has been admitted to graduate standing at California State Polytechnic College. These units shall include:

<table>
<thead>
<tr>
<th>Quarter units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student Teaching</td>
</tr>
<tr>
<td>2. Audio-visual Aids (if not already taken)</td>
</tr>
<tr>
<td>3. Counseling and Guidance in Secondary Schools</td>
</tr>
<tr>
<td>4. Philosophy and Education</td>
</tr>
<tr>
<td>5. Public School Administration</td>
</tr>
<tr>
<td>7. Adult and Continuation Education in Agriculture</td>
</tr>
<tr>
<td>8. Schools in the Community</td>
</tr>
<tr>
<td>9. Seminar in Vocational Education and Guidance</td>
</tr>
</tbody>
</table>

† Education 203, The Teaching of Agriculture, 2 units, is strongly recommended, but not required in the spring quarter of the sophomore year.
Degrees and Credentials

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.

DEPARTMENTAL REQUIREMENTS FOR TEACHING MAJORS AND MINORS

In addition to requirements I, II, and IV above, the candidate shall complete requirements for a teaching major and a teaching minor. The candidate should contact the department head or representative of the teaching major before registering for his junior year, for information concerning the integration of credential requirements with his graduation pattern.

There are good placement opportunities in teaching for majors in engineering who plan a double teaching minor in mathematics and physical science and who meet the other requirements for teacher candidates. By careful selection of electives beginning not later than the sophomore year, it is possible for most engineers in consultation with the engineering adviser to qualify for the general secondary credential within the regular five year program required of all general secondary candidates.

AGRICULTURE—Teaching Major (90 Units)

The requirements are the same as for the Special Secondary Credential in Vocational Agriculture.

AGRICULTURE—Teaching Minor (33 Units)

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agricultural Mechanics (AE 121)</strong></td>
</tr>
<tr>
<td><strong>Anatomy and Physiology (VS 123)</strong></td>
</tr>
<tr>
<td>(Prerequisite: BSc 131, 132)</td>
</tr>
<tr>
<td><strong>Feeds and Feeding (AH 101, 102)</strong></td>
</tr>
<tr>
<td><strong>Select one of the following sequences</strong></td>
</tr>
<tr>
<td>Animal Husbandry 121, 122, 123</td>
</tr>
<tr>
<td>Dairy Husbandry 121; Dairy Manufacturing 132; Dairy Husbandry 123</td>
</tr>
<tr>
<td>Poultry 121, 122, 123</td>
</tr>
<tr>
<td>Truck Crops 124, 125, 126</td>
</tr>
<tr>
<td>Crop Production 121, 122, 123</td>
</tr>
<tr>
<td>Fruit Production 131, 132, 133</td>
</tr>
<tr>
<td>Ornamental Horticulture 121, 122, 123</td>
</tr>
<tr>
<td><strong>Three of the following general courses, outside of the major department selected above</strong></td>
</tr>
<tr>
<td>Animal Husbandry 230</td>
</tr>
<tr>
<td>Dairy Husbandry 230</td>
</tr>
<tr>
<td>Poultry 230</td>
</tr>
<tr>
<td>General Nursery Practices 230</td>
</tr>
</tbody>
</table>

BIOLOGICAL SCIENCE—Teaching Major (72 Units)

First and Second Years

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Physical Science (PSc 101, 102, 103)</strong></td>
</tr>
<tr>
<td><strong>General Botany (BSc 121, 122, 123)</strong></td>
</tr>
<tr>
<td><strong>General Zoology (BSc 131, 132, 133)</strong></td>
</tr>
</tbody>
</table>
### Third and Fourth Years

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics (BSc 303)</td>
<td>3</td>
</tr>
<tr>
<td>General Chemistry (PSc 321, 322, 323, or PSc 324, 325, 326)</td>
<td>12</td>
</tr>
<tr>
<td>Elective courses from Biological Science offerings and a maximum of nine units of the following applied courses</td>
<td>12</td>
</tr>
<tr>
<td>Animal Breeding (AH 304)</td>
<td>3</td>
</tr>
<tr>
<td>(Prerequisite: VS 123, BSc 303)</td>
<td></td>
</tr>
<tr>
<td>General Field Crops (CP 230)</td>
<td>3</td>
</tr>
<tr>
<td>General Fruit Production (PF 230)</td>
<td>3</td>
</tr>
<tr>
<td>General Truck Crops (TC 230)</td>
<td>3</td>
</tr>
<tr>
<td>Plant Propagation (OH 123)</td>
<td>4</td>
</tr>
<tr>
<td>General Nursery Practices (OH 230)</td>
<td>3</td>
</tr>
<tr>
<td>General Poultry Production (PH 230)</td>
<td>4</td>
</tr>
<tr>
<td>Soils (SS 121)</td>
<td>4</td>
</tr>
<tr>
<td>Anatomy and Physiology (VS 123)</td>
<td>3</td>
</tr>
<tr>
<td>(Prerequisite: BSc 131, 132)</td>
<td></td>
</tr>
<tr>
<td>Livestock Hygiene and Sanitation (VS 202)</td>
<td>3</td>
</tr>
<tr>
<td>(Prerequisite: VS 123)</td>
<td></td>
</tr>
<tr>
<td>Animal Parasitology (VS 203)</td>
<td>2</td>
</tr>
<tr>
<td>(Prerequisite: BSc 131, 132)</td>
<td></td>
</tr>
<tr>
<td>Animal Nutrition (AH 402)</td>
<td>3</td>
</tr>
<tr>
<td>(Prerequisite: VS 123 and Chemistry)</td>
<td></td>
</tr>
</tbody>
</table>

### Graduate Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum and Methods in Biological Science (BSc 521)</td>
<td>3</td>
</tr>
<tr>
<td>6 units from:</td>
<td></td>
</tr>
<tr>
<td>Histology (BSc 522) or Plant and Animal Cytology (BSc 523) or Other junior, senior, or graduate courses approved by adviser</td>
<td>6</td>
</tr>
</tbody>
</table>

#### BIOLOGICAL SCIENCE—Teaching Minor (36 Units)

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Botany (BSc 121, 122, 123)</td>
<td>12</td>
</tr>
<tr>
<td>General Zoology (BSc 131, 132, 133)</td>
<td>12</td>
</tr>
<tr>
<td>12 units from any one of the three following sequences:</td>
<td></td>
</tr>
<tr>
<td>General Chemistry (PSc 321, 322, 323) or General Physical Science (PSc 101, 102, 103) or Chemistry (PSc 324, 325, 326)</td>
<td>12</td>
</tr>
</tbody>
</table>

#### HEALTH AND PHYSICAL EDUCATION—Teaching Major (58 Units)

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Football Theory (PE 321)</td>
<td>2</td>
</tr>
<tr>
<td>Baseball and Softball Theory</td>
<td>2</td>
</tr>
<tr>
<td>Kinesiology (PE 302)</td>
<td>2</td>
</tr>
<tr>
<td>Track and Field Theory (PE 331)</td>
<td>2</td>
</tr>
<tr>
<td>Basketball Theory (PE 422)</td>
<td>2</td>
</tr>
<tr>
<td>Organization and Administration of Physical Education (PE 401)</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education Activity (PE 341, 342, 343)</td>
<td>3</td>
</tr>
<tr>
<td>Tests and Measurements in Physical Education (PE 411)</td>
<td>3</td>
</tr>
<tr>
<td>Elementary Physical Education Activity (PE 332)</td>
<td>3</td>
</tr>
<tr>
<td>Physiology of Exercise (PE 303)</td>
<td>2</td>
</tr>
<tr>
<td>Technique of Officiating (PE 311)</td>
<td>2</td>
</tr>
<tr>
<td>School Health Administration (PE 405)</td>
<td>2</td>
</tr>
<tr>
<td>Minor Sports Theory and Practice (PE 423)</td>
<td>3</td>
</tr>
<tr>
<td>Athletic Training and Massage (PE 432)</td>
<td>1</td>
</tr>
</tbody>
</table>
Degrees and Credentials

Graduate Year | Units
---|---
Completion of the following courses in Physical Education: | 
Curriculum and Methods in Health and Physical Education (PE 403) | 3
Corrective Physical Education (PE 406) or Advanced Personal Hygiene (PE 512) | 3

**HEALTH AND PHYSICAL EDUCATION—Teaching Minor (30 Units)**

First and Second Years:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Education (PE 141, 142, 143, 241, 242, 243)</td>
<td>3</td>
</tr>
<tr>
<td>Health and Hygiene (PE 107)</td>
<td>2</td>
</tr>
<tr>
<td>Community Recreation (PE 106)</td>
<td>3</td>
</tr>
<tr>
<td>Intramural Sports (PE 202)</td>
<td>3</td>
</tr>
<tr>
<td>Health Education (PE 203)</td>
<td>2</td>
</tr>
<tr>
<td>Safety and First Aid (PE 101)</td>
<td>2</td>
</tr>
</tbody>
</table>

Third, Fourth, or Fifth Years:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor Sports Theory and Practice (PE 423)</td>
<td>3</td>
</tr>
<tr>
<td>Organization and Administration of Physical Education (PE 401)</td>
<td>3</td>
</tr>
<tr>
<td>Curriculum and Methods in Health and Physical Education (PE 403)</td>
<td>3</td>
</tr>
<tr>
<td>Electives—8 additional units selected from the following</td>
<td>6</td>
</tr>
<tr>
<td>Football Coaching Theory (PE 321)</td>
<td>2</td>
</tr>
<tr>
<td>Basketball Coaching Theory (PE 422)</td>
<td>2</td>
</tr>
<tr>
<td>Baseball Coaching Theory (PE 323)</td>
<td>2</td>
</tr>
<tr>
<td>Track and Field Coaching Theory (PE 331)</td>
<td>2</td>
</tr>
</tbody>
</table>

**MATHEMATICS—Teaching Major (56 Units)**

(18 units of the 56 must be in applications of mathematics)

First and Second Years:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics for Engineers (Math 117, 118)</td>
<td>10</td>
</tr>
<tr>
<td>Differential and Integral Calculus (Math 201, 202, 203)</td>
<td>9</td>
</tr>
<tr>
<td>* First course in Statistical Methods (Math 211)</td>
<td>3</td>
</tr>
<tr>
<td>In addition, at least 3 units from the following:</td>
<td></td>
</tr>
<tr>
<td>* Elementary Engineering Problems (Math 213)</td>
<td>2</td>
</tr>
<tr>
<td>* Mathematics for Printers (Math 105)</td>
<td>3</td>
</tr>
<tr>
<td>* Agricultural Mathematics (Math 102, 103)</td>
<td>3</td>
</tr>
<tr>
<td>* Surveying</td>
<td>2, 4, or 6</td>
</tr>
<tr>
<td>* Descriptive Geometry (ME 125, 126)</td>
<td>6</td>
</tr>
<tr>
<td>* Slide Rule (Math 104)</td>
<td>1</td>
</tr>
</tbody>
</table>

Third and Fourth Years:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory of Equations (Math 307)</td>
<td>3</td>
</tr>
<tr>
<td>Differential Equations (Math 316, 317)</td>
<td>5</td>
</tr>
<tr>
<td>* Mathematical Analysis of Engineering Problems (Math 318)</td>
<td>3</td>
</tr>
<tr>
<td>* Secondary School Mathematics (Math 402, 403)</td>
<td>6</td>
</tr>
<tr>
<td>In addition, at least 5 units from the following:</td>
<td></td>
</tr>
<tr>
<td>* Engineering Statics (Pe 201)</td>
<td>3</td>
</tr>
<tr>
<td>* Mathematical Analysis of Engineering Problems (Math 319)</td>
<td>3</td>
</tr>
<tr>
<td>* Vector Analysis (Math 404, 405)</td>
<td>4</td>
</tr>
<tr>
<td>* Functions of a Complex Variable (Math 408)</td>
<td>2</td>
</tr>
<tr>
<td>Advanced Calculus (Math 412)</td>
<td>3</td>
</tr>
<tr>
<td>Senior Project and Seminar (Math 461, 462, 463)</td>
<td>6</td>
</tr>
<tr>
<td>Applied math course approved by adviser</td>
<td>3</td>
</tr>
</tbody>
</table>

Graduate Year:

Completion of: | 
* Curriculum and Methods in Mathematics (Math 521) | 3 |
| 3 units from the following: | |
| Non-Euclidean Geometry (Math 501) | 3 |
| Development of Mathematics (Math 509) | 3 |
| Survey of Modern Mathematics (Math 510) | 3 |
| Seminar (Math 550) | 3 |

In addition, at least 3 units from any junior, senior, or graduate mathematics course approved by adviser.

* Applied courses.
## MATHEMATICS—Teaching Minor (30 Units)

**First and Second Years**
- Mathematics for Engineers (Math 117, 118) **10**
- Differential and Integral Calculus (Math 201, 202, 203) **9**

**Third and Fourth Years**
- *Secondary School Mathematics (Math 402 or 403) **3***
- In addition, at least 5 units from the following:
  - Differential Equations (Math 316, 317) **3 or 5**
  - Theory of Equations (Math 307) **3**
  - *Mathematical Analysis of Engineering Problems (Math 318) **3***
  - First Course in Statistical Method (Math 211) **3**
  - Vector Analysis (Math 404) **2**
  - Functions of a Complex Variable (Math 408) **2**
  - *Engineering Statics (PSc 201) **3***

**Graduate Year**
- 3 units selected from the following:
  - *Curriculum and Methods in Mathematics (Math 521) **3***
  - Development of Mathematics (Math 509) **3**
  - Survey of Modern Mathematics (Math 510) **3**
  - Non-Euclidean Geometry (Math 501) **3**
  - Seminar (Math 580) **3**
  - Any junior or senior mathematics course approved by adviser **3**

## PHYSICAL SCIENCE—Teaching Major (70 Units)

**First and Second Years**
- General Physics (PSc 131, 132, 133) **12**
- General Chemistry (PSc 321, 322, 323) **12**
- Sound (PSc 212) **3**
- Light (PSc 223) **3**
- Construction of Laboratory Glassware (PSc 243) **3**
- Machine Shop (MS 124) **2**
- Engineering Mathematics (Math 118) **5**
- Differential and Integral Calculus (Math 201, 202, 203) **9**

**Third and Fourth Years**
- Organic Chemistry (PSc 326) **4**
- Quantitative Analysis (PSc 381) **4**
- Electives from the following applied courses: **6**
  - Soils (SS 121) **3**
  - Engineering Statics (PSc 201) **3**
  - Engineering Dynamics (PSc 202) **3**
  - Geology (PSc 406) **3**
  - Astronomy (PSc 416) **3**
  - Strength of Materials (ME 202) **3**
  - Internal Combustion Engines (ME 101) **3**
  - Direct and Alternating Current Circuits (EE 226, 207, 208) **10**
  - Fluid Flow (ME 311, 312) **6**
  - Heat Transfer (ME 313) **6**
  - Other courses approved by adviser.

**Graduate Year**
- Curriculum and Methods in Physical Science (PSc 521) **3**
- In addition select six units from the following: **6**
  - Advanced Inorganic Chemistry (PSc 513) **3**
  - Philosophy of Science (PSc 512) **3**
  - Nuclear Physics (PSc 502) **3**
  - Agricultural Biochemistry (PSc 328) **3**
  - Selected Topics in Advanced Physics (PSc 501) **3**
  - Other courses approved for graduate credit.

* Applied courses.
PHYSICAL SCIENCE—Teaching Minor (37 Units)

General Physics (PSc 131, 132, 133) ........................................ 12
General Chemistry (PSc 321, 322, 323) ...................................... 12

A minimum of 10 units selected from the following courses, not more than 8 units of the minimum to be selected from either physics or chemistry.

Sound (PSc 212) ............................................................. 3
Light (PSc 223) .............................................................. 3
Engineering Statics (PSc 201) ............................................... 3
Quantitative Analysis (PSc 331, 332) .................................... 4 or 8
Organic Chemistry (PSc 326) ................................................ 4
Agricultural Biochemistry (PSc 328) ....................................... 4

Graduate Year

Three units selected from the following:
Curriculum and Methods in Physical Science (PSc 521) ......... 3

Other courses offered in teaching major, graduate year.

SOCIAL SCIENCE—Teaching Major (57 Units)

First and Second Years

History of Civilization (Hist 101, 102, 103) ......................... 9
Principles of Sociology (SSc 201, 202, 203) .......................... 9
American Government (Pol Sc 301) ..................................... 3
Principles of Economics (Ec 201, 202) .................................. 6
Economic Problems (Ec 213) .............................................. 3

Third and Fourth Years

* United States History (Hist 301, 302, 303) ......................... 9
† United States in World Affairs (Hist 305) ......................... 3
State and Local Government (Pol Sc 401) ............................ 3
Global Geography (SSc 308) ............................................. 3

Graduate Year
Curriculum and Methods in Social Science (SSc 521) ............... 3
At least six units, including at least one course from each group:

1. Sources in Social Science (SSc 511) ................................. 3
   Contemporary Problems of the Pacific Area (Hist 558) ....... 2
   Commercial Law (Ec 316) ........................................... 3
   Contemporary Problems, International Relations (Pol Sc 556) 3

2. Agricultural Prices and Government Control (Ec 403) .......... 3
   Industrial Management (Ec 411) .................................. 3
   Industrial Relations (Ec 412) .................................. 3
   Seminar in Economic Problems (Ec 582) ........................ 2

SOCIAL SCIENCE—Teaching Minor (30 Units)

American Government (Pol Sc 301) ..................................... 3

Third and Fourth Years

* United States History (Hist 301, 302, 303) ......................... 9
† United States in World Affairs (Hist 305) ......................... 3
State and Local Government (Pol Sc 401) ............................ 3
Three units selected from the following: .......................... 3

   Global Geography (SSc 308) ....................................... 3
   Industrial Relations (Ec 412) .................................. 3
   Industrial Management (Ec 411) ................................ 3
   Agricultural Prices and Government Control (Ec 403) ....... 3

* Hist 304 will not substitute for any part of this requirement.
† Pol Sc 312 and 313 may be substituted for the requirement and three units of elective.
Graduate Year

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum and Methods in Social Science (SSc 521)</td>
</tr>
<tr>
<td>Six units selected from the following:</td>
</tr>
<tr>
<td>Agricultural Prices and Government Control (Ec 403)</td>
</tr>
<tr>
<td>Seminar in Economic Problems (Ec 582)</td>
</tr>
<tr>
<td>Contemporary Problems of the Pacific Area (Hist 583)</td>
</tr>
<tr>
<td>Sources in Social Science (SSc 511)</td>
</tr>
</tbody>
</table>

APPROVAL OF TEACHER CANDIDATES

Candidates with backgrounds of occupational and job experience, sound college academic records, demonstrated qualities of leadership, and skill in human relations, who are strongly recommended by a number of their college instructors as good teacher prospects, are encouraged and approved to proceed in the teacher education program.

Competence in the subject or field and in professional methods is mandatory for teacher candidates, as is skill in the more intangible areas of social behavior and graces, and human relationships. Emotional stability and maturity of each candidate is considered, as is his real interest in the field and his demonstrated persistence of effort.

As an example of the training required for subject competence, the student working for a Special Secondary Credential in Vocational Agriculture must achieve a bachelor of science degree in an agricultural major, and in addition, must complete course work in other fields of agriculture. The purpose is to provide both depth and breadth of training and to produce a teacher of vocational agriculture who is strongly trained in at least one field of agriculture, and who has a breadth of training and basic knowledge which will equip him to adjust quickly to the particular community in which he teaches. Because California has some 200 commercially produced crops, the beginning teacher cannot be expected to be qualified in each of these enterprises, but he must strive to broaden his qualifications constantly. The applicant must also have lived and worked most of his life on a farm or have engaged in the minimum equivalent of three years of farm work in recent years.

A full year of graduate training is required of each prospective teacher of vocational agriculture and the applicant for a cadet appointment must be approved not only by the college but by the State Bureau of Agricultural Education. Active participation for at least one year in the college chapter of the Future Farmers of America, the campus organization of prospective teachers of vocational agriculture, is considered a “must” for the teacher candidate.

What has been said of the candidate for the Vocational Agriculture Credential by way of illustration, is generally applicable to candidates for other credentials. They must be competent in subject matter, emotionally mature, socially adaptable, professionally alert, and have a real interest in students and student activities.

STUDENT TEACHING AND SUPERVISION

<table>
<thead>
<tr>
<th>Special Secondary Credential in Vocational Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Following the period of selection for candidates in vocational agriculture, the cadet 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. As a result, added stimulation and incentive is given to the trainee. Elimination from the program can occur at any time when achievement is below standard. The fifth-year training program is divided into two parts: five months on-campus completing specific graduate training in methods and professional courses in education and emphasizing agricultural education, and five months in off-campus student teaching activities when the cadet is assigned full-time to a school under the direction of a fully 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. First-hand acquaintance with and utilization of community resources is achieved. The cadet training program in vocational agriculture, including the off-campus student teaching, is under the direct supervision of the agriculture teacher training staff.</td>
</tr>
</tbody>
</table>
Special Secondary Limited Credential in Agriculture

Trainees for this credential proceed through the same selection process as for other teacher candidates. The student teaching requirement consists of the assignment of trainees to selected local training centers under a fully qualified supervising teacher for one-half day each day of the week for one quarter. The participating experience for the student teacher is similar in respect to that required of vocational agriculture trainees except that the out-of-school and community activities of teachers of general agriculture are usually more limited in scope than those in the vocational program.

The supervision of the student teaching for this credential is under the direction of the college Agricultural Teacher Trainer.

Special Secondary Credential in Physical Education and the General Secondary Credential

After the teacher candidate's application for student teaching has been approved by the college Teacher Education Committee, he is assigned to a public school for a minimum of half a day daily for a full quarter. Because the 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 assumed that the student teacher will participate in as many activities as possible that are representative of the certified teacher's total professional obligation. Only if the student teacher's observation-teaching schedule permits, is he allowed to take a maximum of six additional units on campus.

Coordination of the assignment of student teachers is the responsibility of the Department of Education and Psychology. Supervising the student teacher and helping the supervising teacher are joint responsibilities of the Department of Education and Psychology and the subject matter departments, with the latter taking the major share of the responsibility. These departmental representatives have been chosen because of their experience as successful public school teachers.

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

PLACEMENT OF TEACHERS

As soon as student teaching is well under way, but not later than March 1st, the student should contact the college placement office and prepare a complete set of papers including the names of persons qualified to certify as to his teaching competence and his probable influence on students. The names of the supervising teachers, of departmental members and supervisors, and other college staff members, should be included. Complete cooperation of the student includes prompt answers to inquiries; immediate notification of change of address, of employment opportunity contacts for himself or other California State Polytechnic College students, and of acceptance of employment.
THE AGRICULTURAL DIVISION
THE AGRICULTURAL DIVISION

The Agricultural Division of the college prepares men in the field of agriculture with the main objective of giving them a full and broad understanding of basic factors involved in production, management, and marketing, together with the necessary skills to make efficient operators. 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 make 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 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, Animal Husbandry, Field Crops Production, Truck Crops Production, Fruit Production, Dairy Husbandry, Dairy Manufacturing, 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.

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Agriculture</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Related Agriculture</td>
<td>9</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Science and Mathematics</td>
<td>18</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Humanistics-Social</td>
<td>10½</td>
<td>8½</td>
<td>6</td>
</tr>
</tbody>
</table>

**TECHNICAL CURRICULA IN AGRICULTURE**

A student not wishing to enroll in a four-year degree curriculum may enroll in the two-year technical program. This program offers a student selection from a wider field of production courses in the first two years. The student is required to follow one of the regular degree sequences as far as major production courses are concerned, but he is allowed to choose electives in other fields.

For required general education and related courses, the following substitutions may be made:

- Eng 100 for Eng 104, 105, 106
- BSc 100 for Botany and Zoology
- Math 102 for Math 102, 103 (Except Ag. Eng.)
- Pol Sc 100 for Hist 304, 305, Pol Sc 301
- CP 100 for FP 234, CP 321, BSc 126
- VS 100 for VS 123, 202, 203
- Ec 101 for Ec 321 or 322

This arrangement allows a student to devote a major part of his program to production courses. Upon completion of 98 selected units a student may receive a technical certificate in the field of his major.

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

Short courses in certain specific fields of agriculture are offered as the needs of the state indicate.*

* A short 12-weeks special course in horseshoeing is being offered currently. Write to the Dean of Agriculture for details.
The function of this department is to train students in the selection, operation, construction, maintenance, and repair of structures and equipment used in modern agriculture. Students are given practical experience in dealing with the wide variety of engineering problems commonly associated with agriculture. Graduates find placement in such fields as farm equipment sales and service, rural electrification, soil and water conservation, irrigation, farm structures, teaching vocational agriculture, and farming, particularly on large or specialized farms having considerable mechanized equipment or engineering problems.

Students majoring in Agricultural Engineering may, by the proper selection of available courses in the junior and senior years, specialize in one of two occupational areas: power and machinery or mechanized agriculture.

Besides students majoring specifically in agricultural engineering, students from all other departments in the Agricultural Division receive training in the mechanical and engineering phases of their respective majors.

The entire college farm is used as a laboratory. Students are provided ample opportunity for practical application and "learn by doing" practice in coping with engineering problems which arise in connection with the various agricultural production units. A large modern farm machinery building with complete repair and service facilities, two agricultural mechanics shops, a surveying unit, and a farm power laboratory complete the facilities.

Students interested in the two-year technical certificate should refer to the introductory statement for the Agricultural Division which describes this program.

<table>
<thead>
<tr>
<th>CURRICULUM IN AGRICULTURAL ENGINEERING</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freshman</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Agricultural Engineering (AE 100)</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Agricultural Mechanics (AE 121, 122)</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Surveying (AE 131, 132)</td>
<td>2</td>
<td>2</td>
<td></td>
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<tr>
<td>Farm Tractors (AE 241)</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Drafting (ME 121, 122, 123)</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Machine Shop (MS 141, 142, 143)</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Welding (Weld 154, 155, 156)</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Animal Production</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant Production</td>
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<tr>
<td>Agricultural Mathematics (Math 102, 103)</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Language Communication (Eng 104, 106, 108)</td>
<td>3</td>
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<td>3</td>
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<tr>
<td>Physical Education (PE 141, 142, 143)</td>
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<td>1</td>
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<tr>
<td>Health and Hygiene (PE 107)</td>
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<tr>
<td><strong>Total</strong></td>
<td>16½</td>
<td>16½</td>
<td>16½</td>
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<table>
<thead>
<tr>
<th>Sophomore</th>
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</thead>
<tbody>
<tr>
<td>Farm Machinery (AE 221, 223)</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Farm Power (AE 227, 228)</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Farm Carpentry (AE 231, 232)</td>
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<td>2</td>
<td></td>
</tr>
<tr>
<td>Rural Electrification (AE 224, 225)</td>
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<td>2</td>
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<tr>
<td>Irrigation (AE 236)</td>
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<tr>
<td>Agricultural Mathematics (Math 114, 115)</td>
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<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Physics (PSc 131, 132)</td>
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</tr>
<tr>
<td>* Calculus (Math 201)</td>
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<tr>
<td>Soils (SS 121)</td>
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<tr>
<td>Applied Biology (BSc 110)</td>
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<tr>
<td>Sports Education (PE 241, 242, 243)</td>
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<tr>
<td>Welding (Weld 151, 254)</td>
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<tr>
<td>Public Speaking (Eng 201)</td>
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<td><strong>Total</strong></td>
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<td>16½</td>
<td>16½</td>
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* See note bottom page 78.
Junior
(Power and Machinery)

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
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<tbody>
<tr>
<td>Farm Power (AE 336)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>* Engineering Statics (PSc 301)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>* Strength of Materials (ME 202, 203)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Principles of Economics (Ec 201, 202)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>* Accounting (Ec 301, 302)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Physics (PSc 133)</td>
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<td></td>
<td>4</td>
</tr>
<tr>
<td>General Inorganic Chemistry (PSc 324, 325)</td>
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</tr>
<tr>
<td>Organic Chemistry (PSc 326)</td>
<td></td>
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<tr>
<td>Welding (Weld 152)</td>
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<tr>
<td>Electives</td>
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Senior
(Power and Machinery)

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Senior Project (AE 461, 462)</td>
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<tr>
<td>Undergraduate Seminar (AE 463)</td>
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<td></td>
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<tr>
<td>Farm Machinery Repair (AE 431)</td>
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<td>3</td>
<td></td>
</tr>
<tr>
<td>Equipment Engineering (AE 423)</td>
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<td></td>
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</tr>
<tr>
<td>* Parts and Inventory Control (AE 322)</td>
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<td></td>
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</tr>
<tr>
<td>* Engineering Dynamics (PSc 202)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>* Credit and Finance (Ec 310)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>* Psychology of Business and Industry (Psy 302)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Family Psychology (Psy 403)</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>U.S. in World Affairs (Hist 305)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Literature</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>American Government (Pol Sc 301)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Growth of American Democracy (Hist 304)</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>* Machine Shop (MS 241, 242, 243)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Electives</td>
<td></td>
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</tbody>
</table>

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16 17 16

**DESCRIPTIONS OF COURSES IN AGRICULTURAL ENGINEERING**

**AE 1 Preparatory Agricultural Mechanics**

Fundamental farm shop work for those students whose previous training is inadequate for AE 121. Identification, care, and fitting of common tools. Development of essential tool skills. Selection and use of hardware. Preparation and reading of working drawings. Painting and glazing. 1 lecture, 1 laboratory.

**AE 100 Introduction to Agricultural Engineering**

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

**AE 121 Agricultural Mechanics**

Basic mechanical skills important to agriculture. Concrete work, pipe fittings, rope work, woodworking, sheet metal, cold metal working and forging, together with the selection and proper use of tools, materials, and equipment involved. 1 lecture, 1 laboratory. Prerequisite: AE 1 or passing score on placement test.

**AE 122 Agricultural Mechanics**

Design, construction, and repair of production equipment for specific farming enterprises. Construction of livestock, dairy, crops, soils, poultry, and horticultural equipment. Students register for this course by sections according to their specific major. 1 lecture, 1 laboratory. Prerequisite: AE 121

**AE 126 Farm Construction and Maintenance**

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. Prerequisite: AE 122

*A student desiring to specialize in Mechanized Agriculture will omit the courses indicated and substitute the following: AE 339, 415, 437, SS 262, 433, Ec 321, 322, 3 units from Ec 305, 402, 488.*
Agricultural Division

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 (3)
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. 2 lectures, 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 223 Farm Machinery (2)
Selection, operation, and adjustment of haying, harvesting, manure handling, and feed mill equipment. For students majoring in dairy production, animal husbandry, and agricultural engineering. 1 lecture, 1 laboratory. Prerequisite: AE 221

AE 224 Rural Electrification (2)
Fundamentals of wiring farm buildings. Materials, code regulations, electrical rates available for various farm uses. Basic concepts of electric circuits and units. 1 lecture, 1 laboratory.

AE 225 Rural Electrification (2)
The application of electricity to efficient farm operation through various electrical devices. Selection, installation, and maintenance of equipment. Power requirements and costs. 1 lecture, 1 laboratory. Prerequisite: AE 224

AE 227 Farm Power (2)
Fundamental principles of the gasoline engine and its application to agriculture. Trouble shooting, servicing, tune-up, and major overhaul of gasoline engines and their accessories. 1 lecture, 1 laboratory.

AE 228 Farm Power (2)
Fundamental principles of the diesel engine and its application to agriculture. Trouble shooting, servicing, tune-up, and major overhaul of high speed diesel engines and their accessories. Fuels and lubrication. Additional practices on gasoline engines. 1 lecture, 1 laboratory. Prerequisite: AE 227

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 Carpentry (2)
Design and construction of farm buildings. Estimating farm building costs, construction specifications, and preparing materials lists. Typical farm buildings constructed by classes during laboratory periods. 1 lecture, 1 laboratory. Prerequisite: AE 122

AE 232 Farm Carpentry (2)
Farmstead planning and layout. Basic requirements of farm buildings. Legal requirements. Building contracts. Ventilation and insulation. Selection of equipment for farm buildings. Buildings constructed, modified, or repaired by classes during laboratory periods. 1 lecture, 1 laboratory. Prerequisite: AE 231
AE 236 Irrigation
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
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 322 Parts and Inventory Control
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 336 Farm Power

AE 339 Rural Electrification
Design of farmstead wiring systems. Electric motors and protective devices, types, selection, installation, and maintenance. Problems in electric energy consumption for light, heat, and power. 2 lectures, 1 laboratory. Prerequisites: PSc 132, AE 225.

*AE 412 Irrigation Engineering
Design of sprinkler irrigation systems and conveyance structures. Characteristics and power requirements of pumps. Determination of water requirements from climatological data. Irrigation law and institutions. 2 lectures, 1 laboratory. Prerequisite: AE 236.

†AE 415 Hydrology
Collection, organization, and use of precipitation, evaporation, and runoff data. Principles of flood routing, stream flow, and ground water conservation. The hydrograph. 3 lectures.

AE 423 Equipment Engineering
Design and construction of specialized farm equipment. 1 lecture, 2 laboratories. Prerequisites: ME 123, MS 143, Weld 156.

AE 431 Farm Machinery Repair
Management and operation of the farm machinery repair shop. Inspection, major overhaul, and adjustment of all types of farm machinery. 1 lecture, 2 laboratories. Prerequisites: AE 223, MS 143, Weld 156.

AE 437 Soil Erosion Control
The principles, practices, and application of engineering methods to soil and water conservation. 2 lectures, 1 laboratory. Prerequisites: AE 236, SS 202.

AE 461, 462 Senior Project
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
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.

* Offered only in even-numbered years.
† Offered only in odd-numbered years.
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 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 certificate should refer to the introductory statement for the Agricultural Division which describes this program.

**CURRICULUM IN ANIMAL HUSBANDRY**

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<td>* Specialized Sheep Enterprises (AH 322)</td>
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Total units: 17 16 17

### Senior

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Total units: 17 17 16

### Descriptions of Courses in Animal Husbandry

**AH 101 Feeds and Feeding**

Constituents of feeds, their utilization and digestion. Computation of standard rations for livestock. 2 lectures.

**AH 102 Feeds and Feeding**

Economy in feeding livestock, relative values of feeds. Feeding practices for each class of livestock, use of by-product feeds. 2 lectures. Prerequisite: AH 101

**AH 121 Market Beef Production**

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

**AH 122 Elements of Swine Production**

History and development of swine industry. Types and breeds of swine. Hog production under California and Midwest conditions. Common feeds used to supply nutritional requirements. Practice in handling, feeding, and selecting correct type of hogs. 3 lectures, 1 laboratory.

**AH 123 Elements of Sheep Production**

Outline of western sheep operations. Fitting breeds to varying sheep enterprises and locations, basic requirements of successful management, judging the pure breeds. Budgeting for commercial operations. Practical knowledge of wool. Jobs in the industry. 3 lectures, 1 laboratory.

**AH 210 Meats**

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

* May substitute elective animal husbandry courses and/or one dairy husbandry or one poultry husbandry course for equivalent units of major with approval of adviser.

† Economics elective to be selected from Ec 304, 310, 405, or 423.
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 the swine herd and care of pigs till weaning. Selection of feeder pigs. Feeding and managerial practices involved in developing the finished product. Market channels, market cycles, production cost analysis, hog slaughter, carcass grading, and pork processing. 3 lectures, 1 laboratory. Prerequisite: AH 102, 122

AH 230 General Animal Husbandry (4)
For non-animal husbandry majors. Selection, feeding, and management of sheep, swine, and cattle, and their uses on California farms. 3 lectures, 1 laboratory.

AH 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: BSc 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)
Care and management of the commercial and purebred breeding herd, pedigree study, herd records, and cost of production. Buildings and equipment necessary and their cost. Showing, selling, and buying purebred swine. Selection and judging of breeding stock. 3 lectures, 1 laboratory. Prerequisite: AH 223

AH 322 Specialized Sheep Enterprises (4)
The purebred sheep industry including feeding, management, selection, breeding, and marketing. Production of range rams. Management of irrigated and native pastures. 3 lectures, 1 laboratory. Prerequisite: AH 221.

AH 323 Beef Husbandry (4)
Purebred cattle business including selection of foundation stock, herd bulls; breeding programs; pedigrees; facilities and equipment; feeding breeding herd, sale cattle, show cattle; marketing purebred cattle; and general management problems. 3 lectures, 1 laboratory. Prerequisite: AH 102, 121, 222

AH 326 Livestock Judging (3)
Selection of beef cattle, sheep, swine, and horses according to breed, type, and use. 1 lecture, 2 laboratories. Prerequisites: 24 units of animal husbandry

AH 332 Elements of Horse Production (3)
Status of the horse industry. Breeds of horses and their use. Selection of horses. Breeding, feeding, and management of light horses. 2 lectures, 1 laboratory. Prerequisite: AH 102
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, PSc 328.

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.
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.

Graduates who specialize in dairy production find employment as farmers, farm foremen, farm managers, feed salesmen, fieldmen, herders, 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. This herd is maintained in a modern unit with the latest of equipment. A special dairy cattle project farm provides opportunity for students to start and operate their own foundation herds.

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.

**CURRICULUM IN DAIRY HUSBANDRY**

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### Junior

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<td>Animal Parasitology (VS 203)</td>
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† To be selected from Ec 304, 310, 403, or 423.

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## CURRICULUM IN DAIRY MANUFACTURING

### Freshman

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<td>Feeding Dairy Cattle (DH 102)</td>
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<td>Market Milk (DM 132)</td>
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<td>Ice Cream Making (DM 133)</td>
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<td>Anatomy and Physiology (VS 123)</td>
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<td>Feeds and Feeding (AH 101)</td>
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<td>Cheese Making (DM 232)</td>
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<td>Dairy Products Judging (DM 233)</td>
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<td>Milk Production (DH 221)</td>
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<td>Livestock Hygiene and Sanitation (VS 202)</td>
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<td>Dairy Refrigeration (AC 238, 239)</td>
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<td>Steam Boilers and Equipment (AC 237)</td>
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<td>Sports Education (PE 241, 242, 243)</td>
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<td>Dairy Inspection (DM 332)</td>
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<td>Creamery Records (DM 336)</td>
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<td>Modern Literature (Eng 211)</td>
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<td>Principles of Economics (Ec 201, 202)</td>
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### Senior

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<td>Prices and Government Control (Ec 408)</td>
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* Offered in even-numbered years.

† Offered in odd-numbered years.
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: BSc 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 making ice cream mixes. Proper equipment and methods needed to make, 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 non-dairy 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, BSc 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, BSc 222

DM 332 Dairy Inspection (2)
State dairy codes and score cards used for dairy plants and farms. Quality tests of dairy products. Practice in inspecting and scoring dairy farms and factories. 1 lecture, 1 laboratory. Prerequisites: DH 121, DM 132, BSc 222

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. 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. Prerequisites: Required DM major courses prior to senior year.

DM 461, 462 Senior Project (2) (2)
Selection and completion of a project under a minimum of supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

DM 463 Undergraduate Seminar (2)
Reports on student papers, bulletins, periodical articles, and dairy research experiments. Sources of dairy manufacturing information. Practice in oral reporting. Late developments and research work in the dairy industry. 2 lectures.
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 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 50 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. 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.

### CURRICULUM IN FIELD CROPS

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<td>Cereal Crops (CP 122)</td>
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### Agricultural Division

#### Junior

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<td>California Fruit Growing (FP 322)</td>
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*Economics elective to be selected from Ec 304, 310, 403, or 423.
### California State Polytechnic College

#### Junior

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### CURRICULUM IN TRUCK CROPS

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**Total:** 17½ 16½ 17½

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*Economics elective to be selected from Ec 304, 310, 403, or 423.
† FP 230 or CP 230.
### Junior

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### Descriptions of Courses in Crops Production

**CP 100 Principles of Crops, Pest and Disease Control**

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**

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**

Production, distribution, adaptation, and utilization of the major cereal crop varieties in California. 3 lectures, 1 laboratory.

**CP 123 Forage Crops**

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

**CP 221 Weeds and Poisonous Plants**

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**

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

**CP 230 General Field Crops**

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

* Economics elective to be selected from Ec 304, 310, 403, or 423.
CP 304 Plant Breeding  
Application of principles of plant improvement through selection, hybridization, and use of hybrid vigor. 2 lectures, 1 laboratory. Prerequisite: BSc 303.

CP 321 Crop Disease and Pest Control  
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  
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  
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. Prerequisite: CP 121, 122, 123.

CP 421 Oil and Fiber Crops  
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  
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  
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  
Group study of current problems of industry; current experimental and research findings as applied to production and marketing. 3 lectures.

FP 123 Beekeeping  
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  
History of fruit growing; outlook; apple, peach, pear, and prune production; cover crops. 3 lectures, 1 laboratory.

FP 132 Pomology  
Apricot, plum, cherry, olive, and fig production; establishing the orchard, pruning young and bearing trees, and grapevines. Thinning fruit. 3 lectures, 1 laboratory.

FP 133 Nut Crops and Small Fruits  
Production and marketing of nut crops and small fruits. 3 lectures, 1 laboratory.

FP 230 General Fruit Production  
For students other than crops department majors. Common orchard practices in producing deciduous fruits. Varieties, areas, propagation, pruning, pollination, disease and insect control for home and commercial plantings. 3 lectures, 1 laboratory.

FP 231 Viticulture  
Producing, processing, and marketing of raisin, table, and wine grapes. 3 lectures, 1 laboratory.

FP 232 Fruit Plant Propagation  
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
Studies and field identification of diseases and insect pests of deciduous trees. Field application of control materials. 3 lectures, 1 laboratory.

FP 236 Orchard Management
Management problems in orchard and packing house operations. 3 lectures, 1 laboratory.

FP 322 California Fruit Growing
Growing, harvesting, and processing the more important deciduous fruits, grapes, citrus fruits, and avocados. 3 lectures, 1 laboratory.

FP 332 Citrus and Subtropical Fruit Production
For non-citrus majors. Growing and marketing of oranges, lemons, grapefruit, avocados. For field crops, truck crops, and agricultural education majors. 3 lectures, 1 laboratory. Prerequisite: FP 131 or 132 or 230 or 231.

FP 421 Advanced Pomology
Marketing, processing, and handling fruit and fruit products. Field trips to processing centers. 2 lectures, 1 laboratory.

FP 581 Graduate Seminar in Fruit Production
Group study of current problems of industry; current experimental and research findings as applied to production and marketing. 3 lectures.

TC 124 Commercial Truck Crops Production
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
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
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
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
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
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
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
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
Group study of current problems of industry; current experimental and research findings as applied to production and marketing. 3 lectures.
The function of this department is to prepare students for the nursery industry and its many branches. The training stresses nursery management, propagation of both field and glasshouse material, nursery design and layout, greenhouse design and management, and grounds management and supervision. In addition, instruction is given in the design and layout of landscape plans for small homes, suburban property, and small parks.

The training prepares students for managerial jobs in nurseries and greenhouse companies, and for the owner-manager type of nursery. The graduate finds ready employment in nurseries in the capacity of supervisor, superintendent, chief propagator, or salesman. Many of the graduates enter the fields of park management, landscape engineering, and teaching.

The facilities of the department include two lath houses covering 3,000 square feet, cloth houses of 4,000 square feet, 7,000 square feet of glasshouse space, and numerous electrically heated hotbeds. A heated propagation house and laboratory with facilities covers another 3,000 square feet.

The campus composed of 180 acres of landscaped area acts as an outdoor laboratory for the classes.

Equipment includes the latest models of tractors, mowers, and other mechanical equipment necessary to the operation of a large wholesale and retail nursery.

Students interested in the two-year technical certificate should refer to the introductory statement for the Agricultural Division which describes this program.

### CURRICULUM IN ORNAMENTAL HORTICULTURE

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### Agricultural Division

#### Junior

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#### Senior

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<td>Undergraduate Seminar (OH 463)</td>
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<td>Family Psychology (Psy 403)</td>
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**Total Credits:** 16, 17, 17

#### Descriptions of Courses in Ornamental Horticulture

**OH 121 Nursery Practices**

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

**OH 122 Ornamental Shrubs**

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

**OH 123 Plant Propagation**

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

**OH 220 Farm Home Planning**

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**

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

**OH 222 Advanced Plant Propagation**

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, 123

**OH 223 Suburban Home Planning**

Principles of landscape design for residential properties. Designing of several small home properties. 3 lectures, 1 laboratory. Prerequisites: OH 122, 221

*Economics elective to be selected from Ec 310, 316, 403, or 416.
OH 230 General Nursery Practices (3)
For non-horticulture 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 232 Floriculture: Fundamentals and Practices (3)
Survey of the floriculture industry in the United States and California. Major crop production and the factors involved in producing, grading, and marketing of cut flower crops, under glass, lath, and cloth. 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 322 Landscape Design (4)
Principles of landscape design and the application of these principles in solving landscape design problems. 3 lectures, 1 laboratory. Prerequisites: OH 122, 221, 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 (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, BSc 223

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.
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.

### CURRICULUM IN POULTRY HUSBANDRY

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### Descriptions of Courses in Poultry Husbandry

**PH 121 Poultry Industry and Breeds**

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**

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**

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**

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**

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**

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 Ec 304, 310, 403, or 423.*
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 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: BSc 131

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 pedigreering chicks, and hatchery records. 1 laboratory.

PH 303 Poultry Hygiene and Diseases (3)
Flock health problems encountered by the poultryman. Methods of poultry parasite and disease control. 3 lectures. Prerequisite: PH 231

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, BSc 303

PH 322 Hatchery Management (4)
Organization and layout for the operation of a breeder or multiplier hatchery. Breeding program and inter-relationship of the hatchery and cooperating 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 coordination 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, 231, 321

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.
The function of this department is: first, to provide training in soil science for students in the Agricultural Division enrolled in other graduation majors; and, second, 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 research 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.

### CURRICULUM IN SOIL SCIENCE

#### Freshman

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
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<tbody>
<tr>
<td>Soils (SS 121)</td>
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</tr>
<tr>
<td>Soil Management (SS 122)</td>
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<td></td>
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<tr>
<td>General Animal Husbandry (AH 230)</td>
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<td>General Dairy Husbandry (DH 230)</td>
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<tr>
<td>Agricultural Mechanics (AE 121, 122)</td>
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<tr>
<td>Language Communication (Eng 104, 105, 106)</td>
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<tr>
<td>Agricultural Mathematics (Math 102, 103)</td>
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<td>Physical Education (PE 141, 142, 143)</td>
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<tr>
<td>Health &amp; Hygiene (PE 107)</td>
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<td>General Botany (BSc 121, 122)</td>
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Total: 17 1/2 16 1/2 15 1/2

#### Sophomore

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<tr>
<td>Fertilizers (SS 221)</td>
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<td>Soil Conservation (SS 202)</td>
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<tr>
<td>Range Management (SS 223)</td>
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<td>General Field Crops (CP 230)</td>
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<td>General Fruit Production (FP 230)</td>
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<tr>
<td>Surveying (AE 131, 132)</td>
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<td>Farm Tractors (AE 241)</td>
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<td>Engineering Drafting (ME 121)</td>
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<td>Mathematics (Math 114, 115)</td>
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<td>Sports Education (PE 241, 242, 243)</td>
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<td>General Inorganic Chemistry (PSc 324, 325)</td>
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<td>Organic Chemistry (PSc 326)</td>
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Total: 17 1/2 16 1/2 16 1/2
### Junior

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<tr>
<td>Soil Classification (SS 321)</td>
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<tr>
<td>Soil Fertility (SS 322)</td>
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<tr>
<td>Soil Technology (SS 323)</td>
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<tr>
<td>Irrigation (AE 236)</td>
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<td>Public Speaking (Eng 201)</td>
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<td>Literature</td>
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<td>Principles of Economics (Ec 201, 202)</td>
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<td>Farm Record Keeping (Ec 321)</td>
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<tr>
<td>American Government (Pol Sc 301)</td>
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<tr>
<td>Growth of American Democracy (Hist 304)</td>
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<td>General Bacteriology (BSc 221)</td>
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<td>Plant Pathology I (BSc 223)</td>
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<td>Agricultural Biochemistry (PSc 328)</td>
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### Senior

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<tr>
<td>Farm Management I (Ec 322)</td>
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<tr>
<td>Agricultural Resources (Ec 305)</td>
<td>3</td>
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<tr>
<td>U. S. In World Affairs (Hist 305)</td>
<td>3</td>
</tr>
<tr>
<td>Family Psychology (Psy 403)</td>
<td>3</td>
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<tr>
<td>Senior Project (SS 461, 462)</td>
<td>2 2</td>
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<tr>
<td>Undergraduate Seminar (SS 463)</td>
<td>2</td>
</tr>
<tr>
<td>* Soil Chemistry (SS 423)</td>
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</tr>
<tr>
<td>* Soil Physics (SS 432)</td>
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<tr>
<td>* Quantitative Analysis (PSc 331, 332)</td>
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<tr>
<td>* Genetics (BSc 303)</td>
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<tr>
<td>* Statistical Methods (Math 211)</td>
<td>3 2 4</td>
</tr>
<tr>
<td>Electives</td>
<td>3 2 4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16 17 15</strong></td>
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</tbody>
</table>

### Descriptions of Courses in Soil Science

**SS 121 Soils**

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

**SS 122 Soil Management**

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

**SS 123 California Soils**

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**

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**

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**

Forage production potentialities of range lands. Application of management principles and practices to range land resources. Development of plans for effective production and utilization of range forage. 3 lectures, 1 laboratory. Prerequisite: SS 121

* Students electing to specialize in Soil Conservation will substitute for the courses indicated the following: SS 422, 433, AE 415, 437; and in addition, 8 units from the following: CP 321, OH 520, TC 230, BSc 433.
SS 321 Soil Classification
Systems used in soil and land classification. Methods employed in soil surveying. Mapping of assigned areas and the preparation of survey reports. 2 lectures, 1 laboratory. Prerequisite: SS 121

SS 322 Soil Fertility
Plant nutrient requirements of crops. Effect of soil and climatic conditions on the availability of nutrients in the soil. Diagnostic techniques in soils and crops. 2 lectures, 1 laboratory. Prerequisites: SS 221, PSc 325

SS 323 Soil Technology
Physical and chemical properties of soils related to technical problems of use and management. Adaptation of practices to soil, climatic, and crop conditions. 3 lectures, 1 laboratory. Prerequisite: SS 322

SS 422 Soil Microbiology
Biochemical activities of soil organisms. Effect of soil organisms on the formation, characteristics, and productivity of soils. Methods of studying soil organisms. 1 lecture, 2 laboratories. Prerequisites: SS 323, BSc 221

SS 423 Soil Chemistry
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: SS 323, PSc 328

SS 432 Soil Physics
Advanced study of the physical properties of soils. Application of physical-chemical soil relationships to farming and engineering practices. 2 lectures, 1 laboratory. Prerequisites: SS 323, PSc 328

SS 433 Land Use Planning
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 202, AE 437

SS 461, 462 Senior Project
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
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
A review of current research, experiments and problems related to soil science. Development of special demonstration and field trial plot areas for educational groups. Prerequisites: Minimum of 12 quarter units of undergraduate study in soil science and consent of instructor.

SS 582 Graduate Seminar in Land Management
Development of plans and practices for the management of crop, range, and woodland. 2 lectures, 1 laboratory. Prerequisites: Same as SS 581
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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>VS 100</td>
<td>Principles of Livestock Hygiene and Sanitation</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>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</td>
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</tr>
<tr>
<td>VS 123</td>
<td>Anatomy and Physiology</td>
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<tr>
<td></td>
<td>Anatomy and the related physiological functions of farm animals. 2 lectures, 1 laboratory. Prerequisites: BSc 131, 132</td>
<td></td>
</tr>
<tr>
<td>VS 202</td>
<td>Livestock Hygiene and Sanitation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Animal health problems encountered on the farm. The livestock producer's part in disease control and animal health improvement programs. 3 lectures. Prerequisite: BSc 221</td>
<td></td>
</tr>
<tr>
<td>VS 203</td>
<td>Animal Parasitology</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>External and internal parasites causing economic loss in livestock. Life cycles and control of parasites. 2 lectures. Prerequisites: BSc 131, 132</td>
<td></td>
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</tbody>
</table>
THE ENGINEERING DIVISION
Architectural Engineering

Aeronautical Engineering

Electrical Engineering

Printing
Progressive developments in industry determine areas and philosophies of engineering education. No longer is engineering limited to applied science; it has become an investigative and creative science as well. There is no longer a single pattern in engineering education which will adequately meet all the needs of industry for technically trained personnel. Engineering curricula must be adjusted to the technological changes of our time and to those sociological changes in our society which have necessitated changes in the pattern of general education.

As an undergraduate engineering school, California State Polytechnic College emphasizes the applicatory aspects of engineering and prepares men for some of the more important phases of industrial employment concerned with planning, product development, production, operation, distribution, management, and service. Curricula are offered in Aeronautical Engineering, Air Conditioning and Refrigeration Engineering, Architectural Engineering, Electrical Engineering, Electronic and Radio Engineering, Mechanical Engineering, and Printing. In addition, the Machine Shop Department and the Welding Department offer supporting courses. There are four characteristic features of the engineering program which distinguish it from the programs offered by traditional engineering colleges:

First, a high percentage of work in the major department is imperative if students are to be prepared for the specific areas of engineering employment in a highly diversified industrial economy. For this reason, courses in the major field begin in the first year.

Second, all curricula start with a maximum of courses which develop skills and technique peculiar to the major field. These courses also provide a descriptive and qualitative background for engineering courses which begin in the second year and help to give meaning to the fundamental sciences and mathematics which must be taught early in the curriculum. This is called the "upside-down" principle. The student who must leave college at the end of the first or second year is equipped to find technical employment in his field of interest. Certification of qualifications for specific employment will be issued to these students.

Third, throughout the program a real effort is made to avoid separating the learning process from the doing process. An opportunity to engage in constructive project work which emphasizes a balanced development of both the mechanical and analytical aspects of engineering gives the student an appreciation of the fundamental fact that engineers are paid to put ideas, components, and processes together to form something of technical and economic value.

Fourth, fundamentals and basic principles are taught through real situations. Emphasis is placed on the problem-solution technique of teaching. Progress is from the specific and practical case to the general principle. Laboratory work is treated as an activity which closely parallels the work of the engineer.

The engineering curriculum is divided into four areas or groups of courses. Each area has a specific objective which is characterized by its name:

1. Courses in the technical group train in the use of established procedures and operations for the development of manipulative skills and understandings which are basic to engineering, such as surveying, welding, and drafting.
2. Courses in the engineering group train in the application of basic physical laws to useful situations.
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 intelligent participation in a complex world 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.

<table>
<thead>
<tr>
<th>Area</th>
<th>Freshman</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
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<td>Technical</td>
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<tr>
<td>Engineering</td>
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<td>29</td>
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<tr>
<td>Scientific</td>
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<tr>
<td>Humanistic-Social</td>
<td>6</td>
<td>11</td>
<td>3</td>
<td>18</td>
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</table>

*Those students intending to specialize in design and research engineering may wish to plan to attend one of the schools of engineering which emphasizes that type of program.*

[ 109 ]
AERONAUTICAL ENGINEERING DEPARTMENT

Richard E. Hall  A. George Matteson  Ralph B. Miller
M. C. Martinsen  Roy F. Metz  Alden L. Turner

The Aeronautical Engineering Department offers the student a choice of specializing either in aeronautical engineering or aircraft maintenance and operations engineering. The first year is identical for both programs, and the student will decide which he desires to pursue at the beginning of his second year.

The objective of the aeronautical engineering curriculum is to prepare students for positions in the engineering departments of aircraft or aircraft component manufacturers as well as for engineering positions with various government agencies.

Students specializing in aircraft maintenance and operations engineering are trained for positions with the operating airlines as well as the service departments of the aircraft manufacturing or aircraft maintenance companies. The department operates both an aircraft repair station and a mechanics school which are approved by the Civil Aeronautics Administration. The aircraft maintenance and operations curriculum will qualify the student for the CAA examinations as an aircraft mechanic after he has completed the first three years of this course.

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 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

<table>
<thead>
<tr>
<th>Course</th>
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<th>Sophomore</th>
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<tr>
<td>Aircraft Power Plant Fundamentals (Aero 121)</td>
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<tr>
<td>Airframe Construction Fundamentals (Aero 131)</td>
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<td>1</td>
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<tr>
<td>Engineering Drafting (ME 121, 122, 123)</td>
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<tr>
<td>Machine Shop (MS 148)</td>
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<tr>
<td>Oxyacetylene Welding (Weld 159)</td>
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<tr>
<td>Mathematics for Engineers (Math 117, 118)</td>
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<td>Calculus (Math 201)</td>
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<td>General Physics (PSc 131, 132)</td>
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<td>Health and Hygiene (PE 107)</td>
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<td>Applied Biology (BSc 110)</td>
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* indicates required course.
### Engineering Division

#### Junior

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<tr>
<th>Course</th>
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<tr>
<td>* Elementary Aerodynamics (Aero 301, 302)</td>
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<tr>
<td>* Stress Analysis (Aero 324, 325)</td>
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<td>Aircraft Detail Design (Aero 344, 345, 346)</td>
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<td>Aircraft Propulsion Systems (Aero 326)</td>
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<td>* Chemistry (PSc 321, 322, 323)</td>
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<td>Report Writing (Eng 301)</td>
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<td>Principles of Economics (Ec 201)</td>
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<td>American Government (Pol Sc 301)</td>
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<tr>
<td>Growth of American Democracy (Hist 304)</td>
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<td>The U. S. in World Affairs (Hist 305)</td>
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#### Senior

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<tr>
<td>Senior Project (Aero 461, 462)</td>
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<tr>
<td>Undergraduate Seminar (Aero 403)</td>
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</tr>
<tr>
<td>* Aerodynamics (Aero 404, 405, 406)</td>
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<tr>
<td>* Aircraft Design Layout (Aero 444, 445, 446)</td>
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<tr>
<td>* Aeronautical Laboratory (Aero 457, 458, 459)</td>
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<tr>
<td>* Aircraft Propulsion Systems (Aero 421)</td>
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<tr>
<td>Industrial Management (Ec 411)</td>
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<td>Industrial Relations (Ec 412)</td>
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<td>Family Psychology (Psy 403)</td>
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#### Descriptions of Courses in Aeronautical Engineering

**Aero 121 Aircraft Power Plant Fundamentals**

Fundamentals of engine operation, principles, and nomenclature of engine components and accessories. Disassembly, cleaning, inspection, use of table of limits, special tools, and equipment; lubrication system, repair, assembly, and test procedures of laboratory engines and accessories. 3 lectures, 5 laboratories.

**Aero 131 Airframe Construction Fundamentals**

Tools, techniques, and procedures used in airframe manufacturing, maintenance, and repair. Limited practice in sheet metal, woodwork, fabric covering, electricity, hydraulics, and cable splicing. Applicable CAA regulations. Introduction to theory of flight. 3 lectures, 5 laboratories.

**Aero 202 Practical Aerodynamics**

Properties of the atmosphere, airflow, airfoil characteristics, parasite drag, induced drag, lift, power, required. 3 lectures. Prerequisite: Math 117

**Aero 203 Practical Aerodynamics**

Aircraft propellers, power plant characteristics, power available, airplane performance, elements of stability and control. 3 lectures. Prerequisite: Aero 202

**Aero 205 Aircraft Strength of Materials**

Stress and strain in tension, compression, and shear. Joints, torsion, relationship of shear, moment, slope, and deflection. Bending and shear stresses in simple beams. Deflection due to bending. 3 lectures. Prerequisites: Math 201, PSc 201

**Aero 206 Aircraft Strength of Materials**

Restrained and continuous beams. Curved beams. Shear center and shear flow. Columns. Failure under combined and fluctuating stresses. Statical indeterminancy. 3 lectures. Prerequisite: Aero 205


† Offered only in odd-numbered years.
Aero 208 History of Aviation  
History of mechanical flight, historical flights, and personalities. Development of the science of aviation to its present state. 1 lecture. Prerequisite: Sophomore standing.

Aero 216 Thermodynamics of Fluid Flow  

Aero 221 Aircraft Engine Ignition and Electrical Systems  
Operating principles of ignition starting and electrical systems including major units of each system. Maintenance, repair, and testing procedures as outlined and recommended by the manufacturer. Common failures, their cause, and method of correction. 2 lectures, 2 laboratories. Prerequisite: Aero 121

Aero 222 Aircraft Engine Carburetion, Induction, and Fuel Systems  
Theory and operating principles of fuel systems, induction systems, superchargers, float and pressure type carburetors, low and high pressure injection. Applicable CAA regulations. Maintenance and repair as outlined and recommended by the manufacturer. Troubles and correction. Procedures. 2 lectures, 2 laboratories. Prerequisite: Aero 121

Aero 223 Aircraft Engine Propellers  
Propeller theory. Operation, maintenance and repair of fixed pitch, adjustable, constant speed, hydromatic, and electric propellers. Repair procedures as outlined by CAA and manufacturer. Propeller governor and controls. 2 lectures, 2 laboratories. Prerequisite: Aero 121

Aero 229 Aircraft Strength of Materials Laboratory  
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. Prerequisite: Aero 206, or taken concurrently.

Aero 231 Aircraft Materials and Processes  
Materials used in the construction of modern airframes and the processes employed in the handling, layout, fabrication, and finishing of aircraft parts and components. Sheet metal forming, bending, and riveting. Applicable CAA regulations. 2 lectures, 2 laboratories. Prerequisite: Aero 131

Aero 232 Aircraft Control Systems  
Principles of inspection, operation, adjustment, and repair of aircraft controls units, including hydraulically and electrically operated components and appliances, landing gear shock struts, wheels, brakes, and tires. Applicable CAA regulations. 2 lectures, 2 laboratories. Prerequisite: Aero 131

Aero 233 Aircraft Inspection and Servicing  
Daily, preflight, and periodic inspection of power plant, undercarriage, wings, empennage, fuselage, cabin and cockpit, and electrical system. Weight and balance control. Applicable CAA regulations. 2 lectures, 2 laboratories. Prerequisites: Aero 231, 232

Aero 240 Additional Engineering Laboratory  
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  
Mockup, lofting, templates, and tooling. Drafting covers the making of complete aircraft details having all necessary dimensions, notes, proper call outs, bill of material, and finished title block. 1 laboratory. Prerequisite: ME 123

Aero 301 Elementary Aerodynamics  
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. 3 lectures. Prerequisite: Aero 216
Aero 302 Elementary Aerodynamics (3)
Propeller theory, propeller selection methods, aircraft propulsion methods, basic performance problems. Special performance problems. 3 lectures. Prerequisite: Aero 301

Aero 306 Civil Air Regulations (2)
Regulations prescribed by the Civil Aeronautics Administration governing the operations, maintenance, repair, overhaul, and alteration of certificated aircraft, engines, propellers, and instruments. 2 lectures. Prerequisite: Aero 332

Aero 321 Aircraft Engine Lubrication Systems (4)
Theory of lubricating oils and lubrication systems. Engine clearances and results of improper clearance. Maintenance and repair of the associated units. CAA regulations applicable to the installation and repairs. Troubles and the procedure for correction. 2 lectures, 2 laboratories. Prerequisites: Aero 221, 222

Aero 322 Aircraft Engine Maintenance and Overhaul (5)
Inspection, repair, overhaul, and assembly of engines. Emphasis on unit repair and replacement. Use of manufacturers' table of limits and CAA Manual of Procedures. Use of special equipment and technique as required. 3 lectures, 2 laboratories. Prerequisites: Aero 321, 327

Aero 323 Aircraft Engine Installation, Trouble Analysis, and Removal (5)
Construction of engine mounts, exhaust, and cooling systems. Test procedures as outlined by the manufacturers. Malfunction of units and procedure for correction. Applicable CAA regulations. Removal and preparation for storage. 3 lectures, 2 laboratories. Prerequisite: Aero 322

Aero 324 Stress Analysis (4)
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. 3 lectures, 1 laboratory. Prerequisite: Aero 206

Aero 325 Stress Analysis (4)
Design of simple columns, beam columns, columns and instability, stiffened flat and curved plates, monocoque design. 3 lectures, 1 laboratory. Prerequisite: Aero 324

Aero 326 Aircraft Propulsion Systems (3)
Principles of thrust, duct forces. Thrust, power, and propulsive efficiency. Ram, compression, combustion and jet expansion processes, turbojet and turboprop performance, inlet diffusers, air compressors. 3 lectures. Prerequisite: Aero 216

Aero 327 Aircraft Engine Disassembly and Assembly (2)
Disassembly of engine into major sub-assemblies, inspection methods, repair, and re-assembly as outlined by the manufacturer. Use of manuals. Use of special tools as required. Re-assembly, timing of valves. 1 lecture, 1 laboratory. Prerequisites: Aero 221, 222

Aero 331 Aircraft Routine Maintenance and Minor Repair (5)
Techniques of routine maintenance and minor repairs. Aircraft disassembly, inspection, minor repairs re-assembly, and rigging. Cost estimating of aircraft maintenance, overhaul, and repair. Pertinent CAA regulations and safety procedures. 3 lectures, 2 laboratories. Prerequisite: Aero 233

Aero 332 Aircraft Major Repairs and Alterations (6)
Repairs and design changes of structural components and elements of components. Design and construction of fabrication fixtures and jigs to facilitate repairs on composite and all-metal aircraft. 3 lectures, 3 laboratories. Prerequisite: Aero 331

Aero 333 Aircraft Overhaul, Maintenance and Repair (3)
Review of aircraft servicing, maintenance, repair, and overhaul practices and procedures preparatory to CAA examinations. 1 lecture, 2 laboratories. Prerequisite: Aero 332
Aero 344, 345, 346  Aircraft Detail Design  
Details and assemblies are drawn from information taken directly from engineering layouts and from sketches furnished by the designer. Parts are designed to take specific loading conditions and designs are accompanied by calculations. Aircraft drafting systems are carefully followed. 2 laboratories. Prerequisite: Aero 246

Aero 400  Special Problems for Advanced Undergraduates  
Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories. Prerequisite: Senior standing and permission of instructor

Aero 404  Aerodynamics  
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 302

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

Aero 406  Aerodynamics  
Seaplanes, lighter-than-air craft, satellites. Review and consolidation of work covered in aerodynamics. Survey of current developments. 3 lectures. Prerequisite: Aero 405

Aero 424  Aircraft Propulsion Systems  
Combustion chambers and fuels, jet nozzles, impulse and reaction turbine performance, turbine cooling, ramjet and rocket motors. 3 lectures. Prerequisite: Aero 326

Aero 441, 442, 443  Aircraft Maintenance Design  
Layout of actual airplane sections including kinematics and mechanism of landing gear retraction, design of maintenance tools and test equipment, drawings of alteration and repair of the airplane with stress calculations of the project involved. 2 laboratories. Prerequisite: Aero 246

Aero 444, 445, 446  Aircraft Design Layout  
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  
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  
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  
Recent technical and economic developments in the field of aeronautics. Discussion of job descriptions, requirements, and opportunities in the aviation field. 2 lectures. Prerequisite: Senior standing.
Theodore G. Graves  
Donald R. Lawrence  
James M. McGrath  
I. G. Van Nest

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**

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<thead>
<tr>
<th>Year</th>
<th>Course</th>
<th>Credits</th>
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<tr>
<td>Freshman</td>
<td>Air Conditioning Drafting (AC 121, 122, 123)</td>
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<tr>
<td>Freshman</td>
<td>Sheet Metal (AC 125, 126)</td>
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<td>Freshman</td>
<td>Piping Assembly (AC 124)</td>
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<td>Welding Survey (Weld 157)</td>
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<td>Physical Education (PE 141, 142, 143)</td>
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<td>Heating and Ventilation (AC 201, 202)</td>
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<tr>
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<td>General Codes and Wiring Practices (EE 226)</td>
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<td>Heating and Ventilation (AC 203)</td>
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<td>Sophomore</td>
<td>Electricity (EE 207, 208)</td>
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<td>Calculus (Math 202, 203)</td>
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<td>General Physics (PSc 133)</td>
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<td>Chemistry (PSc 321, 322, 323)</td>
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<td>Thermodynamics (PSc 306)</td>
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<td>Sound (PSc 212)</td>
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<td>Sports Education (PE 241, 242, 243)</td>
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Total Credits: 18.5
Junior

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<td>Plumbing and Building Sanitation (ME 331)</td>
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<td>Refrigeration Engineering Practice (AC 342, 343)</td>
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<td>Strength of Materials (ME 202)</td>
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<td>Fluid Flow (ME 311, 312)</td>
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<td>Heat Transfer (ME 313)</td>
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<td>Thermodynamics of Refrigeration (AC 301)</td>
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<td>Refrigeration Engineering (AC 302, 303)</td>
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<td>Heating and Ventilating Engineering Practice (AC 341)</td>
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<td>Refrigeration Lab (AC 332, 333)</td>
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<td>Engineering Statics (PSC 201)</td>
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<td>Engineering Dynamics (PSC 202)</td>
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<td>Public Speaking (Eng 201)</td>
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| Total                                                   | 17| 16| 18|

Senior

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<tr>
<td>Thermodynamics of Air Conditioning (AC 401)</td>
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<td>Air Conditioning Engineering (AC 402, 403)</td>
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<td>Air Conditioning Engineering Practice (AC 441, 442, 443)</td>
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<td>Senior Project (AC 461, 462)</td>
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<td>Undergraduate Seminar (AC 463)</td>
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<td>Air Conditioning Tests and Measurements (AC 481, 482)</td>
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<td>Growth of American Democracy (Hist 304)</td>
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<td>Literature</td>
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| Total                                                   | 17| 17| 17|

DESCRIPTIONS OF COURSES IN AIR CONDITIONING

AC 118 Orientation
Survey of personnel needs in the refrigeration and air conditioning field, the college's refrigeration and air conditioning curriculum, qualifications required for various positions in the field.

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 Air Conditioning Sheet Metal (2) (2)
Materials and techniques of duct construction. 1 lecture, 1 laboratory. Prerequisite: AC 121. Concurrent: AC 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 students. 1 lecture, 1 laboratory.

AC 201, 202, 203 Heating and Ventilating (3) (3) (3)
Heating equipment and its application in homes, and in industrial and public buildings. 3 lectures. Prerequisite: PSC 133. Concurrent: PSC 321, 322, 323.
AC 204 Heating and Ventilating
Survey of heating equipment and its application in homes and in industrial and public buildings. This course primarily intended for architectural and mechanical engineering students. On completion of this course a student may elect to take AC 242. 4 lectures. Prerequisite: PSc 133.

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

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

AC 240 Additional Engineering Laboratory
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 242, 243 Heating and Ventilating Engineering Practice
Individual project work in the planning of heating and ventilating systems. 2 laboratories. Concurrent: AC 202, 203

AC 244 Heating System Maintenance
Operation, maintenance, and management of steam heating systems. 2 lectures, 2 laboratories. Prerequisite: PSc 133. Concurrent: PSc 321, EE 208

AC 245 Refrigerating System Maintenance
Operation, maintenance, and management of refrigerating systems. 2 lectures, 2 laboratories. Prerequisite: PSc 133. Concurrent: PSc 322, EE 209

AC 246 Air Conditioning System Maintenance
Operation, maintenance, and management of air conditioning systems. 2 lectures, 2 laboratories. Prerequisites: AC 245, 246. Concurrent: PSc 323, EE 226

AC 301 Thermodynamics of Refrigeration
The thermodynamic principles of single and multiple stage refrigerating systems. 3 lectures. Prerequisites: Math 203, PSc 133, 306

AC 302, 308 Refrigerating Engineering
The principles involved in the design of refrigerating equipment. Application to single and multiple stage systems. 3 lectures. Prerequisite: AC 301

AC 331 Heating and Ventilating Laboratory
The principles and practices of testing and operating steam equipment. 1 lecture, 1 laboratory. Prerequisite: PSc 323

AC 332, 333 Refrigeration Laboratory
Laboratory tests on refrigerating equipment. 1 lecture, 1 laboratory. Concurrent: AC 302, 303

AC 341 Heating and Ventilating Engineering Practice
Individual project work in the planning of steam heating systems. 2 laboratories. Prerequisite: AC 203

AC 342, 343 Refrigerating Engineering Practice
Individual project work in the planning of refrigerating systems. 2 laboratories. Concurrent: AC 302, 303

AC 400 Special Problems for Advanced Undergraduates
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 Air Conditioning Thermodynamics
The principles of psychometry and heat transfer involved in air conditioning. 3 lectures. Prerequisites: AC 203, 303
AC 402, 403  Air Conditioning Engineering  (3) (3)
Analysis of the selection of equipment and design of systems used in industrial and public buildings. 3 lectures. Prerequisite: AC 401

AC 431, 432  Air Conditioning Tests and Measurements  (2) (2)
Measurement of fluid flow, heat quantities, water, oil, and air properties involved in air conditioning. 1 lecture, 1 laboratory. Prerequisites: AC 203, 303

AC 441, 442, 443  Air Conditioning Engineering Practice  (2) (2) (2)
Planning of an air conditioning system involving the year round control of temperature, humidity, and air purity in a public building. 2 laboratories. Concurrent: AC 401, 402, 403

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.
The practice of architecture and the many fields of the building industry provide a wide occupational choice for highly skilled men. The curriculum in architectural engineering is designed to provide students with the necessary skills and techniques which will make them immediately employable in these fields. Graduates find employment with architects, engineers, and contractors as draftsmen, architectural or structural designers, detailers, and estimators. Emphasis in the early part of the curriculum is on drafting, building materials, and construction. Instruction progresses through more advanced work in structural and architectural design, estimating, etc. In the senior year the student directs his interests to one of the architectural engineering fields of his choice.

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 years of the seven years' experience required for eligibility to take the examination for an architect's license.

The American Institute of Architects sponsors a student chapter of that organization in the department, and visiting architects and engineers provide lectures during the year.

**CURRICULUM IN ARCHITECTURAL ENGINEERING**

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<tr>
<th>Course</th>
<th>Freshman</th>
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<tbody>
<tr>
<td>Architectural Drafting (Arch 141, 142, 143)</td>
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<tr>
<td>Materials of Construction (Arch 101)</td>
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<td>Descriptive Geometry (ME 125, 126)</td>
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<td>Building Codes (Arch 106)</td>
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<td>Mathematics for Engineers (Math 117, 118)</td>
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<td>General Physics (PSc 131, 132)</td>
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<td>Language Communication (Eng 104, 105, 106)</td>
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<td>Physical Education (PE 141, 142, 143)</td>
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<td>Health and Hygiene (PE 107)</td>
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<td>Heating and Ventilating (AC 204)</td>
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<td>Plumbing and Building Sanitation (ME 331)</td>
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<td>Wiring and Codes for Architects (EE 223)</td>
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<td>Stress Analysis (Arch 324)</td>
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<td>Steel and Timber Design (Arch 325)</td>
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<td>Reinforced Concrete Design (Arch 326)</td>
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<td>History of Architecture (Arch 304)</td>
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<td>Growth of American Democracy (Hist 304)</td>
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<td>The United States in World Affairs (Hist 305)</td>
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<td>Principles of Economics (Ec 201)</td>
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<td>Public Speaking (Eng 201)</td>
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<td>Architectural Design and Office Practice (Arch 441, 442, 443)</td>
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<td>Structural Design (Arch 401, 402, 403)</td>
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<td>Specifications and Contracts (Arch 404)</td>
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<td>Senior Project (Arch 461, 462)</td>
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<td>Undergraduate Seminar (Arch 463)</td>
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<td>Commercial Law (Ec 316)</td>
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**DESCRIPTIONS OF COURSES IN ARCHITECTURAL ENGINEERING**

**Arch 101 Materials of Construction**  
(3)  
The use and application of building materials, structural make-up 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 202 Quantity Survey and Estimating**  
(3)  
Methods and applications in estimating costs and quantities of materials, labor, and equipment. 3 lectures.

**Arch 222, 223 Theory of Architectural Design**  
(3) (3)  
Studies in form, space, color, and materials, and their relation to architectural problems. 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, 243 Advanced Architectural Drafting**  
(3) (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 126
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 History of Architecture (3)
Periods of architecture, philosophies, and conditions that influenced them. 3 lectures.

Arch 324 Stress Analysis (3)
Stress analysis of statically determinate and indeterminate structures. 2 lectures, 1 laboratory. Prerequisite: ME 203

Arch 325 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. 2 lectures, 1 laboratory. Prerequisite: Arch 324

Arch 326 Reinforced Concrete Design (3)
Elements and design of reinforced concrete buildings for vertical and lateral loading. 2 lectures, 1 laboratory. Prerequisite: Arch 325

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. 5 laboratories. Prerequisites: Arch 223, 243, 246

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 325

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 (2)
The elements, structure, and writing of specifications. Legal aspects of architectural engineering. 2 lectures.

*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 326

†Arch 412 Advanced Structural Design (2)
Advanced study of welded structures. Prestressed concrete. Pools and tanks. Shell concrete structures. 2 lectures. Prerequisite: Arch 411

Arch 441, 442, 443 Architectural Design and Office Practice (5) (5) (5)
Advanced problems in planning relating the student's engineering skills with the social and economic aspects of architectural design. The class is organized to permit the student to work under office conditions. 5 laboratories. Prerequisites: Arch 326, 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.

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.

* Offered even-numbered years.
† Offered odd-numbered years.
The primary function of the department is to train electrical engineers. The department offers courses in electrical engineering for the other major 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

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<th>Course</th>
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<td>Electric Shop (EE 141, 142, 143)</td>
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<td>Orientation (EE 151, 152, 153)</td>
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<td>Electrical Drafting (EE 146)</td>
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#### Sophomore

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<td>Electric Systems (EE 202)</td>
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<td>Electric Codes (EE 203)</td>
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<td>Electric Shop (EE 241, 242, 243)</td>
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<td>Surveying (ME 231)</td>
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<td>Fundamentals of Electrical Engineering (EE 212, 213)</td>
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<td>Electron Tubes (EL 208, 209)</td>
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<td>Fundamentals of Measurements (EE 245)</td>
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<td>Calculus (Math 202, 203)</td>
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<td>Engineering Dynamics (PSc 202)</td>
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### Credits

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Electrical Engineering (EE 301)
Circuits Laboratory (EE 341)
Electric Machine Theory (EE 302, 303)
Electric Machine Laboratory (EE 342, 343)
Electric Circuit Engineering (EE 309)
Electric Laboratory (EE 353)
Electronic Circuits (EE 313)
Engineering Materials (ME 314)
Thermodynamics (ME 402)
Steam and Gas Power Laboratory (ME 352)
General Chemistry (PSc 321, 322, 323)
Thermodynamics (PSc 306)
Differential Equations (Math 317)
Mathematics (Math 213, 312)
Principles of Economics (Ec 201)
Electives

Senior Project (EE 461, 462)
Undergraduate Seminar (EE 463)
Servomechanisms (EE 402)
Electric Power Transmission (EE 405)
Electric Laboratory (EE 442)
Electrical Machine Design (EE 423)
Fluid Flow (ME 311)
Public Speaking (Eng 201)
American Government (Pol Sc 301)
Family Psychology (Psy 403)
Industrial Relations (Ec 412)
Growth of American Democracy (Hist 304)
U. S. in World Affairs (Hist 305)
Literature
Business Statements (Ec 416)
Electives

DESCRIPTIONS OF COURSES IN ELECTRICAL ENGINEERING

**EE 101, 102, 103 Electric Technology**
Elements of electricity. Simple electric and magnetic circuits and circuit components. Elements of direct and alternating current measurements. 2 lectures.

**EE 141, 142, 143 Electric Shop**
Practice in the basic skills as applied to electrical work. Care and use of tools used. Exercises in cable splicing, soldering, wire pulling, conduit layout and installation. Constructional details of electrical units such as relays, transformers, and motors. 2 laboratories.

**EE 146 Electrical Drafting**
Detail and assembly drawings of electric machine components. Electric circuit drawings, including the use of standard electrical symbols. 2 laboratories. Prerequisite: ME 122

**EE 151, 152, 153 Orientation**

**EE 201 Electric Machines**
Construction and use of direct current motors and generators. Motor starting. Generator regulating. Application and maintenance. 2 lectures. Prerequisite: EE 103
EE 202 Electric Systems
Electrical wiring principles and practices. Types of installations including local
distribution, city wide networks, etc. Unit systems such as automobile, boat, and
aircraft electrical systems. 2 lectures. Prerequisite: EE 201

EE 203 Electric Codes
Government codes referring to the legal and safety aspects of electrical apparatus
and wiring installations. 2 lectures.

EE 207, 208 Principles and Practices of Electrical Engineering
Electrical principles. Electric and magnetic circuits. Direct and alternating current
machines. Elements of electron tubes and electronic circuits. For non-electrical engi-
nearing majors. 3 lectures. Prerequisite: Math 201

EE 212, 213 Fundamentals of Electrical Engineering
Fundamental concepts. Unit systems. Electric circuits and parameters. Magnetic
fields and circuits. Electric fields. Transients. Energy storage in fields. Curvilinear-
square flux mapping. 3 lectures. Prerequisites: PSc 133, Math 201

EE 223 Wiring and Codes for Architects
Elements of electricity. Electric circuits. Direct current voltage, current, and power.
Code requirements. Devices used. Layout of electrical installations. Writing specifi-
cations. 3 lectures. 1 laboratory. Prerequisite: Math 118

EE 226 General Codes and Wiring Practices
Wiring systems for electrical distribution in buildings with particular emphasis on
Legal and safety aspects. 3 lectures. 1 laboratory. Prerequisite: EE 208

EE 240 Additional Engineering Laboratory
Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or
2 laboratories.

EE 241 Electric Shop
Detailed examination of electric motors and generators. Types of bearings, methods
of lubrication, methods of cooling, constructional details, etc. Machines are operated
under normal and abnormal conditions. Servicing and maintenance procedures. 1
laboratory.

EE 242, 243 Electric Shop
Shop practice in coil winding, field coil winding, transformer coil winding. Insulation
breakdown, transformer oil and armature testing. Motor starters, controllers, etc.
Care, maintenance, and adjustment of auxiliary equipment. 1 laboratory.

EE 245 Fundamentals of Measurements
Calibration and use of electrical measuring instruments. Principal meter move-
ments used in industry. Recording instruments. 1 laboratory. Prerequisite: PSc 133

EE 246, 249 Engineering Laboratory
Selected laboratory exercises in electrical engineering. 1 laboratory.

EE 253 General Electrical Laboratory
Use of electric meters. Experiments and exercises involving direct and alternating
current circuits and machines. 1 laboratory. Concurrent: EE 208

EE 301 Electric Circuits
Analysis of the steady state electric circuit. Circuit parameters. Complex impedance,
network analysis. Loop and node methods. Application of such theorems as Thevenin's,
Norton's, Millman's, etc. 3 lectures. Prerequisite: EE 213

EE 302 Electric Machine Theory
Extension of circuit theory to machines. Theory and operation of transformers.
Induction machines. Single phase machines. 3 lectures. Prerequisite: EE 301
EE 303 Electric Machine Theory (3)
   Direct current machines. Salient and nonsalient pole synchronous machines. Operating problems of motors. Parallel operation of generators. Transients in alternating current machines. 3 lectures. Prerequisite: EE 302

EE 305 Quality Control (2)
   Theory and practice of sampling. Methods of tabulation. Interpretation and application of results to quality control of production. Methods of gauging. 2 lectures. Prerequisite: Math 211

EE 309 Electric Circuit Engineering (3)
   Coupled circuits, polyphase circuits, nonsinusoidal waves, symmetrical components, transients, etc. 3 lectures. Prerequisites: EE 301, Math 312

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: EE 213

EE 321 Electricity for Printers (2)
   Fundamentals of operation, testing, and maintenance of electrical equipment used in small printing plants. Electrical machines for slug and materials casting. 1 lecture. 1 laboratory.

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: PSYC 133

EE 341 Circuits Laboratory (1)
   Determination of network characteristics by laboratory methods. Presentation of the characteristics by graphical means with attention to their limitations. 1 laboratory.

EE 342 Machinery Laboratory (1)
   Study of transformers and induction machines. 1 laboratory. Concurrent: EE 302

EE 343 Machinery Laboratory (1)
   Direct current and synchronous machines. Machine systems study. 1 laboratory. Concurrent: EE 303

EE 353 Electrical Laboratory (1)
   Advanced circuits and machine laboratory arranged for individual study. 1 laboratory. Concurrent: EE 309

EE 400 Special Problems for Advanced Undergraduates (1-4)
   Arrangements to be made with department head. Limited to 4 units, with not more than 2 units laboratory.

EE 402 Servomechanisms (3)
   Principles of closed loop control systems. Analysis of transfer functions, corrective networks. Stability criteria. 3 lectures. Prerequisites: EE 303, Math 213, 312

EE 405 Electric Power Transmission (3)
   Transmission and distribution circuit characteristics. Equivalent circuits. Network reduction. Short circuit calculations. 3 lectures. Prerequisite: EE 309

EE 407 Generating Stations (3)
   Power plant load curves. Economic conductor sections. Power distribution systems. 3 lectures. Prerequisite: EE 303
EE 423  Electrical Machine Design  (4)
Theory and practice of empirical design methods applied to electric machines. Drawing details and layout. Theory and practice of flux plotting methods. 2 lectures. 2 laboratories. Prerequisite: EE 303

EE 428  Generating Stations  (3)

EE 442  Electrical Laboratory  (1)
Advanced circuits and machine 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.
The function of the Electronic and Radio Engineering Department is to prepare students for that branch of engineering which is concerned with the transmission and reception 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 agencies, sales organizations, and schools. The work of these graduates is concerned chiefly with applications engineering, product development, test and evaluation, technical operations, and engineering sales. The multiplicity of electronic devices in small industry, business establishments, and the home also makes self-employment in technical services a growing outlet. The wide use of communication facilities by federal and state government agencies has opened many positions in this field. These civil service positions generally require a comprehensive education in communications.

It is recommended that the high school student planning a career in electronic engineering take a balanced program including mathematics, physical sciences, drawing, and shops. The junior college student planning to transfer into this department would do well to meet, insofar as possible, the special requirements of this curriculum.

The department occupies five laboratories and 10 auxiliary rooms, with additional mobile field equipment for antenna studies. A large number of commercial electronic and communication 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 instrumentation make possible a high degree of simulation of actual industrial setups in the department's laboratories and shops.

There is a student chapter of the Institute of Radio Engineers available to juniors and seniors in this department.

### CURRICULUM IN ELECTRONIC AND RADIO ENGINEERING

**Freshman**

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<td>Radio Shop (EL 141, 142, 143)</td>
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<td>Machine Shop (MS 151, 152)</td>
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<td>Sheet Metal Shop (AC 129)</td>
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<td>Engineering Drafting (ME 121, 122)</td>
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<td>Drafting for Electronics (EL 146)</td>
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**Sophomore**

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<td>Television Technology (EL 202)</td>
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<td>Industrial Electronics (EL 203)</td>
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<td>Industrial Electronics Shop (EL 243)</td>
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<td>Fundamentals of Electrical Engineering (EE 212, 213)</td>
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<td>Electron Tubes (EL 208, 209)</td>
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<td>Electrical Engineering Laboratory (EL 246)</td>
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<td>Language Communication (Eng 104, 105, 106)</td>
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| Total Sophomore                                       | 17½| 19½| 17¼ |

### Junior

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<td>Electronic Engineering (EL 305, 306)</td>
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<td>Electronic Circuits Laboratory (EL 345, 346)</td>
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<td>Electric Machines (EE 313)</td>
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<td>Engineering Materials (ME 314)</td>
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<td>Differential Equations (Math 317)</td>
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<td>Chemistry (PSc 321, 322, 323)</td>
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| Total Junior                                           | 17 | 18 | 18 |

### Senior

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<td>Networks and Lines (EL 401)</td>
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<td>Ultra High Frequency Techniques (EL 402)</td>
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<td>American Government (Pol Sc 301)</td>
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<td>Growth of American Democracy (Hist 304)</td>
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<td>The U. S. in World Affairs (Hist 305)</td>
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</table>

| Total Senior                                           | 16 | 16 | 16 |

### DESCRIPTIONS OF COURSES IN ELECTRONIC AND RADIO ENGINEERING

**EL 101, 102, 103 Radio Technology**  
(3) (3) (3)  
Fundamentals of electricity and radio adapted to the needs of the radio service man and commercial radio operator. Descriptive background for later engineering courses. 3 lectures.

**EL 141, 142, 143 Radio Shop**  
(2) (2) (2)  
Directed jobs facilitating an understanding of the operation of radio testing equipment and use of this equipment in adjustments on radio receiving and transmitting sets. 2 laboratories.

**EL 146 Drafting for Electronics**  
(2)  

**EL 151, 152, 153 International Morse Code**  
(2) (2) (2)  
Transmission and reception of International Morse Code signals. Copying on the typewriter. Semiautomatic key transmission. Network traffic handling. 2 laboratories.

**EL 201 Mobile Radio**  
(3)  
Circuit theory of double conversion communication receivers. Measurement of deviation, frequency, and power. FCC rules and regulations. Direction finders, omnidirectional range, TL radio range, markers, ILS, GCA, Loran. 3 lectures.
EL 202 Television Technology (3)
FCC-RMA standard television signal. Operating principles of television systems, camera tubes, video amplifiers, sync generators, and transmitters. Detailed study of television receivers. 3 lectures.

EL 203 Industrial Electronics (3)
Operational study of electronic control circuits used in resistance welding, photoelectric devices, motor speed regulators. Induction and dielectric heating. 3 lectures.

EL 208, 209 Electron Tubes (2) (2)
Physical and electrical characteristics and mathematical analysis of the more common types of electron tubes. 2 lectures. Prerequisites: Math 201, PSc 133

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 Mobile Radio Shop (1)
Technique of double conversion, crystal-controlled receiver alignment. Practice in measurement of frequency, deviation, and power. Numerous field trips illustrate applications. 1 laboratory.

EL 242 Television Shop (1)
Point to point study of television signal in receivers. Technique of visual alignment. Field strength determination and receiver installation practice. 1 laboratory.

EL 243 Industrial Electronics Shops (1)
Techniques in the operation, adjustment, and maintenance of electronic control circuits used in resistance welding, photoelectric devices, motor speed regulators, induction, and dielectric heating equipment. 1 laboratory.

EL 245 Introductory Engineering Laboratory (1)
Laboratory exercises illustrating basic principles in electrical engineering. Development of laboratory technique and familiarization with engineering reporting procedures. 1 laboratory. Concurrent: EE 212

EL 246 Electrical Engineering Laboratory (1)
Laboratory exercises illustrating basic principles of electric circuits, magnetic and electric fields, and associated circuits. 1 laboratory. Prerequisite: EL 245

EL 249 Electron Tube Laboratory (1)
Fundamental experiments investigating the physical and electrical properties of the more common types of electron tubes. 1 laboratory. Prerequisite: EL 208

EL 301, 302 Advanced AC Circuits (4) (4)

EL 305 Electronic Engineering (4)
Vacuum tubes as circuit elements. Untuned voltage and power amplifiers. Tuned voltage and power amplifiers. Special amplifiers, Oscillators. 4 lectures. Prerequisites: EL 200, 301

EL 306 Electronic Engineering (4)
Rectifiers. Amplitude and frequency modulation and demodulation. Relaxation oscillators. Sweep generators. Electronic instruments. Electronic computer circuits. 4 lectures. Prerequisite: EL 305

EL 309 Electroacoustics (3)
Acoustical wave equations; plane and spherical sound waves. Development of analog methods of system analysis and application of these methods to the study of microphones, loud speakers and enclosures, pickups. Acoustical measurements. 3 lectures. Prerequisites: EL 302, Math 317

EL 313 Electronic Circuits (2)
Application of electron tubes. Rectification. Amplification. Control and counting circuits. Motor controls. 2 lectures. Prerequisites: EL 209, EE 301
EL 341 AC Circuits Laboratory
AC measurements and measuring equipment. Determination of alternating current variables through analytical laboratory methods. Verification of classroom theory. 1 laboratory. Concurrent: EL 301

EL 342 AC Circuits Laboratory
Quantitative laboratory study of transients, wave filters, and low frequency transmission lines. Limitations of laboratory equipment, and limits on accuracy of AC measurements. 1 laboratory. Concurrent: EL 302

EL 345, 346 Electronic Circuits Laboratory
Quantitative experimental study of fundamental amplifiers, oscillators, modulators, and detectors. Commercial testing following RMA and IRE standards. 1 laboratory. Concurrent: EL 305, 306

EL 400 Special Problems for Advanced Undergraduates
Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

EL 401 Networks and Lines
Filters and artificial lines. Network theory. High frequency transmission lines as resonant elements. Transmission line charts. Pulse-forming line. 3 lectures. Prerequisites: EL 302, 306

EL 402 Ultra High Frequency Techniques
Spectrum of pulses. Video amplifiers, gain, bandwidth, compensation. Pulse generators. Pulse control circuits. Production of microwaves. Microwave techniques. 3 lectures. Prerequisites: EL 302, 306

EL 403 Electronic Systems Engineering
Television systems, image analysis, signal generators, amplification. Synchronization and modulation. Induction and dielectric heating. Introduction to servomechanism systems. 3 lectures. Prerequisite: EL 402

EL 404 Pulse Techniques
Analytical study of pulse response characteristics of electric circuits and amplifiers. Application of Fourier integral and Laplace transforms. 3 lectures. Prerequisite: EL 402

EL 405 Fields and Waves
Elements of vector analysis. Electric and magnetic fields. Maxwell's equations. Poynting's vector. Application of EM theory to waveguides. 3 lectures. Prerequisite: EL 401

EL 406 Antennas
Application of EM theory to antennas, antenna pattern synthesis. Measurement of antenna impedance and patterns. 3 lectures. Prerequisite: EL 405

EL 441, 442, 443 Electronics Laboratory
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
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
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.

EL 463 Undergraduate Seminar
Discussion of new developments in the fields of communications and industrial electronics, with particular reference to fields of employment. Job analysis. 2 lectures.
Instructor 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 postwar 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** Bench and Drill Press Work

Fundamentals of bench and drill press work. Offhand tool sharpening and elementary heat treating. 1 laboratory.

**MS 142** Machine Shop

Fundamentals of lathe operation including turning between centers and thread cutting. Feeds, speeds, and tool grinding. 1 laboratory. Prerequisite: MS 141

**MS 143** Machine Shop

Fundamentals of lathe operation including chuck work and internal thread cutting. Tool grinding. 1 laboratory. Prerequisites: MS 142 or 144 or 147

**MS 144** Machine Shop

Combined content of MS 141 and MS 142. 2 laboratories.

**MS 145** Machine Shop

Combined content of MS 143 and MS 241. 2 laboratories. Prerequisites: MS 142 or MS 144

**MS 148** Machine Shop

Combined content of MS 141, MS 142, and MS 143. 3 laboratories.

**MS 151** Machine Shop

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

Fundamentals of shaping, milling, grinding, sawing, and drilling machines. 1 laboratory. Prerequisites: MS 143 or 148 or 151

**MS 241** Machine Shop

Advanced lathe practice and introduction to shaper and milling machine operation. 1 laboratory. Prerequisites: MS 143 or MS 148

**MS 242** Machine Shop

Operation of power hacksaw, radial drill, contour saw, shaper, and milling machine. 1 laboratory. Prerequisites: MS 145 or MS 241

**MS 243** Machine Shop

Milling machine and shaper practice. Introduction to surface and cylindrical grinding. 1 laboratory. Prerequisite: MS 242

**MS 245** Machine Shop

Combined content of MS 242 and MS 243. 2 laboratories. Prerequisites: MS 145 or MS 241
MS 248  Machine Shop
Combined content of MS 241, MS 242, and MS 243. 3 laboratories. Prerequisites: MS 143 or MS 148

MS 340  Machine Shop Practice
Advanced individual instruction on all machine tools. Construction and repair of laboratory equipment. Total credit limited to 4 units. 1 or 2 laboratories. Prerequisites: MS 243, 245, or 248

MS 343  Printers Mechanics
Advanced benchwork instruction for printers. Special printers' tools, gauges, and jigs are constructed. 1 laboratory. Prerequisite: MS 141 or equivalent.

MS 447  Manufacturing Processes
Design, construction, and use of punch press tools, jigs, and fixtures used in mass production. Elementary screw machine and turret lathe work. 3 laboratories. Prerequisites: MS 243, 245, or 248

MS 448  Manufacturing Processes
Design, construction, and use of plastic molds and products, and die casting dies and products. 3 laboratories. Prerequisite: MS 447

MS 449  Manufacturing Processes
Design, construction, and application problems in milling, grinding and related forming and shaping processes. Product finishing problems. 3 laboratories. Prerequisite: MS 448
Engineering Division

MECHANICAL ENGINEERING DEPARTMENT
Department Head, Thomas J. Zilka

Clifford H. Anderson  Thomas Hardgrove  R. Howell Reece
Gerald E. Ellis  Hugh W. Haroldson  Joy O. Richardson
George A. Greene, Jr.  Robert M. Johnston

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 in the petroleum industry, with public utilities companies, manufacturing companies, construction contractors, and federal and state civil service. Types of work performed by graduates include plant engineering; tool, piping, and machine 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 Power Plant 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 Hydraulics Laboratory provides facilities for studying characteristics of fluids and hydraulic equipment.

### CURRICULUM IN MECHANICAL ENGINEERING

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<td>Steam Power Plants (ME 101, 102)</td>
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<td>Internal Combustion Engines (ME 103)</td>
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<td>Engineering Drafting (ME 121, 122, 123)</td>
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<td>Mechanical Engineering Lab (ME 144, 145, 146)</td>
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<td>Oxyacetylene Welding (Weld 151, 152)</td>
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<td>Metallic Arc Welding (Weld 154, 155)</td>
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<td>Language Communications (Eng 104, 105, 106)</td>
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<td>Engineering Surveying (ME 231, 232)</td>
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<td>Heating and Ventilation (AC 204)</td>
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<td>Descriptive Geometry (ME 125)</td>
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<td>Machine Shop (MS 144, 145, 245)</td>
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<td>Kinematics (ME 223)</td>
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<td>General Codes &amp; Wiring Practices (EE 226)</td>
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DESCRIPTIONS OF COURSES IN MECHANICAL ENGINEERING

ME 101 Steam Power Plants
Analysis of modern steam plants. Problems involving heat, properties of steam, combustion, and auxiliaries. Development of skills in setting up and solving problems in a neat and orderly manner. 2 lectures, 1 computation period.

ME 102 Steam Power Plants
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 computation period. Prerequisite: ME 101

ME 103 Internal Combustion Engines
Construction and performance of diesel and gasoline engines and gas turbines. Problems in efficiencies, horsepower, and economy. 2 lectures, 1 computation period. Prerequisite: ME 102

ME 121 Engineering Drafting
The use of drafting instruments, lettering, geometric construction, orthographic and pictorial projections, and dimensioning. Standard practices emphasized with application to requirements of industry. 1 lecture, 1 laboratory. Prerequisite: ME 121.

ME 122 Engineering Drafting
Single and double auxiliary projection, types and principles of working drawings, sections and conventional representation, gears and cams, and generation of surfaces, including parallel line developments, radial line developments, and triangulation. 1 lecture, 1 laboratory. Prerequisite: ME 121.

* Senior Electives:
  - Machine Design (ME 421, 422, 423)
  - Manufacturing Processes (MS 447, 448, 449)
  - Mechanical Equipment of Buildings (ME 424, 425, 426)
  - Welding Design (Weld 434, 435, 436)

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F  W  S
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Junior 3 3 3
Strength of Materials (ME 202, 203) 3 3 3
Strength of Materials Lab (ME 249) 3 3 3
Introduction to Machine Design (ME 329) 3 3 3
Fluid Flow (ME 311, 312) 3 3 3
Fluid Flow Lab (ME 345) 3 3 3
Thermodynamics (ME 402, 403) 3 3 3
Chemistry (PSc 301, 322, 323) 4 4 4
Thermodynamics (PSc 306) 3 3 3
American Government (Pol Sc 301) 3 3 3
Growth of American Democracy (Hist 304) 3 3 3
Principles of Economics (Ec 201) 3 3 3
Applied Biology (BSc 110) 3 3 3
Elective 1 1 1
17 17 17

Senior 2 2 2
Senior Project (ME 461, 462) 2 2 2
Undergraduate Seminar (ME 463) 2 2 2
Mechanical Design (ME 427, 428, 429) 3 3 3
* Senior Electives 3 3 3
Industrial Relations (Ec 412) 3 3 3
Family Psychology (Psy 403) 3 3 3
The U. S. in World Affairs (Hist 305) 3 3 3
Literature 7 7 4
Electives 17 17 17
ME 123 Engineering Drafting (2)

Intersections and developments, threads and fastenings, piping drawings, welding symbols, detail and assembly drawings and sketching. Good pencil technique stressed as a requisite for drawings from which reproductions are made. 1 lecture, 1 laboratory. Prerequisite: ME 122

ME 125 Descriptive Geometry (3)

Space relations of points, lines, and plane surfaces and their application to the graphic solution of space problems. 1 lecture, 2 laboratories. Prerequisite: ME 121

ME 126 Descriptive Geometry (3)

The construction of space curves and the determination of shades and shadows. 1 lecture, 2 laboratories. Prerequisite: ME 125

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 simple structural and machine elements. 3 lectures. Prerequisite: PSc 201

ME 223 Kinematics (3)

The study of motion in mechanisms. Displacements, velocities, and accelerations in linkage, cams, gears, and other useful devices. 2 lectures, 1 drafting laboratory. Prerequisites: PSc 131, ME 122

ME 231 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.

ME 232 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: ME 231, Math 117

ME 233 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: ME 232

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. Verification of strength calculation formulas. Familiarity with physical properties of industrially useful materials. Elements of heat treatment. 1 laboratory. Prerequisite: ME 202

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. Prerequisites: PSc 131, 201, 202

ME 312 Fluid Flow (3)

Fluid resistance, dynamic lift, and propeller action. Compressible flow, subsonic and supersonic. Liquids in open channels. Pumps, turbines, fluid drive mechanisms. Fluid film lubrication. 3 lectures. Prerequisite: ME 311
ME 313  Heat Transfer  (3)
Calculation of heat transfer by conduction, convection, and radiation. Application of principles to specific elements of engineering structures and machines. 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. Prerequisites: ME 202, 203, PSc 202

ME 331  Plumbing and Building Sanitation  (4)
Application of the theory of hydraulics and pneumatics of the plumbing system to adequate design of the water supply and waste collection pipe layouts for buildings. Selection of mechanical equipment identified with control of hot water, illuminating gas, compressed air, and chilled drinking water. 3 lectures, 1 laboratory. Prerequisite: PSc 131

ME 345  Fluid Flow Laboratory  (1)
Flow in pipes and open channels, measuring devices, pumps, and pump accessories. 1 laboratory. Prerequisite: ME 311

ME 349  Advanced Materials Testing Laboratory  (1)
Advanced laboratory work in testing of materials and structures. Column and beam tests, fatigue tests, heat treatment, effect of microstructure on physical properties. 1 laboratory. Prerequisite: ME 249

ME 352, 353  Steam and Gas Power Laboratory  (1)  (1)

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 402, 403  Thermodynamics  (3)  (3)

ME 405  Introduction to Plant Engineering  (3)
Familiarization with the scope of plant engineering including plant organization, design, construction, operation, and maintenance. 3 lectures.

ME 406  Techniques of Plant Engineering  (3)
A course covering good practice in specific phases of plant engineering. Building operation and maintenance, preventive maintenance, plant layout, materials handling, industrial safety, plant protection, equipment records, estimating. 3 lectures.
ME 411 Heat Power  
Application of thermodynamics to actual power cycles. Turbine theory. Modern combustion gas and vapor power plants and auxiliaries. Economics of power generation. 3 lectures. Prerequisite: ME 403

ME 412 Heat Power  
Fuels, fuel systems, aspiration, combustion, detonation; mechanism, lubrication, and performance of internal combustion engines. 3 lectures. Prerequisite: ME 403

ME 421, 422, 423 Machine Design  
Combination of machine and structural elements. Design of machines, structures, and installations. Balancing, special linkages and cams, critical speeds, vibration prevention, and isolation. 2 lectures, 1 laboratory. Prerequisite: ME 323

ME 424, 425, 426 Mechanical Equipment of Buildings  
Industrial piping, piping stress analysis, heat transfer equipment selection, vessel and tank design, fans, air compressors, mechanical conveying, elevators, fire protection, standpipe and sprinkler systems. Design problems and specifications. 2 lectures, 1 laboratory. Prerequisite: ME 331

ME 427, 428, 429 Mechanical Design  
Design of basic machine and structural elements such as bearings, gears, columns, shafts, springs, cams, pressure vessels, and piping elements. Machine and assembly drawing organization. Construction planning and cost estimating. 1 lecture, 1 laboratory. Prerequisite: ME 323

ME 434 Fundamentals of Petroleum Production  
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  
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: PSc 201, ME 101, 102, 103

ME 436 Petroleum Production—Pumping  
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: PSc 201, ME 311

ME 437 Plant Layout  
Application of step-by-step procedure in the development of a workable layout of the modern industrial plant. Coordination between plant layout, methods engineering and production control. Scale models are employed in the solution of a layout problem. 2 lectures, 1 laboratory.

ME 445 Heat Power Laboratory  
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 403

ME 461, 462 Senior Project  
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.

ME 463 Undergraduate Seminar  
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.
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 rural newspapers and print shops. 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 allied trades 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 advance to positions of responsibility. A graduate is qualified to operate his own print shop, or to publish a small rural 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, and bindery equipment.

Practical instruction in cost finding, plant organization, and layout are included in the senior year. In addition to courses in the major curriculum, students must take an additional minimum of 15 units in agricultural journalism.

### CURRICULUM IN PRINTING

#### Freshman
- Applied Biology (BSC 110) .................................................. 3
- Health and Hygiene (PE 107) .................................................. 2
- Language Communication (Eng 104, 105, 106) .......................... 3, 3, 3
- Mathematics for Printers (Math 105) ...................................... 3
- 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) ........................... 2
- Stereotyping Operations (Pr 125) .......................................... 2
- Hand-Fed Platen Presswork (Pr 131) .................................... 2
- Automatic Platen Presswork (Pr 132) .................................. 2
- Physical Education (PE 141, 142, 143) .................................. 2
- *Electives* ............................................................................. 5, 5, 4

Total: 17 1/2, 17 1/2, 17 1/2

#### Sophomore
- Psychology of Business and Industry (Psy 302) ....................... 3
- Sports Education (PE 241, 242, 243) ........................................ 3
- General Psychology (Psy 202) .................................................. 3
- Machine Shop (MS 141) ......................................................... 1
- American Government (Pol Sc 301) ........................................ 3
- Mathematics (Math 117) ....................................................... 5
- Public Speaking (Eng 201) ..................................................... 2
- Advanced Composition and Layout (Pr 221) ............................ 3
- Composing Machine Mech. and Maintenance (Pr 222, 223) ............ 2, 2
- Imposition and Lockup (Pr 251) ............................................. 2
- Automatic Cylinder Presswork (Pr 292) ................................ 3
- Advanced Automatic Cylinder Presswork (Pr 233) .................... 3
- Composing Machine Operation (Pr 241, 242, 243) .................... 3, 3, 3
- Bindery Operations (Pr 251) ................................................ 2
- Principles of Economics (Ec 201) .......................................... 3
- *Electives* ............................................................................. 1, 6, 1

Total: 18 1/2, 18 1/2, 18 1/2
Engineering Division

Junior

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<td>Composing Machine Oper. and Maint. (Pr 321, 322, 323)</td>
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Senior

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<td>Production Problems (Pr 421, 422, 423)</td>
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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.

Pr 102 Proofreading (2)

Print shop 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 copy-fitting. 1 lecture, 2 laboratories. Prerequisite: Pr 121.

Pr 123 Press and Composing Room Problems (2)

Proper use and operation of all print shop equipment. Safety and accident prevention. Familiarization with cost and labor-saving devices, augmented by field trips, pictures, and special study of problems that develop in operation of newspaper and commercial plants. 1 lecture, 1 laboratory.

Pr 125 Stereotyping (2)

Care and operation of stereotype equipment, including routers, saws, and production from mats, shell casts and type-high cuts, color separation and mortising as used on rural newspapers. Metal content and care. 1 lecture, 1 laboratory.

* The student must include in his program Eng 301, Jour 201, 202, 233, 401, 403.
† PSc 131, 132, 133 may be substituted. Note prerequisites for these courses.
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 (2)
Operation and maintenance of automatic fed platen presses, proper positioning and lockup of type forms, makeready, and correct use of ink. 2 laboratories. Prerequisite: Pr 131

Pr 133 Introduction to Cylinder Press (2)
Study of development and advantages of the cylinder press. Practical operation and care of press, ink, and rollers in actual production of college newspapers and other publications. 1 lecture, 1 laboratory.

Pr 221 Advanced Composition and Layout (3)
Proper methods of newspaper and 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.

Pr 222 Composing Machine Mechanism and 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.

Pr 223 Composing Machine Mechanism and Maintenance (2)
Advanced methods of maintenance and repair. Lockup and pot adjustments. Intertype and Linotype quadders and mixers. 1 lecture, 1 laboratory.

Pr 231 Imposition and Lockup (2)
Planning and laying out 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 research into makeready, ink, paper, and other press problems. Study of color and process printing. 1 lecture, 2 laboratories. Prerequisites: Pr 131, 132

Pr 233 Advanced Automatic Cylinder Presswork (3)
Continuation of Pr 232 with emphasis on production and maintenance. 3 laboratories. Prerequisite: Pr 232

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.

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.

Pr 243 Composing Machine Operation (3)
Book work, magazine, and commercial composition. 3 laboratories.

Pr 251 Bindery Operations (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  
Operation, maintenance, and repair of Ludlow slug-casting 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  
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 Composing Machine Operation and Maintenance  
Advanced mechanism, repair, maintenance, and operation of quadders and mixers. Field trips, use of visual aids, and lectures by experts. 1 lecture, 2 laboratories. Prerequisites: Pr 241, 242, 243

Pr 326 Cost and Estimating  
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.

Pr 331 Advanced Typography and Layout  
Layout, designing, and composing of all types newspaper, magazine, 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  
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 401 Printing Office Management  

Pr 411, 412, 413 Cost and Estimating  
Estimating and pricing all types of printing, office procedures, purchasing, writing instructions. 1 laboratory. Prerequisite: Pr 326

Pr 421, 422, 423 Production Problems  
Analysis of methods of coordinating all factors of production. Methods of promoting interdepartmental harmony and understanding. Review of all plant and shop skills. 1 lecture, 2 laboratories.

Pr 431 Commercial Job Composition  
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.

Pr 433 Plant Organization and Layout  
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.

Pr 461, 462 Senior Project  
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.

Pr 463 Undergraduate Seminar  
Senior students have an opportunity to become familiar with data gathered by other seniors in preparation of thesis material. Each student is required to conduct the seminar class, under supervision of instructor, at least twice during quarter. 1 lecture, 1 laboratory.
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 fillet, fillet, and butt joints. 1 laboratory. Prerequisite: Weld 154.

Weld 156 Fundamental 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 159 Oxyacetylene Welding
A composite welding course consisting of Weld 151, 152, 153. This course is given in one quarter. 3 laboratories.

Weld 251 Advanced Welding
Pipe layout. Development of templates for various piping connections. Hydrostatic and other tests for welded pressure vessels. 1 laboratory. Prerequisite: Weld 153

Weld 252 Advanced Welding
Light and heavy oxyacetylene welding. Problems in welding cast iron, steel pipe, and steel tubing. Applications of machine flame cutting for mass production of parts from steel plate. 1 laboratory. Prerequisite: Weld 251

Weld 253 Advanced Welding
Uses and applications of resistance welding and inert-gas shielded arc welding to various metal and alloys. Problems in welding stainless steel and aluminum as found in present manufacturing operations. 1 laboratory. Prerequisite: Weld 252

Weld 254 Advanced Welding
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
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
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 253

Weld 434 Elements of Welding Design
Problems in welded structural design, welded pressure vessels in accordance with the various governing codes. Cost estimates and other data incident to the manufacture and installation of welded pressure vessels. 3 lectures, 2 laboratories. Prerequisites: Weld 156, ME 249

Weld 435 Welding Design
Uses of arc welding as a mass production process. Resistance welding design problems, jig and fixture problems for mass production. Commercial weldery layout and arc welding production control. 3 lectures, 2 laboratories. Prerequisite: Weld 434

Weld 436 Welding Design
Basic metallurgy as applied to welding problems. Electrode evaluation tests for deposition rates and weldability. Welding quality control including the use of X-ray and gamma ray. Problems in estimating the cost of welded products. 3 lectures, 2 laboratories. Prerequisite: Weld 435
THE LIBERAL ARTS DIVISION
THE LIBERAL ARTS DIVISION

The Liberal Arts Division has three principal functions. First, as a service division, it provides for students in agriculture and engineering those related courses directly supporting major courses. Second, it provides those courses not so closely related to the major, and those required as general education. Third, it prepares candidates who are seeking teaching credentials.

The Liberal Arts Division cooperates with the Agricultural Division in preparing teachers for the Special Secondary Credential in Vocational Agriculture and the Special Secondary Limited Credential in Agriculture. The Liberal Arts Division recommends candidates for the Special Secondary Credential in Health and Physical Education, and the General Secondary Credential with teaching majors and minors in the following fields: Biological Science, Health and Physical Education, Mathematics, Physical Science, and Social Science. The college grants the degree of bachelor of science and the degree of master of arts in education, with concentrations in Agriculture, Biological Science, Health and Physical Education, Mathematics, Physical Science, or Social Science.

The major departments in the Liberal Arts Division are: Agricultural Journalism, Biological Science, Health and Physical Education, Mathematics, Physical Science, and Social Science. The supporting departments are: Education and Psychology, English, and Music.

AGRICULTURAL JOURNALISM DEPARTMENT

Department Head, Kenneth Kitch
John R. Healey Robert E. Kennedy

The college offers the State's only major in agricultural journalism. Major students train for jobs as writers, editors, advertising men (or combination 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 freelance writers.

While 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 and expositions, 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.

CURRICULUM IN AGRICULTURAL JOURNALISM

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<td>The American Scene (Eng 311, 312, 313)</td>
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<tr>
<td>Elementary Photography (Jour 321)</td>
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<td>Press Photography (Jour 322)</td>
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<tr>
<td>Editorial and Feature Writing (Jour 302)</td>
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<tr>
<td>Radio News (Jour 313)</td>
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<td>* Electives</td>
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### Senior

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<tr>
<td>Family Psychology (Psy 408)</td>
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<tr>
<td>Agricultural Marketing (Ec 304)</td>
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<td>State and Local Government (Pol Sc 401)</td>
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<tr>
<td>Senior Project (Jour 461, 462)</td>
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<tr>
<td>Undergraduate Seminar (Jour 463)</td>
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<tr>
<td>Newspaper and Magazine Advertising (Jour 401)</td>
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<td>Advertising Layout and Copywriting (Jour 405)</td>
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<tr>
<td>Radio Advertising (Jour 402)</td>
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<tr>
<td>Newspaper Management (Jour 403)</td>
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<td>Public Relations (Jour 412)</td>
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<td>* Electives</td>
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<td><strong>Total</strong></td>
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### Descriptions of Courses in Agricultural Journalism

**Jour 140, 141 Typing**

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 201 Introductory Journalism**

An introduction to journalism, survey of its history, and study of techniques of writing the news story. 3 lectures. Prerequisite: Eng 106

* Of elective units, 45 shall be taken from the field of agriculture with 12 from an approved major sequence to be taken during the freshman year. No more than 24 units will be taken in any one agricultural field, except with permission of the department head.

* Of nongovernmental elective units, at least 10 will be chosen from the field of journalism or a closely allied field.

* Unless already acceptable typists, majors will be required to take Jour 140 and/or 141 during their freshman year.
Jour 202 Reporting
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 233 Editing and Copy Desk
Copy desk work, head writing, page make-up, 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 positions on college publications or student news bureau. 1-2 laboratories. Prerequisite: one year of journalism or instructor's permission.

Jour 302 Editorial Feature Writing
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
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 313 Radio News Writing
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: Eng 201

Jour 321 Elementary Photography
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 322 Press Photography
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
Technique of the picture story, magazine article illustration, livestock and industrial equipment photography, advertising photography. 1 lecture, 2 laboratories. Prerequisite: Jour 322

Jour 351, 352, 353 Journalism Practice (1-2) (1-2) (1-2)
Credit arranged for students holding editorial positions on college publications or in student news bureau. Responsibilities more advanced than in 251, 252, and 253. 1-2 laboratories. Prerequisite: one year of journalism.

Jour 401 Newspaper and Magazine Advertising
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 402 Radio Advertising
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 401
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, 401.

Jour 405 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 401.

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 422 Rural Press  (2)
Small or community newspapers. 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 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.
The curriculum of the Biological Science Department 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 biology in secondary schools; to provide the necessary basic course work for students who plan to enter such fields as biological survey, wildlife management, conservation, entomology, plant pathology, laboratory work, agricultural inspection, museum work, pest control, and fish and game; and to give the courses which fulfill the general education requirement in biology.

The five 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 it is the meeting point of Southern and Northern California flora and fauna.

### CURRICULUM IN BIOLOGICAL SCIENCE

#### Freshman

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<thead>
<tr>
<th>Course</th>
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<tr>
<td>Physical Education (PE 141, 142, 143)</td>
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<tr>
<td>Language Communication (Eng 104, 105, 106)</td>
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<tr>
<td>Health and Hygiene (PE 107)</td>
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<td>Basic Mathematics for General Education (Math 111, 112)</td>
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<tr>
<td>General Zoology (BSc 131, 132, 133)</td>
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<tr>
<td>* General Inorganic Chemistry (PSc 324, 325)</td>
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<td>Organic Chemistry (PSc 326)</td>
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<tr>
<td>Biological Techniques (BSc 141, 142, 143)</td>
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#### Sophomore

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<td>Sports Education (PE 241, 242, 243)</td>
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<tr>
<td>Principles of Economics (Ec 201, 202)</td>
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<td>Economic Problems (Ec 218)</td>
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<td>General Botany (BSc 121, 122, 123)</td>
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<tr>
<td>General Bacteriology (BSc 221)</td>
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<td>General Entomology (BSc 126)</td>
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<td>Genetics (BSc 308)</td>
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<td>Literature, Art, and/or Music</td>
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<td>Public Speaking (Eng 201)</td>
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<td>Electives</td>
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#### Junior

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<tr>
<td>General Psychology (Psy 202)</td>
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<tr>
<td>Microtechnique (BSc 245)</td>
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<tr>
<td>† General Physical Science (PSc 101, 102, 103)</td>
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<tr>
<td>Plant Pathology I (BSc 223)</td>
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<tr>
<td>American Government (Pol Sc 301)</td>
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<td>Growth of American Democracy (Hist 304)</td>
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<td>U. S. in World Affairs (Hist 305)</td>
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<tr>
<td>‡ Vertebrate Field Zoology (BSc 226)</td>
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<tr>
<td>Electives</td>
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<td>Total</td>
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</table>

*PSc 321, 322, 323 will substitute for PSc 324, 325.
† PSc 131, 132, 133 will substitute.
‡ BSc 243 will substitute.
California State Polytechnic College

Senior

State and Local Government (Pol Sc 401) 3
Family Psychology (Psy 403) 3
Agricultural Biochemistry (PSc 328) 4
Human Anatomy (BSc 237) 3
Human Physiology (BSc 238, 239) 3 3
* Embryology (BSc 323) 4
Senior Project (BSc 461, 462) 2 2
† Undergraduate Seminar (BSc 463) 2
Electives 3 6 4

15 15 16

DESCRIPTIONS OF COURSES IN BIOLOGICAL SCIENCE

BSc 100 Agricultural Biology

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.

BSc 101 General Biology

Characteristics of living things; cellular composition and organization; functional approach to organ systems of man. 3 lectures.

BSc 102 General Biology

Endocrine system; reproduction; heredity and environment; social implications of biological principles. 3 lectures. Prerequisite: BSc 101.

BSc 103 General Biology

Disease; plants, animals and man; balance of nature; conservation of resources; history of man. 3 lecture. Prerequisite: BSc 102

BSc 110 Applied Biology

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

BSc 121 General Botany

Introduction to structures and functions of seed-bearing plants. 2 lectures, 2 laboratories.

BSc 122 General Botany

Nature and relationships of plant groups from bacteria to angiosperms; emphasis on nonseedbearing plants of economic importance. 2 lectures, 2 laboratories. Prerequisite: BSc 121

BSc 123 General Botany

Elementary plant genetics, paleobotany, organic evolution, plant ecology, and plant geography. 2 lectures, 2 laboratories. Prerequisite: BSc 122

BSc 126 General Entomology

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

BSc 131 General Zoology

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

BSc 132 General Zoology

Invertebrate animals from Protozoa to Chordates; emphasis on those forms of economic importance. 2 lectures, 2 laboratories. Prerequisite: BSc 131

BSc 133 General Zoology

Ecology, introductory embryology, classification, genetics, evolution of animals. 2 lectures, 2 laboratories. Prerequisite: BSc 132

* BSc 425 will substitute.
† BSc 433 will substitute.
BSc 141, 142, 143 Biological Techniques
Preparation of plant and animal specimens for display or study purposes. Sample projects: Collecting, preserving, casting, molding, taxidermy, skeletons, herbaria, microtechnique. 2 laboratories.

BSc 221 General Bacteriology
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: BSc 101, or 121, or 131, or PSc 321 or 324.

BSc 222 Dairy Bacteriology
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: BSc 221.

BSc 223 Plant Pathology I
Principal diseases of plants; symptoms, field identification, and control methods. 3 lectures, 1 laboratory. Prerequisite: BSc 121.

BSc 226 Vertebrate Field Zoology
Identification, life histories, and economic importance of vertebrates, especially birds and mammals. Field work emphasized. 2 lectures, 2 laboratories. Prerequisite: BSc 103 or 122 or 132.

BSc 237 Human Anatomy
Structural aspects of the organ systems of man. 2 lectures, 1 laboratory. Prerequisite: 101 or 131.

BSc 238 Human Physiology
Human cellular organization and function. Functions of respiratory, circulatory, digestive, and excretory systems. Intermediary mechanisms. 2 lectures, 1 laboratory. Prerequisite: BSc 237.

BSc 239 Human Physiology
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: BSc 238.

BSc 243 Taxonomy of Higher Plants
General principles of classification of plants; procedure for identification of unknown plants; preparation and use of specimens. 2 lectures, 1 laboratory. Prerequisite: BSc 121.

BSc 245 Microtechnique
Methods of preparing plant and animal tissue for microscopic study. 2 laboratories.

BSc 303 Genetics
Principles of heredity and variation. 3 lectures. Prerequisite: BSc 101 or 121 or 131.

BSc 322 Plant Physiology
Functions of plants and plant organs. 2 lectures, 1 laboratory. Prerequisites: BSc 121 and PSc 321 or 324.

BSc 323 Embryology
Elementary embryology emphasizing the structural aspects of development in the frog, chick, pig, and in man. 2 lectures, 2 laboratories. Prerequisite: BSc 131.

BSc 324 Plant Pathology II
Plant diseases of environmental, virus, bacterial, and fungus origin; systematic mycology applied to the identification of the principal diseases of major crop and ornamental plants. 2 lectures, 1 laboratory. Prerequisite: BSc 223.
BSc 325  Plant and Animal Ecology  (3)
Response of plants and animals to their environment. 2 lectures, 1 laboratory. Prerequisite: BSc 103 or 122 or 132

BSc 326 Comparative Anatomy of Vertebrates  (4)
Comparative structure of vertebrate organ systems. 2 lectures, 2 laboratories. Prerequisite: BSc 131

BSc 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: BSc 223

BSc 425 Parasitology  (4)
External and internal parasites of man and animals; life history, control, distribution, and economic importance. 2 lectures, 2 laboratories. Prerequisite: BSc 131

BSc 433 Wild Life Management  (4)
General principles, problems, and techniques of wild life management. Identification, distribution, and life histories of important species. 3 lectures, 1 laboratory. Prerequisite: BSc 226 or SS 321

BSc 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.

BSc 463 Undergraduate Seminar  (2)
Study and discussion of recent developments in the field of biology. 2 meetings.

BSc 521 Curriculum and Methods in Biological Science  (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.

BSc 522 Histology  (4)
Tissues, microscopic organology, and correlation of form with function. 2 lectures, 2 laboratories. Prerequisite: Graduate standing.

BSc 523 Plant and Animal Cytology  (3)
Detailed study of animal and plant cells, structurally and functionally. 2 lectures, 1 laboratory. Prerequisite: Graduate standing, or upper class with credit in BSc 121, or 131, or equivalent.

BSc 581, 582, 583 Special Problems  (3) (3) (3)
Library research and laboratory projects on special problems. Prerequisite: Graduate standing.
EDUCATION AND PSYCHOLOGY DEPARTMENT

Dale W. Andrews
Herbert H. Burlingham
Arthur G. Butzbach
Morris G. Garter
Norman S. Gould
Robert Maurer

The Department of Education and Psychology attempts to develop in students the ability to apply basic principles of human behavior to the fields of mental health, human relations, and learning. Each student is provided with understandings necessary for becoming more self-directive in his relationships with his own environment. Stress is laid upon certain specific skills of value in daily living, and for students in the college's teacher training program, upon skills and techniques of special value in teaching.

The student interested in teacher preparation should see the section under degrees and credentials for information about requirements and programs to prepare for the Special Secondary Credential in Vocational Agriculture, the Special Limited Secondary Credential in Agriculture, the Special Secondary Credential in Physical Education, and the General Secondary Credential.

DESCRIPTIONS OF COURSES IN EDUCATION

Ed 203 The Teaching of Agriculture
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.

Ed 301 Principles of Secondary Education
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 312 Educational Psychology
Pupil-teacher relationships; promotion of learning, mental health, and motivation. Growth and development. Individual differences and group interaction. Group methods and classroom observation. 5 lectures. Prerequisite: Psy 202

Ed 401 Audio-visual Aids
Visual and auditory aids of value in classroom teaching in secondary schools. Lecture, discussion, demonstration, previewing, and laboratory work. Planning and integrating use of audio-visual aids in the classroom. 3 combined lectures and laboratories. Prerequisite: Ed 312 or permission of instructor.

Ed 403 Teaching Plans and Techniques
Planning lessons, unit development, specific teaching skills, class management, and utilization of community resources and relationships. Demonstrations and observations in secondary schools. Classroom planning coordinated with public school practice. 5 lectures. Prerequisite: Ed 312

Ed 404 Growth and Development of the Child
Social, emotional, and intellectual development during childhood and adolescence, with particular applications to the school situation. Problems of mental hygiene. 3 lectures.

Ed 407 Methods of Teaching Basic Elementary School Subjects
Techniques and procedures used in teaching reading, language arts, arithmetic, social studies, science, and health. 3 lectures.

Ed 408 Elementary School Curriculum and Methods
Content and organization of the elementary school curriculum. Development of skills in the elementary school; fundamentals of social and emotional development. 3 lectures.

Ed 421 Student Teaching
Observation and teaching under direction of a selected regular teacher in a secondary school. Participation in representative public school activities. Supervision by college teacher education staff following approval of candidate by Teacher Education Committee. For special secondary candidates in general agriculture and physical education.
Ed 423 Curricula 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.

Ed 424A-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.

Ed 501 Philosophy and Education (3)
Function of philosophy; human nature, values, and ethics; the relationship of these concepts to educational methods and subject matter. 3 lectures.

Ed 502 Public School Administration (3)
Administrative problems associated with the operation 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 503 Guidance in Secondary Schools (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 505 Schools in the Community (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 506A-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.

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.

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.

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.

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.
Liberal Arts Division

Ed 530  Student Teaching (General Secondary)  (9)
Observation and teaching under direction of a selected regular teacher in a secondary school. Participation in representative public school activities. Supervision by college teacher education staff following approval of candidate by Teacher Education Committee.

Ed 580  Special Problems in Agricultural Education  (3)
For graduate students in agricultural education. Contemporary problems in teaching agriculture in secondary schools. Trends, developments, individual problems. 3 lectures. Consent of instructor required.

Ed 590  Seminar in Student Teacher Supervision  (2)
Organization, responsibilities, problems, and procedures in supervising, directing, and evaluating student teachers and student teaching activities in agriculture and other secondary fields. 2 lectures—discussions.

Ed 621S  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.

Ed 631S  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 PSYCHOLOGY

Psy 1, 2  Remedial Reading  (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 16  Effective Study Techniques  (2)
A remedial course 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 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.

Psy 403  Family Psychology  (3)
Pre-marital relations, choosing a mate, budgeting, causes of divorce, factors of religion, pregnancy and birth, endocrine system, compatibility in marriage. 3 lectures.
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: 211, 212, 213, 311, 312. Other courses are offered for department patterns and as electives.

For the purpose of assigning students to the appropriate level of training in language communication, a placement test is given. The test measures acceptable proficiency in language communication as revealed in sentence structure, appropriate usage, spelling, and paragraph unity. Students who demonstrate considerable deficiency will be assigned to English 4, a preparatory course without credit toward a degree. A passing grade in this course entitles the student to advance to English 104.

DESCRIPTIONS OF COURSES IN ENGLISH

Eng 4  Preparatory English (3)
For the student who needs additional work before entering English 104. The organization of ideas into logical, clear sentences and paragraphs, taught primarily through intensive writing based on the student's interests and experience. 3 lectures.

Eng 100  Applied English Composition (3)
Concentrated work in English composition, letter writing, reports, and language uses in agriculture. May not be substituted for Eng 104, 105, or 106. 3 lectures. Prerequisite: passing grade on placement examination.

Eng 104  Language Communication (3)
Oral and written communication as they relate to examining assumptions, distinguishing fact from opinion, and recognizing oversimplification and rationalization. Application of these skills to reports, letter writing, and factual exposition. 3 lectures. Prerequisite: satisfactory grade on entrance examination.

Eng 105  Language Communication (3)
Oral and written communication as they relate to testing inferences, using forms of logic, and developing adequate definitions. Application of these skills to practical problem-solving situations involving argumentation, persuasion, and use of evidence. 3 lectures. Prerequisite: Eng 104

Eng 106  Language Communication (3)
Oral and written communication as they are used in the mass media, particularly newspapers, magazines, radio, and movies. Analysis of language components in propaganda disseminated through these media. 3 lectures. Prerequisite: Eng 105

Eng 201  Public Speaking (2)
Oral presentation of facts and opinion and 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

Eng 211  Modern Literature (3)
Consideration, through the study of modern literature, of the problems of man and his social world—his search for social, political, and economic stability. 3 lectures. Prerequisite: Eng 106
**Eng 212 Modern Literature** (3)
Consideration, through the study of modern literature, of the problems of man and his material world—his reaction to nature, science, and machinery. 3 lectures. Prerequisite: Eng 106

**Eng 213 Modern Literature** (3)
Consideration, through the study of modern literature, of the problems of man's inner world—his attempt to understand himself through psychology, religion, and philosophy. 3 lectures. Prerequisite: Eng 106

**Eng 301 Report Writing** (3)
Practice in routine business correspondence followed by a study of the engineering report, technical article, and research paper. 3 lectures. Prerequisite: Eng 106

**Eng 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: Eng 201

**Eng 311 The American Scene** (3)
Use of materials from American writings to distinguish between democratic and authoritarian concepts of the role of man in society. Continued emphasis on the relation of language to thinking. 3 lectures. Prerequisite: Eng 106

**Eng 312 The American Scene** (3)
Use of materials from American writings to distinguish between absolutistic and relativistic concepts of the role of man in adjusting to his physical, social, and religious environment. Continued emphasis on the relation of language to thinking. 3 lectures. Prerequisite: Eng 106

**Eng 313 The American Scene** (3)
Use of materials from American writings to distinguish between idealistic and realistic concepts of the role of literature in man's everyday experience. Use of current fiction, drama, and poetry. Continued emphasis on the relation of language to thinking. 3 lectures. Prerequisite: Eng 311 or 312

**Eng 402 Advanced Letter Writing** (2)
Advanced letter writing problems; letters of application, inquiries, questionnaires, and the psychology of modern business letters. 2 lectures. Prerequisite: Eng 106
The major function of the Department of Health and 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 provides an intramural sports program for the students of the college. A second function of the department is to prepare secondary school teachers in the fields of safety, health, driver training, physical education, and athletic coaching.

In addition to the functions mentioned above, the department provides special services such as workshops to the health and physical education organizations of the State.

In general, courses beyond the freshman level are open only to students who are majoring or minoring in health and physical education and to those receiving permission of the Health and Physical Education Department.

Extensive outdoor facilities include a football stadium, large turfed area for physical education classes, intramural sports and varsity practice fields, regulation baseball diamond, quarter mile track with a 220-yard straightaway, and basketball, volleyball, tennis, and handball courts.

Indoor facilities include a regulation basketball court; areas for boxing; wrestling, weight lifting, and gymnastics; a 75-foot swimming pool, and showers and individual locker facilities to accommodate four sports squads at one time.

### CURRICULUM IN HEALTH AND PHYSICAL EDUCATION

#### Freshman

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<th>Course</th>
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<tbody>
<tr>
<td>Language Communication (Eng 104, 105, 106)</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Basic Mathematics for General Education (Math 111, 112)</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Health and Hygiene (PE 107)</td>
<td></td>
<td></td>
<td>2</td>
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<tr>
<td>Physical Education (PE 141, 142, 143)</td>
<td>½</td>
<td>½</td>
<td>½</td>
</tr>
<tr>
<td>Safety and First Aid (PE 101)</td>
<td>2</td>
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<tr>
<td>Community Recreation (PE 106)</td>
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<td>3</td>
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<tr>
<td>Swimming and Water Sports (PE 103)</td>
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<tr>
<td>Intramural Sports (PE 202)</td>
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<tr>
<td>General Zoology (BSc 131, 132)</td>
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<tr>
<td>Public Speaking (Eng 201)</td>
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<tr>
<td>Electives</td>
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Total: 16 ½

#### Sophomore

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<th>Course</th>
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<tr>
<td>Principles of Economics (Ec 201, 202)</td>
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<td>3</td>
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<tr>
<td>Economic Problems (Ec 213)</td>
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<tr>
<td>General Psychology (Psc 202)</td>
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<tr>
<td>General Physical Science (Psc 101, 102, 103) or equivalent</td>
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<tr>
<td>Sports Education (PE 241, 242, 243)</td>
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<td>½</td>
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<tr>
<td>Human Anatomy (BSc 237)</td>
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<tr>
<td>Human Physiology (BSc 238, 239)</td>
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<tr>
<td>Principles of Physical Education (PE 201)</td>
<td></td>
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<td></td>
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<tr>
<td>Apparatus and Gymnastics (PE 222)</td>
<td></td>
<td>2</td>
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<tr>
<td>Health Education (PE 203)</td>
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<tr>
<td>Public Speaking (Eng 308)</td>
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<tr>
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Total: 17 ½

#### Junior

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<tbody>
<tr>
<td>American Government (Pol Se 301)</td>
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<tr>
<td>*Growth of American Democracy (Hist 304)</td>
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<td>3</td>
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<tr>
<td>Literature</td>
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<tr>
<td>Educational Psychology (Ed 312)</td>
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<td>5</td>
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<tr>
<td>Football Coaching Theory and Practice (PE 321)</td>
<td>2</td>
<td></td>
<td></td>
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<tr>
<td>Track and Field Theory and Practice (PE 333)</td>
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</table>

* Social Science minors should take History 301, 302, 303 in lieu of this course.
Junior—Continued

Baseball Theory and Practice (PE 323)  F  W  S  2
Elementary Physical Education Activities (PE 332)  3
Physiology of Exercise (PE 303)  2
Techniques of Officiating (PE 311)  2
Physical Education Activity (PE 341, 342, 343)  1  1  1
Kinesiology (PE 302)  1  2
† Electives  6  2  4

17  16  17

Senior

State and Local Government (Pol Sc 401)  3
Senior Project (PE 461, 462)  2  2
Undergraduate Seminar (PE 463)  2
U. S. in World Affairs (Hist 305)  3
Family Psychology (Psy 403)  3
Basketball Theory and Practice (PE 422)  2
Minor Sports Theory and Practice (PE 423)  3
Organization and Administration of Physical Education (PE 401)  3
Tests and Measurements in Physical Education (PE 412)  3
School Health Administration (PE 405)  2
Athletic Training and Massage (PE 432)  1
Corrective Physical Education (PE 406)  2
Methods of Physical Education (PE 403)  3
† Electives  5  3  6

16  16  16

DESCRIPTIONS OF COURSES IN HEALTH AND PHYSICAL EDUCATION

PE 101  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 103  Swimming and Water Sports Theory and Practice  (2)
Supervision of pool activities. Swimming instruction and safety. 1 lecture, 1 laboratory.

PE 106  Community Recreation  (3)
The supervision and administration of community recreation. Games and activities suitable for a community recreation program. 1 lecture, 2 laboratories.

PE 107  Health and Hygiene  (2)
Personal hygiene and health education and the relation of exercise, 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 141  Physical Education  (½)
Fundamentals of sports and games. 2 laboratories.

PE 142  Physical Education  (½)
Tumbling and apparatus work; boxing and wrestling; 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.

† Recommended in mathematics, social studies, or science.
PE 151, 152, 153 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 202 Intramural Sports (3)
Sports adapted to intramural use. Organization of intramural programs. 2 lectures, 1 laboratory.

PE 203 Health Education (2)
General school health problems of interest to students of physical education, teachers in service, and others. 2 lectures.

PE 222 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 241 Sports Education (½)
Training and competition in seasonal sports such as speedball, touch football, 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, and soccer. 2 laboratories.

PE 245 Advanced Swimming and Lifesaving (½)
Lifesaving techniques. Students may qualify for lifesaving tests. 2 laboratories.

PE 251, 252, 253 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 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 311 Techniques of Officiating (2)
Techniques of officiating all sports. 1 lecture, 1 laboratory.

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 321 Football Coaching Theory and Practice (2)
Fundamentals and systems of offense and defense, rules of the game. 2 lectures.

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 332 Elementary Physical Education Activities (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 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 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 Corrective Physical Education (2)
Group procedure in the administration of individual exercise for the correction of various defects in body mechanics. 2 lectures.

PE 412 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 422 Basketball Coaching Theory and Practice (2)
Fundamental individual basketball skills. Theories of offensive and defensive team play. 1 lecture, 1 laboratory.

PE 423 Minor Sports Theory and Practice (3)
Techniques of minor sports. Fundamentals of tennis, golf, boxing, wrestling, and gymnastics; the place of minor sports in a school program. 2 lectures, 1 laboratory.

PE 432 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 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 Corrective 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. Prerequisite: Graduate standing.

PE 512 Advanced Personal Hygiene (3)
Rules of hygiene; problems of healthful living, and school hygiene. 3 lectures. Prerequisite: Graduate standing.

PE 513 Research Techniques in Physical Education (4)
Tools of research as applied to the field of physical education; measurement, surveys, job analysis, and testing. 4 lectures. Prerequisite: Graduate standing.
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 services 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 Liberal Arts Division will normally begin with Math 111. Students in the Agricultural Division will normally begin with Math 102.

### CURRICULUM IN MATHEMATICS

<table>
<thead>
<tr>
<th>Freshman</th>
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<tbody>
<tr>
<td>Mathematics for Engineers (Math 117, 118)</td>
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<tr>
<td>Calculus (Math 201)</td>
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<tr>
<td>Language Communication (Eng 104, 106)</td>
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<tr>
<td>Physical Education (PE 141, 142, 143)</td>
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<tr>
<td>Health and Hygiene (PE 107)</td>
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<tr>
<td>Biological Science (BSc 101, or 121, or 131)</td>
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<tr>
<td>General Physics (PSc 131, 132)</td>
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<tr>
<td>Calculus (Math 202, 203)</td>
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<td>Differential Equations (Math 316)</td>
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<td>General Psychology (Pys 202)</td>
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<td>General Physics (PSc 133)</td>
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<td>Principles of Economics (Ec 201)</td>
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<tr>
<td>Differential Equations (Math 317)</td>
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<td>Math, Analysis of Engineering Problems (Math 318)</td>
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<td>Introduction to Theory of Equations (Math 307)</td>
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<td>American Government (Pol Sc 301)</td>
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<td>Growth of American Democracy (Hist 304)</td>
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| Total Credit Hours | 17 17 16 16 |

* Fifteen units must be selected from approved skills courses.
† Fifteen units must be selected from approved applied mathematics courses.
‡ Three of these units must be taken from Ec 202, 316, or 412.
### DESCRIPTIONS OF COURSES IN MATHEMATICS

**Math 1 Preparatory Mathematics**
Fundamentals of fractions, ratios, decimals, percentage, linear measures, areas, volumes, and first principles of algebra, including linear equations. 5 lectures.

**Math 7 Preparatory Algebra**
Signed numbers, linear equations, literal equations, formula evaluation, functional relationships, graphing linear and quadratic equations, factoring algebraic fractions, fractional equations. 5 lectures. Prerequisite: Satisfactory score on entrance examination.

**Math 102 Agricultural Mathematics I**
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. Prerequisites: Satisfactory scores on entrance examination, or Math 1

**Math 103 Agricultural Mathematics II**
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**
Operation of the slide rule and methods of computation used in engineering. 1 lecture. Prerequisite: Math 103 or 117

**Math 105 Printer's Mathematics**
Special fractions, percentage, compound numbers, point system, spacing, ratio and proportion, margins, estimating, and micrometer reading. 3 lectures. Prerequisite: Math 1 or satisfactory score on entrance examination.

**Math 111 Basic Mathematics for General Education**
Proportion, variation, units of measurement, slide rule, and probability as applied to biological science, physical education, and social science. 3 lectures. Prerequisites: Satisfactory score on entrance examination or Math 7

**Math 112 Basic Mathematics for General Education**
Elements of trigonometry, analytic geometry, and statistics as applied to biological science, physical education, social science. 3 lectures. Prerequisite: Math 111

**Math 114 Agricultural Mathematics III**
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 105

**Math 115 Agricultural Mathematics IV**
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**
Factoring, algebraic fractions, linear equations, logarithms, right and oblique triangle problems, graphs of trigonometric functions, and trigonometric relationships needed in engineering. 5 lectures. Prerequisite: Math 7 or satisfactory score on entrance examination

* Fifteen units must be selected from approved skills courses.
† Fifteen units must be selected from approved applied mathematics courses.
Math 118 Mathematics for Engineers (5)
An integrated course in college algebra and analytic geometry. Quadratic systems, conic sections, determinants, higher plane curves, complex numbers, and elementary theory of equations. 5 lectures. Prerequisite: Math 117

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 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 transcendental functions by formula, trigonometric substitution, parts, partial fractions, and tables. Methods used in approximate integration, evaluating indeterminate forms, and improper integrals. Applied problems using transcendental functions. 3 lectures. Prerequisite: Math 202

Math 211 First Course in Statistical Method (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

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 coordinates, empirical equations, properties of determinants, infinite series, hyperbolic functions, multiple integration, partial derivatives. 2 lectures. Prerequisite: Math 203

Math 307 Introduction to Theory of Equations (3)
Complex numbers, general theorems on algebraic equations, solution of the general cubic and quartic, methods of solution of algebraic equations. 3 lectures. Prerequisite: Math 201

Math 312 Matrix Analysis of Electric Networks (2)
Definition and fundamental operations of matrices. Application of matrix transformations and inversions to electric networks. 2 lectures. Prerequisite: Math 317

Math 316 Differential Equations (3)
An introduction to first order differential equations and simple linear equations with constant coefficients. Applications to dynamics, electric circuits, and heat flow. 3 lectures. Prerequisite: Math 203

Math 317 Differential Equations (2)
Linear differential equations with constant coefficients. Operational methods including an introduction to the Laplace transform. 2 lectures. Prerequisite: Math 316

Math 318 Mathematical Analysis of Engineering Problems (3)
Gamma functions, Laplace transforms, the Heaviside operator, the Fourier integral, the elliptic integral, and probability. 3 lectures. Prerequisite: Math 317

Math 319 Mathematical Analysis of Engineering Problems (3)
Infinite series, Bessel functions, Fourier series, partial differential equations. 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. Offered in odd-numbered years.
Math 402 Secondary School Mathematics (3)
Evaluation of content, texts, and supplementary material for seventh and eighth grade arithmetic, ninth and twelfth grade general mathematics, and remedial mathematics with techniques for developing concepts. 3 lectures, 1 laboratory. 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 laboratory. 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 203

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. Offered in even-numbered years.

Math 408 Functions of a Complex Variable (2)
Fundamental properties of a complex variable. Conformal mapping and its applications to heat transfer, electric potential theory, and hydrostatics. 2 lectures. Prerequisite: Math 317. Offered in odd-numbered years.

Math 409 Functions of a Complex Variable (2)
Analysis of two-dimensional fields by use of conformal mapping. 2 lectures. Prerequisite: Math 408

Math 412 Advanced Calculus (3)
Real number system, continuum, Dedekind cuts, sequences, limits, continuity, derivatives and differentials, Riemann integration. 3 lectures. Prerequisite: Math 203. Offered in even-numbered years

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 Non-Euclidean 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)
The seminars are 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: Approval by instructor.

* Not offered 1954-55.
MILITARY SCIENCE AND TACTICS DEPARTMENT

Capt. Howard H. Braunstein
Capt. George W. Thoemke

The major purpose of California State Polytechnic College's ROTC program is the training of officers to serve with the Army's Organized Reserve Corps and the National Guard. In addition, however, the program provides for selection of distinguished graduates of senior ROTC units for direct Regular Army appointment as junior officers. Through competitive active-duty tours of volunteer officers, it is also possible to obtain a Regular Army commission. The basic course (first and second academic years) will consist of three class-hours per week. Advanced-course cadets will receive five hours' instruction per week. As in any other course, credits count toward college graduation. Within regulations prescribed by the Department of the Army, draft deferment will be afforded those who qualify and apply.

ARMS, EQUIPMENT, AND UNIFORMS

The United States Government furnishes arms, equipment, uniforms, and textbooks for cadets. This property belongs to the government and must be returned at the end of each school year.

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, as in the advanced course, is voluntary. To be eligible for enrollment in the basic course, a student must be a citizen of the United States and physically and morally qualified. Veterans with one year or more in the armed forces may, upon proper certification, be given credit for completion of the basic course and enrolled directly into the advanced course. Other students with previous military training or 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 training in a junior division ROTC unit, equivalent training at a government-recognized school, or senior division ROTC training at another institution may be granted advanced standing in the basic course depending on previous ROTC training completed. Satisfactory completion of the junior ROTC program of three years will entitle the student to enroll initially in the second year of the basic course.

It is essential that each entering student who desires advance ROTC credit should, prior to his enrollment, secure from the high school or other institution concerned a transcript of his previous ROTC training. This transcript should be presented by the student for proper evaluation at the time he enrolls as a cadet.

ADVANCED COURSE

The major purpose of the advanced course is to produce college-trained junior officers to meet Army and reserve officer 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. When a student enrolls in the advanced course, completion thereof becomes a prerequisite to graduation from the college unless discharged by competent authority.

All graduation majors at California State Polytechnic College are listed as recommended for students interested in a Regular Army commission.

Students who do not qualify as distinguished military graduates may compete for a Regular Army commission by taking the "competitive tour of duty" following college graduation.

The advanced course is offered for regularly enrolled students physically qualified and between the ages of 16 to 26, and who either have graduated from the basic course or have completed one or more years of active service in the armed forces. In addition, advanced-course students should have at least two academic years remaining prior to graduation or a like period to complete academic work for a post-graduate degree.
advanced course may, at the discretion of the head of the Department of Military Science and Tactics and the president of the college, be compressed to a shorter period. Advanced-course students receive from the Government commutation of subsistence equivalent to the value of the Army ration (about $27 per month).

At time of enrollment in the advanced course, a student must agree to accept a commission as a second lieutenant in the Army Organized Reserve Corps and to serve two years on active duty, if called.

**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 to and from camp, and subsistence and 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.

**DESCRIPTION OF COURSES IN MILITARY SCIENCE AND TACTICS**

**MS&T 101-102-103 Basic Course**

Basic theoretical and practical education to enable the student to operate as a soldier in the field. Enrollment limited to those students without previous military training who are accepted by the head of the Department of Military Science and Tactics. May be substituted for Phys. Ed. 141, 142, 143, 241, 242, 243. Two lectures. One hour and 20 minutes field instruction.

**MS&T 201-202-203 Basic Course**

To continue and preserve the training given in 101, 102, and 103, and to instill a theoretical and practical knowledge of military tactics as applied to the individual and small groups. Prerequisite: MS&T 103 or previous equivalent ROTC or military training.

**MS&T 301-302-303 Advanced Course, Senior ROTC**

Continuation and preservation of the training given in the basic course or service in the armed forces; leadership and the duties of company grade officers. Four lectures; one hour and 20 minutes field instruction per week. Prerequisite: MS&T 203 or equivalent.

**MS&T 400 ROTC Summer Camp**

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-weeks period during the period normally following completion of MS&T 303.

**MS&T 401-402-403 Advanced Course Senior ROTC**

Continuation of 301, 302, and 303 to qualify the student for a commission in the Officers' Reserve Corps, United States Army, or a commission in the Regular Army.

*Formal enrollment in the advanced courses will make the completion thereof a prerequisite to graduation from the college unless the student is discharged by appropriate authority.
The purposes of the courses offered in the Music Department are: First, to give all musically inclined students the opportunity to participate in college musical organizations; and second, to give all students interested in music a broader insight into the general field of music through courses in appreciation, theory, and harmony.

It is necessary that the student have some previous experience with a musical instrument in order to try out for band and orchestra. While previous experience in choral singing is helpful, it is not mandatory for the student trying out for the glee club.

While it is not possible for a student to major in the Music Department, 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 various organizations such as glee club, orchestra, band, quartets, and small groups.

**DESCRIPTONS OF COURSES IN MUSIC**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Credits</th>
<th>Credits</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Mu 141, 142, 143</td>
<td><strong>Orchestra</strong></td>
<td>(2)</td>
<td>(2)</td>
<td>(2)</td>
</tr>
<tr>
<td>Mu 151, 152, 153</td>
<td><strong>Band</strong></td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
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<tr>
<td>Mu 154, 155, 156</td>
<td><strong>Glee Club</strong></td>
<td>(1-2)</td>
<td>(1-2)</td>
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<tr>
<td>Mu 202</td>
<td><strong>Music Theory</strong></td>
<td>(3)</td>
<td></td>
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</tr>
<tr>
<td>Mu 203</td>
<td><strong>Harmony and Theory</strong></td>
<td>(3)</td>
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<tr>
<td>Mu 204, 205, 206</td>
<td><strong>Music Appreciation</strong></td>
<td>(2)</td>
<td>(2)</td>
<td>(2)</td>
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<tr>
<td>Mu 241, 242, 243</td>
<td><strong>Orchestra</strong></td>
<td>(2)</td>
<td>(2)</td>
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<tr>
<td>Mu 251, 252, 253</td>
<td><strong>Band</strong></td>
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<tr>
<td>Mu 254, 255, 256</td>
<td><strong>Glee Club</strong></td>
<td>(1-2)</td>
<td>(1-2)</td>
<td>(1-2)</td>
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<tr>
<td>Mu 341, 342, 343</td>
<td><strong>Orchestra</strong></td>
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<td>Course</td>
<td>Description</td>
<td>Term(s)</td>
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<tr>
<td>Mu 351, 352, 353</td>
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<td>Continuation of Mu 251, 252, 253</td>
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<td>Mu 354, 355, 356</td>
<td>Glee Club</td>
<td>(1-2) (1-2) (1-2)</td>
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<td></td>
<td>Continuation of Mu 254, 255, 256</td>
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<tr>
<td>Mu 441, 442, 443</td>
<td>Orchestra</td>
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<td>Continuation of Mu 341, 342, 343</td>
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<td>Mu 451, 452, 453</td>
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<td>Mu 454, 455, 456</td>
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</table>
The primary purpose of the Physical Science Department is to offer courses which help provide scientific explanations for work taken by students in the Engineering and Agricultural Divisions and which contribute to the general education of all students by giving them a thorough foundation in the method and factual content of science and the role which it plays in our society.

The second objective is to prepare students for employment as secondary school teachers. The graduates may also find employment in civil service and in the purchasing, sales, personnel, and technical divisions of industrial firms.

It is recommended that the high school student planning a physical science major should include in his high school program three semesters of algebra, one of trigonometry, two of geometry, two of physics, and two of chemistry.

Before a student is admitted to General Physics, he is required to take a placement examination in mathematics. If the result of this examination indicates that he is unlikely to succeed in General Physics, it is recommended that he take Preparatory Physics and Preparatory Mathematics before taking General Physics. Students enrolling in General Chemistry are required to pass a placement test, or PSc 4, or the equivalent.

CURRICULUM IN PHYSICAL SCIENCE

**Freshman**

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<thead>
<tr>
<th>Course</th>
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<tr>
<td>Language Communication (Eng 104, 105, 106)</td>
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<td>3</td>
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<tr>
<td>Physical Education (PE 141, 142, 143)</td>
<td>4</td>
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<tr>
<td>Health and Hygiene (PE 107)</td>
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<tr>
<td>General Physics (PSc 131, 132)</td>
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<tr>
<td>Mathematics for Engineers (Math 117, 118)</td>
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<tr>
<td>Calculus (Math 201)</td>
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<tr>
<td>General Biology (BSc 101, 102)</td>
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<tr>
<td>Engineering Drafting (ME 121) or other elective</td>
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<tr>
<td>Machine Shop (MS 147)</td>
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<tr>
<td>Electives</td>
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**Sophomore**

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>General Physics (PSc 133)</td>
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<tr>
<td>Principles of Economics (Ec 201)</td>
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<tr>
<td>Calculus (Math 202, 203)</td>
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<tr>
<td>General Chemistry (PSc 321, 322, 323)</td>
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<tr>
<td>Differential Equations (Math 316)</td>
<td>3</td>
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<tr>
<td>Engineering Statics (PSc 201)</td>
<td>3</td>
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<tr>
<td>Sound (PSc 212)</td>
<td>3</td>
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<tr>
<td>Light (PSc 223)</td>
<td>3</td>
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<tr>
<td>Engineering Dynamics (PSc 202)</td>
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<tr>
<td>Literature</td>
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<td>Literature, Art, and/or Music</td>
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<td>Construction of Laboratory Glassware (PSc 243)</td>
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<td>Sports Education (PE 241, 242, 243)</td>
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<td><strong>Total</strong></td>
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**Junior**

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<th>Course</th>
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<tbody>
<tr>
<td>Differential Equations (Math 317)</td>
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<tr>
<td>General Psychology (Psy 202)</td>
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<tr>
<td>Organic Chemistry (PSc 326)</td>
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<tr>
<td>Quantitative Analysis (PSc 331, 332)</td>
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<td>Heat (PSc 301)</td>
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<tr>
<td>Advanced Electricity and Magnetism (PSc 303)</td>
<td>3</td>
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<tr>
<td>Geology or Astronomy (PSc 406 or 416)</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
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### Liberal Arts Division

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<tr>
<td>American Government (Pol Sc 301)</td>
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<tr>
<td>Growth of American Democracy (Hist 304)</td>
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<tr>
<td>U. S. in World Affairs (Hist 305)</td>
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<th>Senior</th>
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<tbody>
<tr>
<td>Geology or Astronomy (PSc 406 or 416)</td>
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<tr>
<td>Modern Physics (PSc 401, 402)</td>
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<tr>
<td>Agricultural Biochemistry (PSc 328)</td>
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<tr>
<td>Physical Chemistry (PSc 405)</td>
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<tr>
<td>Senior Project (PSc 461, 462)</td>
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<tr>
<td>Undergraduate Seminar (PSc 463)</td>
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<tr>
<td>Commercial Law (Ec 316)</td>
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<td>Economics</td>
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<tr>
<td>Family Psychology (Psy 402)</td>
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<td>Electives</td>
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<td><strong>16</strong></td>
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### Descriptions of Courses in Physical Science

**PSc 4 Preparatory Chemistry**
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

**PSc 7 Preparatory Physics**
For students whose background is deficient in physics and mathematics. The elements of mechanics, heat, light, sound, magnetism, and electricity with emphasis on problems involving mechanics. 5 lectures. Prerequisite: Math 7

**PSc 101 General Physical Science**
For liberal arts students not majoring in mathematics or a natural science. 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: Math 103 or 112

**PSc 102 General Physical Science**
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**
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 131 General Physics**
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, 118, or higher.

**PSc 132 General Physics**
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: PSc 131
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>PSc 133</td>
<td>General Physics</td>
<td>4</td>
<td>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 recitation, 1 laboratory. Prerequisite: PSc 132</td>
</tr>
<tr>
<td>PSc 201</td>
<td>Engineering Statics</td>
<td>3</td>
<td>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: PSc 131, Math 201</td>
</tr>
<tr>
<td>PSc 202</td>
<td>Engineering Dynamics</td>
<td>3</td>
<td>Rectilinear and curvilinear motion and the forces involved. Rotation. Work, energy, and power. Plane motion. Impulse, momentum, and impact. 3 lectures. Prerequisite: PSc 201</td>
</tr>
<tr>
<td>PSc 212</td>
<td>Sound</td>
<td>3</td>
<td>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: PSc 133</td>
</tr>
<tr>
<td>PSc 223</td>
<td>Light</td>
<td>3</td>
<td>The physical nature of light. Reflection, refraction, diffraction, interference, polarization, and absorption of light. 2 lectures, 1 laboratory. Prerequisite: PSc 133. Math 201 is strongly recommended.</td>
</tr>
<tr>
<td>PSc 243</td>
<td>Construction of Laboratory Glassware</td>
<td>1</td>
<td>Techniques of glassblowing applied to the making of simple laboratory apparatus. 1 laboratory. Prerequisite: PSc 321 or 324</td>
</tr>
<tr>
<td>PSc 306</td>
<td>Thermodynamics</td>
<td>3</td>
<td>Solution of basic problems dealing with forms of energy, thermodynamic coordinates, first and second laws of thermodynamics, gas laws, energy equations, reversible non-flow processes of gases, Carnot cycle. 3 lectures. Prerequisites: PSc 132, Math 203</td>
</tr>
<tr>
<td>PSc 321</td>
<td>General Chemistry</td>
<td>4</td>
<td>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 students. 3 lectures, 1 laboratory. Prerequisite: PSc 4 or the passing of a placement test.</td>
</tr>
<tr>
<td>PSc 322</td>
<td>General Chemistry</td>
<td>4</td>
<td>Electrochemistry and the chemistry of the alkali metals and the commoner nonmetals. 3 lectures, 1 laboratory. Prerequisite: PSc 321</td>
</tr>
<tr>
<td>PSc 323</td>
<td>General Chemistry</td>
<td>4</td>
<td>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: PSc 322</td>
</tr>
</tbody>
</table>
PSc 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: PSc 4 or the passing of a placement test.

PSc 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: PSc 324

PSc 326 Organic Chemistry (4)
The fundamental concepts of organic chemistry with applications to industrial and agricultural processes. 3 lectures, 1 laboratory. Prerequisites: PSc 322 or 325

PSc 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, insecticides, and dairy products. 3 lectures, 1 laboratory. Prerequisite: PSc 326

PSc 331 Quantitative Analysis (4)
Principles of gravimetric analysis applied to industrial methods for metals, with less work on determination of anions. The laboratory work is the focal point with class discussion supplying supporting theory. 2 lectures, 2 laboratories. Prerequisite: PSc 328 or 325

PSc 332 Quantitative Analysis (4)
Volumetric industrial analytical procedures based upon precipitometry, redoximetry, alkalimetry, and acidimetry. Basic theory of the laboratory procedure is considered in class discussions. 2 lectures, 2 laboratories. Prerequisite: PSc 331

PSc 401 Modern Physics (3)
Recent and current problems in physics. Determination of “e” and “e/m.” Photoelectric effect, the Bohr atom, X-rays, the cyclotron, betatron, and linear accelerators. 3 lectures. Prerequisites: PSc 133, 323, Math 317

PSc 402 Modern Physics (3)
Spectral analysis and atomic theory. Wave mechanics. Preliminary considerations of special theory of relativity. 3 lectures. Prerequisite: PSc 401

PSc 403 Physical Chemistry (3)
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. Prerequisite: PSc 323

PSc 406 Geology (3)
Fundamental geologic processes. General surface features of the earth. Rocks and minerals. 3 lectures. Given in odd numbered years.

PSc 416 Astronomy (3)
Astronomical properties of the earth, solar system, stars, and galaxies. Principles and methods of astronomical investigation. 3 lectures. Prerequisite: PSc 132. Given in even numbered years.

PSc 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.

PSc 463 Undergraduate Seminar (2)
A discussion of periodicals of an appropriate level. 2 meetings.
PSc 501 Selected Topics in Advanced Physics (3)
Electromagnetic theory of radiation, and special theory of relativity. 3 lectures. Prerequisite: graduate standing.

PSc 502 Nuclear Physics (3)
Fundamental observations. Theory of nuclear structure. Nuclear reactions and nuclear reactors. 3 lectures. Prerequisite: graduate standing.

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 513 Advanced Inorganic Chemistry (3)
Selected topics concerning the preparation and uses of commercially important materials. 3 lectures. Prerequisite: graduate standing.

PSc 521 Curriculum and Methods in Physical Science (3)
Techniques, aims, and objectives in physical science and general science teaching at the secondary school level. Selection and organization of teaching material. Evaluation of results. 3 lectures. Prerequisite: graduate standing.
The Social Science Department 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 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 sciences 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 SCIENCE**

**Freshman**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
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<th>S</th>
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<tbody>
<tr>
<td>Language Communication (Eng 104, 105, 106)</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Physical Education (PE 141, 142, 143)</td>
<td>¼</td>
<td>¼</td>
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<tr>
<td>Health and Hygiene (PE 107)</td>
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<td></td>
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<tr>
<td>Basic Mathematics for General Education (Math 111, 112)</td>
<td>3</td>
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<td></td>
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<tr>
<td>General Biology (BSc 101, 102, 103) or equivalent</td>
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<td>3</td>
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<tr>
<td>History of Civilization (Hist 101, 102, 103)</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Typing (Jour 140/141)</td>
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<tr>
<td>* Electives</td>
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**Sophomore**

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<th>Course</th>
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<tbody>
<tr>
<td>Principles of Economics (Ec 201, 202)</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Economic Problems (Ec 213)</td>
<td></td>
<td></td>
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<tr>
<td>Sports Education (PE 241, 242, 243)</td>
<td>¼</td>
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<tr>
<td>General Psychology (Psy 202)</td>
<td></td>
<td></td>
<td>3</td>
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<tr>
<td>General Physical Science (PSc 101, 102, 103,) or equivalent</td>
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<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Principles of Sociology (SSc 201, 202, 203)</td>
<td>3</td>
<td>3</td>
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<tr>
<td>American Government</td>
<td></td>
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<tr>
<td>Public Speaking (Eng 201, 303)</td>
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<tr>
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**Junior**

<table>
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<th>Course</th>
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</thead>
<tbody>
<tr>
<td>† History of the United States (Hist 301, 302, 303)</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Inter-American Relations (SSc 311)</td>
<td></td>
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<tr>
<td>The U.S. in World Affairs (Hist 305)</td>
<td></td>
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<tr>
<td>International Relations (Pol Sc 312)</td>
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<tr>
<td>Comparative Government (Pol Sc 318)</td>
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<tr>
<td>Literature</td>
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<tr>
<td>Global Geography (SSc 308)</td>
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<tr>
<td>Commercial Law (Ec 316)</td>
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<tr>
<td>Statistical Method (Math 211)</td>
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<tr>
<td>* Electives</td>
<td>2</td>
<td>3</td>
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</table>

* Of the 52 units of electives, 24 will require approval of department head.
† Hist 304 will not substitute for any part of this requirement.
<table>
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<th>Course</th>
<th>Units</th>
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<tr>
<td>Family Psychology (Psy 403)</td>
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<tr>
<td>History of Pacific Area (Hist 411, 412)</td>
<td>3</td>
</tr>
<tr>
<td>State and Local Government (Pol Sc 401)</td>
<td>3</td>
</tr>
<tr>
<td>Senior Project (SSc 461, 462)</td>
<td>2</td>
</tr>
<tr>
<td>Undergraduate Seminar (SSc 463)</td>
<td>2</td>
</tr>
<tr>
<td>Social Psychology (Psy 401)</td>
<td>3</td>
</tr>
<tr>
<td>Accounting (Ec 301, 302)</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
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</tbody>
</table>

**Total Units:** 17

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### DESCRIPTIONS OF COURSES IN SOCIAL SCIENCE

**Ec 100 Project Records**

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.

**Ec 101 Farm Records and Farm Management Practices**

Farm record keeping 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 Ec 321 or 322. 3 lectures, 1 laboratory.

**Ec 201 Principles of Economics**

The financial, market, agricultural, and industrial structure of the American Economy; immediate problems facing the individual living therein. 3 lectures.

**Ec 202 Principles of Economics**

Introductory analytical economics. Prices 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**

The relationship between the consumption and production of goods and the satisfaction of human wants. Problems of exchange, nationally and internationally. Public regulation. Comparative economic systems and the problem of reform. 3 lectures. Prerequisite: Ec 201

**Ec 301, 302 Principles of Accounting**

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 304 Agricultural Marketing**

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 202

**Ec 305 Agricultural Resources**

Resources including soil, climate, topography, institutions, farm crops, and animal products. Determinants of production areas of United States. Emphasis given to California. 3 lectures.

**Ec 310 Credit and Finance**

Presentation of sound credit principles and their effect on farmers, farm equipment dealers, and other small businesses. Financing problems of the businessman studied and analyzed through all phases of credit institutions and operations. 3 lectures. Prerequisite: Ec 301 or 321

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

$ Ec 411, 412 will substitute.
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. Prerequisite: Ec 201, 316

Ec 321 Farm Records (3)
The fundamental processes of record keeping based on the uses of records, the kinds of records that could be kept, the farm inventory, depreciation, the cash and accrual basis of income tax reporting, the basic fundamental reports, i.e., the balance sheet and the operating statement and their analysis. 2 lectures, 1 laboratory. Prerequisite: Ec 202

Ec 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 farm. 3 lectures, 1 laboratory. Prerequisites: Ec 321 or 301 and 302

Ec 403 Agricultural Prices and Government Control (3)
General price level, price making 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

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, and supplementary financial statements. 1 lecture.

Ec 423 Farm Management II (3)
Farm appraisal methods, financing the farm operations; techniques and experience in analyzing crop, orchard, and livestock enterprises; job cost approximation. 3 lectures. Prerequisite: Ec 322

Ec 582 Seminar in Economic Problems (2)
Selected problems at an advanced level; distribution of income, private and public finance, economic mobilization, and international trade. 2 meetings. Prerequisites: 9 units of economics and graduate standing.

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 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 historical 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 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 internal policies and international relations of lands of Pacific Basin from 1750 to present. Development of Japan and China and their present day problems. Growth of United States interests and responsibilities in Pacific area. 3 lectures.

Hist 583 Contemporary Problems of the Pacific Area (2)
Internal and international problems of the countries of the Pacific area since 1945. Conducted as seminar. 2 lectures. Prerequisite: Graduate standing; social science major.

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.

Pol Sc 301 American Government (3)

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 (2)
Intensive study of current problems in international relations. Geopolitical factors; contributory causes of international conflict, and analyses of proposed solutions. 2 meetings. Prerequisites: Graduate standing and major in social science.

Ssc 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.

Ssc 308 Global Geography (3)
Survey of man’s utilization and occupation of the earth. Inter-relations of human life and elements of natural dependence of nations, and world trade. Supporting power of geographical environment. 3 lectures.

Ssc 311 Inter-American Relations (3)
Inter-American affairs. Political, economic, and social problems, the origin, and the 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
**Ssc 461, 462 Senior Project**

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.

**Ssc 463 Undergraduate Seminar**

Intensive study of selected social problems with application of techniques for analysis. 2 meetings. Prerequisite: Completion of thesis.

**Ssc 511 Sources in Social Science**

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.

**Ssc 521 Curriculum and Methods of Teaching the Social Sciences**

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.

**Art 201 Art in Everyday Living**

Role of visual arts in everyday living. Principles of artistic expression approached through fields of architecture, landscaping, sculpture, painting, photography, motion pictures, and such applied arts as ceramics, metal work, and weaving. 3 lectures.
Voorhis Campus

Kellogg Campus

Animal Husbandry

Citrus Fruit Production
INSTRUCTION

Instruction is offered at the Kellogg-Voorhis campus in the departments of Animal Husbandry, Horticultural Services and Inspection, Fruit Production, Ornamental Horticulture, General Crops Production, Soil Science; in general agricultural subjects; and in related biological, physical, and social sciences.

The educational philosophy and pattern of courses followed is the same as that of the Agricultural Division at San Luis Obispo.

Students seeking the bachelor of science degree complete the first two or three years of their curriculum at the Kellogg-Voorhis campus depending on the major in which they are enrolled. The remainder of the requirements must be met at the San Luis Obispo campus.

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, valued at $4,000,000, 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.

In 1951 the State Legislature appropriated $1,000,000 a year for three years to begin the development on the Kellogg-Voorhis campus of four-year programs in Agriculture, Engineering Occupations, Business Education, and Home Economics. Twenty-two buildings with facilities for 3,600 students are proposed in the master plan.
GENERAL INFORMATION

LANDS AND LOCATION

The Kellogg-Voorhis Campus of California State Polytechnic College is about 20 miles east of Los Angeles near the communities of Covina, Pomona, and San Dimas. The campus of the Voorhis Unit includes 157 acres climatically suited for specialization in citrus fruits and ornamental horticulture. Approximately 30 acres are used for citrus, avocados, and deciduous fruits, demonstrating the utilization of land for each agricultural field.

The 800 acres available at the Kellogg Unit provide practical learning opportunities for students enrolled in Animal Husbandry, Ornamental Horticulture, General Crops Production, Fruit Production, Soil Science, and Horticultural Services and Inspection.

BUILDINGS AND EQUIPMENT

VOORHIS CAMPUS

General

Campus activities are centered in the administration group of buildings, which contain administrative offices, classrooms, photographic dark room, and science laboratories. One entire wing is made available for student activities, with campus store, patio, and dining hall.

Library

Another wing houses the college library which is centrally located for convenient use. The library collection emphasizes specialized information pertaining to Horticultural Services and Inspection, General Crops Production, Fruit Production, Ornamental Horticulture, Animal Husbandry, Soil Science, and related fields of agriculture.

Classrooms

The classroom building, containing approximately 10,000 square feet of floor space, provides additional classrooms and offices.

Athletic Plant

The athletic plant covering about five acres is at the extreme east end of the campus. This area includes facilities for track and field events; a football field; two baseball diamonds; basketball, tennis, badminton, and handball courts; a portable boxing ring; and a spacious outdoor swimming pool.

Dormitories

Six stucco buildings designed in the traditional early California mission style serve as residence halls. These dormitories are modern, well-lighted, and arranged for student use. Each dormitory has a lounge which serves to facilitate student recreation. The residence halls are Sunset, Rose, Smith, Jerry, Uncle Charlie’s, and Aunt Nell’s. The latter two are named after the principal donor and his wife, Mr. and Mrs. Charles B. Voorhis.

Housing Project

The housing project for married students and their families is near the swimming pool. This unit consists of two double-story buildings and three single-floor structures equipped with all the necessary conveniences for family life. It houses a total of 44 families. Twenty-eight units have one bedroom, living room, kitchenette, and bath. Sixteen have two bedrooms, living room, kitchenette, and bath. The housing project is equipped with electric washing machines, gas ranges, refrigerators, double and single beds. It also is completely landscaped, including a fenced-in play area for children.

Chapel

Nonsectarian services are held in the campus chapel each Sunday, and many student and community weddings occur in the chapel during the school year. The architectural style of the chapel was patterned by the donors, Charles B. Voorhis and his wife, after the old Spanish missions founded along the West Coast by Padre Serra.
Agricultural Instruction Buildings

In addition to the many classrooms, laboratories, and other facilities used for general instructional purposes, the Kellogg-Voorhis Campus is well-equipped with buildings and laboratories specifically designed for the training in agricultural subjects. Description of these facilities may be found under the heading, Agricultural Division.

KELLOGG CAMPUS

Agricultural Instruction Buildings

Present facilities include a 30-horse stable, exhibition pavilion, hay storage and stallion barn, glasshouse, and farm center with large hay storage barn, draft horse barn, farm machinery shed, and maintenance shops.

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 regularly enrolled students normally become members of the Associated Student Body. The membership fee totals $15 per year and entitles the student to admission to all athletic and social events. 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 CLUBS

All students are encouraged to engage in the social and recreational activities sponsored by the college. The following clubs and organizations are designed to appeal to a variety of student interests: Block "P" Association, Young Farmers, Services and Inspection Club, Ornamental Horticulture Club—"Los Robles," Citrus Club—"Caldimas," Crops Club—"Los Rancheros," Animal Husbandry Club—"Los Ganaderos," Soil Science Club, Gamma Pi Delta, and dormitory clubs.

POLY VUE

Poly Vue is the name given to the annual open house day of the Kellogg-Voorhis campus. 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 sponsored by the students. Each year a coeducational college in the area is selected by the student body to provide a queen and her court.

ATHLETICS

The Kellogg-Voorhis campus participates regularly in inter-collegiate 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 Redlands, California Institute
California State Polytechnic College

of Technology, Occidental, Whittier, and Chico State. At least one game each season takes the football squad on a trip away from home. Golf, cross country, and water polo teams also compete in intercollegiate matches.

An extensive intramural program is an integral part of physical education at the Kellogg-Voorhis campus. Team sports such as touch football, basketball, volleyball, and softball are organized around the six dormitories. 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 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

The services of the placement office on the San Luis Obispo campus are available to graduates and transfers from the Kellogg-Voorhis campus. In addition, staff members of all departments aid in locating jobs for men who have had all or part of their instruction on the Kellogg-Voorhis campus.

EMPLOYMENT

Opportunities are available for students to earn money and gain work experience in line with their major interests. The planting and maintenance of grounds, the maintenance of dormitories; and the care of crops, citrus groves, and horses are among the jobs often assigned to paid student workers. In addition, students work in the cafeteria, on the fire crew, and at other campus tasks. Off-campus jobs also are made available to students.

STUDENT LOANS

The Alex M. Wilson Memorial Loan Fund of $500 was established in September, 1950, to provide short-term loans for needy students. In 1951 the Associated Student Body established the Associated Students Loan Fund in the same amount and for the same purpose.

During 1952 three additional loan funds were inaugurated—the Chet Pencille Memorial Fund of $2,500 (established by the Pest Control Operators of California), the Lemon Men's Club Fund of $500, and the Terminex Educational Foundation Fund of $500.

The Leopold Edward Wrasse Loan Fund is available to students under the same terms and conditions as for students at the San Luis Obispo campus.

SCHOLARSHIPS

In addition to the scholarships listed in the General Information section of this catalog, three 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. The California Nurseryman's Scholarship of $100 is awarded to a promising freshman student in Ornamental Horticulture. One $200 scholarship and one $100 scholarship are included in the Chet Pencille Memorial Fund. They may be awarded to outstanding students completing their junior year in the pest control phase of the Horticultural Services and Inspection major.

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.
The following regulations apply to students at the Kellogg-Voorhis 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 Load, Credit for Military Service. (See section of this catalog on General Regulations.)

Eligibility for Intercollegiate Athletics

All students regularly enrolled at the Kellogg-Voorhis campus are eligible to participate on the athletic teams, providing they meet the following rules set up by the Athletic Board.

1. Competition is open to regularly enrolled students currently carrying at least 12 units and passing in at least 10 units.
2. Students must have passed in 10 or more units and earned at least five grade points during the last quarter or semester of any college attendance.
3. A certified student must be an amateur sportsman who is engaged in sports for the physical, mental, or social benefits he derives therefrom, and to whom the sport is an avocation. According to the National Collegiate Athletic Association's interpretation, any athlete who takes or is promised pay in any form for participation in athletics does not meet this definition of an amateur.
4. Freshmen, junior college transfers, and transfer students from four-year colleges are immediately eligible if previous credits satisfy requirements of eligibility.

Administration of these regulations is carried out by a faculty committee which checks bimonthly on the eligibility of students participating in extra-curricular activities.

FEES AND EXPENSES

Fees and Deposits

STATE FEES AND DEPOSITS

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory and course fees (quarter)</td>
<td>$6.00</td>
</tr>
<tr>
<td>Breakage deposit (year)</td>
<td>10.00</td>
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<tr>
<td>Late registration fee</td>
<td>2.00</td>
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<tr>
<td>Late return of registration cards fee</td>
<td>2.00</td>
</tr>
<tr>
<td>Transcript fee (no charge for first copy)</td>
<td>1.00</td>
</tr>
<tr>
<td>Evaluation of record fee (nonmatriculated students)</td>
<td>2.00</td>
</tr>
<tr>
<td>Course challenge by special examination fee (per unit)</td>
<td>1.00</td>
</tr>
<tr>
<td>Extension course fee (per unit)</td>
<td>1.00 or 5.00</td>
</tr>
<tr>
<td>Change of program fee</td>
<td>1.00</td>
</tr>
<tr>
<td>Failure to meet administratively required appointment</td>
<td>2.00</td>
</tr>
<tr>
<td>Credential fee (for each credential)</td>
<td>4.00</td>
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OTHER FEES

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associated student card fee (fall quarter)</td>
<td>7.50</td>
</tr>
<tr>
<td>Associated student card fee (winter and spring quarters—each)</td>
<td>3.75</td>
</tr>
<tr>
<td>Post office box rental (all students, per quarter)</td>
<td>2.25</td>
</tr>
<tr>
<td>Medical fee (per quarter)</td>
<td>3.00</td>
</tr>
<tr>
<td>Graduation fee</td>
<td>7.50</td>
</tr>
</tbody>
</table>

(All deposits refundable at end of year if there are no charges against student)

Living Expenses

FOR STUDENTS LIVING ON CAMPUS

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room, per month (subject to change)</td>
<td>$10.00</td>
</tr>
<tr>
<td>(Must be paid quarterly in advance; students are required to furnish bed linen, blankets, and pillow)</td>
<td></td>
</tr>
<tr>
<td>Board, average per month (subject to change, excludes week ends)</td>
<td>32.50</td>
</tr>
<tr>
<td>(Must be paid in advance)</td>
<td></td>
</tr>
</tbody>
</table>
Example A
Students living on campus and not enrolled under Public Law 16, 346, or the California Veterans Educational Institute should be prepared to pay at time of fall 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) .................................. 0.25
Medical fee (per quarter) ................................................ 3.00
Laboratory and course fee (per quarter) ............................ 6.00
Room rent (per quarter) ($10 per month) ........................... 30.00
Board (average per month) .......................................... 32.50
Books and supplies (estimated) ...................................... 35.00

$124.25*

Example B
Students living on campus and enrolled under Public Law 16, 346, or the California Veterans Educational Institute should be prepared to pay at time of fall quarter registration:

Post office box rental (per quarter) .................................. 0.25
Room rent (per quarter) ................................................ 30.00
Board (per month) ....................................................... 32.50
Associated student card (fall quarter $7.50; winter and spring quarters, $3.75 each) ........................................... 7.50
Medical fee (quarter) ................................................. 3.00
† Books and supplies ....................................................

$73.25*

FAMILY HOUSING

† Rental Charge on Apartments:

1-bedroom apartments, furnished, including utilities ........... $35.00 (per month)
2-bedroom apartments, furnished, including utilities ........... 40.00 (per month)

* The student should be prepared to pay approximately the same amount at the time of winter and spring registration, with the exception of deposits which carry through the year.
† If the trainee has a Veterans Administration "letter of entitlement" when he registers, books and supplies will be furnished. If he does not have the "letter of entitlement," the trainee must pay all fees, including those for books and supplies, until the time the letter is presented. A refund will be made to the veteran when the letter is presented. Trainees under the California Veterans Institute purchase their own books and supplies for which they receive an allowance of $10 per month.
‡ Includes electricity, gas, and water.
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 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 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.

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major agriculture</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Related agriculture</td>
<td>9</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>Science and mathematics</td>
<td>18</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Humanistic-social</td>
<td>10½</td>
<td>11½</td>
<td>9</td>
</tr>
</tbody>
</table>

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 glass houses, two lath houses, two screen houses, two propagation houses, and numerous hot beds and cold frames.

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 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.

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.
Facilities available for instruction in animal husbandry at the Kellogg-Voorhis campus combine naturally to provide opportunities for students to obtain practical training in the production, management, and marketing phases of beef cattle, sheep, horse, and swine enterprises.

The objective of the Animal Husbandry Department is to provide students with the knowledge and skill necessary for livestock production in California. 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: Livestock production, farm management, livestock feeding, livestock marketing, meat packing, and vocational agriculture teaching.

Beef cattle, sheep, swine, and horses are maintained by the college for use in the instructional program. Facilities for student-owned and operated projects are made available by the California State Polytechnic College Foundation. The project program and the practical nature of course work carry out the “learn by doing” philosophy of the college.

CURRICULUM IN ANIMAL HUSBANDRY

Freshman

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
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</thead>
<tbody>
<tr>
<td>Feeds and Feeding (AH 101, 102)</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Market Beef Production (AH 121)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elements of Swine Production (AH 122)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elements of Sheep Production (AH 123)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Mechanics (AD 121, 122)</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Language Communication (Eng 104, 105, 106)</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Agricultural Mathematics (Math 102, 103)</td>
<td>3</td>
<td></td>
<td>3</td>
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<tr>
<td>Agricultural Project Records (Ec 100)</td>
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<tr>
<td>Physical Education (PE 141, 142, 143)</td>
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<td>¼</td>
<td>¼</td>
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<tr>
<td>General Zoology (BSc 131, 132)</td>
<td>4</td>
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</tr>
<tr>
<td>Electives</td>
<td>2</td>
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Sophomore

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
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</thead>
<tbody>
<tr>
<td>*Sheep Husbandry (AH 221)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Commercial Beef Production (AH 222)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Market Swine (AH 223)</td>
<td></td>
<td>2</td>
<td></td>
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<tr>
<td>Farm Machinery (AE 221)</td>
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<td></td>
<td></td>
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<tr>
<td>Agricultural Mechanics (AD 123)</td>
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<tr>
<td>Farm Tractors (AE 241)</td>
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<tr>
<td>Anatomy and Physiology (VS 123)</td>
<td>3</td>
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<tr>
<td>Forage Crops (CP 123)</td>
<td>4</td>
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<tr>
<td>Soils (SS 121)</td>
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<tr>
<td>Public Speaking (Eng 201)</td>
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<tr>
<td>Principles of Economics (Ec 201, 202)</td>
<td>3</td>
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<tr>
<td>Health and Hygiene (PE 107)</td>
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<tr>
<td>Sports Education (PE 241, 242, 243)</td>
<td>¼</td>
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<tr>
<td>General Bacteriology (BSc 221)</td>
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<tr>
<td>General Botany (BSc 121)</td>
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Junior (San Luis Obispo)

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
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<tbody>
<tr>
<td>* Swine Husbandry (AH 321)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Specialized Sheep Enterprises (AH 322)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Beef Husbandry (AH 323)</td>
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<td>4</td>
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<tr>
<td>Animal Breeding (AH 304)</td>
<td>3</td>
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<tr>
<td>Livestock Hygiene and Sanitation (VS 202)</td>
<td>3</td>
<td></td>
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<tr>
<td>Animal Parasitology (VS 205)</td>
<td>2</td>
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<tr>
<td>Range Management (SS 223)</td>
<td>4</td>
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</table>

* May substitute elective animal husbandry courses and/or one dairy husbandry or one poultry husbandry course for equivalent units of required courses with approval of adviser.

7—76187
Junior (San Luis Obispo)—Continued

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Farm Record Keeping (Ec 321)</td>
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<tr>
<td>Genetics (BSc 303)</td>
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<td>General Inorganic Chemistry (PSc 324, 325)</td>
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<tr>
<td>Organic Chemistry (PSc 326)</td>
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<td>Electives</td>
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<tr>
<td></td>
<td>17</td>
<td>16</td>
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Senior (San Luis Obispo)

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
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<tbody>
<tr>
<td>Senior Project (AH 461, 462)</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Undergraduate Seminar (AH 463)</td>
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<tr>
<td>Animal Nutrition (AH 402)</td>
<td>3</td>
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<tr>
<td>Literature</td>
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<tr>
<td>Farm Management I (Ec 322)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>† Economics elective</td>
<td></td>
<td>3</td>
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</tr>
<tr>
<td>American Government (Pol Sc 301)</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Growth of American Democracy (Hist 304)</td>
<td></td>
<td>3</td>
<td></td>
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<tr>
<td>U. S. in World Affairs (Hist 305)</td>
<td></td>
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<tr>
<td>Family Psychology (Psy 403)</td>
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<tr>
<td>Agricultural Biochemistry (PSc 328)</td>
<td>4</td>
<td>6</td>
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<tr>
<td>Electives</td>
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<tr>
<td></td>
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</tr>
</tbody>
</table>

DESCRIPTIONS OF COURSES IN ANIMAL HUSBANDRY

AH 101 Feeds and Feeding (2)
Constituents of feeds, their utilization and digestion. Computation of standard rations for livestock. 2 lectures.

AH 102 Feeds and Feeding (2)
Economy of feeding livestock, relative values of feeds. Feeding practices for each class of livestock, use of cheap by-product feeds. 2 lectures. Prerequisite: AH 101

AH 121 Market Beef Production (4)
Breeds, market classes, and grades of beef cattle. Selection of feeder cattle, management practice in purchasing and fattening cattle with farm grown feeds. Study of cattle feeding operations carried on at the college. Marketing of beef cattle. 3 lectures, 1 laboratory.

AH 122 Elements of Swine Production (4)
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)
Outline of Western sheep operations, fitting breeds to varying sheep enterprises and locations, basic requirements of successful management, judging the pure breeds. Budgeting for commercial operations, practical knowledge of wool. Jobs in the industry. 3 lectures, 1 laboratory.

AH 125 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.

† Economics elective to be selected from Ec 304, 310, 403, or 423.
Note: First and second year courses available fall quarter 1953. Third and fourth years to be completed at San Luis Obispo.
AH 221 Sheep Husbandry
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 123

AH 222 Commercial Beef Production
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
Management of the swine herd and care of pigs till weaning. Selection of feeder pigs. Feeding and managerial practices involved in developing the finished product. Market channels, market cycles, production cost analysis, hog slaughter, carcass grading, and pork processing. 3 lectures, 1 laboratory. Prerequisite: AH 122

AH 236 Horse Husbandry
History, size, and scope of the light horse industry in California and the United States, 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.

AH 324 Advanced Horsemanship
Techniques in training young horses, specialized training and gaiting of older horses for specific tasks. Pleasure horses, driving horses, jumpers, stock horses, etc. Fitting and showing horses in breeding and performance classes. Study of horse show classes and horse show management. 2 lectures, 2 laboratories. Prerequisite: AH 125

AH 326 Livestock Judging
Training in selection of beef cattle, sheep, swine, and horses according to breed, type, and use. 1 lecture, 2 laboratories. Prerequisites: 24 units of animal husbandry.
An industry as economically valuable as the California fruit industry is in constant need of the services of efficiently trained men. The Fruit Production Department of the Kellogg-Voorhis campus has designed its curriculum to meet this need.

Each student obtains actual field experience in orchard practices necessary in 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 fruits is made easily accessible because of the proximity of the college to local packing houses, fruit processing plants, and marketing organizations.

The primary purpose of the fruit production program is to prepare students for occupations as orchard operators or managers. Placement opportunities also exist in related fields serving the agricultural industry. These opportunities include both agricultural teaching and employment with insecticide, fertilizer, and equipment companies; fruit processing and marketing organizations; nurseries; pest control concerns; soil laboratories; agricultural contractors; and agencies of the county, state, and federal government.

### CURRICULUM IN FRUIT PRODUCTION

#### Freshman

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Communication (Eng 104, 105, 106)</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Agricultural Mathematics (Math 102, 103)</td>
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### DESCRIPTIONS OF COURSES IN FRUIT PRODUCTION

**CF 121 Citrus Fruit Production**
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**
Frost and wind protection methods, fertilization, pruning and disease control. Commercial varieties of citrus grown in California. 3 lectures, 1 laboratory.

**CF 123 Citrus Fruit Production**
Cultural operations, propagation of citrus including nursery methods, top-working, rootstock selection and performance. Selection, planting, and care of young trees. 3 lectures, 1 laboratory. Prerequisite: BSc 121

**CF 221 Citrus Pest Control**
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: BSc 126, CF 121

**CF 222 Avocado Production**
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 Citrus Diseases**
Diseases of citrus under California conditions, their symptoms and methods of control. 3 lectures, 1 laboratory. Prerequisites: BSc 223, CF 122

**CF 226 Avocado Production**
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: BSc 121, 126

**CF 245 Fruit Propagation**
Nursery propagation of fruit plants. Budding, tip grafting, cuttings, seed propagation, seedbed preparation, planting seedlings, care and management of the nursery. 1 laboratory. Prerequisite: BSc 121

* Only three units required of courses marked.
† Only four units required of courses marked.
CF 246  Fruit Propagation
   Topworking and grafting fruit plants. Types of grafts used, selection of grafting 
   wood, inarching, and bridge grafting. 1 laboratory. Prerequisite: BSc 121

CF 301  Citrus and Avocado Marketing
   Present day practices in marketing citrus and avocados. Organization of coopera-
   tives 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
   Management of citrus and avocado packinghouses in relation to harvesting, pooling 
   systems, marketing agreements and prorates, processing and packing, storage and pre-
   cooling, grower and labor relations. 3 lectures, 1 laboratory. Prerequisites: CF 222, 226

CF 323  Citrus and Avocado Orchard Management
   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 326  Citrus and Avocado Products
   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. Prerequisite: PSc 326, CF 322

CF 461, 462  Senior Project
   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
   Intensive study of the problems and new developments in the operation and manage- 
   ment of citrus and avocado orchards. Critical study of the economics of these industries. 
   2 lectures.

FP 131  Pomology
   Commercial deciduous fruits and nuts. Varieties, production areas, seasonal cultural 
   practices and problems. 3 lectures, 1 laboratory.

FP 132  Pomology
   Establishing an orchard, selection and planting young trees, pruning, pest control, 
   rootstocks, propagation, and seasonal cultural practices. 3 lectures, 1 laboratory. Pre-
   requisite: BSc 121

FP 136  Small Fruit Production
   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.

FP 231  Viticulture
   Producing, processing, and marketing of raisin, table, and wine grapes. 3 lectures, 
   1 laboratory.

FP 234  Deciduous Disease and Pest Control
   Studies and field identification of diseases and insect pests of deciduous trees. Field 
   application of control materials. 3 lectures, 1 laboratory.
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. 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

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### California State Polytechnic College

#### Senior (San Luis Obispo)

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| Total Units                                                   | 16| 17| 17|

### Descriptions of Courses in General Crops

#### CP 121 Field Crops

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

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

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

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 321 Crop Pest Control

Methods of recognizing and combating insect pests, plant diseases, and rodents attacking commercial vegetable and field crops. Sprays, dusts, fumigants, and poisons, as well as cultural and sanitation practices of control. 3 lectures, 1 laboratory. Prerequisites: BSc 122, 126, 223

#### CP 333 Irrigated Pastures

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

Operation of commercial vegetable and field crop acreages. Land preparation, cultivation, planting, fertilization, and pest control. Familiarity with more specialized farm equipment. 2 lectures, 1 laboratory. Prerequisites: CP 121 or 122, TC 224 or 225

#### CP 461, 462 Senior Project

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

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

* Four units to be selected from the courses indicated.
† Three units of economics to be selected from Ec 304, 310, 323, 402.
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.
The Horticultural Services and Inspection Department has three primary functions:

1. 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.

2. To prepare students for employment in Civil Service and open positions with county, state, and federal agencies. County, state, and federal inspectors are cooperative 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, and the prevention of fraud and deception in the marketing of these crops requires the services of many inspectors.

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 the 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**

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<td>Soils (SS 121)</td>
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* At San Luis Obispo.
### Kellogg-Voorhis Campus

#### Junior

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<tr>
<td>Farm Records (Ec 321)</td>
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<tr>
<td>General Inorganic Chemistry (PSc 324, 325)</td>
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<tr>
<td>Organic Chemistry (PSc 326)</td>
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<tr>
<td>American Government (Pol Sc 301)</td>
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<tr>
<td>Growth of American Democracy (Hist 304)</td>
<td>3</td>
</tr>
<tr>
<td>* Plant Quarantine (SI 322)</td>
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<tr>
<td>† Plant Pathology</td>
<td>3</td>
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<tr>
<td>* Standardization (SI 321)</td>
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<td>* Shipping Point Inspection (SI 325)</td>
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<td>Services and Inspection Problems (SI 372, 373)</td>
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<td>Advanced Entomology (BSc 334)</td>
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#### Senior (San Luis Obispo)

<table>
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<tr>
<td>Agricultural Biochemistry (PSc 328)</td>
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<td>Family Psychology (Psy 403)</td>
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<td>U. S. in World Affairs (Hist 305)</td>
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<td>‡ Economics</td>
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<td>Senior Project (SI 461, 462)</td>
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#### DESCRIPIONS OF COURSES IN HORTICULTURAL SERVICES AND INSPECTION

**SI 101 Agricultural Law and Procedure**

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**

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**

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: BSc 122, 126

**SI 226 Weed Control**

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, BSc 122

**SI 228 Economic Insect Pests**

Recognition and distribution of the more serious mites and insects with gradual metamorphosis attacking important agricultural crops. Identification of damage to various parts of plants. Seasonal history relating to susceptibility to commonly applied control measures. 2 lectures, 1 laboratory. Prerequisite: BSc 126

* Students wishing to specialize in Structural Pest Control will substitute for the courses indicated, the following: SI 333, 334, and other courses to be selected from Arch 101, 103, 141, ME 121, Psy 302, BSc 355, Jour 412 with approval of major advisor.

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

‡ Two courses to be selected from Ec 304, 310, 322, 403, 411, 412, 416.
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<td>SI 229</td>
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<td>SI 231</td>
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<td>Standardization</td>
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<td>SI 322</td>
<td>Plant Quarantine</td>
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<td>SI 334</td>
<td>Insects Affecting Timber Products</td>
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<td>SI 336</td>
<td>Apiculture</td>
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<td>SI 372, 373</td>
<td>Services and Inspection Problems</td>
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<td>SI 461, 462</td>
<td>Senior Project</td>
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</table>
The function of this department is to train men for positions in the ornamental horticultural industry and allied fields.

Students majoring in ornamental horticulture may, by proper selection of available courses in the junior year, specialize in one of two occupational areas: design and contracting and nursery operations.

Class and student projects give a practical aspect to instruction. Each year a section of the campus is improved by such project activities. Use and beauty are considered and a completely new design is developed, constructed, and planted, giving the students valuable practical experience.

Frequent field trips are made to the Los Angeles area, which leads the Nation in the ornamental horticultural industry. In addition to the opportunities of working in nurseries and on maintenance jobs, students in the department grow and sell cut flowers, pot plants, house plants, and nursery stock. Student salesmen learn how to meet customers and sell their products. Student project owners receive a share of the profits.

Graduates are prepared for managerial and operational positions in general nursery work, specialized growing, landscape design, construction and contracting, estate maintenance, tree surgery, and for civil service position with park and highway departments.

**CURRICULUM IN ORNAMENTAL HORTICULTURE**

**Freshman**

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<th>Course</th>
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<td>General Entomology (BSc 126)</td>
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<tr>
<td>Basic Horticulture (OH 131)</td>
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<tr>
<td>Ornamental Shrubs (OH 122)</td>
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<td>Principles and Practices of Nursery Operation (OH 121)</td>
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<td>Project Records (Ec 100)</td>
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**Sophomore**

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<td>Principles of Economics (Ec 201, 202)</td>
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<td>Farm Tractors (AE 241)</td>
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<td>Soils (SS 121)</td>
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<td>Farm Surveying (AE 181, 182)</td>
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<td>Public Speaking (Eng 201)</td>
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<td>Plant Pathology I (BSc 223)</td>
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<td>Sports Education (PE 241, 242, 243)</td>
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<td>Ornamental Trees (OH 221)</td>
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<td>Specialized Propagation Practices (OH 222)</td>
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<td>Principles of Landscape Design (OH 224)</td>
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<td>Landscape Design of Small Homes (OH 226)</td>
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Junior (Design and Contracting)

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<td>American Government (Pol Sc 301)</td>
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<td>Diseases and Pests of Ornamental Plants (OH 327)</td>
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<td>General Inorganic Chemistry (PSc 324, 325)</td>
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<td>Fertilizers (SS 221)</td>
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<td>* Park Design (OH 324)</td>
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Senior (San Luis Obispo)

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<td>Undergraduate Seminar (OH 463)</td>
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<td>† Economics</td>
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<td>Business Statements (Ec 416)</td>
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DESCRIPTIONS OF COURSES IN ORNAMENTAL HORTICULTURE

OH 121 Nursery Practices
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
Broadleaf shrubs and vines used in California. Identification, habits of growth, cultural requirements, and landscape use. 3 lectures, 1 laboratory.

OH 131 Basic Horticulture
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
Broadleaf trees grown and used in California. Identification, habits of growth, cultural requirements, and landscape use. 3 lectures, 1 laboratory.

OH 224 Principles of Landscape Design
Basic principles of design and the application of these principles in the solving of landscape design problems. 2 lectures, 1 laboratory.

OH 225 Landscape Design of Small Homes
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. 1 lecture, 2 laboratories. Prerequisite: OH 224

OH 226 Planting Design
The proper association of plant materials according to texture, color, and mass. The techniques involved in their grouping, arranging, and planting about buildings. 2 lectures, 1 laboratory. Prerequisites: OH 122, 221

* A student desiring to specialize in Nursery Operations will omit the courses marked and will substitute the following: OH 323, 334, FP 132, BSc 305, and any two from PSc 337, 338, 339.

† Three units to be selected from: Ec 304, 403.
OH 232 Specialized Propagation Practices
Commercial specialized propagation including all types of grafting, budding, layering, 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, BSc 122

OH 236 Native Plant Materials
Native California plants suitable for landscape purposes. Their identification, habits of growth, cultural requirements, and landscape use. 2 lectures, 1 laboratory.

OH 321 Herbaceous Landscape Plants
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
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 324 Park Design
Application of design principles to more specialized landscape problems of parks, schools, and public institutions. 2 lectures, 2 laboratories. Prerequisites: OH 224, 225

OH 326 Landscape Design of Suburban Properties
Design principles are applied in the solving of landscape problems dealing with large residential developments. 1 lecture, 2 laboratories. Prerequisites: OH 224, 225

OH 327 Diseases and Pests of Ornamental Plants
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, BSc 223

OH 329 Tree Surgery
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 331 Landscape Contracting
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

OH 332 Landscape Contracting
Practice in handling men and applying approved techniques in landscape construction. Contract writing and legal aspects of landscape contracting. 2 lectures, 1 laboratory. Prerequisite: OH 331, Math 102, 103, AE 131, 132

OH 334 Commercial Cut-flower Growing
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, BSc 122

OH 335 Park and Estate Management
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 461, 462 Senior Project
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
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.
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

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<td>Soil Management (SS 122)</td>
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<td>Market Beef Production (AH 121)</td>
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<td>Elements of Dairying (DH 121)</td>
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<td>Agricultural Mechanics (AE 121, 122)</td>
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#### Sophomore

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<td>Soil Conservation (SS 202)</td>
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<td>Pomology (FP 131)</td>
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<td>Farm Tractors (AE 241)</td>
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<td>Engineering Drafting (ME 121)</td>
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<td>General Inorganic Chemistry (PSc 324, 325)</td>
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#### Junior (San Luis Obispo)

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<tbody>
<tr>
<td>Soil Classification (SS 321)</td>
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<td>Soil Fertility (SS 322)</td>
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<td>Soil Technology (SS 323)</td>
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<tr>
<td>Irrigation (AE 236)</td>
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<tr>
<td>Public Speaking (Eng 201)</td>
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<td>Literature</td>
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<td>Principles of Economics (Ec 201, 202)</td>
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<td>Farm Record Keeping (Ec 321)</td>
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<td>Growth of American Democracy (Hist 304)</td>
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<tr>
<td>General Bacteriology (BSc 221)</td>
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<td>Plant Pathology I (BSc 223)</td>
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<tr>
<td>Agricultural Biochemistry (PSc 328)</td>
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### Kellogg-Voorhis Campus

**Senior (San Luis Obispo)**

<table>
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<th>Course</th>
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<tr>
<td>Farm Management I (Ec 322)</td>
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<tr>
<td>Agricultural Resources (Ec 305)</td>
<td>3</td>
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<tr>
<td>U. S. in World Affairs (Hist 305)</td>
<td>3</td>
</tr>
<tr>
<td>Family Psychology (Psy 403)</td>
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<tr>
<td>Senior Project (SS 461, 462)</td>
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<tr>
<td>Undergraduate Seminar (SS 463)</td>
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<tr>
<td>* Soil Chemistry (SS 423)</td>
<td>3</td>
</tr>
<tr>
<td>* Soil Physics (SS 432)</td>
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<tr>
<td>* Quantitative Analysis (PSc 331, 332)</td>
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</tr>
<tr>
<td>* Genetics (BSc 303)</td>
<td>3</td>
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<tr>
<td>* Statistical Methods (Math 211)</td>
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<tr>
<td>Electives</td>
<td>3 2 4</td>
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</table>

**Total: 16 17 15**

### Descriptions of Courses in Soil Science

**SS 121 Soils**

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

**SS 122 Soil Management**

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

**SS 123 California Soils**

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**

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**

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**

Forage production potentialities of range lands. Application of management principles and practices to range land resources. Development of plans for effective production and utilization of range forage. 3 lectures, 1 laboratory. Prerequisite: SS 121.

* Students electing to specialize in Soil Conservation will substitute for the courses indicated the following: SS 422, 433, AE 415, 437; and in addition, eight units from the following: CP 321, OH 220, TC 230, BSc 433.
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

Havan Q. Conard

AE 121 Carpentry and Concrete (2)
Elements of carpentry and concrete work as applied to farm buildings and structures, concrete walks, floors, and foundations. 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. Trouble shooting, 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 236 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 MECHANICAL ENGINEERING

ME 121 Engineering Drafting (2)
The use of drafting instruments, lettering, geometric construction, orthographic and pictorial projections, and dimensioning. 1 lecture, 1 laboratory.

DESCRIPTION OF COURSE IN DAIRY HUSBANDRY

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.

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

DESCRIPTIONS OF COURSES IN VETERINARY SCIENCE

VS 123 Anatomy and Physiology (3)
Anatomy and the related physiological functions of farm animals. 2 lectures, 1 laboratory. Prerequisites: BSc 131, 132
LIBERAL ARTS COURSES

DESCRIPTIONS OF COURSES IN BIOLOGICAL SCIENCE

J. Laurens Barnard
Howard S. Brown
Jerome E. Dimitman

J. F. Lamiman
Harold L. Lint

BSc 121 General Botany
Introduction to structure and functions of seed-bearing plants. 2 lectures, 2 laboratories.

BSc 122 General Botany
Nature and relationships of plant groups from bacteria to angiospermae; emphasis on nonseed-bearing plants of economic importance. 2 lectures, 2 laboratories. Prerequisite: BSc 121

BSc 123 General Botany
Elementary plant genetics, paleobotany, organic evolution, plant ecology, and plant geography. 2 lectures, 2 laboratories. Prerequisite: BSc 122

BSc 126 General Entomology
Generalized study of insects; life histories, economic importance, and controls. Insect collection required. 3 lectures, 1 laboratory.

BSc 131 General Zoology
Cells, tissues, and organ systems of vertebrates; emphasis on man and domestic animals. 2 lectures, 2 laboratories.

BSc 132 General Zoology
Invertebrate animals from Protozoa to Chordates; emphasis on those forms of economic importance. 2 lectures, 2 laboratories. Prerequisite: BSc 131

BSc 133 General Zoology
Ecology, introductory embryology, classification, genetics, evolution of animals. 2 lectures, 2 laboratories. Prerequisite: BSc 132

BSc 221 General Bacteriology
Morphology, classification, physiology, and cultivation of bacteria; relation of bacteria to health of man, animals, and plants. 2 lectures, 2 laboratories. Prerequisites: BSc 121 or 131, or PSc 321 or 324

BSc 223 Plant Pathology I
Principal diseases of plants; symptoms, field identification, and control methods. 3 lectures, 1 laboratory. Prerequisite: BSc 121

BSc 236 Families of Flowering Plants
Recognition of the major orders and families of flowering plants. 2 lectures, 1 laboratory. Prerequisite: BSc 122

BSc 303 Genetics
Principles of heredity and variation. 3 lectures. Prerequisite: BSc 121 or 131

BSc 304 Plant Breeding
Principles and techniques of improving ornamental and agronomic plants. 2 lectures, 1 laboratory. Prerequisite: BSc 303

BSc 322 Plant Physiology
Functions of plants; water relations, metabolism, and plant growth. 2 lectures, 1 laboratory.

BSc 334 Advanced Entomology
Methods and techniques of systematic entomology. Immature forms of economic importance. Principles of biological control; insect ecology. Methods for evaluation of insect control procedures. 2 lectures, 1 laboratory. Prerequisite: BSc 126
BSc 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 ENGLISH, PUBLIC SPEAKING, AND JOURNALISM

Albert J. Aschenbrenner
Henry B. Niles
Lowell K. Weeks
John A. Stuart

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 communication as they relate to examining assumptions, distinguishing fact from opinion, and recognizing oversimplification and rationalization. Application of these skills to reports, letter writing, and factual exposition. 3 lectures. Prerequisite: Satisfactory grade on entrance examination.

Eng 105 Language Communication (3)
Oral and written communication as they relate to testing inferences, using forms of logic, and developing adequate definitions. Application of these skills to practical problem-solving situations involving argumentation, persuasion, and use of evidence. 3 lectures. Prerequisite: Eng 104

Eng 106 Language Communication (3)
Oral and written communication as they are used in the mass media, particularly newspapers, magazines, radio, and movies. Analysis of language components in propaganda disseminated through these media. 3 lectures. Prerequisite: Eng 105

Eng 201 Public Speaking (2)
Oral presentation of facts and opinion and 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

Eng 211 Modern Literature (3)
Consideration, through the study of modern literature, of the problems of man and his social world—his search for social, political, and economic stability. 3 lectures. Prerequisite: Eng 106

Eng 212 Modern Literature (3)
Consideration, through the study of modern literature, of the problems of man and his material world—his reaction to nature, science, and machinery. 3 lectures. Prerequisite: Eng 106

Eng 213 Modern Literature (3)
Consideration, through the study of modern literature, of the problems of man’s inner world—his attempt to understand himself through psychology, religion, and philosophy. 3 lectures. Prerequisite: Eng 106

Eng 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: Eng 201

Jour 201 Introductory Journalism (3)
An introduction to journalism, survey of its history, and study of techniques of writing the news story. 3 lectures. Prerequisite: Eng 106

Jour 251, 252, 253 Journalism Practice (1-2) (1-2) (1-2)
Credit arranged for students holding editorial positions on college publications or student news bureau. 1-2 laboratories. Prerequisite: One year of journalism or instructor’s permission.
Credit arranged for students holding editorial positions on college publications or in student news bureau. Responsibilities more advanced than in 251, 252, and 253. 1-2 laboratories. Prerequisite: One year of journalism.

DESCRIPTIONS OF COURSES IN HEALTH AND PHYSICAL EDUCATION

Robert B. Stull

PE 101 Safety and First Aid
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 103 Swimming and Water Sports Theory and Practice
Supervision of pool activities. Swimming instruction and safety. 1 lecture, 1 laboratory.

PE 106 Community Recreation
The supervision and administration of community recreation. Games and activities suitable for a community recreation program. 1 lecture, 2 laboratories.

PE 107 Health and Hygiene
Personal hygiene and health education and the relation of exercise, 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 141 Physical Education
Fundamentals of sports and games. 2 laboratories.

PE 142 Physical Education
Tumbling and apparatus work; boxing and wrestling; gymnastics and calisthenics. 2 laboratories.

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

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

PE 151, 152, 153 Competitive Athletics
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
History of physical education and the concept of physical education as a profession. Correlation between principles and methods. 3 lectures.

PE 202 Intramural Sports
Sports adapted to intramural use. Organization of intramural programs. 2 lectures, 1 laboratory.

PE 203 Health Education
General school health problems of interest to students of physical education, teachers in service, and others. 2 lectures.

PE 241 Sports Education
Training and competition in seasonal sports such as speed ball, touch football, and tennis. 2 laboratories.

PE 242 Sports Education
Training and competition in seasonal sports such as basketball, badminton, volleyball, boxing, and wrestling. 2 laboratories.
PE 243  Sports Education  
Training and competition in seasonal sports such as tennis, track and cross-country running, softball, and soccer. 2 laboratories.

PE 251, 252, 253  Competitive Athletics  
May be substituted for required physical training by those qualified to compete in intercollegiate sports program. 10 hours laboratory.

DESCRIPTIONS OF COURSES IN MATHEMATICS
Donald E. Rees

Math 1  Practical Mathematics (3)  
Review of the fundamental operations of mathematics including fractions, decimals, ratio and proportion, percentage, and farm measurements. Required of all students in agriculture except those who satisfactorily pass a placement examination. 3 lectures.

Math 102  Agricultural Mathematics 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. Prerequisites: Satisfactory scores on entrance examination, or Math I.

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 111  Basic Mathematics for General Education (3)  
Proportion, variation, units of measurement, slide rule, and probability as applied to biological science, physical education, and social science. 3 lectures. Prerequisites: Satisfactory score on entrance examination.

Math 112  Basic Mathematics for General Education (3)  
Elements of trigonometry, analytic geometry, and statistics as applied to biological science, physical education, social science. 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

DESCRIPTIONS OF COURSES IN MUSIC
Lowell K. Weeks

Mu 141, 142, 143  Orchestra (2) (2) (2)  
Limited to those who have had considerable experience playing musical instruments. The orchestra student has an opportunity to play for various college entertainments, dances, community programs, and radio broadcasts. 2 laboratories.

Mu 151, 152, 153  Band (1) (1) (1)  
Limited to those students who have had experience with band instruments. The band plays for many college functions, assemblies, athletic games, and rallies, and makes at least one trip each year. Smaller groups are organized from the band for special functions. 1 laboratory.

Mu 154, 155, 156  Glee Club (1-2) (1-2) (1-2)  
Four-part vocal compositions; fundamentals of breathing, tone production, diction, and interpretation. Quartets, octets, and soloists are developed, for which activities additional credit may be given. Try-outs in fall only. 1 or 2 laboratories.
Mu 241, 242, 243 Orchestra
Continuation of Mu 141, 142, 143.

Mu 251, 252, 253 Band
Continuation of Mu 151, 152, 153.

Mu 254, 255, 256 Glee Club
Continuation of Mu 154, 155, 156.

Mu 341, 342, 343 Orchestra
Continuation of Mu 241, 242, 243.

Mu 351, 352, 353 Band
Continuation of Mu 251, 252, 253.

Mu 354, 355, 356 Glee Club
Continuation of Mu 254, 255, 256.

DESCRIPTORS OF COURSES IN SOCIAL SCIENCE

Ec 100 Project Records
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.

Ec 201 Principles of Economics
The financial, market, agricultural, and industrial structure of the American economy; immediate problems facing the individual living therein. 3 lectures.

Ec 202 Principles of Economics
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
The relationship between the consumption and production of goods and the satisfaction of human wants. Problems of exchange, nationally and internationally. Public regulation. Comparative economic systems and the problems of reform. 3 lectures. Prerequisite: Ec 201

Ec 304 Agricultural Marketing
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 202

Ec 321 Farm Records
The fundamental processes of record keeping based on the uses of records, the kinds of records that could be kept, the farm inventory, depreciation, the cash and accrual basis of income tax reporting, the basic fundamental reports, i.e. the balance sheet and the operating statement and their analysis. 2 lectures, 1 laboratory. Prerequisite: Ec 202

Ec 322 Farm Management I
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. Prerequisites: Ec 321
**Ec 416 Business Statements**
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.

**Hist 304 Growth of American Democracy**
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**
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

**Pol Sc 301 American Government**

**Pol Sc 401 State and Local Government**
The structure, function, and problems of state, county, and city governments. 3 lectures. Prerequisites: Pol Sc 301, Hist 304

**Psy 101 Personal Development**
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**
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 302 Psychology of Business and Industry**
Psychological factors involved in sales approach, stimulating sales interest, clinching the sale, and follow-up. Selling that serves customers; gaining employment and promotion; hiring and promoting techniques in business and industry; leadership in industrial relations. 3 lectures.

**Psy 403 Family Psychology**
Pre-marital relations, choosing a mate, budgeting, causes of divorce, factors of religion, pregnancy and birth, endocrine system, compatibility in marriage. 3 lectures.

**DESCRIPTIONS OF COURSES IN PHYSICAL SCIENCE**

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<td>PSc 324</td>
<td>General Inorganic Chemistry</td>
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**Gabriel T. Moran**
**Donald E. Rees**
PSc 326 Organic Chemistry
The fundamental concepts of organic chemistry with applications to industrial and agricultural processes. 3 lectures, 1 laboratory. Prerequisite: PSc 325

PSc 328 Agricultural Biochemistry
Fundamental chemistry of carbohydrates, proteins, fats, vitamins, enzymes, and hormones as applied to their function in plant and animal metabolism. 3 lectures, 1 laboratory. Prerequisites: PSc 326

PSc 337 Soil Analysis
Chemical analysis as a means of diagnosing problems related to Western soils. Offered only at Kellogg-Voorhis campus. 1 lecture, 1 laboratory. Prerequisites: PSc 325, SS 121, Math 102, 103

PSc 338 Plant Tissue Analysis
Chemical analysis of plant tissue as a guide to fertilization and crop production. Offered only at Kellogg-Voorhis campus. 1 lecture, 1 laboratory. Prerequisites: PSc 325, SS 121, Math 102, 103

PSc 339 Soil Physics
Fundamental aspects of soil physics and their application. Offered only at Kellogg-Voorhis campus. 1 lecture, 1 laboratory. Prerequisites: SS 121, Math 102, 103
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