COLLEGE OF AGRICULTURE

Wayne R. Bidlack, *Dean*

John E. Trei, *Interim Associate Dean*

The agri-food-food industry serves the State by generating food for the U.S. and the world. While less than two percent of California's population now lives and works on the farm, they produce $19.5 billion and add another $60 billion in processing, packaging and distribution of the food supply. Opportunities are tremendous for careers in national and international agri-food programs, especially for individuals with dual language skills. Agricultural graduates can expect challenging opportunities in agriculturally-related occupations in business, industry, specialized services, education, conservation, and recreation, as well as production. Additionally, the College offers challenging programs that will prepare graduates for careers in nutrition/dietetics and the apparel industry. These expanding careers provide challenging opportunities for men and women over a broad spectrum of interests and abilities. Hundreds of careers, many relatively unknown a few years ago, are attracting men and women from both urban and rural communities.

Instruction in the College of Agriculture is offered in 10 majors and 17 options leading to the bachelor of science degree. There are three Master of Science degrees offered in Agricultural Science, Animal Science, and Foods and Nutrition.

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

Facilities on or near the campus make possible practical laboratories for the various majors. The university farm consists of fertile soils typical of the Southern California area with enough variation in soil type and climate to give students a broad background of experience. Over 700 acres of university-owned land are available for pastures, crops, groves, and ornamental plantings.

To assure each student of occupational competence, the university provides an opportunity to learn the fundamental skills involved in the care, maintenance, and operation of agricultural equipment and facilities. All departments offer employment for student assistants.

The College of Agriculture is involved in a wide variety of continuing education programs. They range from workshops in equine management to cultural food classes, from agricultural leadership conferences to food distribution seminars, pest management and citronomics. Industry and agricultural faculty work cooperatively together in planning and presenting conferences to satisfy the needs of the agribusiness industry. A unique conference for the past several years has been the Agricultural Business Management conference for Japanese supermarket operators on food distribution in the United States. Short courses are provided by the agricultural education faculty in the newly emerging technical areas. Faculty stand ready to assist industry, government and others in sponsoring programs to meet the needs of the community at large.

Because of the commitments of the College of Agriculture to contributing to the total lifestyle of handicapped persons, special education concerns are incorporated into appropriate courses within the College.

As an adjunct to the academic programs, the College of Agriculture is actively engaged in international programs. One important component of these programs is the USDA's sponsorship of students from less developed countries who work for baccalaureate and master's degrees in agriculture. Another part of this international program activity is the preparation of faculty members to serve as advisors in less developed countries. Their goal is to teach the native people how to increase food production.

Gamma Sigma Delta, an honorary society in agriculture, is open to all students in agriculture. Information concerning requirements for membership can be obtained from the Dean's Office in the College of Agriculture.

Departments and Majors

AGRICULTURAL BUSINESS MANAGEMENT and AGRICULTURAL EDUCATION

Edison I. Cabacungan, *Chair*
Apparel Merchandising and Management (BS)
Agricultural Business Management major (BS)
Agricultural Science major (BS)
Minors in Agricultural Business Management, International Agriculture, and International Agricultural Business Management

AGRICULTURAL ENGINEERING & IRRIGATION SCIENCE

Eudell Vis, *Chair*
Fashion Merchandising minor
Landscape Irrigation Science (BS)
Minor (and certificate) in Landscape Irrigation Design

ANIMAL AND VETERINARY SCIENCES

Cedric Y. Matsushima, *Interim Chair*
Animal Science major (BS) options in
- Pre-Veterinary Science/Graduate School
- Animal Industries/Business Management
- Equine Industry
- Animal Health Science

Animal Science minor
Physiology Minor

NUTRITION AND CONSUMER SCIENCES

Cheryl Loggins, *Chair*
Foods and Nutrition major (BS)
Early Childhood Education (Certificate)
Costume Technology minor
Foods and Nutrition minor
Home Economics minor

HORTICULTURE/PLANT AND SOIL SCIENCE

Daniel Hostetler, *Chair*
Agricultural Biology major (BS);
Agricultural Biology and Pest Management Minors
Agronomy major (BS) options in
- Crop Production
- Crop Science
- Agronomy minor

Horticulture major (BS) options in
- Fruit Industries
- Ornamental Horticulture

Ornamental Horticulture minor
Soil Science major (BS)
Soil Science minor

MASTER OF SCIENCE IN AGRICULTURE with options in:

Agricultural Science, Animal Science, and Nutrition and Food Management, Sports Nutrition

Interdisciplinary General Education (IGE)

Students majoring in the various programs in Agriculture are encouraged to take part of their General Education requirements through the Interdisciplinary General Education Program (IGE). This IGE program is specially designed to meet the needs of Agriculture students particularly in the areas of writing, critical thinking, humanities and the social sciences.

Agriculture Educational Enhancement Services (AGR.E.E.S.)

AGREES is a college-based program designed to improve the retention and graduation rate of underrepresented students enrolled in the College of

Agriculture, AGREES provides faculty and peer interaction as well as a variety of support services to assist students in their academic pursuits at Cal Poly.

Apparel Technology and Research Center

The Apparel Technology and Research Center provides a unique learning environment for the Apparel Merchandising and Management degree. The Center houses a model manufacturing plant featuring state-of-the-art equipment and advanced manufacturing systems. Through hands-on experience, students have the opportunity to work in a real time setting to solve industry problems. The ATRC also provides assistance to domestic apparel companies through research, demonstration and training programs. The ATRC is the only recipient on the West Coast of both a research and demonstration contract from the Department of Defense—Defense Logistics Agency. These contracts provide over $13 million in funding to expand the capabilities of the ATRC to work with industry.

Student Enterprise Projects

Students in the College of Agriculture are provided an opportunity to learn the interrelated skills involved in the production of a crop or animal project by means of the Student Enterprise Project experience. This supervised work program allows the student to utilize College of Agriculture facilities and equipment, along with financing provided through the Kellogg Unit Foundation. All aspects of project design, initiation and completion are developed by the student in consultation with the supervising faculty member. In addition to valuable experiential learning, the student is able to share in the profits generated by the project. Interested students should see their department chair for further information.

California Agricultural Leadership Program

Cal Poly Pomona, through the College of Agriculture, is one of four universities in the state which participate in the California Agricultural Leadership Program. Under the auspices of the Agricultural Education Foundation, the Program consists of a series of seminars and travel experiences designed to broaden the perspectives of selected mid-career agricultural professionals who have demonstrated leadership potential. Participants complete the program with a greater capacity to accept leadership responsibility in any part of society. For more information, contact the Dean of the College of Agriculture.

W. K. Kellogg Arabian Horse Center

The Center continues the tradition of the Kellogg Ranch, which has been one of the world's outstanding Arabian horse breeding farms, perpetuating the Arabian and making valuable blood lines available to the public. The Arabians are utilized in the animal science courses related to the ever expanding field of light horse production, research and training. Public performances are given on the first Sunday in October through June at 2 p.m. In July 1989, the University established an equine outreach program to serve the interest of all breeds and horse audiences. The primary objective of this program was to develop educational opportunities and programs that would address the needs and challenges of the horse industry.

Responsibilities of the equine educational program include providing educational programs to the horse public and addressing the specialized needs of the commercial equine industry. Programs are also developed to meet the needs of specialized clientele.

Equine Research Center

The Equine Research Center, founded in 1980, complements the programs of the W. K. Kellogg Arabian Horse Center. The Research Center, unlike the Kellogg Center, deals with all horse breeds and not only the Arabian. The Research Center conducts investigations in the areas of equine nutrition, physiology, and management. The Research Center is a self-support center funded through national donations with the major contributor being the Oak Tree Racing Association.

Reproductive Physiology Center

The mission of the Reproductive Physiology Center is to provide an undergraduate teaching and graduate student research laboratory for the investigation of physiological events responsible for reproduction in domestic farm animals. The primary emphasis of the Center is to utilize new biotechnology procedures to manipulate and preserve male and female gametes collected from ruminant and nonruminant animals. The Center is equipped to collect, analyze and freeze spermatozoa for improving the procedures associated with artificial insemination.

Institute for Irrigation Research and Evaluation

The Institute provides teaching and research opportunities for students and faculty in the evaluation of irrigation equipment in cooperation with the irrigation industry. Special emphasis is placed upon the development of testing equipment, facilities and procedures that analyze plastic components of irrigation systems designed for urban and landscape use.

Raymond Burr Orchid Collection

The collection consists of over 50,000 specimens of orchids, primarily of the Cattleya alliance, housed in the Horticulture Department nursery facilities. Primarily used for teaching and research purposes in horticulture courses, the orchids are used for instruction in propagation, including plant breeding. The collection is also utilized by community groups interested in orchid culture, and for continuing education.

Cooperative Education

The College of Agriculture commenced a cooperative education program with industry, business and government during the fall quarter, 1978. This program is designed to provide alternating periods of full-time study and full-time work. It is expected that each student on the co-op education program will spend a total of four quarters over a three-year period in the work experience. For these four quarters of experience the student will receive 16 units of academic credit.

1. Provide the opportunity for the student to gain experience in agri-food, agri-business, agricultural production and/or government. This experience should stimulate the student's interest in those areas of academic instruction that relate to the newly acquired experience.
2. Provide the opportunity for students to evaluate alternative career opportunities.
3. Provide an opportunity for students to earn a salary which will enable them to go to school full-time during alternating quarters.
4. Provide an opportunity for prospective employers to get acquainted with co-op students.

More information may be obtained from the Office of the Dean of Agriculture and/or the University's Career Center.

The curriculum for cooperative education is listed in the following course descriptions.

Course Descriptions

AG 100 Orientation to the College of Agriculture (1)

An orientation course to acquaint students with the academic opportunities within the College of Agriculture and in the individual majors. Strategies to assist students with the successful completion of their college career will be introduced. Resources available to students both on and off campus will be reviewed. Open to non-majors. 1 lecture/counseling. Graded only on a credit/no credit basis.

AG 101 Agriculture and the Modern World (4)

An introduction to the history of modern agriculture, its integration into social, economic and political institutions, the biological systems of which it is a part, the causes and impact of world hunger, and the implications of future changes and innovations in the production of food and fiber. The

course will emphasize critical analysis of current agriculture and food issues. 4 lectures. Open to all majors. Required of all agriculture majors.

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

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

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

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

AG 401 Ethical Issues in Agriculture (4)

The examination of current issues related to majors in the College of Agriculture within a framework of ethical reasoning. Students will participate in investigation and discussion of selected topics and will be encouraged to explore a personal ethical stance as a professional. 4 lecture/problem-solving sessions. Prerequisite: senior standing.

AG 464 Development of Leadership Skills (3)

The exploration of professional growth and leadership development in the context of food and agriculture careers. 2 seminar-discussions. Prerequisite: senior standing.

AG 470, 471, 472, 473 Cooperative Education (2-4) (2-4) (2-4) (2-4)

On-the-job experience for all majors in the College of Agriculture. Students alternate one or more quarters of full time studies in their major with an equal number of quarters of relevant full time work for pay. Prerequisite: Consent of instructor and junior standing. (Courses must be taken in ascending sequence.)

AGRICULTURAL BIOLOGY

Daniel Hostetler, *Chair, Horticulture/Plant and Soil Science Department*
Richard S. Kaae, *Coordinator,* Agricultural Biology
Rex O. Baker
Lester C. Young
Gregory Partida

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

Professional careers with county, state and federal Departments of Agriculture, Public Health Services and allied governmental agencies protecting and promoting agriculture, consumer services and environmental protection are very challenging and rewarding. Positions in sales, advisory services, and consultants with numerous pest management and related commercial organizations, agricultural production enterprises, and international and domestic public health service organizations are available. Research, teaching and graduate studies are other interesting pursuits.

An interesting new area is Environmental Health Science. Health sanitarians play an important role in the administration and regulatory enforcement of environmental and public health laws. Some activities environmental health professionals are involved and include:

- Drinking water sanitation and enforcement
- Vector control and public health concerns
- Prevention of atmospheric pollution
- Sanitation in production of meat, milk, and foods
- Hazardous and toxic substance control
- Housing and institutional sanitation
- Solid and liquid waste management
- Review of legislation regarding environmental health

The marketing of agricultural products presents many opportunities for individuals with a knowledge of quality standards, environmental factors, and organisms affecting food, fiber and health.

Summer employment, cooperative education placement, and internships are encouraged because they provide both valuable experiences and income for students.

Opportunities are expanding and are abundant for graduates. Increased demand for qualified graduates has resulted because of growing public awareness in environmental, consumer and public health issues. Many governmental agencies are expanding their role in recruiting qualified individuals to staff their needs. In addition to the development of knowledge necessary for occupational proficiencies, sources of information are emphasized. This enables the graduate to increase professional competence and to cope with the constantly growing volume of new information. Thus graduates are prepared for immediate employment in a wide range of positions and are prepared to enhance their careers after graduation.

A recent survey of our alumni indicated that careers were plentiful. A recent graduate can expect a starting salary in the $25-$30,000 range and reach $60-70,000 within 10 years.

PEST MANAGEMENT AND AGRICULTURAL BIOLOGY MINORS

The Pest Management minor combines key courses in order to prepare students for the many careers which partially encompass areas of pest control. This minor is ideally suited for those majoring in Agricultural Business Management, Agronomy, Animal Science, Fruit Industries and the Agricultural Biology minor is especially suited for individuals majoring in Biology or many areas of agriculture and are interested in working in careers with the county, state or federal departments of agriculture dealing with consumer and environmental protection.

ENVIRONMENTAL HEALTH SPECIALIST MINOR

The Environmental Health Specialist Minor is an Interdisciplinary program which may be pursued by majors in any field. Its purpose is to prepare students for careers in Environmental Health by meeting the standards for the state internship program. State employed specialists enforce and administer laws governing water, food, and air contamination, noise, land use planning, occupational health hazards, and animal vectors of disease. The minor is particularly suitable for students majoring in Biology.

A full description of the minor is in the "University Programs" section of this catalog.

CORE COURSES FOR MAJOR*

Orientation to the College of Agriculture	AG	100	(1)
Ag and the Modern World	AG	101	(4)
Ethical Issues in Agriculture	AG	401	(4)
Introduction to Arthropods	AGB	165/165L	(4)
Environmental Toxicology	AGB	411	(4)
Senior Project	AGB	461	(2)
Senior Project	AGB	462	(2)
Undergraduate Seminar	AGB	463	(2)
Weeds and Weed Control	AGR	330/330L	(4)
Crop Ecology	AGR	401	(4)
Plant Structures & Functions	BOT	124/124L	(5)
Plant Pathology	BOT	323/323L	(4)
Basic Soil Science	SS	231/231L	(4)
Agricultural Insect Pests	AGB	228/228L	(4)
Integrated Pest Management	AGB	231	(3)
Vertebrate Pest Management	AGB	323/323L	(4)
Produce Quality and Protection	AGB	325/325L	(3)
Invertebrate Vector Control	AGB	342/342L	(4)
Field Entomology	AGB	401/401L	(4)
Immature Insects	AGB	455/455L	(3)

SUPPORT COURSES

(Required of all students)

Internship	AGB	441	(3)
Internship	AGB	442	(3)
College Chemistry	CHM	105	(3)
College Chemistry Laboratory	CHM	142	(1)
Statistics with Applications	STA	120	(4)

Directed Electives (42)

Students majoring in Agricultural Biology must complete 42 units of directed electives (listed on the reverse side of the curriculum sheet) by selecting a career emphasis track in Agricultural Biology or Environmental Health. Students are encouraged to work closely with their advisors when selecting these career tracks.

GENERAL EDUCATION COURSES

Area 1:

A. Select one course . . . . . (4)
B. Select one course . . . . . (4)
C. Select one course . . . . . .

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

Area 2:

A. Select one course			(4)
B. College Chemistry	CHM	104	(3)
College Chemistry Laboratory	CHM	141L	(1)
C. Basic Biology	BIO	115/115L	(5)
D. Select one course			(4)

Area 3:

A. Select one course			(4)
B. Select one course			(4)
C. Select one course			(4)
D. Select one course			(4)
E. Select one course			(4)
F. Select one course			(4)
G. Select one course			(4)

Area 4:

United States History	HST	202	(4)
Intro to American Government	PLS	201	(4)

Area 5:

Ag Enterprise Management	ABM	328/328L	(4)
Accounting for Management Decisions	ABM	324/324L	(4)

PEST MANAGEMENT MINOR – 26 units required

Intro to Arthropods	AGB	165/165L	(4)
Agricultural Insect Pests	AGB	228/228L	(4)
Integrated Pest Management	AGB	231	(3)
Pesticide and Hazmat Laws	AGB	301	(3)

Select three courses from list below:

Vertebrate Pest Management	AGB	323/323L	(4)
Invertebrate Vector Control	AGB	342/342L	(4)
Biological Control	AGB	403/403L	(4)
Weeds and Weed Control	AGR	330/330L	(4)

AGRICULTURAL BIOLOGY MINOR – 25 units required

Plant Identification	AGB	224/224L	(4)
Integrated Pest Management	AGB	231	(3)
Pesticide and Hazmat Laws	AGB	301	(3)
Exclusion/detection of pests	AGB	322/322L	(4)
Vertebrate Pest Management	AGB	323/323L	(4)
Produce Quality and Protection	AGB	325/325L	(3)

Select one course list:

Agricultural Insect Pests	AGB	228/228L	(4)
Weeds and Weed Control	AGR	330/330L	(4)
Crop Diseases	AGR	421/421L	(4)
Fruit and Vegetable Standards	AGB	426/426L	(4)

Course Descriptions

+All courses offered in Agricultural Biology may be taken on a CR/NC basis except for students who are majors or minors. AGB 165 may not be taken on a CR/NC basis.

AGB 165/165L Introduction to Arthropods (3/1)

Arthropods and certain relatives affecting food, plants, animals, man and his buildings. Emphasizing insects, mites, ticks, spiders, snails, and slugs; their morphological and phylogenetic relationships; habits and habitats; important characteristics affecting the well-being of mankind. 3 lectures, 1 three-hour laboratory. Corequisite: AGB 165/165L.

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

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

AGB 224/224L Plant Identification (3/1)

Identification of ornamental, orchard, and crop plants by contrast of odors, leaf shapes, and arrangements; fruit and flower types, growth habits; coloration of plant parts, and environmental variations. Consideration of scientific, common, and family name; general propagation and most serious pests. 3 lectures, 1 three-hour laboratory. Prerequisite: BOT 124/124L. Corequisites: ABG 224/224L.

AGB 228/228L Agricultural Insect Pests (3/1)

Recognition and distribution of important insects and mites attacking agricultural crops such as the major field, cereal, and truck crops, and citrus, avocados, deciduous fruit, small fruit, berries, grapes and nut trees. Host preference and identification of damage to plant parts. Seasonal history, habits and problems relating to pest management programs. 3 lectures, 1 three-hour laboratory. Prerequisite: AGB 165/165L or equivalent. Corequisites: AGB 228/228L.

AGB 231 Integrated Pest Management (3)

Concepts of pest management in agricultural, industrial, urban and structural situations. Pesticide categorization, toxicology, safety and formulation. Mechanical, physical, cultural and biological control in pest management systems. 3 lectures.

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

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor. Instruction is by lecture, laboratory, activity, or a combination. Corequisites: AGB 299/299L/299A individually or in combination.

AGB 300 Insects and Civilization (4)

An analysis of insects and their relationship to man which ranges from everyday life to the development of civilization. A survey of insects and their relatives as to their importance in disease, health, everyday life and as pests of structures, fabric, stored products and crops; beneficial aspects. Analysis of need for pesticides and their side effects on man and the environment. 4 lectures/analysis.

AGB 301 Pesticide and Hazardous Material Laws (3)

Federal and California laws and regulations affecting individuals, corporations, and agencies providing for the public health, safety and welfare; and protecting the environment including our natural resources. Emphasis on hazardous materials, ground water protection, pesticides, and pest control laws and regulations. Pesticide safety included. Function and structure of pertinent federal, state and county agencies and their enforcement practices as they relate to agribusiness, public health and pest control operations, including case studies, 3 one-hour lectures.

AGB 321 Urban Wildlife Pests and Civilization (3)

The symbiotic relationship and resulting conflicts between man and wildlife in urban, residential, recreational and industrial environments. Biology, ecology and management principles of animal pests (commensal rodents, birds and other small vertebrate animals) transmitting disease, damaging structures and landscaping, and influencing land stability. Analysis of damage leading to written recommendations. 3 lecture/analysis.

AGB 322/322L Regulatory Exclusion and Detection of Pests (3/1)

Programs of regulatory exclusion and detection of injurious pests including: survey, detection, eradication and quarantine. Purpose and application of United States and California plant quarantine laws and regulations, including biological, economic, and administrative aspects. Identification, habits, seasonal history and hosts of potential pests and diseases. 3 lectures, 1 three-hour laboratory. Prerequisite: AGB 165/165L. Corequisites: AGB 322/322L.

AGB 323/323L Vertebrate Pest Management (3/1)

Diagnosis, analysis and management of vertebrate pest damage in plant and

animal production settings. Identification, biology, and ecology of vertebrate pests (small animals and birds to large predators). Evaluation of damage, control measures, non-target wildlife hazards and computer modeling. Program development and laws and regulations. 3 lecture/analysis, 1 three-hour laboratory. Corequisites: AGB 323/323L.

AGB 325/325L Produce Quality and Protection (2/1)

The marketing of quality fruits and vegetables from growers to consumers. Identification, cause and analysis of defect factors resulting from insects, mites, nematodes, birds, mammals, plant diseases and nonparasitic disorders on marketing of fruits and vegetables. Written analytical reports required. 2 lectures-analysis, 1 three-hour laboratory. Prerequisite: BOT 323/323L. Corequisites: AGB 325/325L.

AGB 333/333L Medical Entomology (2/1)

Arthropod pests existing as nuisances in dwellings and other structures; door-yard pests, and pests attacking man and domestic animals. Emphasis on biology, recognition, habitat, ecology, distribution and disease transmission; techniques and materials used for control. 2 lectures, 1 three-hour laboratory. Prerequisite: AGB 165/165L or equivalent. Corequisites: AGB 333/333L.

AGB 336/336L Bee Science (2/1)

Care, management, and manipulation of bees. Practical application of principles for effective establishment and maintenance of apiaries. Pollination and value of bees to agriculture. Recognition and control of bee diseases. Laws and regulations pertaining to beekeeping. 2 lectures, 1 three-hour laboratory. Corequisites: AGB 336/336L.

AGB 342/342L Invertebrate Vector Control (3/1)

Major invertebrate pests attacking structures, wood, and stored products; recognition of stages and damage; life histories and means of control; related laws and regulations. 3 lectures, 1 three-hour laboratory. Prerequisite: AGB 165 or equivalent. Corequisites: AGB 342/342L.

AGB 377/377L Insect Population Ecology (2/1)

The study of pest populations in crop ecosystems in relation to chemical, biological, cultural, physical, and integrated control practices. Relationships among host, pest population, related biotic agents, soil, climate and management practices. 2 lectures. 1 three-hour laboratory. Corequisites: AGB 377/377L.

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

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

AGB 401/401L Field Entomology (2/2)

Collection, classification and study of insects and other arthropods from ecological zones, animals, crop plants, or other habitat situations. 2 lectures, 2 three-hour laboratories. Prerequisite: AGB 165 or a course in general entomology and consent of instructor. Corequisites: AGB 401/401L.

AGB 403/403L Biological Control (3/1)

Natural and induced control of insect, mite, and weed pests using agents other than toxicants; collection, production and liberation of control agents; habits and identification of major groups of parasites and predators; recent developments in pest inhibition, 3 lectures, 1 three-hour laboratory. Prerequisite: AGB 165/165L and advanced standing and consent of instructor. Corequisites: AGB 403/403L.

AGB 411 Environmental Toxicology (4)

Survey and analyses of the effects of civilization on the environment. Emphasis will be placed on the effects of agriculture and other forms of com merce on food, water, air and soil. 4 lectures/discussions. Prerequisite: Senior standing or consent of instructor.

AGB 413 Inspection Procedure (2)

Practical application of inspection techniques in the fields of vertebrate, insect, disease and weed pest management; pesticide use enforcement; nursery and seed regulation; plant quarantine and pest detection; and fruit and egg quality control. Development of: public relations programs, legal cases (collection, preparation and presentation of evidence); and program analysis. 2 lectures. Prerequisite: Senior standing and consent of instructor.

AGB 424/424L Pest Control Methodology (2/1)

Summation of entomology courses through field observation and analysis of pest levels leading to written recommendations for control. Weekly field trips to agricultural areas required with written reports on trips. 2 lecture/analysis, 1 three-hour laboratory. Prerequisite: AGB 165/165L and AGB 228, AGB 231, senior standing and consent of instructor. Corequisites: AGB 424/424L.

AGB 426/426L Fruit and Vegetable Standards (3/1)

Analysis and interpretation of quality provisions of the Agricultural Code relating to fruits, nuts, vegetables, eggs and honey. Analysis of minimum standards for marketing, including maturity, containers, marketing and size requirements. Written reports required. 3 lecture/analysis, 1 three-hour laboratory. Prerequisite: AGB 325/325L. Corequisites: AGB 426/426L.

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

On the job experience with public and private agencies for advanced students. Professional type experience new to the student so that a valuable contribution toward career development results. Written and oral reports necessary. Approval before enrolling required. Each course can be repeated for a total of 12 units.

AGB 455/455L Immature Insects (1/2)

The identification of immature arthropods through analysis and interpretation of dichotomous keys. Emphasis on those orders of insects with complete metamorphosis. 1 lecture/analysis, 2 three-hour laboratories. Prerequisite: AGB 165/165L and consent of instructor. Corequisites: AGB 455/455L.

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

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

AGB 463 Undergraduate Seminar (2)

Critical reviews of contemporary research in the field of Agricultural Biology. The student will analyze, criticize and advocate by ductive and deductive methods, that inferences in contemporary literature are based on fact or a logical, unambiguous extension of fact. Oral reports of literature and senior projects are required.

AGB 470/470L Plant Growth Regulators (2/1)

The natural and synthetic substances used to control the growth of economic plants and their products. Emphasizes chemical characteristics, physiological plant responses, uses, and modes of application. Related laws and regulations. 2 lectures, 1 three-hour laboratory. Prerequisite: BOT 124/124L. Corequisites: AGB 470/470L.

AGB 499/499L/499A Special Topics for Upper Division Students (1-4)/(1-4)/(1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, laboratory, activity, or a combination. Corequisites: AGB 499/499L/499A individually or in combination.

AGRICULTURAL BUSINESS MANAGEMENT

This major is offered in the Agricultural Business Management/ Agricultural Education Department. Two career tracks are offered within the major; they are *international agribusiness and food marketing and management.*

Edison I. Cabacungan, *Chair*
A. Reza Hoshmand
William C. Hughes
Marvin L. Klein
Arthur F. Parker
James M. Weidman

The agricultural business management major is the application of business concepts to the agricultural industry. Because of the wide selection of course offerings, a broad range of occupational choices is available to the graduate. These include the banking and finance area, food and fiber processing, sales and marketing positions, federal, state and county government units, agricultural communications, farm and ranch management, commodity and produce brokerage, international trade, packing house management and supermarket management. The core is designed to provide students with an understanding of the basic functions of business and the application of theory and practice to the agribusiness industry. The directed electives and career tracks allow the student to design a curriculum that is more closely in tune to the student's career goals. The two career tracks allow students to tailor their course work to their particular interests.

The international agribusiness track includes courses within the university to prepare students for employment in some aspect of international trade, with more emphasis given to the international marketing area. The food marketing and management track is directed more towards the domestic agribusiness industry. Within this track, students can generally emphasize some aspect of marketing or management with courses in both agriculture and business. Interested students can even direct their course work towards a specific technical area such as management of crop or animal enterprise. As a supplement to classroom and laboratory meetings, field trips are taken to distribution centers, production areas, and other related industries within agriculture. Frequent visits by guest speakers from leading agricultural firms further ensure that the student gains practical, current knowledge. In addition to business management, sales, and sales-promotional training, students may elect studies in specified production fields to gain valuable production techniques and experience necessary for job competency. As a senior, the student is encouraged to take part-time employment in a related agricultural industry of interest and to work closely with management people in the development of the senior feasibility study.

CORE COURSES FOR MAJOR*

(Required of all students)

Orientation to the College of Agriculture	AG	100	(1)
Agriculture and the Modern World	AG	101	(4)
Intro. to Microcomputing	CIS	101	(4)
Global Resources for Food	IA	101	(4)
Managing Agribusiness Organizations	ABM	201	(3)
California & World Agriculture	ABM	300	(3)
Food and Fiber Marketing	ABM	304	(4)
Seminar in Food and Fiber System Management	ABM	310	(3)
Applied Economics for Agribusiness	ABM	311	(4)
Politics of Food and Agriculture	ABM	313	(3)
Accounting for Management Decisions	ABM	324	(4)
Financial Analysis for Agribusiness	ABM	326	(4)
International Food & Fiber Marketing	ABM	330	(4)
Ag Data Management	ABM	375	(4)
Senior Feasibility Study	ABM	490	(4)
or a total of 4 units from			
Internship - Ag Business Management	ABM	441	(1-4)
and/or Internship - Ag Business Management	ABM	442	(1-4)
Undergraduate Seminar	ABM	463	(1)
Ag Issues and Ethics	AG	401	(4)
Development of Leadership Skills	AG	464	(3)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Legal Env of Bus Trans	FRL	201	(4)
Principles of Economics	EC	202	(4)
Career track (see advisor)			(50)
Unrestricted Electives			(6-7)

GENERAL EDUCATION COURSES

Area 1:			
a. Freshman English I	ENG	104	(4)
b. Advocacy and Argument	COM	204	(4)
c. Choose one course			(4)
Area 2:			
a. Statistics with applications	STA	120	(4)
b. Choose one course			(4-5)
c. Choose one course			(4)
d. Choose one course			(4)
Area 3:			
a. Choose one course			(4)
b. Choose one course			(4)
c. Choose one course			(4)
d. Principles of Econ	EC	201	(4)
e. Choose one course			(4)
f. Choose one course			(4)
g. General Psychology	PSY	201	(4)
Area 4:			
Intro to Am. Gov	PLS	201	(4)
U.S. History	HST	202	(4)
Area 5:			
Principles of Management	MHR	301	(4)
Multicultural Organizational Behavior	MHR	318	(4)

AGRICULTURAL BUSINESS MANAGEMENT MINOR

Accounting for Management Decisions	ABM	324	(4)
Financial Analysis for Agribusiness	ABM	326	(4)
Agricultural Enterprise Management	ABM	328	(4)
Select 20 Units from the following:			
Global Resources for Food	IA	101	(4)
Managing Agribusiness Organizations	ABM	201	(3)
Sales and Advertising Management	ABM	225	(4)
California and World Agriculture	ABM	300	(3)
Agricultural Commodity and Futures Trading	ABM	305	(3)
Wholesaling and Retailing of Food	ABM	306	(4)
Seminar in Food and Fiber Systems Management	ABM	310	(3)
Applied Economics for Agribusiness	ABM	311	(4)
The Politics of Food and Agriculture	ABM	313	(3)
Equine Enterprise Management	ABM	329	(3)
International Food and Fiber Marketing	ABM	330	(4)
Agricultural Data Management	ABM	375`	(4)
Operations Management for Agribusiness	ABM	376	(4)
Personnel Management	ABM	402	(4)
Food and Agricultural Marketing Applications	ABM	405/405L	(3)
Equine Investment Management	ABM	429	(3)
Assessing International Agrimarketing Opportunities	ABM	431	(4)
Land Appraisal	ABM	406	(4)

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

INTERNATIONAL AGRICULTURAL BUSINESS MANAGEMENT MINOR

Global Resources for Food	IA	101	(4)
Institutions for International Agriculture Trade & Development	IA	301	(4)
Agricultural Market Development	IA	302	(4)
Food & Fiber Marketing	ABM	330	(3)
Ag Policy in Developing Nations	IA	362	(4)
Food & Ag Marketing Applications	ABM	405/405L	(3)
Internships in Ag Business Management	ABM	441/442	(2-3)

Course Descriptions

+All Departmental offerings may be taken on a CR/NC basis except for majors in the department.

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

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

ABM 201 Managing Agribusiness Organizations (3)

A comprehensive overview of management fundamentals emphasizing the study of management and business organizations in the contemporary food and agricultural system. Includes various management theories, approaches and techniques and how they might be applied to organizations within the food and agricultural system. The conflict between organizational and personal values will also be covered. 3 lectures.

ABM 225 Sales and Advertising Management (4)

Industry-sponsored agricultural advertising programs; tools of publicity, merchandising and public relations. Detailed examination of local types of advertising media, and rates for short, seasonal promotions. Advertising provisions of marketing orders. Seminar type discussions and guest speakers. 4 lecture discussions.

ABM 299/299A/299L Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor. Instruction is by lecture, laboratory, activity, or a combination.

ABM 300 California and World Agriculture (3)

Discussion and analyses of contemporary issues of the food and agricultural system in California and the world. Overview of principles and issues such as the resource base, environmental and health consequences of production and marketing, international trade and free trade agreements, and designing an economically and environmentally sustainable food and agricultural system for California and the world. 3 lecture/discussions. Prerequisite: EC 201 or consent of instructor.

ABM 304 Food and Fiber Marketing (4)

Economic aspects of marketing agricultural products. Problems and alternative solutions of various marketing institutions. Current trends and developments in California product marketing. 4 lectures. Prerequisite: EC 201 or permission of the instructor.

ABM 305 Agricultural Commodity Marketing and Futures Trading (3)

Principles of marketing agricultural commodities. Understanding the operation of commodity markets, developing marketing strategies and learning the mechanics of futures trading. Application for specific commodities. 3 lectures.

ABM 306 Wholesaling and Retailing of Food Products (4)

Principles and practices of distributing food products from producer to consumer; buying, assembling, transporting, handling, receiving and merchandising. Functions of wholesalers and intermediate handlers, chain stores, food brokers, jobbers. Operating costs of retail stores; site selection; scheduling; management of store personnel; pricing, inventory control. 4 lectures.

ABM 310 Seminar in Food and Fiber Systems Management (3)

Seminar on special problems encountered in food and fiber business management with an emphasis on the food consumer. Economic, social, cultural and demographic factors influencing consumer behavior and consumption patterns will be covered. Market surveillance techniques used by managers will also be discussed. 3 lecture/discussions. Prerequisite: Junior status or food/fiber industry experience.

ABM 311 Applied Economics for Agribusiness (4)

Intermediate micro-economic theory applied to production and marketing problems in agriculture. 4 lectures/problem solving. Prerequisite: EC 201 or equivalent.

ABM 313 Politics of Food and Agriculture (3)

The political framework affecting the food and agricultural system. Federal and state laws and regulations impacting agribusiness. Contemporary development and economic analysis of public programs and policies. Current policies and programs as well as alternate policies evaluated. Seminar discussions. Policy case studies. 3 lecture/ discussions. Prerequisite: EC 201 or consent of instructor.

ABM 324 Accounting for Management Decisions (4)

Emphasis on the practical applications of accounting information for agribusiness management. Analysis of accounting data and its meaning for management and financial decisions. Includes the basics of recording transactions as well as accounting for assets, liabilities, owner's equity and net income, and the interpretation of this information. 4 lectures/problem solving.

ABM 326 Financial Analysis for Agribusiness (4)

Techniques of financial analysis. To include capital budgeting, sources of loans for agribusiness, analysis of financial statements, credit instruments, risk and insurance for agriculture, farm credit system. 4 lectures/problem solving. Prerequisite: ABM 324.

ABM 327 Agricultural Financial Analysis II (3)

Continuation of ABM 326. Financial forecasting, leverage and growth, further topics in the time value of money, working capital management, financing operations. 3 lectures. Prerequisite: ABM 326/326L.

ABM 328 Agricultural Enterprise Management (4)

Criteria for decision making involving agricultural enterprises. Case studies used. Budgeting processes, credit use, and feasibility analysis. Source of economic information. Introduction to simulation of management process. Seminar discussions. 4 lectures. Concurrent enrollment required.

ABM 329 Equine Enterprise Management (3)

Equine enterprise analysis with emphasis on capital acquisition, leasing, land acquisition, legal problems and labor problems. 3 lectures. Prerequisites: ABM 328, AS 325.

ABM 330 International Food and Fiber Marketing (4)

Marketing of food, fiber and horticultural products in foreign markets. Special emphasis on selecting export markets, procedures for establishing contacts, promotion, financing, insuring, shipping tariffs, customs, regulations and other matters related to food and fiber products. Management practices and problems of firms involved in exporting and importing textiles and garments, livestock, fruits, vegetables, grains and other food and fiber products. 4 lecture/discussions.

ABM 331 Apparel Importing and Exporting (4)

Fundamentals of apparel importing and exporting. Analysis, planning and implementation of strategies for global marketing of apparel. Management practices and issues facing firms that are involved in the importing and exporting of apparel. 4 lecture/discussions. Prerequisite: Course in microeconomics or marketing would be desirable but not required.

ABM/IA 360 Agricultural Cooperatives (4)

Structure, management and organization of the Agricultural Cooperative with emphasis upon current management practice. Includes comparison of cooperative with other business forms, ideals, history, and progress of the cooperative movement, problems in establishing a new cooperative; financing and membership problems. 4 lecture/discussions. Concurrent enrollment required.

ABM 375 Agricultural Data Management (4)

Principles and procedures involved in analysis of agricultural data for management. Includes single two-sample hypothesis testing for means and proportions. Chi-square, simple and multiple regression and correlation. Microcomputer applications. 4 lectures/problem solving, Prerequisite: STA 120 or equivalent.

ABM 376 Operations Management for Agribusiness (4)

Application of statistical and other quantitative techniques employed in agricultural economic and operations analysis. Areas covered include statistical forecasting, resource allocation, break-even analysis, project management, inventory control, total quality management (TQM), and quality control. 4 l4lectures/problem solving. Prerequisite: ABM 375.

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

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

ABM 402 Personnel Management (4)

Management-employee relations and theory; employee motivation; union and management relations; recruitment and selection; performance appraisal; communications; individual and group incentive systems; employee counseling; labor legislation; wage determination and salary systems; employment and unemployment. Case studies analyzed. Seminar discussions held, role playing emphasized, guest speakers. 4 lectures.

ABM 405/405L Food and Agricultural Marketing Applications (2/1)

An application of theories, principles and procedures involved in developing a marketing strategy. Students will work as a team to develop a marketing plan for an agricultural product. Topics covered will include all aspects of food and fiber market strategy planning such as identifying a target market, analyzing market opportunities, developing a marketing mix, and completing a budget for the plan. Course requirement: Current NAMA membership. 2 lectures, 1 three-hour laboratory. Concurrent enrollment required.

ABM 406 Real Property Appraisal and Acquisition (3)

Principles, methods and techniques of appraising agricultural real property for loans, purchase and sale, tax assessments, condemnations, and other purposes. 3 lecture/discussions.

ABM 429 Equine Investment Management (3)

In-depth analysis of equine investments. Emphasis on capital acquisition, equine tax law, limited partnerships, joint ventures, and stallion or mare syndications. 3 lectures.

ABM 431 Assessing International Agrimarketing Opportunities (4)

Comparative agribusiness systems and methods to assess international agribusiness trade and foreign investment opportunities. Analyzes the international forces with which the international agribusiness firm must contend and potential responses. Includes integration of foreign food and agricultural marketing, natural resource and production policies with impact on private sector responses. Term project on a product and country required. 4 lectures/discussions. Prerequisites: IA 101, ABM 300 or IA 362, and ABM 330, or equivalents.

ABM 441, 442 Internship in Agricultural Business Management (1-4) (1-4)

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

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

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Must be taken in sequence, not concurrently. Prerequisites: ABM 101, 311, 324, 325, 375 and COM 216.

ABM 463 Undergraduate Seminar (1)

New methods and developments, practices, and procedures in the field. 1 meeting. Prerequisite: Senior project completed.

ABM 490 Senior Feasibility Study (4)

Selection and completion of a major feasibility study under faculty supervision. Prerequisites: ABM 311, 324, 376 and COM 216.

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

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, laboratory, activity, or a combination of both.

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

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, laboratory, activity, or a combination of lecture and laboratory or activity.

ABM 575 Statistics for Agriculture (4)

A summary of statistical tools and techniques used in agriculture. Includes hypothesis testing, Chi Square, ANOVA, correlation, as well as simple and multiple regression. Application of computer to selected statistical techniques. Review of statistical literature from various fields of agriculture. Open to graduate students only. 4 lectures/problem solving. Prerequisite: STA 120 of equivalent

AGRICULTURAL EDUCATION

Flint Freeman, *Coordinator,* Agricultural Education

Robert J. Tullock, Graduate Coordinator, M.S. in Agriculture, Agricultural Science Option

The primary function of the agricultural education program is the preparation of teachers of agricultural education for the public secondary schools of California. Specialized preprofessional and professional courses are offered for undergraduate and graduate (fifth year) students. Technological, scientific, and broad general education course work for agriculture teaching candidates is offered throughout the College of Agriculture and other Colleges including the School of Education and Integrative Studies.

Students with an interest in becoming agriculture teachers are advised to enroll in the agricultural science major and obtain a B.S. degree, or they may complete a B.S. degree in one of the other approved majors in the College of Agriculture. Agricultural science majors and all students who wish teacher certification are required to show competency in four areas of agriculture. This can be accomplished by completing the subject matter program in agriculture or receiving a passing score on the National Praxis in Agriculture.

In addition to coursework in four areas of agriculture, students who plan to teach agriculture must have two years of practical experience in agriculture and must complete an Agricultural Specialist credential. The Agricultural Specialist credential requires a minimum of 45 additional units beyond the B.S. degree. Some of the graduate work may be applied towards a Master of Science in Agriculture, Agricultural Science option.

Enrollment in a Single Subjects credential program is required in order to qualify for student teaching. Candidates for the Single Subjects teaching credential who are not agricultural science majors are advised to wisely use the electives available in their major in order to complete required teaching credential courses which are not normally specified in their undergraduate major. Because of the wide range of variables involved, all candidates for teaching certification are urged to consult the Agricultural Education Program as early as possible in their college careers.

For students wishing to obtain a Master of Science in Agriculture, such a degree has been approved with an option in agricultural science.

CORE COURSES FOR MAJOR*

(Required of all majors in agricultural science. Students interested in teaching should see the Teacher Preparation section for additional secondary education requirements.)

Orientation to the College of Ag.	AG	100	(1)
Ag and the Modern World	AG	101/101A	(4)
Ethical Issues in Agriculture	AG	401	(4)
Development of Leadership Skills	AG	464	(3)
Development of Competitive Activities	AGS	250	(2)
Intro to Ag. Education Programs	AGS	300	(3)
Agriculture Skills & Facilities	AGS	420/420A	(3)
Field Experiences in Ag Education	AGS	441	(4)
Senior Project	AGS	461	(2)
Senior Project	AGS	462	(2)
Management Accounting	ABM	324	(4)
Ag Enterprise Management	ABM	328	(4)
Introduction to Animal Nutrition	AVS	100	(3)
Feeds & Feeding	AVS	101/101L	(2)
Animal Ag. Science	AVS	111	(4)
Intro. Livestock Evaluation	AVS	241/241L	(2)
Horticulture Principles & Practices	HOR	131/131L	(4)
Basic Soil Science	SS	231/231L	(4)
Landscape Construction	AE	124/134L	(3)
General Surveying	AE	232/232L	(3)
Tractors	AE	241/241L	(2)
Landscape Sprinkler Irrigation	LIS	231/231L	(4)
Automatic Irrigation Systems Controls	LIS	365/365L	(4)

Select 3 animal management science courses. Must include 1 ruminant and 1 nonruminant course. (12 units)

Swine Management Science	AVS	122/122L	(4)
Sheep Management Science	AVS	123/123L	(4)
Equine Management Science	AVS	125/125L	(4)
Poultry Management Science	AVS	126/126L	(4)
Companion Animal Care	AVS	128	(4)
Beef Management Science	AVS	131/131L	(4)

Select 3 courses from among the following (10-12 units):

Pesticides & Hazardous Materials Laws	AGB	301	(3)
Weeds & Weed Control	AGR	330/330L	(3)
Crop Ecology	AGR	401	(4)
Environmentally Sustainable Agriculture	AGR	437/437L	(4)
Greenhouse Management	HOR	323/323L	(4)
Landscape Management	HOR	443/443L	(4)

Select 2 courses from among the following (7-8 units):

Introduction to Arthropods	AGB	165/165L	(4)
Vegetable Crop Systems	AGR	226/226L	(4)
Pomology	FI	203/203L	(4)
Plant Propagation	HOR	132/132L	(3)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Secondary School Health Education	KIN	442	(3)
Fundamentals of Physics	PHY	102	(4)
Unrestricted Electives			(15-18)

GENERAL EDUCATION COURSES

(Required of all students)

Global Resources for Food	IA	101	(4)
Intro to American Government	PLS	201	(4)
U.S. History	HST	202	(4)
Culture, People, and Dress	HE	138	(4)
Basic Biology	BIO	115/115L	(5)
Plants & Civilization	AGR	311	(4)
College Chemistry	CHM	104	(3)
College Chemistry	CHM	141L	(1)
Freshman English I	ENG	104	(4)
Ethics	PHL	204	(4)
College Algebra	MAT	105	(4)
Logics and Semantics	PHL	202	(4)
General Psychology	PSY	201	(4)
Child Psychology: The Middle Years	PSY	311	(4)
Adolescent Psychology	PSY	312	(4)
U.S. History	HST	201	(4)
Public Speaking	COM	100	(4)
Elementary Spanish	FL	151	(4)
History of Garden Art	PA	214	(4)

SINGLE SUBJECTS TEACHING CREDENTIAL

Students wishing teacher certification in agriculture are required to show competency in four areas of agriculture. This can be accomplished by receiving a passing score on the National Praxis Examination in Agriculture or completing the subject matter program in agriculture. Interested individuals should contact the Agricultural Education Program Coordinator for additional information.

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

Subject Matter Program

Those qualifying for a credential through course work rather than the Praxis Exam must complete the following:

18 units in Animal and/or Veterinary Science
18 units in Ag. Mechanics and/or Ag. Engineering
8 units in Ag. Business Management. and/or Farm Management./Ag. Economics
26 units in a combination of courses in Agronomy, Plant Science, Soils, Ag. Biology and Ornamental Horticulture

Students who are Ag Science majors automatically meet this requirement as a part of their degree requirements.

Others should consult with the Agriculture Education Coordinator. In addition to a B.S. in Agriculture, students preparing to student teach must complete requirements for the single subjects credential. The required courses include:

Field Experiences in Ag Ed	AGS	441	(4)
or Field Experience—Intro to Schooling	TED	301	
Procedures in Agricultural Education	AGS	440/440A	(4)
Dynamics of Teaching in a Pluralistic Society	TED	420/420A	(4)
Psychology in the Instructional Process	TED	421	(3)
Teaching Reading in the Content Area	TED	432	(4)
Secondary Student Teaching I	TED	435	(9)
Seminar: Secondary Student Teaching I	TED	436	(2)
Secondary Student Teaching II	TED	437	(9)
Field Practices and Supervision	AGS	450	(3)
Intro to Exceptionality	GED	501	(4)
Technological Applications in Ag Ed	AGS	410/410A	(3)
or Educational Comp Tech Sci	TED	455	(3)
Secondary School Health Education	KIN	442	(3)

A minimum of 45 graduate credit units are required for the Single Subject credential.

AGRICULTURAL SPECIALIST CREDENTIAL

In addition to a B.S. in Agriculture, students preparing to teach agriculture must complete the requirements for the single subjects credential and the requirements for the agricultural specialist credential. The courses include:

Intro to Ag Ed Programs	AGS	300	(3)
Special Problems	AGS	400	(2)
Agriculture Skills & Facilities	AGS	420/420A	(3)
Program Planning and Development	AGS	430	(3)
Youth and Adult Leadership Programs	AGS	505/505A	(3)

Students are also required to have a concentration of 27 units, including 9 upper division, in one area of agriculture. This is generally completed as an undergraduate. A minimum of 2 years of verified work experience in agriculture is also required. A total of 45 graduate credit units are required for the Agricultural Specialist credential.

+Students may complete the requirements for both the Single Subject and the Agricultural Specialist credentials concurrently. A limited number of courses may be taken at the undergraduate level. Students should consult with the Agricultural Education Program Coordinator prior to enrolling in any courses to be used for credentialing purposes.

Courses in Related Agriculture

AGS 250 Development of Competitive Agricultural Activities (2)

The philosophy and development of competitive activities for students of agriculture. Selection of contest officials, development of contest patterns, scoring of placing cards, and publications of results. Use of the California Curricular Code. Practical application of this class will occur with the operation of Agriculture Field Day. 2 lectures.

AGS 299/299A/299L Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units with a maximum of 4 units per quarter. Prerequisite: Permission of instructor. Instruction is by lecture, laboratory, activity, or a combination.

AGS 300 Introduction to Agricultural Education Programs (3)

Overview of agriculture programs including goals and purposes. Qualifications essential to success in agricultural education. Programs of studies to meet requirements for instruction in agriculture. 3 lecture discussions.

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

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

AGS 410/410A Technological Applications in Agricultural Education (2/1)

The development and integration of computer literacy in the pedagogical and agricultural fields. Instructional focus will be on the competent infusion of computer technology and awareness in the organizational, delivery, and managerial domains of agricultural education. Study of pervasive issues of computer technology in this society, terminology, computer systems, data terminal devices, communications media, computer assisted instruction (simulations, demonstrations, tutorials, drill and practice), and computer managed instruction (word processing, database management, graphics, spreadsheets, telecommunications, grading programs, and media development). A special project undertaken by each student will promote the development and integration of problem-solving skills, critical thinking, or creative processes with regard to computer technology and agriculture. Two hour lecture problem-solving, two hour practicum. Concurrent enrollment required.

AGS 420/420A Agriculture Skills and Facilities (2/1)

Development, operation, and management of agriculture facilities. Skills necessary for classroom, laboratory, and school farm instruction in agricultural education will be demonstrated. Emphasis will be on facility management and individual skills development and assessments. 2 lectures, 1 activity. Concurrent enrollment required.

AGS 430 Program Planning and Development (3)

Study of career opportunities in agriculture. Program development in such areas as the Future Farmers of America, and other youth groups. Supervised practice including cooperative work experience in agriculture. Development of up-to-date approaches in an integrated program. Operating policies and procedures. 3 lecture/problem-solving.

AGS 440/440A Procedures in Agricultural Education (2/2)

Approaches to the learning process and development of daily and unit plans as well as the utilization of resources. Class demonstration in teaching procedures with emphasis being given to J.I.T., micro-teaching, and the development of pedagogical skills including development analysis and evaluation. 2 lectures, 2 activity periods. Concurrent enrollment required.

AGS 441 Field Experiences in Agricultural Education (4)

An overview of Agricultural Education in the public schools. Professional type experience new to the student so that a valuable contribution toward career development results. Supervised, focused observation/participation at the secondary school level. Written reports necessary.

AGS 450/450A Field Practices and Supervision (1/2)

Organization and implementation of an instructional program in agriculture education. Field application of F.F.A., supervised practice, and classroom instruction. 1 lecture, 2 activity periods. Concurrent enrollment required.

AGS 460 Adult Education through Cooperative Extension (3)

Critical and analytical examination of traditional and contemporary cooperative extension. Emphasis placed on structures of non-formal education and on identifying and fulfilling the needs of adult learners. 3 lecture/problem-solving. No prerequisite.

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

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

AGS 499/499A/499L Special Topics for Upper Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, laboratory, or a combination of both. Graduate courses are listed in the graduate section of this catalog.

AGRICULTURAL ENGINEERING

This major is being phased out. Admissions to this program are closed. The following curriculum is in effect to accommodate current students. For the other program in the Agricultural Engineering/Irrigation Science Department, see Landscape Irrigation Science.

Eudell Vis, *Chair*
Joe Y. T. Hung Ramesh Kumar

Agricultural engineering is an expanding field of engineering that applies the knowledge and skills of science, physics, chemistry and mathematics to enhance the quality and quantity of food, natural resources, alternate fuels, and other agricultural products. Agricultural engineers are called upon to utilize engineering principles in such areas as food engineering, soil and water, electric power and processing, power and machinery, and agricultural structures and environment

Cal Poly offers a strong emphasis in irrigation, both in agricultural and landscape irrigation design. This Department is at the forefront in the application of drip and trickle irrigation as a method of conservation of water resources. Irrigation, drainage, flood and erosion control, and water supply require study of soils, movement of water through the soil, and design criteria for canals, ditches and small dams.

The rapid expansion in the marketing of convenience foods can lead to opportunities for the student to apply engineering principles to food process design. Students with an interest in the power and machinery area learn power testing procedures for tractors, design of hydraulic systems, the effects of noise and vibration on equipment operators, and characteristics of food products that impact machine design. The trend to large dairy, beef, swine and poultry enterprises has necessitated the automation of feed handling; a knowledge of electric power and electronic controls is necessary to engineer these complex systems.

The agricultural engineering curriculum is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). Students desiring to major in agricultural engineering should have a particularly high aptitude for science and mathematics, and incoming freshmen should have taken substantial college preparatory courses in these disciplines in high school. Incoming transfer students should have completed at least one year of college calculus and one year of college physics (with laboratory) prior to beginning the program at Cal Poly. The community college student planning to transfer into this department should consult a school counselor or his department to determine which courses meet the program requirements.

Students are urged to consider the Integrated General Education (IGE) program as a valuable means of satisfying the General Education requirements of the degree. Graduates of the program are prepared to do production work in their first jobs as well as to grow with their profession throughout their engineering careers. The curriculum is designed to prepare a student for direct entry into the engineering profession and for graduate school.

Agricultural engineering students are encouraged to become active in the student branch of the American Society of Agricultural Engineers and the Agricultural Engineering Club.

CORE COURSES FOR MAJOR*

(Required of all students)

Orientation to the College of Agriculture	AG	100	(1)
Ag and the Modern World	AG	101	(4)
Engr Digital Computations	ME	132/142L	(3)
Engineering Analysis of Agricultural Machines	AE	210/210L	(3)
Processing Equipment and Procedures for Agricultural Products	AE	234	(3)
Strength of Biological Materials	AE	330	(3)
Food Process Engineering	AE	332/332L	(4)
Instruments and Controls	AE	350/350L	(3)
Human Engineering	AE	410	(2)
Hydraulic Systems	AE	411	(3)
Farm Power and Machinery Design	AE	415	(4)
Agricultural Environments and Structures	AE	420/420L	(3)
Irrigation Engineering	AE	440/440L	(4)
Erosion Control & Drainage Engineering	AE	441/441L	(4)
Senior Project	AE	461	(2)
Ag Engr Design	AE	464	(4)
Applied Elec Engr	ECE	232	(4)
Strength of Materials	ME	218	(3)
Strength of Materials	ME	219	(3)
Strength of Materials Laboratory	ME	220L	(1)
Thermodynamics	ME	301	(4)
Fluid Mechanics	ME	311	(3)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

General Surveying	AE	232	(3)
Analytical Geom & Calculus II	MAT	115	(4)
Analytic Geometry and Calculus	MAT	116	(4)
Calculus of Several Variables	MAT	214	(3)
Calculus of Several Variables	MAT	215	(3)
Differential Equations	MAT	216	(4)
Vector Statics	ME	214	(3)
Vector Dynamics	ME	215	(4)
General Physics	PHY	133	(3)
General Physics Lab	PHY	153L	(1)
Basic Soil Science	SS	231/231L	(4)
General Physics	PHY	131	(3)
General Physics	PHY	132	(3)
General Physics Lab	PHY	152L	(1)
General Chemistry	CHM	112	(3)
General Chemistry Laboratory	CHM	152L	(1)
Ag Sci Elec (restr'd See advisor)			(3)
Engr Design Elect (restricted)			(8)
Engr Science Elect (restricted)			(8)

GENERAL EDUCATION COURSES

Area 1:

Freshman English I	ENG	104	(4)
Advocacy and Argument	COM	204	(4)
Report Writing	COM	216	(4)

Area 2:

Analytic Geometry and Calculus	MAT	114	(4)
General Physics Lab	PHY	151L	(1)
Life Science	BIO	110	(3)
General Chemistry	CHM	111	(3)
General Chemistry Laboratory	CHM	151L	(1)
Engr Numerical Computations	ME	330	(4)

Area 3:

A. Elective			(4)
B. Elective			(4)
C. Elective			(4)
D. Principles of Economics	EC	201	(4)
or Principles of Economics	EC	202	
E.	SOC/PLS	390	(4)
F.	SOC/PLS	390	(4)
G. Elective			(4)

Area 4:

Introduction to American Government	PLS	201	(4)
U.S. History	HST	202	(4)

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

Area 5:

Ethics and Engineering Decision Making	EGR	402	(4)
Capital Allocation Theory	EGR	403	(4)

LANDSCAPE IRRIGATION DESIGN MINOR

Principles of Irrigation	LIS	212	(4)
Landscape Hydraulics	LIS	221	(4)
Landscape Sprinkler Irrigation	LIS	231/231L	(4)
Computer Aided Drafting	LIS	241/241L	(4)
Landscape Drainage	LIS	341	(4)
Automatic Irrigation System Controls	LIS	365/365L	(4)
Landscape Irrigation Trouble Shoot	LIS	452/452L	(3)
Micro Irrigation	AE	340/340L	(3)
Total Units			30

Course Descriptions

All courses offered by the department may be taken on a CR/NC basis except for majors.

AE 101 Introduction to Agricultural Engineering (1)

An introduction to the field of agricultural engineering, career opportunities and responsibilities. Preparatory work for future challenges, including various subfield areas of study in the agricultural engineering profession. Library research and other related activities. Preparation of engineering reports. 1 lecture.

AE 110/110L Introduction to Farm Power and Machinery (2/1)

Principles of operation and construction of farm tractors. Performance, operation and adjustment of machines for tillage, planting, cultivating, treating and harvesting field crops. 2 lecture/problems and 1 three-hour laboratory. Prerequisite: MAT 105 or equivalent. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

AE 121/121L Construction Fundamentals (1/1)

Safety in construction techniques, material strength tests, and structural planning. Carpentry and masonry tools, hardware and materials as applied to construction of various structures. Hand and power equipment, 1 lecture, 1 three-hour laboratory. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

AE 123/123L Welding (1/1)

Fundamentals of arc and acetylene welding. Flat, horizontal, vertical, and overhead positions. Cutting, brazing, hard-facing. Practical arts and skills of metal fabrication. 1 lecture, 1 three-hour laboratory. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

AE 124/124L Landscape Construction (2/1)

Theory and application of hardscape materials used in the landscaping trade. Techniques and safety using common tools in the construction of decks, enclosed wooden structures, and concrete surfaces. Uses of lighting, masonry, irrigation, plumbing equipment, and plastics. 2 lecture/problems and 1 three-hour laboratory. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

AE 131/131L Surveying Fundamentals (1/1)

Measurement of distances, elevations, angles, and directions. Care and use of surveying equipment. Contours, maps, field notes, calculation methods. 1 lecture/problem, 1 three-hour laboratory. Prerequisite: MAT 105 or 106 or equivalent. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

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

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

AE 210/210L Engineering Analysis of Agricultural Machines (2/1)

A functional analysis of soil working tools, planting equipment, pest control equipment, and harvesting equipment. Study of tractor and mechanical power as used in agricultural operations. 2 lecture/problems, 1 three-hour laboratory. Concurrent enrollment required.

AE 231/231L Materials and Creative Construction (1/1)

Creative use of construction, flower and plant materials to develop an art form to match the chosen theme of a floral festival. Use of various tools and equipment to achieve the desired aesthetic and functional perceptions. 1 lecture presentation, 3 hours of laboratory. Can be repeated for a maximum of 4 units of letter grade and additional 2 units of credit/no credit. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

AE 232/232L General Surveying (2/1)

Measurement of distances, elevations, angles, and directions. Contours, maps, plane table mapping, earth yardage for land forming, cuts and fills, road curves, and aerial photogrammetry. Care of surveying equipment, note taking and calculations. 2 lecture/problems and 1 three-hour laboratory. Prerequisite: MAT 106. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

AE 234 Processing Equipment and Procedures for Agricultural Products (3)

Introduction to pumps, fans, sizing, sorting and materials handling equipment; the application of psychrometrics to drying systems for agricultural products. 3 lecture/problems. Prerequisites: AE 101 and PHY 132.

AE 240/240L Irrigation (3/1)

Principles and practices of irrigation. Irrigation design engineering. Pumps, wells, water conveyance and measurement. Surface, sub-surface, drip and sprinkler irrigation. Science of plant-soil-water relationships. Water requirements of crops. Leaching and drainage problems. 3 lecture/problems. 1 three-hour laboratory. Prerequisite: AE 131/131L, SS 231/231L, MAT 105 or 106 or equivalent. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

AE 241/241L Tractors (1/1)

Basic principles of engines and power transmission. Safe field and shop practice in operation, service, adjustment, and minor repair of wheeled and tracklayer tractors. Gasoline, LPG, and diesel engines. Includes bulldozer, backhoes, skiploaders, etc. 1 lecture, 1 three-hour laboratory. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

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

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units with a maximum of 4 units per quarter. Prerequisite: Permission of instructor. Instruction is by lecture, laboratory, or a combination of both.

AE 301/301L Facilities Maintenance Technology (3/1)

Application of basic science to the operation and maintenance of electrical and mechanical equipment; refrigeration, heating, cooking, dish-washing, cleaning, etc. Energy use and cost are included. 3 lecture/problems and one three-hour laboratory. Prerequisite: MAT 105 or equivalent. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

AE 330 Strength of Biological Materials (3)

Resistance to mashing and resulting damage to such products as fruits, vegetables, grain, and eggs. Absorption of loads applied to these biological materials and how the loads are transmitted to container walls and floors. 3 lecture/problems. Prerequisite: ME 219, and MAT 216.

AE 332/332L Food Process Engineering (3/1)

Application of fluid mechanics, heat transfer, and thermodynamics to the processing of food. Drying, evaporation, dehydration, and freezing for the preservation of foods. 3 lecture/problems, 1 three-hour laboratory. Prerequisites: AE 234, ME 301, ME 311, or consent of instructor. Concurrent enrollment required.

AE 340/340L Microirrigation (2/1)

Design, operation and maintenance of drip irrigation systems, including determination of plant water requirements, emitter selection and uniformity of water distribution. Lateral, manifold, and mainline design, filtration, fertilization and automation are included. 2 lecture/problems, 1 three-hour laboratory. Prerequisite: AE 240 or AE 321. This is a service course for students in majors other than agricultural engineering. Concurrent enrollment required.

AE 350/350L Instruments and Controls (2/1)

Fundamentals of instruments and their operation characteristics with respect to damping, range, and accuracy. Electric, electronic, and fluidic controls for sensing and controlling devices. 2 lecture/problems and one three-hour laboratory. Prerequisites: MAT 216, PHY 133. Concurrent enrollment required.

AE 381/381L Apparel Production I (3/1)

Introduction to apparel manufacturing from cut order planning through general warehousing and distribution. Emphasis on understanding the relationship of each manufacturing process for apparel production, manufacturing line design, work measurement techniques, and the role of quality control. 3 hours lecture-problem solving. 3 hours laboratory. Prerequisite: IME 239.

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

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

AE 410 Human Engineering (2)

Human factors in the design of agricultural equipment and facilities. Effect of noise, vibrations, temperature, humidity, etc. on human performance and ability to operate equipment. Design of locations of controls and sensing equipment with respect to body dimensions. 2 lecture/problems. Prerequisite: Junior, senior standing, or consent of instructor.

AE 411 Hydraulic Systems (3)

Hydraulic system components used in agricultural machines and facilities. Design of hydraulic systems for powering, sensing and controlling machine functions. 3 lecture/problems. Prerequisite: MAT 216.

AE 415 Farm Power and Machinery Design (4)

Design of agricultural machinery and components such as agricultural v-belts, chains, couplings, drawbar, axle and shaft. Horsepower requirements of agricultural equipment and engine selection and testing. 4 lecture/problems. Prerequisites: AE 210/210L, ME 215, ME 219.

AE 420/420L Agricultural Environments and Structures (2/1)

Design of building walls, floor, and members to withstand forces of wind, snow, and product storage. Optimum building environments are designed for animals, greenhouse plants, and fruit and vegetable storage. 2 lecture/problems and 1 three-hour laboratory. Prerequisites: AE 332/332L, ME 219. Concurrent enrollment required.

AE 440/440L Irrigation Engineering (3/1)

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

AE 441/441L Erosion Control and Drainage Engineering (3/1)

Analysis of hydrological events which impact on land drainage problems, erosion and floods. Engineering design for reducing erosion due to water, wind and other artificial and natural causes. Engineering design for reducing excessive water in the soil to improve crop production. Flood routing analysis and design of erosion control and drainage structures. 3 lecture/problems, 1 three-hour laboratory. Prerequisite: ME 311. Concurrent enrollment required.
AE 461 Senior Project (2) Students will select an engineering problem in their area of interest. Project will be completed under appropriate faculty supervision and will culminate in a written engineering report.

AE 464 Agricultural Engineering Design (4)

Design of structures, machines, and processes common in agriculture, water, and food-related fields. Design procedures based on theory and accepted engineering practices for specific problems. Students will be expected to go through the entire design procedure for a given problem. 4 lecture/problems. Prerequisite: Senior standing.

AE 481/481L Apparel Production II (3/1)

Computer simulation of manufacturing systems to analyze quick response modular manufacturing systems, bundle systems, and UPS. Definitions, principles of simulation, and applications in apparel industry. Instrumentation and tools to evaluate ergonomic factors are studied. Software for utilization in total quality management programs are introduced. 3 hours lecture-problem solving, 1 three-hour laboratory. Prerequisite: AE 381.

AE 491 Internship in Agricultural Engineering or Apparel Merchandising (1-4)

Professional level work experience with public agencies or private companies for advanced students. Work experiences are valuable for development of career goals and for application of academic training. Written reports are required. Course may be repeated for a maximum of 12 units.

499/499A/499L Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, activity, laboratory, or a combination of both.

AGRONOMY

Daniel Hostetler, *Chair,* Horticulture/Plant and Soil Science Department
Gerald L. Croissant, *Coordinator,* Agronomy
Daniel G. Hostetler
Victor Wegrzyn

Agronomy is the study of the science and technology of crop production for food, forage and fiber. This discipline feeds and clothes a growing world population. Graduates in the Agronomy major can look forward to a wide range of rewarding career opportunities, both domestically and internationally. Students receive excellent training in fundamental principles as well as the more technical and scientific areas. Agronomy students have the freedom to pursue individual interest areas via a 48 unit directed elective package from which the student chooses his/her course from approved department lists.

The Agronomy major is divided into two options: Crop Production and Crop Science.

The Crop Science option is an exciting area, combining agronomy with biotechnology and advanced sciences. Studies in these areas prepare students for entrance into graduate plant science programs throughout the country. Recent graduates from this option are actively employed in careers in plant breeding and genetic engineering, plant pathology, nematology, environmental crop physiology, conservation, and ecology. The Department has excellent rapport with the University of California, Davis where a number of our students pursue graduate studies. Agricultural biotechnology companies actively seek graduates in this option because of their advanced science training combined with sound fundamental agronomic training.

The Crop Production option is designed to give students a practical, yet scientific, background in the production of crops. Courses emphasize current practices employed by commercial agriculture in California and other major agricultural areas. Students in the Crop Production option choose from career tracks in production or a new area in sustainable agriculture. The 48 unit directed elective area contains courses in environmental protection, ecology, toxicology and conservation. This emphasis area is tied closely to programs at the Regenerative Studies Center where students work and live in a sustainable community growing their own food.

Agronomy students at Cal Poly have the unique opportunity to obtain actual experience with crop plants. The University farm regularly hires students and interns to assist in the maintenance of over 800 acres of vegetable, field, forage, and cereal crops as well as native range and irrigated pastures. Enterprising students are allowed to conduct individual or group crop projects, many involving several acres of land. These projects provide valuable training in all phases of crop and farm management and at the same time, allow students to share in the profits.

Employment possibilities are numerous and varied. In addition to commercial crop production, students are prepared to work as consultants to growers, the seed industry, crop processing and marketing, the agricultural chemical industry, as well as numerous other careers. Excellent opportunities also exist at the county, state and federal levels with agricultural commissioners, California department of Food and Agriculture, and the U.S. Department of Agriculture.

Agronomy Minor

The agronomy minor is designed for students majoring in another discipline that has close ties to plant growth, production and nutrition. It is a valuable addition for those majoring in Botany, Horticulture, Soil Science, Agricultural Business Management, Animal and Veterinary Science, Agricultural Biology, Agricultural Science, Nutrition and Consumer Sciences, Agricultural Engineering and irrigation.

CORE COURSES FOR MAJOR*

Orientation to the College of Agriculture	AG	100	(1)
Agriculture and the Modern World	AG	101	(4)
Ethical Issues in Agriculture	AG	401	(4)
Introduction to Arthropods	AGB	165/165L	(4)
Environmental Toxicology	AGB	411	(4)
Weeds & Weed Control	AGR	330/330L	(4)
Crop Ecology	AGR	401	(4)
Senior Project	AGR	461	(2)
Senior Project	AGR	462	(2)
Undergraduate Seminar	AGR	463	(2)
Plant Structures & Functions	BOT	124/124L	(5)
Plant Pathology	BOT	323/323L	(4)
Basic Soil Science	SS	231/231L	(4)
Agronomic Practices	AGR	120/120L	(4)
Field Crop Systems	AGR	220/220L	(4)
Pasture & Forage Systems	AGR	223/223L	(4)
Vegetable Crop Systems	AGR	226/226L	(4)
Plant Breeding	AGR	404/404L	(4)
Crop Diseases	AGR	421/421L	(4)

SUPPORT AND ELECTIVE COURSES

(Required for Specific Options)

Crop Science Option

Integrated Pest Management	AGB	231	(3)
College Chemistry	CHM	105	(3)
College Chemistry Laboratory	CHM	142	(1)
Elements of Organic Chemistry	CHM	201	(3)
Elements of Organic Chemistry Lab	CHM	250	(1)
Soil Fertility & Fertilizers	SS	233/233L	(4)
Statistics with Applications	STA	120	(4)

Directed Electives - 38 units of directed electives to be selected from approved departmental lists with prior consent of instructor (courses are listed on the curriculum sheet). Approved lists include study areas in:

Basic Science	(8)
Advanced Science	(20)
Agricultural Support	(10)
Total	(38)

Crop Production Option

Integrated Pest Management	AGB	231	(3)
Soil Fertility & Fertilizers	SS	233/233L	(4)
Directed Electives			(48)

Directed Electives – 48 units of Directed Electives to be selected from approved departmental lists with prior consent of instructor (courses are listed on the curriculum sheet). Students must select an emphasis area in production or sustainable agriculture. Approved lists include study areas in:

Production

Basic Ag Production & Management	(8)
Advanced Ag Production & Management	(12)
Diversified Ag Support	(12)
Business Management	(4)
Animal & Vet Science/Ag Engineering	(4)
Science Support	(8)
Total	(48)

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

Sustainable Agriculture

Environmentally Sustainable Agriculture	AGR	437/437L	(4)
Life Support Processes	RS	301	(4)
Global Regenerative Systems	RS	302/302L	(4)
Shaping a Sustainable Future	RS	303/303L	(4)
Soil Resource Management & Conservation	SS	334/334L	(4)
Agricultural Support			(10)
Diversified Support			(8)
Science Support			(10)
Total			(48)

GENERAL EDUCATION COURSES

Area 1:

Select pattern 1 or 2			(12)

Area 2:

A. Select 1 course			(4)
B. College Chemistry	CHM	104	(3)
College Chemistry Lab	CHM	141L	(1)
C. Basic Biology	BIO	115/115L	(5)
D. Select 1 course (upper division)			(4)

Area 3:

A. Select 1 course			(4)
B. Select 1 course			(4)
C. Select 1 course			(4)
D. Select 1 course			(4)
E. Select 1 course			(4)
F. Select 1 course			(4)
G. Select 1 course			(4)

Area 4:

Introduction to American Government	PLS	201	(4)
United States History	HST	202	(4)

Area 5*:

Accounting for Management Decisions	ABM	324	(4)
Agricultural Enterprise Management	ABM	328	(4)

*Completion of a Regenerative Studies minor substitutes for upper division General Ed requirements in Areas 2 and 5.

AGRONOMY MINOR

Units Required—24
Upper Division Units Required—12
Required Courses (all students)

Plants and Civilization	AGR	311	(4)

Select 16 units from the following:

Agronomic Practices	AGR	120/120L	(4)
Field Crops Systems	AGR	220/220L	(4)
Pasture and Forage Systems	AGR	223/223L	(4)
Vegetable Crop Systems	AGR	226/226L	(4)
Crop-Animal Systems	AGR	229/229L	(5)
Crop Quality and Utilization	AGR	322/322L	(4)
Weeds and Weed Control	AGR	330/330L	(4)
Seed Production	AGR	331/331L	(4)

Select 4 units from the following:

Crop Ecology	AGR	401	(4)
Plant Breeding	AGR	404/404L	(4)
Crop Diseases	AGR	421/421L	(4)
Environmentally Sustainable Ag	AGR	437/437L	(4)

Course Descriptions

+All courses offered in Agronomy may be taken on a CR/NC basis except for majors.

AGR 120/120L Agronomic Practices (2/2)

Practical application of primary and secondary crop production cultural practices with a relationship to field conditions. Sequence and necessity of operations from soil preparation through harvesting. Analysis of equipment efficiency to crop culture. 2 one-hour lecture, 2 three-hour laboratories. Corequisites: AGR 120/120L.

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

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

AGR 220/220L Field Crop Systems (3/1)

Production and management of the major California field crops such as cereals, cotton, field beans, sugar beets and potatoes. Characteristics of the major varieties in relation to applicable cultural practices, cost of production, harvesting, marketing, grading and processing. 3 lectures, 1 three-hour laboratory. Corequisites: AGR 220/220L

AGR 222 Culinary Produce Technology (4)

Integration of principles of culture, procurement, identification, and quality of standard and gourmet vegetables, fruits, and herbs, for restaurant and culinary uses. Onsite studies/discussion. Organic vs. standard produce. Case studies. 4 one-hour lecture/problem-solving. Corequisites: AGR 222/222L.

AGR 223/223L Pasture and Forage Systems (3/1)

Establishment, management, and composition of irrigated and rangeland pastures adapted to Southwestern conditions. Identification, botanical characteristics, and livestock utilization of major pasture species. 3 lectures, 1 three-hour laboratory. Corequisites: AGR 223/223L.

AGR 226/226L Vegetable Crop Systems (3/1)

Cultural practices, varieties, economics of production of major warm and cool season vegetables. Application of production techniques on college-operated acreage. 3 lectures, 1 three-hour laboratory. Corequisites: AGR 226/226L

AGR 229/229L Crop-Animal Systems (3/2)

Production, management and utilization of principal feed crop species in the Southwest. Identification, botanical characteristics, and nutrient value of major feed crops. Poisonous plants and toxicology. Animal health as affected by crops and crop contaminants. Ecology of pasture and range systems. 3 lectures, 2 three-hour laboratories. Prerequisite: BIO 110 or BIO 115/115L. Corequisites: AGR 229/229L.

AGR 299/299L/299A Special Topics for Lower Division Students (1-4)/(1-4)/(1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor. Instruction is by lecture, laboratory, activity, or a combination. Corequisites: AGR 299L/299A individually or in combination.

AGR 311 Plants and Civilization (4)

A critical review of science, technology and the environment as related to plant domestication and current world food and fiber production. Societal implications associated with the biological and technical innovations in world cropping systems will be discussed. Students will evaluate and discuss issues in an open classroom forum. Oral and written reports. 4 lecture-problem solving. Prerequisites: ENG 104 and satisfactory completion of Category IIa, b and c.

AGR 322/322L Crop Quality and Utilization (3/1)

Grades, quality factors, and processing of cereal, fiber, and forage crops. Market and nutritional values. Optimum harvesting and storage conditions to preserve quality and facilitate utilization. 3 lectures. 1 three-hour laboratory. Corequisites: AGR 322/322L.

AGR 330/330L Weeds and Weed Control (3/1)

Recognition and control of weeds occurring in crop and range lands, ornamental plantings, and non-cropped situations. Classification of weeds. Cultural, chemical, and biological control practices. Laws and regulations. 3 lectures, 1 three-hour laboratory. Prerequisite: BIO 115/115L or BOT 124/124L. Corequisites: AGR 330/330L.

AGR 331/331L Seed Production (3/1)

California field, vegetable and flower seed production. Location and methods of growing, harvesting, storing. Economic outlook for principal kinds. Certified seed production. Seed laws. 3 lectures, 1 three-hour laboratory. Corequisites: AGR 331/331L.

AGR 351/351L Post Harvest Physiology of Fruit & Vegetables (3/1)

Issues affecting the quality of fruit, vegetable and floral commodities from the point of harvest, transportation through marketing channels, and to the consumer. Topics will include storage, ripening, and processing of these fresh commodities. Major pathological organisms affecting quality will be discussed. 3 lectures, 1 three-hour laboratory. Prerequisite: BIO 115/115L. Corequisite: AGR 351/351L.

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

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

AGR 401 Crop Ecology (4)

The environmental, physiological, and production factors in the growth of horticultural and agronomic plants in a managed setting. 4 lectures. Prerequisite: SS 231/231L.

AGR 404/404L Plant Breeding (3/1)

Principles and techniques of improving agronomic and horticultural crop species. Application of field plot design and statistics to experimentation in crop improvement. 3 lectures. 1 three-hour laboratory. Prerequisite: BIO 115/115L. Corequisite AGR 404/404L.

AGR 421/421L Crop Diseases (3/1)

Methods of recognizing and controlling diseases of commercial vegetable and field crops. Chemical and cultural control methods that are presently being utilized in California. 3 lectures, 1 three-hour laboratory. Prerequisite: BOT 323/323L. Corequisites:AGR 421/421L.

AGR 437/437L Environmentally Sustainable Agriculture (3/1)

An examination of environmental problems which will impact the sustainability of the American agricultural system into the future. Studies on waste management, nitrogen and pest management, soil conservation and health, land conservancy, food distribution, and governmental policies affecting plant and animal agriculture. 3 lectures, 1 three-hour laboratory. Corequisite: AGR 437/437L.

AGR 441, 442 Internship in Agronomy (1-4) (1-4)

On-the-job experience with public and private agencies for advanced students. Professional type experience new to the student so that a valuable contribution toward career development results. One unit credit for each 100 hours of experience. Written reports necessary. Approval required before enrolling. Prerequisite: Junior standing.

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

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time. Prerequisite: Student must take GWT before enrollment in AGR 461.

AGR 463 Undergraduate Seminar (2)

Critical review of contemporary research in the field of Agronomy. The student will analyze, criticize and advocate by inductive and deductive methods that inferences in contemporary literature are based on fact or logical, unambiguous extension of fact. Oral reports of contemporary literature and senior projects are required. Prerequisite: AGR 462

AGR 499/499L/499A Special Topics for Upper Division Students (1-4)/(1-4)/(1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, laboratory, activity, or a combination. Corequisites: AGR 499/499L/499A individually or in combination.

ANIMAL AND VETERINARY SCIENCES

Cedric Y. Matsushima, *Interim Chair*

Leo B. Abenes
Wayne R. Bidlack
Robert E. Bray
Melinda J. Burrill
Edward A. Cogger
Edward S. Fonda
Gerald E. Hackett, Jr
Eugene K. Keating
G. Duane Sharp
John E. Trei
G. Duane Sharp
Steve I. Wickler
Adolph A. Wysocki

A four-year curriculum leading to a Bachelor of Science degree in Animal Science with options in preveterinary science/graduate school, animal industries/business management, equine industry, and animal health science is offered by the department.

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

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

A Master of Science degree in Agriculture with an option in animal science is offered. Specializations available within the degree are animal nutrition, animal breeding, meat science, and animal physiology.

Location of the university provides rich opportunities for students to obtain specialized and practical educational experience in production, management, feeding, marketing and processing. Cooperation of prominent local breeders, feeders, producers, marketing organizations and related animal industries offers additional opportunity for field study. Facilities for student-owned and operated livestock projects are made available by the Cal Poly Foundation.

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

The Equine Industry option is designed to prepare students for employment as managers and related agri-business opportunities in the equine industry. The option combines course work in equine production, nutrition, breeding, genetics and diseases with studies in the management aspects of an equine enterprise.

The Animal Industries/Business Management Option stresses preparation for management positions in the production and marketing of animal agribusiness products. Particular emphasis is given to animal industries needing animal specialists as part of their management and marketing team. This option is also useful for students planning to teach agriculture at the secondary level or to serve in developing countries.

The Animal Health Science Option prepares graduates to become veterinary technologists and to sit for state and national animal health accreditation agencies and licensing agency exams. Graduates with this option can pursue careers as veterinary assistants in public and private facilities or as veterinary technologists in public health organizations and research institutions. This program is run jointly with Mount San Antonio College.

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

Non-majors may elect to minor in Animal Science by completing a minimum of 32 units, 9 of which must be upper division.

PHYSIOLOGY MINOR

The Physiology Minor is an interdisciplinary program which can be elected by students majoring in any field. Its purpose is to improve the training and advising of students in order to facilitate their pursuit of careers in biomedical fields utilizing a knowledge of Physiology. It is particularly appropriate for students majoring in Animal Science.

A full description of the minor is located in the "University Programs" section of this catalog.

QUANTITATIVE RESEARCH MINOR

The Quantitative Research Minor is an interdisciplinary program which can be taken by students majoring in any field other than Mathematics. Its purpose is to prepare students to conduct quantitative analyses in their chosen discipline. Students acquire practical experience using statistics, principles of experimental design, survey and data analysis techniques. This minor is particularly suited for students majoring in Animal Science. A full description of this minor is included in the "University Programs" section of this catalog.

CORE COURSES FOR MAJOR *

(Required of all students)

Orientation to the College of Ag	AG	100	1
Ag and the Modern World	AG	101	4
Agricultural Issues and Ethics	AG	401	4
Development of Ag. Leadership	AG	464	3
Introduction to Animal Nutrition	AVS	100	3
Feeds and Feeding	AVS	101/101L	2
Animal Agriculture Science	AVS	111	4
Animal Diseases	AVS	201	3
Anatomy & Physiology of Domestic Animals	AVS	350/350L	5
Genetics	BIO	303/303L	4
or			
Genetics of Domestic Animals	AVS	204	(3)

Any two of the following:. . . . . (7-8)
(must include ruminant and nonruminant)

Sheep Management Science	AVS	123/123L	(4)
Beef Management Science	AVS	131/131L	(4)
Dairy Management Science	AVS	150/150L	(4)
Swine Management Science	AVS	122/122L	(4)
Poultry Management Science	AVS	126/126L	(4)
Equine Management Science	AVS	125/125L	(4)
Companion Animal Care	AVS	128	(3)

OPTION COURSES FOR MAJOR*

(Required in specific options)

PRE-VETERINARY SCIENCE/GRADUATE SCHOOL

Animal Parasitology	AVS	302/302L	4
Meat Science and Industry	AVS	327/327L	4
Applied Animal Feeding	AVS	303/303L	4
or Advanced Animal Nutrition	AVS	402/402A	(4)
or Ruminant Nutrition	AVS	403	(3)
Animal Breeding	AVS	404/404A	4
Physiology of Reproduction & Lactation	AVS	414/414L	4
or			
Mammalian Endocrinology	AVS	412	(4)
Biotechnology Applic. in Animal Science	AVS	430/430L	4
Senior Project	AVS	461	2
and Senior Project	AVS	462	2
or			
Problem Solving Methodologies	AVS	464	(5)

Undergraduate Seminar	AVS	463	2

Support and Directed Courses

Computer Applic. in Animal Science	AVS	428	3
College Chemistry	CHM	105/142L	4
College Chemistry	CHM	106/143L	4
Organic Chemistry	CHM	314/317L	4
Organic Chemistry	CHM	315	3
Organic Chemistry	CHM	316	3
Elements of Biochemistry	CHM	321/321L	4
Trigonometry	MAT	106	4
College Physics	PHY	121/141L	4
College Physics	PHY	122/142L	4
Elem. Statistics w/Applications	STA	120	4
Plant Structure & Functions	BOT	124/124L	5
or			
Basic Soil Science	SS	231/231L	(4)
Vertebrate Zoology	ZOO	138/138L	5
Embryology	ZOO	414/414L	5

ANIMAL INDUSTRIES/BUSINESS MANAGEMENT

Principles. Mkt. Animal & Carcass Evaluation	AVS	240	4
Meat Science and Industry	AVS	327/327L	4
Animal Parasitology	AVS	302/302L	4
Applied Animal Feeding	AVS	303/303L	4
or Advanced Animal Nutrition	AVS	402/402A	(4)
or Ruminant Nutrition	AVS	403	(3)
Animal Breeding	AVS	404/404A	4
Physiology or Reproduction & Lactation	AVS	414/414L	4
or Mammalian Endocrinology	AVS	412	(4)
Biotechnology Applic. in An. Science	AVS	430/430L	4
Senior Project	AVS	461	2
and Senior Project	AVS	462	2
or Problem Solving Methodologies	AVS	464	(5)
Undergraduate Seminar	AVS	463	2

Support and Directed Courses

Computer Applic. in Animal Science	AVS	428	3
Principles of Economics	EC	201	4
Crop-Animal Systems	AGR	229/229L	4
or Pasture and Forage System	AGR	223/223L	(4)
Management. of Ag. Organizations	ABM	201	3
Sales and Advertising Management.	ABM	225	4
Food and Fiber Marketing	ABM	304	4
Food and Ag. Policy	ABM	313	4
Ag. Financial Analysis	ABM	326	4
Agricultural Cooperatives	ABM	360	3
Basic Soil Science	SS	231/231L	4

Restricted Electives from Plant & Soil Science, Ag. Business Management., College of Business (to be taken in consultation with Option Coordinator and/or major advisor) 14

EQUINE INDUSTRY

Light Horse Halter & Perform. Eval.	AVS	132/132L	4
Farrier Science	AVS	234	2
Farrier Science	AVS	235L	2
Horsemanship	AVS	335	2
Equine Herd and Health Care	AVS	365/365L	(4)
or Equine Reprod. and Nutrition	AVS	355/355L	3
Animal Breeding	AVS	404/404A	4
Physiology of Reprod. & Lactation	AVS	414/414L	4
or Mammalian Endocrinology	AVS	412	(4)
Applied Animal Feeding	AVS	303/303L	4
or Advanced Animal Nutrition	AVS	402/402A	(4)
or Ruminant Nutrition	AVS	403	(3)
Biotechnology Applic. in An. Science	AVS	430/430L	4
Senior Project	AVS	461	2
and Senior Project	AVS	462	2
or Problem Solving Methodologies	AVS	464	(5)
Undergraduate Seminar	AVS	463	2

Support and Directed Courses

Computer Applic. in Animal Science	AVS	428	3
Crop-Animal Systems	AGR	229/229L	4
or Pasture and Forage System	AGR	223/223L	(4)
Basic Soil Science	SS	231/231L	4
Ag. Financial Analysis	ABM	326	4
Elem. Statistics w/Applic.	STA	120	4
Intro. to Cities and Planning	URP	101	4
Equine Enterprise Management.	ABM	329	3
Intro. to Adapted Physical Ed.	KIN	206	3
Cluster Courses:			17

Select one cluster. Courses in these areas will be decided in consultation with option coordinator and/or advisor.
Cluster 1: Business and Marketing
Cluster 2: Physiology and Nutrition

ANIMAL HEALTH SCIENCE

Careers in AHS	AVS	104	1
Animal Handling and Restraint	AVS	129/129L (AGAN 51*)	4
Clinical Laboratory Practices	AVS	205/205L (AGHE 62 A/B*)	4
Clinical Biochem. and Pharmacol.	AVS	207/207L (AGHE 64*)	4
Veterinary Radiology	AVS	208/208L (AGHE 65*)	3
Surg. & Anesth. for Vet. Asst.	AVS	209/209L (AGHE 61*)	4
Laboratory Animal Health Care	AVS	266/266L (AGHE 79*)	4
or Equine Herd Health Care Mgt.	AVS	365	4
Vet. Med. Law and Language	AVS	310	3
Lab. Animal Management. Rules and Reg.	AVS	369	3
Internship in Animal Science	AVS	441	2
Critical Care, Adv. Surg. & Anesth.	AVS	407/407L	4

*Course numbers in parentheses refer to equivalent courses taught at Mount San Antonio College.

Support and Directed Courses

Computer Applic. in Animal Science	AVS	428	3
Vertebrate Zoology	ZOO	138/138L	5
Basic Microbiology	MIC	201/201L	5
College Chemistry	CHM	105/142L	4
Elements of Organic Chemistry	CHM	201/250L	4
Elements of Biochemistry	CHM	321/321L	4
Training and Development	MHR	405	4
Unrestricted Electives			23

Students are required to take 23 units of unrestricted electives. Courses should be taken in consultation with the Option Coordinator and faculty advisor.

GENERAL EDUCATION

Required for all students in all options.

Track B

Freshman English I	ENG	104	4
Advocacy and Argument	COM	204	4
or Freshman English II*	ENG	105	4
College Algebra	MAT	105	4
Basic Biology	BIO	115/115L	5

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

College Chemistry	CHM	104/141L	4
Science Tech. and Civ. (II,D) - Elective			4
Arts (III,A) - Elective			4
Philosophy and History (III,B) - Elective			4
Lit. and Foreign Language (III,C) - Elective			4
Economic Institutions (III,D) - Elective			4
Social Institutions (III,E) - Elective			4
Political and Hist. Institutions (III,F) - Elective			4
Integrated Being (III,G) - Elective			4
U.S. History, Const. & Am. Ideals - Elective			4
U.S. History, Const. & Am. Ideals - Elective			4
Upper Division G.E.			4
Upper Division G.E.			4

ANIMAL SCIENCE MINOR COURSES

Introduction to Animal Nutrition	AVS	100	3
Animal Agricultural Science	AVS	111	4
Feeds and Feeding	AVS	101/101L	2
Meat Science and Industry	AVS	327/327L	4
Approved Animal Science Electives			5
Select one management course			4
Beef Cattle Management Science			
Sheep Management Science			
Dairy Management Science			
Swine Management Science			
Poultry Management Science			
Equine Management Science			
Select 9 units of upper division approved Animal Science Electives			9

Course Descriptions

CR/NC courses noted with a +

AVS 100 Introduction to Animal Nutrition (3)

An introductory course discussing the fundamentals of animal nutrition, the composition of feeds, feeding standards and their application to livestock production. 3 lectures.

AVS 101/101L Feeds and Feeding (1/1)

A practical, applied course which provides instruction in the use of the nutritional values of feedstuffs and the nutritional requirements of animals in the formulation of least-cost, balanced rations for domestic farm animals. 1 lecture and 1-3 hr. laboratory. Concurrent enrollment required. Prerequisite: AVS 100 or instructor approval.

AVS 104 Careers in Animal Health Sciences (1)

An introductory course to familiarize students with the employment opportunities in the Animal Health Sciences. Emphasis will be placed on the diversity of careers, training, experience required, the responsibilities of professionals in animal health care, animal nursing care, and management of animal teaching and research facilities. 1 hour lecture.

AVS 111 Animal Agricultural Science (4)

A study of the basic physiological, economic, environmental and nutritional considerations impacting on both the producer and consumer; the course deals with the role, production and use of animal products to resolve problems associated with world population and food production. 4 lectures.

AVS 122/122L Swine Management Science (3/1)

A study of the swine industry emphasizing the importance of breeds, selection, evaluation, nutrition, breeding principles, disease control, equipment and facilities to ensure scientifically based management decisions. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

AVS 123/123L Sheep Management Science (3/1)

A study of the sheep industry emphasizing the importance of breeds, selection, evaluation, nutrition, breeding principles, disease control, equipment and facilities to ensure scientifically based management decisions. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

AVS 124/124A Basic Equitation (1/2)

The fundamentals of the art of equitation. The anatomy of the horse as it pertains to riding. Equipment utilized in training and riding, care of the horse and safety precautions are emphasized. 1 lecture and 2 two-hour activities. Concurrent enrollment required.

AVS 125/125L Equine Management Science (3/1)

A study of the horse industry emphasizing the importance of breeds, selection, evaluation, nutrition, breeding principles, disease control, equipment and facilities to ensure scientifically based management decisions. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

AVS 126/126L Poultry Management Science (3/1)

A study of the poultry industry including breeds and breeding systems, incubation, nutrition, disease control, equipment, and facilities. Also, poultry biology will be examined. This course emphasizes knowledge required for scientifically based management decisions. Discussion and lecture formats will be used. 3 lectures, 1 three-hour laboratory.

AVS 128 Companion Animal Care (3)

A survey course to familiarize students with the routine problems encountered and the responsibilities involved where leisure time has provided increased incentive to own companion animals for recreational purposes. 3 lectures.

AVS 129/129L Animal Handling and Restraint (2/2)

Instruction in the general concepts of restraint and handling of wild and domestic animals. Emphasis will be placed on both physical and chemical restraint. Discussion will also include the tools of restraint, rope work and medical problems that might occur during restraint. 2 lectures, 2 three-hour laboratories.

AVS 131/131L Beef Cattle Management Science (3/1)

A study of the beef cattle industry emphasizing the importance of breeds, selection, evaluation, nutrition, breeding principles, disease control, equipment and facilities to ensure scientifically based management decisions. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

AVS 132/132L Light Horse Halter and Performance Evaluation (1/1)

Visual evaluation of various breeds of light horses at the halter and under saddle. Intensive training for intercollegiate horse judging competition. 1 lecture, 1 three-hour laboratory. Concurrent enrollment required.

AVS 150/150L Dairy Cattle Management Science (3/1)

A study of the dairy cattle industry emphasizing the importance of breeds, selection, evaluation, nutrition, breeding systems, disease control, equipment and facilities to ensure scientifically based management decisions. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

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

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Graded only on a CR/NC basis.

AVS 201 Animal Diseases (3)

Study of factors contributing to animal diseases and their control. 3 lectures.

AVS 204 Genetics of Domestic Animals (3)

An introductory course dealing with the basic genetics of all species of livestock and common companion animals. Emphasis will be placed on inherited abnormalities, traits of economic importance, conventional methods of dealing with these traits, and technologies of the future. 3 lectures. Prerequisites: AVS 111, BIO 115/115L.

AVS 205/205L Clinical Laboratory Practices (2/2)

An advanced laboratory course providing instruction in hematology, clinical pathology, microbiology, urinalysis and necropsy procedures used to diagnose health problems in veterinary clinics and diagnostic laboratories. 2 lectures and 2 three-hour laboratories. Prerequisites: BIO 115, CHM 104.

AVS 207/207L Clinical Biochemistry and Pharmacology (2/2)

The use of clinical chemical procedures, the classification and action of pharmaceuticals, and the dispensing of medications will be studied. Includes conversion and calculation of drugs, prescription writing and routes of administration. 2 lectures, 2 three-hour laboratories. Prerequisites: CHM 201, 250.

AVS 208/208L Veterinary Radiology (1/2)

Instruction in the use of radiological equipment and the development and interpretation of X-rays as used in veterinary clinics. 1 lecture and 2 three-hour laboratories. Prerequisites: BIO 115/115L.

AVS 209/209L Anesthesiology and Surgery for Veterinary Assistants (2/2)

Instruction in surgical receiving, surgical procedures, anesthetic nursing, incubation, induction and monitoring, including instrumentation and equipment operation and care. 2 lectures, 2 three-hour laboratories. Prerequisite: AVS 205/205L and Basic Anatomy.

AVS 224L Intermediate Equitation (2)

A laboratory riding class allowing students to develop proficiency in the riding skills they have been exposed to in prior experience. 2 three-hour laboratories.

AVS 234 Farrier Science (2)

Understanding the fundamentals of horseshoeing, anatomy and physiology of the horse's foot, pastern and leg. Caring for the horse's feet and legs, principles of horseshoeing and introduction to corrective shoeing. 2 lectures.

AVS 235L Farrier Science (2)

Fundamentals of horseshoeing, anatomy and physiology of the horse's foot, pastern and leg. Trimming feet, fitting, milling shoes, principles of horseshoeing, an introduction to corrective shoeing. 2 three-hour laboratories. Prerequisite: AVS 234 or concurrent enrollment in AVS 234.

AVS 240/240L Principles of Market Animal and Carcass Evaluation (2/2)

A study of the relationship between live meat animal evaluation and carcass evaluation. Visual appraisal techniques used in the quality and yield grading of live meat-type animals compared to the grading parameters used for carcass evaluation. Incorporates the effect of selection and management on body composition and live animal and carcass value. 2 lectures, 2 three-hour laboratories. Concurrent enrollment required.

AVS 241L Introductory Livestock Evaluation (2)

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

AVS 266/266L Laboratory Animal Health Care and Therapeutic Techniques (3/1)

Specific instruction for feeding, caring for, and therapeutic techniques according to "The Guide" for laboratory animals under confinement conditions will be studied. Will include techniques (parenteral and oral) for administration-tion of medications or treatment. 3 lectures, 1 three-hour laboratory. Prerequisites: AS 100, AS 101.

AVS 299/299A/299L Special Topics for Lower Division Students (1–4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor. Instruction is by lecture, laboratory, activity, or a combination.

AVS 300 Animal Issues in Science and Society (4)

This course addresses global issues and ethics relating to animal use in science and society. These issues will include the use of animals for food, research and companionship. The impact of livestock production on environments such as global warming, soil erosion, forestry and rangeland resources, water resources and livestock-wildlife interactions will be considered. 4 hours lecture-discussion. Prerequisite: Track B, Area 2, subareas A, B and C.

AVS 302/302L Animal Parasitology (3/1)

The study of animal parasites and their relationship to diseases and infestations of horses, cattle, sheep, swine, and poultry. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

AVS 303/303L Applied Animal Feeding (3/1)

A study of the nutritional requirements for maintenance, growth, fattening, reproduction and lactation of domestic animals. The use of computerized least-cost formulation of rations to satisfy nutritional requirements. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required. Prerequisite: AVS 101/101L.

AVS 304 Avian Health Care and Management (3)

Consideration of the etiology, symptomatology, and control of infectious, nutritional, and parasitic diseases of poultry. 3 lectures.

AVS 310 Veterinary Medical Law and Language (3)

Instruction in the application of the rules, guidelines, and regulation of federal, state, county, municipal and local governments, report writing and accounting procedures used in the operation of animal health care. Documentation requirements, licensing requirements and task appropriation by level of supervisors. 3 lectures. Prerequisite: AVS 104.

AVS 327/327L Meat Science and Industry (3/1)

Introduction to processing and utilization of fresh and value-added red meat products. Discussions on identity standards, factors affecting sensory, nutritional, and shelf-life qualities, food safety and inspection, and grading of red meats. 3 lectures; 1 three-hour laboratory.

AVS 328/328A Seafood and Poultry Processing Technology (3/1)

Introduction to the processing, marketing and utilization of fresh and value-added seafood and poultry products for the supermarket and food service industries. Examination of classification and standards to identify, marketing channels and forms, grading systems, factors affecting quality, food safety and public health considerations, and processing methods for the respective product types. 3 Lectures, 1 two-hour activity. Concurrent enrollment required.

AVS 335L Horsemanship (2)

Theory and practice of basic training principles and methods. Handling, training, grooming of the young foal and yearling. Instruction in long line training and ground driving. 2 three-hour laboratories. Prerequisite: AVS /125/125L.

AVS 341L Livestock Evaluation (3)

Intensive visual evaluation of breeding and market swine, sheep and beef cattle in preparation for intercollegiate livestock judging competition. Extensive training in the preparation and delivery of oral reasons. 3 three-hour laboratories. Prerequisite: AVS 241L.

AVS 345 Equine Genetics and Breeding Principles (3)

Principles of inheritance for qualitative and quantitative traits. Inheritance of color in the horse. Genetically caused abnormalities; methods of detection of carrier animals. Mare and stallion selection: pedigrees and other types of performance information and their use. Prerequisites: BIO 115/115L, AVS 125/125L. 3 lectures.

AVS 350/350L Anatomy and Physiology of Domestic Animals (4/1)

An integrated approach to the structure and function of animal systems. Topics to be discussed include the cell, the muscular-skeletal system, the nervous system, the cardio-vascular system, the respiratory system, and the excretory system. 4 lecture/discussions. 1 three hour laboratory. Concurrent enrollment required. Prerequisites: BIO 115/115L, one quarter of Chemistry.

AVS 355 Equine Reproduction and Nutrition (3)

Anatomy of the digestive tract of the horse as it effects feeding practices. Nutrient requirements for maintenance, work, pregnancy, and lactation in the horse. Interpreting National Research Council "Nutrient Requirements For Horses". Assessing recent advances in horse nutrition. 3 lectures. Prerequisites: AVS 101/101L, AVS 125/125L.

AVS 365/365L Equine Herd Health Care and Management (3/1)

A study of the etiology, symptomalogy, and control of infectious, nutritional and parasitic diseases of horses. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required. Prerequisite: AVS /125/125L.

AVS 369/369L Laboratory Animal Management, Rules and Regulations (3/1)

Instruction in the specific concepts of laboratory management according to "The Guide" will be the basis of study. An emphasis will be placed on supervisory management of laboratory animal facilities and accreditation requirements. 3 lectures, 1 three-hour laboratory. Prerequisite: AVS 266.

AVS 375/375A Equine Riding Instruction (1/2)

Development of teaching techniques and theory of efficiently and safely instructing large groups of beginning and advanced riders. 1 lecture, 2 two-hour activities. Prerequisite AVS 124/124A and AVS 224L.

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

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Graded only on a CR/NC basis.

AVS 402/402A Animal Nutrition (3/1)

Metabolism of proteins, carbohydrates, fats, minerals, and vitamins. Relationship of proper nutrition to livestock production. 3 lectures, 1 two-hour recitation. Concurrent enrollment required. Prerequisite: CHM 201, 250, or CHM 314, 317 or Instructor approval.

AVS 403 Ruminant Nutrition (3)

Implications of recent findings in ruminant nutrition. The physicochemical processes of digestion and absorption. Metabolism and the importance of rumen microflora. Normal metabolism and abnormal metabolic disorders. Modes of action of feed additives. 3 lectures. Prerequisite: CHM 201, 250, or CHM 314, 317 or Instructor approval.

AVS 404/404A Animal Breeding (3/1)

Introduction to the basic principles of applied quantitative genetics and their use in the improvement of livestock. Methods of heritability estimation, selection, and systems of mating. Prerequisite: BIO 303 or AVS 204. 3 lectures; 1 two-hour recitation.

AVS 405/405L Immunological Procedures in Animal Production (3/1)

The application of immunology to disease control in farm animals; the use of immunological techniques in animal research; and potential as a tool in livestock production. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required. Prerequisites: AVS 350/350L.

AVS 407/407L Critical Care, Advanced Surgical Assisting and Anesthesiology (2/2)

Instruction in the specific concepts of intensive care veterinary nursing, surgical assisting in advanced and/or specialized surgical techniques and advanced anesthesia techniques will be mastered. 2 lectures, 2 three-hour laboratories. Prerequisites: AVS 208 and 209.

AVS 412 Mammalian Endocrinology (4)

A general course surveying the glands of internal secretion and their role in development, growth, metabolic regulation, lactation, and reproduction of animals. 4 lectures. Prerequisite: AVS 350/350L or equivalent.

AVS 414/414L Physiology of Reproduction and Lactation (3/1)

A study of the physiological processes of reproduction from gametogenesis to parturition. The reproductive cycles of the food animals and the physiology of milk secretion including factors affecting milk production will be discussed. 3 lecture/discussions. 1 three-hour laboratory. Concurrent enrollment required. Prerequisites: AVS 350/350L on equivalent.

AVS 415 Applied Reproductive Management of Domestic Animals (3/1)

Fundamentals and techniques used in the manipulation of gametes in the reproductive management of birds, cattle, horses, sheep and swine. Applied physiological aspects of reproductive management, semen cryopreservation, artificial insemination and embryo micromanipulation techniques used in the livestock industry will be evaluated. 3 lectures; 1 three-hour laboratory. Concurrent enrollment required. Prerequisite: AVS 414.

AVS 424L Nutritive Analysis (2)

Laboratory course involving the principles and practices in quantitative analysis of feedstuffs. 2 three-hour laboratories. Prerequisite: CHM 201, 250 or Instructor approval.

AVS 427/427L Meat Processing and Technology (3/2)

Manufacturing of processed meats, and meat products as related to processing operations, sanitation, product formulation, quality control, and smokehouse operations. 3 lectures, 2 three-hour laboratories. Concurrent enrollment required. Prerequisite: AVS 327/327L.

AVS 428/428L Computer Applications for Animal Science (1/2)

A course requiring investigation and application of advanced software such as document processing, decision aids, database management, spreadsheets. Statistical analysis and communications in Animal Science. 1 lecture, 2 three-hour laboratories. Concurrent enrollment required.

AVS 430/430L Biotechnology Applications in Animal Science (3/1)

A study of the principles and applications of biotechnology in Animal Science. Discussion of the implications of genetic engineering, gene transfer, transgenic animals, embryo transfer and embryo manipulation for livestock improvement; present and future importance to the agriculture industry, human and veterinary medicine, ethical issues, patent law and strategies for future problem solving. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required. Prerequisites: AVS 111, Management Science Courses, AVS 350/350L, BIO 303 or AVS 204 or AVS 345.

AVS 431 Avian Physiology (3)

Detailed consideration of the physiology of avian species with emphasis on birds of economic importance to man. 3 lectures.

AVS 432/432A Advanced Animal Breeding (3/1)

Introduction to the theoretical development and principles of quantitative genetics including selection theory and heritability, breed, strain and line formation. 3 lectures; 1 two-hour recitation.

AVS 435 Equine Exercise Physiology (3)

The basic and applied physiology of the exercising horse. Discussion of muscular respiratory, cardiovascular, nutritional and osmo-regulatory physiology. Includes gait analysis, lameness and pharmacology. 3 lectures. Prerequisite: AVS 350/350L.

AVS 436 Biochemical Adaptations in Animals (3)

A view of how the biochemistry of animals has adapted to the environment. Topics include adaptations to exercise, high altitude, diving, hibernation, desiccation, temperature, lactation. Students are expected to present seminars. 3 lectures. prerequisite: BIO 115 and junior standing.

+AVS 441 Internship in Animal Science (1-16)

On-the-job training in animal science, providing collegiate level experiences in animal production, agri-business and related areas. Experiences may be useful for preparation of senior projects. Total credit limited to 16 units. Prerequisites: permission of coordinator required in advance. Graded only on a CR/NC basis.

AVS 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.

AVS 463 Undergraduate Seminar (2)

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

AVS 464/464A Livestock Management Systems Problem Solving Methodologies (3/2)

A systems approach to integrated livestock management. Students utilize their previous learning experience to resolve management problems inherent in the livestock industry using systems-based problem solving methodologies. 3 lectures, 2 two-hour recitations. Concurrent enrollment required. Prerequisites: Senior standing or consent of instructor.

AVS 472/472L Feed Manufacturing Technology (3/1)

An integration of prior course work to the feed industry including plant design, plant management, materials handling and storage, manufacturing operations, speciality feeds, computer applications, quality assurance, sanitation and pest management, safety, energy requirements, and environmental concerns. 3 lecture/problem sessions; 1 three-hour laboratory. Concurrent enrollment required. Prerequisites: AVS 303/303L or AVS 402/402A or AVS 403.

AVS 499/499A/499L Special Topics for Upper Division Students (1-4)/(1-4)/(1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, laboratory, activity, or a combination of both. Graduate courses are listed in the graduate section of the catalog.

APPAREL MERCHANDISING AND MANAGEMENT

Betty K. Tracy, *Program Director*
Jean A. Gipe

California's apparel industry is considered a trend setting influence in the U.S. and international fashion markets. California is the largest apparel manufacturing state in the U.S. and in combination with the fashion retailing industry provides a substantial number of jobs. Los Angeles is the leading national center for apparel and fashion and careers in the Los Angeles area are many and varied. The U.S. apparel industry is moving into a new era of high technology and innovative manufacturing and retailing processes and systems to meet the needs of a globally competitive marketplace.

Apparel and fashion industry careers require varying skills and abilities. People with a creative flair do well in product development and promotion whereas people with analytical skills excel in production, market research and retail.

The Bachelor of Science in Apparel Merchandising and Management has two Options: Apparel Manufacturing and Fashion Retailing. These Options, similar at the freshman, sophomore and beginning junior levels, diverge in the balance of upper division coursework into one of two areas of specialization. The common core of courses for the two Options provides graduates with a broad based interdisciplinary educational background in apparel and fashion products as well as manufacturing and retailing processes. Graduates will have experience in all areas of the apparel soft goods chain including product development, production, wholesale sales, distribution, retail buying, selling, and promotion. Through a combination of coursework and internship experience, graduates will be prepared for supervisory, managerial and executive level career paths.

The apparel curriculum is a combination of theory and application in both the classroom and on-the-job internships. An Apparel Industry Advisory Committee works closely with the apparel faculty in keeping the curriculum current and providing internship opportunities.

Students will also have the opportunity to learn in the Apparel Technology and Research Center, the only facility of its kind on the West Coast. This state-of-the-art manufacturing facility will provide students with first hand knowledge of the apparel manufacturing process. Since many retailers have become private-label manufacturers both apparel manufacturing and fashion retailing students will benefit from the on-campus opportunity.

Students will work closely with their faculty advisor on career counseling, scheduling and internship placement.

The apparel major also offers a joint minor with the International Business and Marketing Management Department in Fashion Merchandising.

For more information contact the Apparel Program Director in building 45 room 104 at (909) 869-2220.

Any student who meets the CSU entrance requirements will be eligible to enter this program. A student who successfully completes the 198 required units as described will be eligible for graduation.

CORE COURSES*

Orientation to College	AG	100	(1)
Fashion Industry	AMM	101	(4)
Intro Textile Science	AMM	104/104L	(3/1)
Culture, People, and Dress	AMM	108	(4)
Apparel Design Analysis	AMM	210	(4)
Apparel Product Analysis	AMM	220/220A	(2/2)
Fashion Promotion	AMM	230	(4)
Apparel Merch Buying	AMM	250	(4)
Apparel Product Develop I	AMM	310	(3)
Visual Merch/Store Design I	AMM	370/370A	(2/1)
Internship	AMM	442	(3)
Ag and the Modern World	AG	101	(4)
Ethical Issues in Agriculture	AG	401	(4)
Apparel Import & Export	ABM	331	(4)
Apparel Production I	AE	381/381L	(3/1)
Managerial Statistics	OM	314 or	(4)
Ag Data Management	ABM	375	(4)

APPAREL MANUFACTURING

Option Courses:

Apparel Production II	AE	481/481L	(2/2)
Apparel Product Develop II	AMM	314/314A	(2/2)
Apparel Product Develop III	AMM	410/410A	(2/2)
Apparel Product Develop IV	AMM	414/414A	(2/2)
Apparel Product Develop Sim	AMM	418/418A	(2/2)
Product Control Lab	ETP	276/276L	(3/1)
Product & Facility Plan/Lab	ETP	371/371L	(3/1)
Industrial Costs &Controls	IME	239	(3)

Support Courses:

Internship	AE	491	(1)
Intro. to Microcomputers	CIS	101	(4)
Spanish or Japanese or	FL		(4)
See Advisor			

Restricted Electives: Select 20 units from the approved list

FASHION RETAILING

Option Courses:

Visual Merch/Store Design II	AMM	374	(3)
Visual Merch/Store Design III	AMM	470/470A	(2/1)
Visual Merch/Store Design IV	AMM	474/474A	(2/1)
Visual Merch/Store Design Sim	AMM	478/478A	(2/1)
Industrial Costs & Controls	IME	239	(3)
Principles of Marketing Management	MKT	301	(4)
Marketing Strategy	MKT	302	(4)
Retail Management	MKT	308	(4)

Support Courses:

Internship	ABM	441	(2)
Introduction to Microcomputers	CIS	101	(4)
Spanish or Japanese or	FL		(4)
See Advisor			

Restricted Electives: Select 19 from the approved list.

GENERAL EDUCATION

Area 1 (12)

Pattern I or 2

Area 2 (16)

A. Introduction to Statistics	STA	120	(4)
B. Any from GE list	CHM or	PHY	(4)
C. Any course from GE list			(4)
D. Any (upper division) course from GE list			(4)

Area 3 (28)

A. Fine and Performing Arts – any Art course			(4)
B. Philosophy and History – any course			(4)
C. Literature & Foreign Language – Spanish or Japanese			
D. Economic Institutions	EC	201 or 202	(4)
E. Social Institutions – any course			(4)
F. Political & Historical Institutions - any course			(4)
G. Integrated Being – any course			(4)

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

Area 4 (8)

Intro. to American Government	PLS	201	(4)
United States History	HST	202	(4)

Area 5 (8) (Upper Division)

Principles of Management	MHR	301	(4)
Personnel Management	ABM	402	(4)
or Multicult. Organiz. Behavior	MHR	318	

Fashion Merchandising Minor

This interdisciplinary minor is designed for students other than AMM majors who seek additional study in the fashion industry. The minor provides students with a background in both fashion as well as business to better prepare them to seek employment in manufacturing or retailing. The minor in Fashion Merchandising is administered jointly by the Department of International Business and Marketing and the College of Agriculture.

The attainment of a minor in Fashion Merchandising is accomplished by appropriate selection, timely scheduling and satisfactory completion of specifically designated courses and electives totaling a minimum of 36 quarter units as outlined below:

Fashion Industry	AMM	101	(4)
Apparel Design Analysis	AMM	210	(4)
Apparel Importing and Exporting	ABM	331	(4)
Principles of Marketing Management	MKT	301	(4)
Marketing Internship	MKT	441/2	(4)
Select two courses from Group A			(8)
Select two courses from Group B or C			(8)

Group A

Culture, People and Dress	AMM	108	(4)
Apparel Product Analysis	AMM	220/220A	(2/2)
Fashion Promotion	AMM	230	(4)

Group B

Professional Selling	MKT	208	(4)
Retail Management	MKT	308	(4)
Retailing Problems	MKT	447	(4)

Group C

Intro to International Bus	MHR	332	(4)
International Marketing Management	MKT	414	(4)
Intl Food & Fiber Prod Mktg	IA/ABM	330	(4)
Strategy in Intl Mktg	MKT	415	(4)

Course Descriptions

AMM 101 Fashion Industry (4)

History, development and scope of U.S. and international fashion industry, investigation of processes and career opportunities in fashion design, production, wholesaling, retailing and promotion. Oral and written findings on current topics relevant to the fashion industry. 4 lecture/problem-solving.

AMM 104/104L Introduction to Textile Science (3/1)

Introductory study of the chemical and physical properties of textile fibers, dyes and finishes; fabric geometry including yam and fabric structure; methodologies for evaluating textile properties and performance; textile products as represented by technologies of diverse cultures. 3 lectures, 1 three hour laboratory.

AMM 108 Culture, People, and Dress (4)

Study of the interrelatedness of socio-psychological, economic and political/religious influences on dress in historical perspective. Cross-cultural analysis and interpretation of Western and non-Western clothing behavior through written analysis papers. 4 lecture/analysis hours.

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

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

AMM 210 Apparel Design Analysis (4)

Analyze designs for profitable lines based on aesthetic, functional and structural design factors. Use of art principles as applied to clothing design and human body forms as they relate to target customers. 4 lecturers discussion.

AMM 220/220A Apparel Product Analysis (2/2)

Analysis and comparison of techniques and equipment used to produce apparel products. Written and oral projects. Concurrent enrollment required. 2 lecture-problem solving hours, 2 two-hour activities.

AMM 230 Fashion Promotion (4)

Principles and techniques of fashion writing, advertising, publicity and special events to promote and increase sales in wholesaling and retailing of apparel and related products. Written analysis and presentation. 4 lecture/problems.

AMM 250 Apparel Merchandise Buying (4)

Apparel and fashion buying in the retail environment. Buyer's role in merchandising management. Locating apparel and other fashion resources. The apparel and fashion buyers role in pricing and promoting merchandise. Written and oral projects. 4 lecture-problem solving hours.

AMM 310 Apparel Product Development I (3)

Analysis of fashion merchandising principles and problems, merchandising goals and plans related to apparel product development. Relationship of fashion information, fashion services, apparel suppliers, production considerations and PDM technology to successful development of a complete apparel product line. Written and oral projects. 3 lecture-problem solving hours. Prerequisite: All lower division AMM courses or equivalent.

AMM 314/314A Apparel Product Development II (2/2)

Principles and methods of developing apparel designs and specifications. Uses of CAD in development of specific apparel products to execute merchandise plans. Written and oral analysis projects. Concurrent enrollment required. 2 lecture-problem solving hours and 2 two-hour activities. Prerequisite: AMM 310.

AMM 370/370A Visual Merchandising/Store Design I (2/1)

Understanding of design principles and color theory as they relate to display areas and interior design of stores. Analysis of their use in merchandising of goods and customer appeal. Experimental application to all facets of apparel retailing. Written and oral projects. Concurrent enrollment required. 2-1lecture problem-solving hours, I two hour activity. Prerequisite: All lower division AMM courses or equivalent.

AMM 374 Visual Merchandising/Store Design II (3)

A study of historical interiors with application to the design of contemporary stores and visual displays. Focus on interior architecture, furniture, textiles and colors of key periods. Written and oral projects. 3 lecture-problem solving hours. Prerequisite: AMM 370/370A.

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

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

AMM 410/410A Apparel Product Development III (2/2)

Development of apparel product prototypes, "samples" and "duplicates." Uses of PDS technology in development of "first pattern." Fit standards and verification. Criteria for evaluation of apparel product prototypes, "samples"

and "duplicates." Written and oral student projects and presentations. Concurrent enrollment required. 2 lecture-problem hours, 2 two-hour activities. Prerequisite: AMM 314/314A.

AMM 414/414A Apparel Product Development IV (2/2)

Principles of production pattern making, grading and marker making. Criteria for selection of GMS technology or use of services. Final costing determinations. Written and oral analysis projects. Concurrent enrollment required. 2 lecture-problem solving hours, 2 two-hour activities. Prerequisite: AMM 410./410A.

AMM 418/418A Apparel Product Development Simulation (2/2)

Principles, procedures and practices in producing a line of clothing for the ready-to-wear fashion industry. Written and oral presentation of solutions to fashion production problems unique to ready-to-wear. Concurrent enrollment required. 2 lectures, 2 two-hour activities. Prerequisite AMM 414/414A.

AMM 442 Internship (1–8)

New, on-the-job professional experience related to apparel manufacturing or fashion retailing. A valuable contribution toward career goals based on completed coursework. Periodic analytical reports required. Pre-requisite: Prior consent of faculty coordinator.

AMM 470/470A Visual Merchandising/Store Design III (2/1)

Techniques used to present visual displays and store design. Selection and application of materials and equipment drawing of floor plans, color boards, models and containers. Appreciation for creative use and limitations of available materials. Written and oral projects. Concurrent enrollment required. 2 lecture-problem solving hours, 1 two-hour activity. Prerequisite: AMM 374.

AMM 474/474A Visual Merchandising/Store Design IV (2/1)

The study of space and lighting principles in store design and product display. Guidelines and codes regulating the use of space and lighting. The application of lighting to attract target customers, provide a positive visual environment and sell merchandise. Written and oral projects. Concurrent enrollment required. 2 lecture-problem solving hours, 1 two-hour activity. Prerequisite: AMM 470/470A.

AMM 478/478A Visual Merchandising/Store Design Simulation (2/1)

Design and develop displays, department and store layouts using principles and techniques of visual merchandising. Analyze existing sites and critique case studies. Written and oral projects. Concurrent enrollment required. 2 lecture-problem solving hours, 1 two-hour activity. Prerequisite: AMM 474/474A.

AMM 488/488L Advanced Textile Science (3/1)

Theoretical analysis of textile structures. Assessment of current research and development in textiles. Evaluation of chemical and physical properties of fibers, fabrics, dyes and finishes. 3 lectures, 1 three-hour laboratory. Prerequisite AMM 104/104L.

FOODS AND NUTRITION

One of the two majors offered in the nutrition and consumer sciences department is foods and nutrition. For the other program offered in this department see home economics.

Cheryl Loggins, *Chair*
Ruby Beilby
Nenita B. Cabacungan
Anahid T. Crecelius
Ramiro C. Dutra
Kara F. Caldwell-Freeman

A Bachelor of Science degree with a major in foods and nutrition prepares students for challenging and rewarding careers in dietetics, nutrition education, nutrition research, foodservice management, food technology/product development, and food marketing and sales. In addition, the major provides a strong academic background for graduate study and research in foods and nutrition.

Foods and nutrition majors select a career track to gain experience in technological skills, problem solving, communication skills, interpersonal relations, and organizational and leadership competencies as applied to the areas of dietetics, business/industry, and food science.

High school students planning to major in foods and nutrition are advised to build a background in foods, chemistry and biology. Community college students should concentrate on chemistry (including organic), biology (including bacteriology), communication skills and general education.

The curriculum, facilities and faculty reflect the Nutrition and Consumer Sciences Department's commitment to a strong, up-to-date, science-based undergraduate program that provides the types of skills and knowledge needed by graduates to meet professional goals. Career tracks offered within the major are the following:

Dietetics

This career track is an Approved American Dietetic Association Didactic Program in Dietetics. Students pursuing career goals in the dietetic field qualify for post-graduate internships, preprofessional practice programs, and/or graduate programs which can lead to membership in the American Dietetic Association (ADA). The department offers a post-baccalaureate Dietetic Internship Program which is under developmental accreditation by the American Dietetic Association. Upon completion of a dietetic internship or pre-professional practice program, students are eligible to take an examination to become a Registered Dietitian. Students requesting transcript evaluation by the ADA will be required to pay an extra transcript fee of $20 if registered as students or $25 if not currently enrolled. A physiology minor may be included in this career track.

Business/Industry

The greater Los Angeles area has many food companies, restaurants, and food-related businesses and industries, so careers are many and varied. Career opportunities include: food technology, recipe and product development, marketing and sales, quality control, sensory evaluation, and safety and sanitation. A marketing minor may be included in this career track.

Food Science

The many food production companies and research laboratories in the Los Angeles/Southern California area employ large numbers of food scientists. The food science career track gives students the background in nutrition, foods, and science needed for these positions. They learn the analysis of food components (chemical characterization, separation, qualification, interaction, etc.). Food science graduates may also qualify for a chemistry minor. The career track in food science offers students the opportunity to integrate course work in science, foods, and nutrition, which will enable them to qualify for a wide variety of positions in both production and research.

CORE COURSES FOR MAJOR*

(Required of all students)

Orientation to the College of Ag	AG	100	(1)
Ag and the Modern World	AG	101	(4)
Introduction to Foods	FN	121/121L	(4)
Nutrition and	FN	235	(3)
Nutrition Laboratory	FN	236L	(1)
Experimental Food Science	FN	321/321L	(4)
Cultural Aspects of Food	FN	328/328L	(3)
Undergraduate Investigations and Seminar	FN	463	(4)
Agricultural Issues and Ethics	AG	401	(4)

Professional Track Courses (all students must complete one of the following tracks)

Dietetics Track

Meal Management	FN	221/221L	(4)
Nutrition of the Life Cycle	FN	335	(4)
Nutrition Education	FN	345/345A	(3)
Community Nutrition	FN	346/346L	(3)
Food Service Systems I	FN	357/357L	(4)
Food Service Systems II	FN	358/358L	(5)
Food Service Systems III	FN	359/359L	(4)
Advanced Nutrition	FN	433	(4)
Advanced Nutrition	FN	434	(4)
Nutritional Assessment—Biochemical	FN	435/435L	(2)
Diet Therapy	FN	443/443L	(4)
Diet Therapy	FN	444	(3)

Business/Industry Track

Meal Management	FN	221/221L	(4)
Food Science and Technology	FN	317/317L	(4)
Issues in the Food Chain	FN	325	(4)
Sensory Evaluation of Foods	FN	418/418A	(4)
Food Chemistry and Toxicology	FN	420/420L	(4)
Recipe Development; Food Present	FN	421/421L	(4)
Internship	FN	441/442	(2)
Food Science Colloquium	FN	464	(2)
Consumerism Move., Impact & Issues	HE	245	(4)
Marketing Strategy	MKT	302	(4)
Professional Presentation Techniques	HE	390/390L	(3)
Writing for the Professions	ENG	301	(4)

Food Science Track

Issues in Food Chain	FN	325	(4)
Food Technology	FN	317/317L	(4)
Sensory Evaluation	FN	418/418A	(4)
Food Chemistry and Toxicology	FN	420/420L	(4)
Internship	FN	441/442	(2)
Food Science Colloquium	FN	464	(2)
Meat Science & Industry	AVS	327/327L	(4)
College Chemistry	CHM	106/143L	(4)
Quantitative Analysis	CHM	221/221L	(4)
Spectro Methods	CHM	342/342L	(4)
Separation Methods	CHM	343/343L	(4)
Applied Microbiology	MIC	310/310L	(5)
or Food Microbiology	MIC	320/320L	(4)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

University Computer Course			(4)
College Chemistry	CHM	105	(3)
College Chemistry Laboratory	CHM	142L	(1)

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

Elements of Organic Chemistry	CHM	201	(3)
Organic Chemistry Lab	CHM	250L	(1)
Basic Microbiology	MIC	201/201L	(5)
Hotel and Rest. Sanitation and Safety	HRT	225	(4)
Elements of Biochemistry * #	CHM	321/321L	(4)
Genetics *	BIO	303	(4)
Human Physiology *	ZOO	235/235L	(4)
College Physics#	PHY	121/141L	(4)
College Physics#	PHY	122/142L	(4)
Directed Electives for Dietetics			(10)
(from approved departmental list with prior consent of departmental advisor)			
Directed Electives for Business/Industry			(21)
(from approved departmental list with prior consent of departmental advisor)			
Directed Electives for Food Science			(10)
(from approved departmental list and with prior consent of departmental advisor)			
Unrestricted Electives			(12)

*Required only for Dietetics Track.
#Required for Food Science Track.

GENERAL EDUCATION COURSES

(Required of all students)

Area 1:

Freshman English I	ENG	104	(4)
Advocacy & Argument	COM	204	(4)
Freshman English II	ENG	105	(4)

Area 2:

Intro to Statistics	STA	120	(4)
College Chem	CHM	104	(3)
College Chem Lab	CHM	141L	(1)
Basic Biology	BIO	115/115L	(5)
Science, Technology and Civilization			

Area 3:

A. Arts			(4)
B. Philosophy & History			(4)
C. Literature & Foreign Language			4)
D. Principles of Econ	EC	201	(4)
or Principles of Econ	EC	202	
E. Intro to Cult. Anthro	ANT	102	(4)
or Principles of Soc	SOC	201	
F. Political and Historical Institutions			(4)
G. General Psych	PSY	201	(4)

Area 4:

Intro to Am Govt	PLS	201	(4)
U.S. Hist	HST	202	(4)

Area 5:

Dietetics Track: MHR 301, MHR 318
Business/Industry Track: MHR 301, MHR 318, MKT 301
Food Science Track: CHM 311, CHM 312, CHM 313, CHM 304/304A

FOODS AND NUTRITION MINOR

The purpose of the minor in Foods and Nutrition is to help students understand the role that nutrients play in maintaining good health.

Introduction to Food Science	FN	121/121L	(4)
Meal Management	FN	221/221L	(4)
or Current Issues in the Food Chain	FN	325	(4)
Nutrition Science and Health	FN	305	(4)
or Introduction to Nutrition	FN	235	
and Nutrition Laboratory	FN	236L	
Nutrition of the Life Cycle	FN	335	(4)
Community Nutrition	FN	346/346L	(3)
College Chemistry	CHM	104	(3)
College Chemistry Lab	CHM	141	(1)
College Chemistry	CHM	105	(3)
College Chemistry Lab	CHM	142	(1)
Elements of Organic Chemistry	CHM	201	(3)
Elements of Organic Chemistry Lab	CHM	250	(1)
One upper division FN class			(3-4)
Total units required			(38-39)

Course Descriptions

+All courses offered by the department may be taken in a CR/NC basis except for major.

FN 121/121L Introduction to Food Science (2/2)

Scientific principles and techniques of food preparation by conventional and microwave methods. Study of food categories, elements of food sanitation, legislation and consumer choices. 2 lectures, 2 three-hour laboratories. Concurrent enrollment required.

FN 200 Special Problems (1-2)

For lower division students individual or group investigation, research, studies or surveys of selected problems for lower division students. Total credit limited to 4 units, with a maximum of 2 units per quarter.

FN/KIN 203 Health, Nutrition and the Integrated Being (4)

Investigation of specific areas of the integrated being dealing with nutrition, stress, drugs, sexuality, major health problems and death and dying. Understanding their effect on "the integrated being" and the development of behaviors and actions that will promote optimum physical and mental health. Meets G.E. Area 3g requirement. Team taught. 4 lecture/discussions.

FN 205 Contemporary Nutrition (4)

Concepts of nutrition related to macro-nutrients, micro-nutrients, and energy metabolism. Food intake and its relationship to health. Use of the scientific method to assess the reliability of nutrition information. Computer analysis and written evaluation for individual dietary intake. 4 lecture/problems. For students not majoring in Foods and Nutrition.

FN 221/221L Meal Management (2/2)

Management principles as applied to production of nutritious, economical and palatable meals. Evaluation of time, energy and economic resources as related to meal patterns. 2 lectures, 2 three-hour laboratories. Prerequisite: FN 121/121L or equivalent or consent of instructor. Concurrent enrollment required.

FN 228 Food and Culture (4)

Interrelationship of food availability, historical developments, socio-economic institutions, political, religious, and other influences on food patterns. In-depth study of a selected culture group. Oral presentation and discussion of group projects. 4 lecture analysis/discussion.

FN 235 Nutrition (3)

Role of the carbohydrates, lipids, proteins, minerals, vitamins and water, in human nutrition. Dietary standards and recommended allowances. Computation of nutritional needs and written dietary analysis. Oral report of selected nutrients. 3 lecture/problems. Prerequisite: CHM 201, 250 or equivalent, ZOO 235/235L. To be taken concurrently with FN 236.

FN 236L Nutrition Laboratory (1)

Introduction to techniques and experiments used in nutrient analysis in foods and nutritional assessment in living organisms. 1 three-hour laboratory. Prerequisites: CHM 201, 250 or equivalent, ZOO 235/235L: To be taken concurrently with FN 235.

FN 299/299A/299L Special Topics (1-4)

Group study of a selected topic, the title to be specified in advance for lower

division students. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor. Instruction is by lecture, laboratory, activity, or a combination of both.

FN 305 Nutrition, Science and Health (4)

Integrative approach to nutrition, health and fitness based on physiological and chemical principles. Role of diet and other influences that affect wellness and prevention of degenerative disease. Nutritional self-assessment. Written critiques of current controversies and other assigned topics. 4 lecture-discussions. Prerequisite: Completion of Area 2d of General Education.

FN 317/317L Food Science and Technology (3/1)

Principles of food processing including refrigeration, freezing, dehydration, canning, and fermentation as they relate to the technology of foods and beverages. Introduction to ecology. Field trips. 3 lectures, 1 three-hour laboratory. Prerequisite: MIC 201/201L or equivalent. Concurrent enrollment required.

FN 321/321L Experimental Food Science (2/2)

Experimental approach to solve food preparation problems. Recent developments in food ingredient uses and food preparation techniques. Individual guided projects involving problem identification, literature search, project design, data collection, critical analysis of data, oral and written presentation of findings. 2 lecture/problem solving, 2 three-hour laboratories. Prerequisites: FN 121/121L, CHM 250, STAT 120. Concurrent enrollment required.

FN 325 Current Issues in the Food Chain (4)

Scientific analysis of current national and global issues in the production, processing, distribution and consumption of foods as related to health, safety, and consumer protection. 4 lecture-discussions.

FN 328/328L Cultural Foods (2/1)

Relation of environment, technology, religion, social institutions and other aspects of culture to food patterns of selected cultures, countries and regions. Individual oral reports and group projects involving selection, preparation, presentation and evaluation of food patterns. 2 lectures-problem solving; 1 three-hour laboratory. Concurrent enrollment required.

FN 335 Nutrition of the Life Cycle (4)

Nutritional needs of pregnancy, lactation, childhood, adolescence, adulthood and the aged. Planning and computation of normal diets for all phases of the life cycle. Reading and reporting of current developments in nutrition. 4 lecture/problems. Prerequisite: FN 205 or FN 235, 236L.

FN 345/345A Nutrition Education (2/1)

Principles of learning and evaluation applied to nutrition. Development of instructional systems, including objectives, learning activities and strategies in various settings. Identifications and analysis of current problems inherent in such applications. Discussion and critique of student reports. 2 lecture/problems; 1 two-hour activity. Prerequisites: FN 205 or FN 235/236L. Concurrent enrollment required.

FN 346/346L Community Nutrition (2/1)

Goals and trends in community nutrition. Dietary methodology. National nutrition status surveys. Role of public and private agencies in community nutrition programs. Analytical tools. Grantsmanship, public policy and legislation, 2 lectures, 1 three-hour laboratory. Prerequisites: FN 205 or 235, FN 221/221L, FN 335, FN 345/345A. Concurrent enrollment required.

FN 357/357L Foodservice Systems I (3/1)

Introduction to foodservice management through a systems approach perspective. Development of goals, objectives, policies and procedures for foodservice facilities. Beginning of facility planning project. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required. Prerequisite: FN 221.

FN 358/358L Foodservice Systems II (3/2)

Management of foodservice facilities using menu as a basis for determining recipes, specifications, receiving and storage standards. Purchasing for the foodservice industry. Continuation of facility planning project. 3 lectures, 2 three-hour laboratories. Concurrent enrollment required. Prerequisite: FN 357.

FN 359/359L Foodservice Systems III (2/2)

Production planning, quantity food production, distribution and service, and equipment and layout in foodservice facilities. Principles and practices in planning, preparing and serving food. Completion of facility planning project. 2 lectures, 2 three-hour laboratories. Concurrent enrollment required. Prerequisite: FN 358.

FN 400 Special Problems (1-2)

Individual or group investigation, research, studies, or surveys of selected problems for upper division students. Total credits limited to 4 units, with a maximum of 2 units per quarter.

FN 418/418A Sensory Evaluation of Foods (2/2)

Methods of sensory evaluation of food products. Includes difference and preference testing, applications in food research and development, consumer testing. Statistical analysis of results. 2 lectures, 2 two-hour activities. Prerequisite: STA 120, computer competency or consent of instructor. Concurrent enrollment required.

FN 420/420L Food Chemistry and Toxicology (2/2)

Chemical composition of foods. Chemical changes occurring during processing and storage. Detection of deterioration, adulteration and contamination with toxic materials. Laboratory analysis of various types of food. 2 lectures, 2 three-hour laboratories. Prerequisite: CHM 201, 250. Concurrent enrollment required.

FN 421/421L Recipe Development and Food Presentation (2/2)

Sources of recipes, testing procedures and recipe writing for conventional and microwave food preparation. Development of recipe brochure, including photography. 2 lectures, 2 three-hour laboratories. Concurrent enrollment required. Prerequisite: FN 121 or consent of instructor.

FN 433 Advanced Nutrition (4)

Metabolic, physiological and biochemical functions of nutrients on the cellular level. Understanding and integrating the structures and functions of the various sub-cellular components and their role in maintaining a healthy organism. Oral and written analyses of current research. 4 lecture/problem-solving/analysis. Prerequisites: CHM 321, FN 235, FN 236L, ZOO 235/235L To be taken concurrently with FN 435/435L.

FN 434 Advanced Nutrition (4)

Hormonal effects upon nutrient absorption, transport and utilization. Hormonal interactions and their effects on metabolism and diseases of hormonal origin. Update and analysis of current research. Preparation of an extensive annotated bibliography. 4 lecture/problems. Prerequisite: FN 433.

FN 435/435L Nutritional Assessment Methods (1/1)

Evaluation of nutritional status by laboratory methods. Anthropometric measures, determination of nutrient levels in the diet and biochemical analysis of nutrients/metabolite in body fluids. 1 lecture, 1 three-hour laboratory. To be taken concurrently with FN 433. Concurrent enrollment required.

FN 441, 442 Internship in Foods and Nutrition (1-8) (1-8)

On-the-job training in foods and nutrition, providing professional level experiences in food service, community nutrition, research, and quality control. Experiences may be useful for preparation of senior projects. Total credit for each course is limited to eight units. Prerequisite: permission of coordinator required in advance.

FN 443/443L Diet Therapy (3/1)

Relationship between diet and health with emphasis on specific dietary requirements associated with certain diseases and conditions. 3 lectures, 1 three-hour laboratory. Prerequisite: FN 433, FN 435. Concurrent enrollment required.

FN 444 Diet Therapy (3)

Relationship between diet and health with emphasis on specific dietary requirements associated with certain diseases and conditions. 3 lectures—analysis. Prerequisite: FN 443/443L.

FN/IA 445 Nutrition/International Development (4)

Issues in international and national food policy formulation and implementation as well as impacts on development are discussed. Concerns about food and nutrient distribution and availability, malnutrition and human productivity are also included. 4 lectures.

FN 461 Investigative Process in Foods and Nutrition

Methods of defining problems and scientific investigations, assessing needs, data gathering and locating resources. Critical thinking involved in the writing of proposals and investigation of integrated issues through written reports based on library research. 2 lectures. Prerequisites: Eng. 104, 105, or Com. 216; senior standing.

FN 462 Senior Project (2)

Independent study with approval of advisor. Project may be experimental design, survey research, content analysis, community service, or development of information/technology base. A written report will be submitted. Prerequisite: FN 461

FN 463 Undergraduate Investigations and Seminar (4)

Individual investigations and group studies of foods and nutrition issues. Oral presentations and written reports. 4 seminar-discussions. Prerequisites: COM 204, COM 216, or ENG 105 and senior standing.

FN 464 Food Science Colloquium (2)

Classroom interaction of students with selected food industry leaders focusing on technical, economic, regulatory, and new product trends as they impact occupational opportunities in the food and beverage industries. Written reports. One two-hour activity. Prerequisite: Senior standing.

FN 499/499A/499L Special Topics (1-4)

Group study of a selected topic, the title to be specified in advance for upper division students. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, laboratory, activity, or a combination of both.

HOME ECONOMICS

This major is being phased out. Admissions to this program are closed. The following curriculum is in effect to accommodate current majors. For the other program offered in the Nutrition and Consumer Sciences Department, see foods and nutrition.

Cheryl Loggins, *Chair*
Ruby I. Beilby
Bonnita M. Farmer
Ruby L. Trow

Graduates can look forward to expanding choices of career opportunities in business, industry, education and government. Entry-level career positions include: test kitchen home economists, preschool teacher, interior designer, home economics teacher or department manager in retail clothing stores. The curriculum also establishes the educational foundations for advancement to higher level positions such as food editor, child care program administrator, interior design project coordinator, consumer-industry liaison, school administrator and fashion buyer.

Home economics majors select career tracks to gain expertise in knowledge of products, problem solving, communication skills, interpersonal relations, and technical and organizational competencies as applied to the areas of interior design, fashion merchandising, secondary education, child care programs and foods in business. Career tracks offered within the major are the following:

Child Care Programs. Beyond the traditional careers of teaching and managing a preschool, opportunities now exist to coordinate programs for cities, school districts, county agencies, and large companies. Selected professional positions include: Executive Director Child Care Council, Child Care Program Development Specialist—County Office of Education, City/Child Care Coordinator, Child Care Administrator, Child Care Center Manager, Program Supervisor—Resource and Referral.

Graduates of the home economics sciences major can look forward to expanding career opportunities in business, education, and government. The curriculum prepares graduates to respond to the rapidly changing nature of jobs in response to the development and application of new technology to the home and workplace and the demand for a greater variety of consumer services. Within education, population increases and demands for a better educated and retrained work force should result in good job prospects for education at all levels, but especially at the secondary and adult education levels. Child care and family services industries represent growth employment areas for graduates also. Home economics majors select courses in career clusters to gain expertise in knowledge of products, decision-making, problem-solving, communication skills, interpersonal relations, and technical and organizational competencies suited to their career goals. The challenging curriculum addresses priority societal issues with a global perspective to prepare graduates to understand the cultural backgrounds and the evolving needs and functions of diverse families. Courses are designed to help families meet their resource needs, assure an optimal future for young people, conserve environmental resources, and enhance the quality of life.

Home economics majors, upon entering Cal Poly, are encouraged to work closely with their faculty advisor for academic and career counseling. Students are encouraged to participate in departmental clubs and activities to develop leadership skills, expand professional contacts, and continue career exploration. Recognition for demonstrated academic and leadership abilities is offered by membership in Phi Upsilon Omicron National Honor Society.

The California State Credential for secondary school teachers of home economics may be obtained with additional work through the School of Education. Students in Early Childhood Education may qualify as teachers in state licensed preschools by taking course work in the certificate program in "Administration of Child Care Programs" offered by the department. To ensure quality in the professional preparation and practices of graduate family and consumer scientists, the American Association of Family and Consumer Sciences now certifies professional family and consumer scientists. The home economics program at Cal Poly qualifies students to apply for this certification.

Teacher Education. Career opportunities include teaching in areas such as: Vocational Home Economics Grades—12; Adult Education; HERO Home Economics-Related Occupational Programs, and ROP/ROC Regional Occupational Programs Centers. This also provides career choices in business such as: Educational Director, Training Officer, Educational Materials & Textbook Sales.

The California State Credential for secondary school teachers of home economics may be obtained with additional work through the School of Education. Students in Early Childhood Education may qualify as teachers in state licensed preschools by taking coursework in the certificate program in "Administration of Child Care Programs" offered by the department. To ensure quality in the professional preparation and practices of graduate home economists, the American Association of Family and Consumer Sciences now certifies professional home economists. The home economics program at Cal Poly qualifies students to apply for this certification.

CALIFORNIA SINGLE SUBJECTS CREDENTIAL—HOME ECONOMICS

University programs offering professional preparation for public school teaching are evaluated by a two-part review. One part is the review of subject matter content and the other is the approval of teacher candidates' professional preparation. Each subject matter major involved in training candidates for single subject teacher certification in the State of California submits a proposed program of subject matter course work to the Commission on Teacher Credentialing. If a subject matter program meets specified criteria, it is granted an examination "waiver". A teacher candidate who does not graduate from one of the State's subject matter "waiver" programs must pass the subject matter portion of the National Teachers Exam or complete the designated "waiver" program of a California college or university to obtain a credential. Passage of the NTE in Home Economics is not considered adequate preparation of teaching in funded CHE/HERO programs in California so it is recommended that students complete the "Waiver" program.

Students can satisfy the "waiver" program requirement in Home Economics by completing units as follows: (1) Foods and Nutrition, 12 units, (2) Clothing and Textiles, 12 units, (3) Child and Family, 12 units (4) Housing Interiors, and Equipment, 12 units (5) Consumer Education and Management, 12 units. In addition to the 60 units of required courses, students complete 28 units of courses in closely related subjects chosen in consultation with the Home Economics Teacher Educator.

CALIFORNIA DESIGNATED SUBJECTS CREDENTIAL—HOME ECONOMICS

An essential component of any successful vocational program which prepares students for employment is a well-qualified instructor. To teach vocational classes in ROP's, ROC's or HERO programs, adult education or community college programs, the instructor must have expertise in the specific occupational area backed by actual work experience in that area. Students entering the DS Credential Program have their educational and work experience background evaluated and have an individualized program designed for them based on this assessment. Work experience verification which meets credential guidelines is submitted by the candidate and becomes a part of his/her credential file.

Courses for the DS Credential in Home Economics may be taken as part of the regular program at Cal Poly, Pomona or credential candidates may take the course work for Phase I or Phase II in concentrated workshops through Continuing Education.

CORE COURSES FOR MAJOR *

(Required of all students) 58 units

Orientation to the College of Ag.	AG	100	1
Intro. to Family Issues	FCS	101	4
Intro. to Interior Design/Housing	FCS	120/120L	4
Housing, Interiors and Equipment	FCS	220/220L	4

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

Consumerism: Impact & Issues	FCS	245	4
Meal Management	FN	221/221L	4
Nutrition Education	FN	345/345A	3
or Nutrition of the Life Cycle	FN	335	
Ethnicity and Family Life	EWS	330	4
Family Resource Management	FCS	342	4
Professional Presentation Techniques	FCS	390/390L	3
Family Housing and Environment	FCS	422	4
Family Financial Behavior	FCS	440	4
Family Life and Parenting	FCS	455	3
Investigative Process in Home Economics	FCS	461	2
Senior Project	FCS	462	4
or Community Service in Home Econ.	FCS	443/443L	
or Internship in Home Economics	FCS	441/442	
Ethical Issues in Agriculture	AG	401	4
Undergraduate Seminar	FCS	463	2

NOTE: Teacher education candidates must take KIN 442, TED 454, FCS 452, FCS 453, FCS 454, FCS 455 to satisfy requirements for the Clear California Single Subjects Credential. These classes may be taken as "Directed" courses by undergraduates or during the fifth year for graduate students.

Support and Directed Courses

Human Sexuality	BIO	301	4
Writing for the Professions	ENG	301	4
Sociology of Minority Communities	SOC	323	4
or Socialization: Self and Society	SOC	402	
Environment, Technology and Culture	ANT	350	4
or Social Anthropology	ANT	358	
Spanish or other foreign language			4
Directed Courses			36

Students select an additional 36 units in major courses based on their career interests. Course selections must be approved by a department academic advisor. It is recommended that no more than half of these should be FCS courses and that the courses be selected in a career interest cluster.

Child Care Programs:

Foundations of Early Childhood	FCS/PSY	110/110L	3
Early Childhood Principles & Practices	FCS	215/215L	3
Early Childhood Programs & Activities	FCS	315/315L	3
Issues in Child Care Programs	FCS	410	4
Management: Preschool Programs	FCS	415/415L	4
Administration of Child Care Programs	FCS	416	3
Nutrition of the Life Cycle	FN	335*	3
Child, Youth and Family Crisis	SW	313	4
Culturally and Socially Different Child	SW	314	4
Children's Literature	ENG	324	4
Developmental Movement for Children	KIN	328/328A	3
Design for Children and Accessibility	ES	423	4

*If not taken in the core.

Community/Social Programs:

Culture, People and Dress	FCS	138	4
Community Nutrition	FN	346/346L	3
Family Violence	SW	322	4
Developmentally Disabled Population	SW	312	4
Women & Men: Changing Sex Roles	BHS	328	4
The Ethnic Woman	EWS	390	4
Personnel Management	ABM	402	4
Management. for Nonprofit Organizations	MHR	319	4
Human Relations	PSY	314/314A	4
Basic Counseling	PSY	417/417A	4
Sociology of Minority Communities	SOC	323*	4
Socialization: Society and Self	SOC	402*	4
Environment, Technology and Culture	ANT	350*	4
Social Anthropology	ANT	358*	4

*If not taken as support course.

Teacher Education:

Intro. To Food Science	FN	121/121L	4
Clothing Construction Analysis	FCS	130/130A	4
Art of Dress	AMM	210	4
Intro. to Textile Science	AMM	104/104L	4
Early Childhood Principles & Practices	FCS	215/215L	3
Nutrition Education	FN	345/345A	3
or Community Nutrition	FN	346/346L	

Select 2 courses from Home Economics and Foods & Nutrition 6-8

Other Courses:

Special Problems	FCS	200/400	1-4
Internship	FCS	441/442	1-8
Select university computer course.			4
Human Relations	PSY	314/314A	4
Basic Counseling	PSY	417/417A	4

Other HE or University courses as approved by advisor.

GENERAL EDUCATION COURSES

(Required of all students)

Area 1:

A. Any course from GE list			(4)
B. Any course from GE list			(4)

Area 2:

A. Any GE Math or Stat			(4)
B. Consumer Chemistry	CHM	101	(4)
or College Chemistry	CHM	104	
and College Chemistry Lab	CHM	141	
C. Life Science	BIO	110/111L	(4)
or Basic Biology	BIO	115/115L	(5)
D. Contemporary Nutrition	FN	205	(4)

Area 3:

A. Any ART or ENV course			(4)
B. Philosophy & History			(4)
C. Literature & Foreign Language			(4)
D. See approved dept. list			(4)
E. Social Institutions	SOC	321	(4)
F. Ag and the Modern World	AG	101	(4)
G. General Psychology	PSY	201	(4)

Area 4:

Intro to Am Govt	PLS	201	(4)
U.S. Hist	HST	202	(4)

Area 5:

Choose two courses:

Child Psychology: Early Childhood	PSY	310	(4)
Child Psychology: The Middle Years	PSY	311	(4)
Adolescent Psychology	PSY	312	(4)
Family as a Social Institution	SOC	321	(4)
Unrestricted electives			(11)

HOME ECONOMICS MINOR

The home economics minor will provide students with a general broad base in the five discipline areas of home economics: textiles/clothing, foods/nutrition, housing/interiors/equipment, management/finance/ consumerism, and child/family relations. This minor is available to EDUC students seeking an additional teaching authorization and is valuable to those students seeking employment with businesses that sell or provide consumer goods or services.

Intro. to Family Issues	HE	101	4

One of the following:

Clothing Construction Analysis	HE	130/130A	4
Apparel Design Analysis	AMM	210	4
People, Culture and Dress	AMM	108	4
One of the following: Intro. to Food Science	FN	121/121L	4
Meal Management	FN	221/221L	4

One of the following:

Foundations of Early Childhood	HE/PSY	110/110L	3
Early Childhood Principles & Practices	HE	215/215L	3
Early Childhood Programs & Activities	HE	315/315L	3
Issues in Child Care Programs	HE	410	4
Family Life & Parenting Education	HE	455	3
Contemporary Nutrition	FN	205	4
Consumerism: Its Impact and Issues	HE	245	4
Intro. to Design/Housing	HE	120/120L	4
or Family Housing & Environment	HE	422	
Family Resource Management	HE	342	4
Curriculum in CHE/HERO	HE	454	3
and/or HE Educ. Methods	TED	434	3
or HE/FN elective			34-38

COSTUME TECHNOLOGY MINOR

This minor is designed for students who seek careers in costume construction for theatre, opera, ballet and other dance forms, or movie and television productions. A knowledge of costume history, color, textiles and methods of pattern drafting and costume construction must be coupled with an insight into the theatre arts and stage design. Upon completion, students may pursue careers as costumers, costume technicians, wardrobe supervisors, drafters or other related positions in costume manufacturing and retailing.

Acting	DR	151	(4)
Intro to Theatre*	DR	203	(4)
Cloth Constr Analysis	HE	130/130L	(4)
Art of Dress	HE	137	(4)
or Culture, People and Dress	HE	138	
Intro to Textile Science	HE	188/189L	(3/1)
Fashion Design: Pattern Draft **	HE	330/330A	(4)
Stage Cost Design & Constr	DR	381	(4)
History of Costume	DR	481	(4)
Advanced Proj in Theatre***	DR	441	(2)
Approved Upper Division Clothing Elective			(2)
			(36)

*Prerequisite: ENG 104 or consent of instructor.

** Prerequisite: HE 131, 132 or consent of instructor.

*** To be filled by a minimum of two costume crew assignments on two separate productions.

ADMINISTRATION OF CHILD CARE PROGRAMS CERTIFICATE

To qualify for a Children's Center Supervisory Permit from the State Department of Education, a student must complete 36 units in early childhood courses for the Children's Center (teaching) Permit, 9 units in supervisory work and 18 additional units in advanced early childhood courses. It is recommended that students complete the basic 36 units for the Children's Center Permit at a local community college, and then take the following additional courses (28 units):

Issues in Child Care Programs	HE	410	(4)
Management, Preschool Programs	HE	415/415L	(4)
Administration of Child care Programs	HE	416	.(3)
Internship (in Child Care Programs)	HE	441	(4)
Senior Project	HE	461/462	(2/2)
or			
Community Service (in Child Care Programs)	HE	401	(4)
Child, Youth, and Family Crisis	SW	313	(4)
Culturally and Socially Different Child	SW	314	(4)
Exceptional Children and Youth	EDU	454	(3)

Course Descriptions

+All courses offered by the department may be taken on a CR/NC basis except for majors.

HE 101 Introduction to Family Issues (4)

An introduction to family studies covering issues related to family demographics, types of families, living arrangements, paths to family formation, childbearing patterns, changing roles of family members, economic well-being, child care and future outlook for children. Lecture, discussion, case studies, analysis of data sets, and student project related to a current issue. 4 lecture/problems.

HE 110/110L/PSY 110/110L Foundations of Early Childhood (2-1)

An introduction to the fundamental principles of child growth and development as they have influenced the development of the field of early childhood education. Types of programs and evaluations of programs concerning the child in the family and community. 2 hours lecture, 1 three-hour laboratory arranged involving participation in local children's center. Concurrent enrollment required.

HE 120/120L Introduction to Interior Design/Housing (3, 1)

Color, design, materials, and organization of space as applied to the aesthetics and function of interiors. Relationship of interior design to architectural styles. Application of design and housing to individual needs. Experimental application of theories. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

HE 122/122A Color for Interiors (2, 1)

Analysis of color theories. Problem solving using psychological and physiological effects of color and their application to interiors. Activities include experimenting and developing color palettes for clients and interior spaces. 2 lecture/problem-solving, 1 two-hour activity. Concurrent enrollment required.

HE 129/129A Drafting for Interior Design (2, 2)

Fundamental drafting and space planning for interior design. Problem solving of specific space and plans. Activities include experimental use of equipment and development of preliminary plans for interior spaces. 2 lecture/problem-solving, 2 two-hour activities. Concurrent enrollment required.

HE 130/130A Clothing Construction Analysis (2, 2)

Analysis and comparison of techniques and equipment used to produce sewn products. 2 lectures, 2 two-hour activities. Concurrent enrollment required.

HE 200 Special Problems (1-2)

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

HE 215/215L Early Childhood Principles and Practices (2/1)

Application of principles and concepts of child growth in the development of the preschool age child's socio-psychological, intellectual and physical self; observation and participation in local children's centers. 2 lectures, 1 three-hour arranged laboratory. Prerequisite: HE/PSY 110/110L or consent of instructor. Concurrent enrollment required.

HE 220/220L Housing, Interiors and Equipment (3,1)

Product information and strategies for purchase of residential equipment and furnishings, window and wall treatments, flooring. Materials, energy sources and conservation. 3 lectures, 1 three-hour laboratory. Concurrent enrollment is required.

HE 228/228A Interior Design Techniques (2/2)

Introduction to equipment used in developing professional interior design presentations. Selection and application of appropriate tools and techniques in developing such projects as floor plans, details, color boards, material layouts, models and portfolios. Prerequisite: Consent of instructor. 2 lectures, 4 hours activity. Concurrent enrollment required.

HE 245 Consumerism: Its Impact and Issues (4)

Analysis of the role of consumption in economic systems. The consumer movement past, present and future viewed as a response to economic and social conditions. Contemporary consumer issues, information sources, legislation and protection. 4 lecture/problem hours.

HE 299/299A/299L Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units with a maximum of 4 units per quarter. Instruction is by lecture, laboratory, activity, or a combination of both. Prerequisite: permission of instructor. Concurrent enrollment required.

HE 315/315L Early Childhood Programs and Activities (2/1)

Examination of early childhood programs, and methods; creative activities including the areas of arts and crafts, science, social studies, rhythmic and large muscle movement, language and literature, math, music, health and safety; participation in local preschool programs. 2 lectures, 1 three-hour arranged laboratory. Prerequisite: HE 215/215L or consent of instructor. Concurrent enrollment required.

HE 320/320A Interior Design II (3/3)

The application of space planning and lighting principles in residential and non-residential interiors. Solutions to problems regarding the relationship of functional and aesthetic requirements. Prerequisite: Consent of the instructor. 3 lectures, 6 hours activity. Concurrent enrollment required.

HE 342 Family and Workplace Resource Management (4)

Introductory study of the economic, social and institutional forces that influence resource management of individuals and families. Management principles in relation to use of family resources, family structures, values and goals, problem-solving, and decision-making. 4 lecture/problem-solving.

HE 390/390L Professional Presentation Techniques (2/1)

Techniques and methods used in making professional written and oral presentations and demonstrations in the subject areas of home economics and foods and nutrition for live or video-tape audiences. 2 lectures, 1 three-hour lab.

HE 400 Special Problems (1-2)

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

HE 410 Issues in Child Care Programs (4)

Examination of current trends and issues in child care programs, including government's role. Advocacy and public policy. Group oral reports and critiques of current literature. 4 lecture/problem-solving. Prerequisite: HE 110/110L or equivalent.

HE 415/415L Management: Preschool Programs (3/1)

Types of preschool programs; physical facilities, budget and personnel needs and responsibilities. State and local regulations. Participation in local preschools. 3 lectures, 1 three-hour arranged laboratory. Prerequisite: HE 315/315L, or consent of instructor. Concurrent enrollment required.

HE 416 Administration of Child Care Programs (3)

Discussion and reports of child care administration careers with emphasis on government programs, such as city coordinators, alternative payment resource and referral, and respite programs. Sources of funding, grant proposals. 3 lecture/problem-solving. Prerequisite: HE 415/415L or equivalent and 12 units in early childhood courses.

HE 420/420A Interior Design III (2/2)

Product information, selection, specification and installation of counters, cabinetry, equipment and ventilation systems with an emphasis on kitchens and baths. Prerequisite: Permission of the instructor. 2 hours lecture, 4 hours activity. Concurrent enrollment required.

HE 422 Family Housing and Environment (4)

The housing market as it relates to the social, economic and political settings. Housing styles, trends, issues and lifestyle decisions. 4 lecture/problem-solving.

HE 423/423L Historical Interiors I (3/1)

Historical development of interiors from Ancient times through the Renaissance. Trends of furniture, textiles and other furnishings; relationship of interiors and architectural styles; influence of culture, politics and society. Adaptation of historical furnishings and interiors for today's market. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

HE 424/424L Historical Interiors II (3/1)

Historical development of interiors from Baroque to today. Trends of furniture, textiles, and other furnishings; relationship of interiors and architectural styles; influences of culture, politics and society. Adaptation of historical furnishings and interiors for today's market. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

HE 427 Commercial Interiors (3)

Application of information related to the selection, use and care of materials to the design of hotel, restaurants, offices, institutions and other public interiors. Problem solving and investigation of product availability, design, purchase, installation and maintenance alternatives. 3 lecture/problems.

HE 429/429A Interior Design Practices (2/1)

Client and designer responsibilities. Consultations and fees, business forms, record keeping, resources and materials, freelance opportunities and public relations. Written analysis of professional problems interior designers encounter. 2 lectures, 1 two hour activity. Prerequisite: HE 120/120L or consent of instructor.

HE 440 Family Financial Behavior (4)

Impact of family financial decisions on lifestyle choices and coping behavior throughout the family life cycle. Emphasis on professional counseling for financial responsibility. Preparation of financial plans and analysis of investment opportunities. 4 lecture/problems.

HE 441, 442 Internship (1-8) (1-8)

Supervised professional work experience in home economics related to a career track in business, education, or industry. Helpful to career exploration and future employment. Prerequisite: permission of faculty required in advance.

HE 443/443L Community Service in Home Economics (2, 2)

Field work in the community in a not-for-profit setting. Emphasis on work with special needs populations including the elderly, handicapped, and economically disadvantaged. 2 lecture/discussions, 2 three-hour arranged laboratories. Concurrent enrollment required.

HE 452 Evaluation in Family/Workplace Education Programs (3)

Design of prototype measures, planning and constructing assessment instruments, competency certification for workplace readiness, subject matter

standards; applied performance testing, portfolio assessment; research proposal development; measures for program validation and teacher certification. 3 hours lecture/problem-solving.

HE 453 Workforce Preparation Programs (4)

Development of workforce training programs, foundation of skills and personal qualities for employability, job descriptions for compliance with the Americans with Disabilities Act, analysis of required employment skills, advisory committee planning and participation, program management and evaluation. Outcomes-based competency certification. 4 lecture/problem hours. Prerequisite: upper division standing.

HE 454 Curriculum in Family/Workforce Education Programs (3)

Design of individualized, specialized curriculum packages; competency based education for special needs groups, school learning experiences and assessments based on SCANS and subject area standards, restructuring, integration of academic and vocational subjects in life/workplace applications. 3 hours lecture/problem- solving.

HE 455 Family Life and Parenting (3)

Development and implementation of educational programs in family living, parenthood education, and child guidance. Role expectations and elimination of sex stereotyping; special needs of family members including single parents; cultural diversity, societal interactions and reaction to crisis & change. 3 lectures.

HE 461 Investigative Process in HE (2)

Methods of defining problems and scientific investigations, assessing needs, data gathering and locating resources. Critical thinking involved in the writing of proposals and investigation of integrated issues through written reports based on library research. 2 lectures. Prerequisites: Completion of Category I G.E.; senior standing.

HE 462 Senior Project (4)

Independent study with approval of advisor. Project may be experimental design, survey research, content analysis, community service, or development of information/technology base. A written report will be submitted. Prerequisite: HE 461. HE 463 Undergraduate Seminar (2) Student group/committee work on current topics; integrative issues throughout the human life span; oral presentations. Professional practices and ethics, leadership, legislation and public policy, grantsmanship. Prerequisite: HE 462.

HE 463 Undergraduate Seminar (2)

Student group/committee work on current topics; integrative issues throughout the human life span; oral presentations. Professional practices and ethics, leadership, legislation and public policy, grantsmanship. Prerequisite: HE 462.

HE 499 Special Topics (1-4)

Group study of a selected topic, the title to be specified in advance. For upper division students. Total credit limited to 8 units with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, laboratory, or a combination of both.

HE 500 Special Problems for Graduate Students in HE (1-2)

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

HE 541-542 Graduate Internship in HE (1-8)

Supervised work related experience in home economics at the professional level in education, business and industry helpful to career exploration and future employment. 40 hours of work experience equals one unit of credit. Prerequisite: permission of faculty required in advance.

HE 599 Special Topics for Grad Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, laboratory or a combination of both.

HORTICULTURE

Daniel Hostetler, *Chair,* Horticulture/Plant and Soil Science
Gregory J. Partida, Jr., *Coordinator,* Fruit Industries
Frederick Roth, *Coordinator,* Ornamental Horticulture
Edwin Barnes III — Kent Kurtz
Terrance Fujimoto — Peggy S. McLaughlin
Frank D. Gibbons III

Graduates from the Horticulture major can look forward to a wide range of career opportunities. The curriculum is science based yet affords men and women the flexibility to enhance their knowledge in specific areas of the horticultural industry. The major is divided into two options of Fruit Industries and Ornamental Horticulture. Specific career track areas include Landscape Management, Park Administration, Nursery Management, Turfgrass Management, and Horticultural Science.

The Ornamental Horticulture Option provides students with an extensive background in one of California's largest agricultural industries. The state's increasing urbanization has created the need for professionals educated in home landscaping, parks, golf courses, botanical gardens, and general urban beautification. Increased environmental awareness has created numerous job opportunities in the growing, maintenance and marketing of indoor and outdoor ornamental and edible plants.

The career track in Landscape Management is supported by a beautiful 1200-acre campus which serves as a fine collection of plant materials and is a living laboratory for students. Landscape Design courses are supported by a fully equipped Computer Aided Design (CAD) laboratory. Numerous outdoor landscapes at Cal Poly in different themes provide hands on training for our students. The Park Administration career track affords students the opportunity to obtain skills for top level management positions in park systems. The courses in Horticulture provide a solid foundation and these are complimented by course work in public administration, relations, and management. The Turfgrass Management career track emphasizes an important part of the horticulture and parks industries. This track is supported by an excellent field laboratory where students conduct research and operate a commercial sod production area.

The Cal Poly Nursery supports the Nursery Management career track. This commercial nursery has over 40,000 square feet of greenhouse space, outdoor growing grounds and is home to the Raymond Burr Orchid Collection and Jolly Batcheller Conservatory. Students nurture numerous crops for sale at the Nursery which is open to the public. A new and exciting career track in Horticultural Science provides students the opportunity to transfer to respected graduate programs in Horticulture around the country. Exciting careers in plant breeding, genetics, pathology, and physiology await the advanced student.

The Fruit Industries Option provides students with the practical and scientific background in the production, management, processing, and marketing of fresh citrus, avocado, deciduous, and subtropical fruits. Over 100 acres of commercial bearing acreage on campus support this program. Students are encouraged to gain hands on experience via internships or on-campus employment. Two emphasis areas in Fruit Industries are orchard management and fruit processing and marketing. These areas encourage students to explore areas of interest within California's large citrus, avocado, and deciduous fruit areas. Cal Poly Pomona has numerous alumni in top positions throughout the industry. Citriculture was one of the first degree programs offered at Cal Poly. Graduates of Fruit Industries are in demand throughout the industry.

CORE COURSES FOR MAJOR*

(Required of all students)

Orientation to the College of Agriculture	AG	100	(1)
Agriculture & the Modern World	AG	101	(4)
Ethical Issues in Agriculture	AG	401	(4)
Introduction to Arthropods	AGB	165/165L	(4)
Environmental Toxicology	AGB	411	(4)
Weeds & Weed Control	AGR	330/330L	(4)
Crop Ecology	AGR	401	(4)
Plant Structures & Functions	BOT	124/124L	(5)
Plant Pathology	BOT	323/323L	(4)
Senior Project	HOR	461	(2)
Senior Project	HOR	462	(2)
Undergraduate Seminar	HOR	463	(2)
Basic Soil Science	SS	231/231L	(4)

OPTION COURSES FOR MAJOR*

Ornamental Horticulture Option

Landscape Horticulture Principles & Practices	HOR	131/131L	(4)
Plant Propagation	HOR	132/132L	(3)
Plant Materials I	HOR	231/231L	(3)
Plant Materials II	HOR	232/232L	(3)
Plant Materials III	HOR	233/233L	(3)
Turfgrass Management	HOR	240/240L	(4)
Greenhouse Management	HOR	323/323L	(4)

Fruit Industries Option

Citrus & Avocado Production I	FI	201/201L	(4)
Pomology	FI	203/203L	(4)
Citrus & Avocado Production II	FI	301/301L	(4)
Advanced Pomology	FI	303/303L	(4)
Diseases of Fruit Crops	FI	426/426L	(4)
Soil Fertility	SS	233/233L	(4)

SUPPORT & ELECTIVE COURSES

Ornamental Horticulture Option

Vegetable Crop Systems	AGR	226/226L	(4)
Plant Physiology	BOT	422/422L	(5)
College Chemistry	CHM	105	(3)
College Chemistry Lab	CHM	142L	(1)
Fruit Science Fundamentals	FI	101/101L	(4)
Directed Electives			(40)

Students following the option in Ornamental Horticulture must complete 40 units of directed electives by selecting one of the following five career tracks**:

Landscape Management
Turfgrass Management
Nursery Management
Park Administration
Horticulture Science

Fruit Industries Option

Integrated Pest Management	AGB	231	(3)
Plant Physiology	BOT	422/422L	(5)
College Chemistry	CHM	105	(3)
College Chemistry Lab	CHM	142L	(1)
Plant Propagation	HOR	132/132L	(3)
Directed Electives			(41)

Students following the option in Fruit Industries must complete 41 units of directed electives by selecting one of the following two career tracks**:

Orchard Management
Fruit Processing & Marketing

**Courses for these career tracks are listed on the reverse side of the curriculum sheet available from the Horticulture/Plant & Soil Science Office, building 2-209. Students are encouraged to work closely with a department advisor when choosing a career track.

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

GENERAL EDUCATION COURSES

Area 1:

A. Select one course			(4)
B. Select one course			(4)
C. Select one course			(4)

Area 2:

A. Select 1 course			(4)
B. College Chemistry	CHM	104	(3)
College Chemistry Lab	CHM	141L	(1)
C. Basic Biology	BIO	115/115L	(5)
D. Select 1 course (upper division)			(4)

Area 3:

A. Select 1 course			(4)
B. Select 1 course			(4)
C. Select 1 course			(4)
D. Select 1 course			(4)
E. Select 1 course			(4)
F. Select 1 course			(4)
G. Select 1 course			(4)

Area 4:

Introduction to American Government	PLS	201	(4)
United States History	HST	202	(4)

Area 5:

Accounting for Management Decisions	ABM	324	(4)
Agricultural Enterprise Management	ABM	328	(4)

ORNAMENTAL HORTICULTURE MINOR

(25 units required)

Landscape Horticulture Principles & Practices	HOR	131/131L	(4)
Plant Materials I	HOR	231/231L	(3)
Plant Materials II	HOR	232/232L	(3)
or Plant Materials III	HOR	233/233L	
or Native Plant Materials	HOR	336/336L	
Turfgrass Management	HOR	240/240L	(4)
Arboriculture	HOR	328/328L	(3)
Greenhouse Management	HOR	323/323L	(4)
or Landscape Management Problem Solving	HOR	443/443L	
Plant Pathology	BOT	323/323L	(4)

Course Descriptions—Horticulture

All courses offered by the department may be taken on a CR/NC basis except for majors.

HOR 131/131L Landscape Horticultural Principles and Practices (3/1)

An introduction to the fundamental skills and principles of plant growth in the landscape. Includes planting techniques, pruning, propagation, irrigation, turfgrass maintenance and greenhouse/nursery production techniques. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

HOR 132/132L Plant Propagation (2/1)

Methods and principles of plant production including propagation by seed, spore, and cuttings for ornamental and vegetable plants. Basic concepts and scientific methodologies used in topworking and grafting fruit and ornamental plants, types of grafts, selection and maintenance of propagation material. Horticultural equipment and structures related to plant production. Transplanting, canning and shifting of nursery stock. 2 lectures, 1 three-hour laboratory. Concurrent enrollment required.

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

Individual or group investigations, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Graded on a CR/NC basis only.

HOR 211/211L Landscape Drafting & Design (3/1)

The fundamentals of drafting and graphic presentation. Methods and procedures for preparation of landscape structure components. 3 lectures, 1 three hours laboratory. Concurrent enrollment required.

HOR 214 History of Garden Art (4)

The relationship of ornamental flora to the human living experience to show the continuity with contemporary gardens, homes, parks, and other art. An introduction to the various styles in landscape art as they developed in different cultures and in preceding ages. 4 lectures.

HOR 223/223L Basic Floral Design (1/2)

Introduction to the theory of the basics of floral design to include principles and elements of design. Color theory, preparation, and care of flowers. The laboratory is for the applied construction of these theories. 1 lecture, 2 three-hour laboratories. Concurrent enrollment required.

HOR 224/224L Nursery Management (3/1)

Legal aspects and economics of operating a commercial retail or wholesale nursery. Federal, state and local regulations. Quality and inventory control, shipping practices, credit management. Site selection, nursery layout, supply purchasing, advertising related to the nursery business. 3 lectures, 1 three-hour laboratory. Prerequisites: HOR 131/131L, 132/132L. Concurrent enrollment required.

HOR 231/231L Plant Materials I—Fall (1/2)

A study of trees, shrubs, vines, ground covers, and herbaceous plant materials which are of greatest ornamental value in the fall season and which are commonly used in the southern California landscape. Trees will be emphasized. Approximately 200 plants will be identified and described according to growth habit, cultural requirements, and use in the landscape. 1 lecture, 2 three-hour field laboratories. Concurrent enrollment required.

HOR 232/232L Plant Materials II—Winter (1/2)

A study of trees, shrubs, vines, ground covers, and herbaceous plant materials which are of greatest ornamental value in the winter season and which are commonly used in the southern California landscape. Shrubs and vines will be emphasized. Approximately 200 plants will be identified and described according to growth habit, cultural requirements, and use in the landscape. 1 lecture, 2 three-hour field laboratories. Concurrent enrollment required.

HOR 233/233L Plant Materials III—Spring (1/2)

A study of trees, shrubs, vines, ground covers, and herbaceous plant materials which are of greatest ornamental value in the spring season and which are commonly used in the southern California landscape. Herbaceous plant materials will be emphasized. Approximately 200 plants will be identified and described according to growth habit, cultural requirements, and use in the landscape. 1 lecture, 2 three-hour field laboratories. Concurrent enrollment required.

HOR 240/240L Turf Management (3/1)

Considerations in the management of turf, including such specialized areas as golf courses, bowling greens, athletic fields and park lawns. 3 lectures, 1 three-hour laboratory. Prerequisite: SS 231/231L. Concurrent enrollment required.

HOR 299 Special Topics for Lower Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor. Instruction is by lecture, laboratory, or a combination of both.

HOR 323/323L Greenhouse Management (3/1)

Design and management of different types of greenhouses and plant shelters. Maintenance, heating, cooling, humidification systems and their controls. Mechanization, automatic and semi-automatic fertilization and watering systems. 3 lectures, 1 three-hour laboratory. Prerequisite: BIO 115/115L or BOT 124/124L. Concurrent enrollment required.

HOR 328/328L Arboriculture (2/1)

Care and management of specimen ornamental trees. Cavity repairs, bracing and cabling, pruning. Practice in the use of lines and climbing. Safety practices. 2 lectures, 1 three hour laboratory. Prerequisite: HOR 131/131L, HOR 231/231L, BOT 124/124L. Concurrent enrollment required.

HOR 336/336L Native Plant Materials (2/1)

Native California plants suitable for landscape purposes. Their identification, habits of growth, cultural requirements, and landscape use. 2 lectures, 1 three-hour laboratory. Concurrent enrollment required.

HOR 360/360L Landscape Development & Design (3/1)

Methods and procedures of rendering landscape designs suitable for the residential garden. The arrangement and relationships of the various elements common to aesthetic, functional landscapes will be stressed. 3 lectures, 1 three-hour laboratory.

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

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Graded on a CR/NC basis only.

HOR 416/416L Landscape Contracting & Estimating (3/1)

Management of landscape contracting firms. Bonding, insurance, contracts, ownership, licensing and other legal aspects of improvement to real property. Calculation of costs, manpower, and quantities of materials in landscape development. Preparation of specifications and estimates used in bidding. 3 lectures, 1 three-hour laboratory. Prerequisite: HOR 131/131L, 211/211L or permission of instructor. Concurrent enrollment required.

HOR 420/420L Urban Forestry (3/1)

Integrated approach to the management of and issues concerning street and park trees and open space vegetation in a public setting. Inventory practices, risk management, funding and budgeting, political considerations, tree waste management, valuation, tree resource utilization, and effective employment of volunteer assistance. 3 lectures, 1 three-hour laboratory. Prerequisite: HOR 328/328L. Concurrent enrollment required.

HOR 422/422L Advanced Plant Propagation (3/1)

Current topics in plant propagation concerning juvenility, growth regulators, scion/rootstock combinations, and tissue culturing. Emphasis on commercial propagation by cuttings, grafting/budding, tissue culturing, division, layering, and seeding. 3 lectures, 1 three-hour laboratory. Prerequisite: BOT 422/422L. Concurrent enrollment required.

HOR 427/427L Diseases of Ornamental Plants (3/1)

Diagnosis and control of biotic and abiotic diseases and selected insect problems on ornamental plants in interior and exterior landscapes, and under various production conditions. Labs include field trips to production areas. 3 lectures, 1 three-hour laboratory. Prerequisite: BOT 323/323L. Concurrent enrollment required.

HOR 436/436L Golf Course Management (3/1)

Management, supervision, maintenance, and operation of golf courses. A study of the equipment, scheduling, promotion and personnel required and related facilities of public and private courses. 3 lectures, 1 three-hour laboratory. Prerequisite: HOR 240/240L. Concurrent enrollment required.

HOR 437/437L Sports Turf and Advanced Turfgrass Science (3/1)

Advances in construction techniques, management philosophy, cultural practices and environmental factors affecting the growth of turfgrass on sports turf facilities and other related turfgrass areas. 3 lectures, 1 three-hour laboratory. Prerequisite: HOR 240/240L. Concurrent enrollment required.

HOR 439/439L Interior Landscape Management & Design (3/1)

Interior landscaping and design in shopping malls, offices, and other interior spaces. Identification of species used, including the proper installation, maintenance and management. Cultural practices, scheduling, pest management and cost analysis. Operational practices of interior landscaping firms. 3 lecturers, 1 three-hour laboratory. Prerequisite: HOR 131/131L. Concurrent enrollment required.

HOR 443/443L Landscape Management Problem-Solving (3/1)

The integration of the technical aspects of landscape management in problem-solving case studies. Aspects of turf management, plant materials, personnel issues, equipment, irrigation, and chemical use will be addressed in determining the proper methodology for maintaining landscaping of parks, streets and institutional grounds. Three lectures, one three-hour laboratory. Prerequisites: HOR 131/131L, 231/231L, 233/233L, PA 233/233L. Concurrent enrollment required.

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

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours of total time. HOR 461 grade only.

HOR 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/her chosen field. 2 lectures.

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

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor. Instruction is by lecture, laboratory, or a combination of both.

Course Descriptions—Fruit Industries

+All courses in Fruit Industries may be taken on a CR/NC basis except by majors.

FI 101/101L Introduction to Fruit Science (3/1)

Evaluation of the role of subtropical and deciduous fruit and nut crops, citrus and avocados in California horticulture. Historical development, economic importance and cultural practices common to all fruit crops. Site selection, orchard planning, variety and rootstock selection, propagation, fertilization, irrigation, pest and disease control, pruning and training, harvesting and marketing of fruit crops. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

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

Individual or group investigation, research, studies or surveys of selected historical or contemporary problems in the production of fruit in California or in other areas of the world. Total credit limited to 4 units, with a maximum of 2 units per quarter.

FI 201/201L Citrus and Avocado Production I (3/1)

Critical evaluation of historical and future trends in the development of the citrus and avocado industry in California. Analytical investigation of citrus and avocado orchard site selection, environmental requirements, variety adaptions, orchard management, cultural requirements, production practices,

and economics of producing citrus and avocados. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

FI 202/202L Subtropical Fruits (3/1)

Historical significance and contemporary importance of subtropical fruits including the date, fig, macadamia, olive, and other selected fruits for commercial plantings in California and other areas of the United States. Critical evaluation of the climactic and cultural requirements, fruiting and growth habits, and varietal characteristics of the selected fruits from western and non-western societies. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

FI 203/203L Pomology (3/1)

Economic importance of California's deciduous fruit and nut orchards. Critical evaluation of the cultural requirements of deciduous fruit and nut orchards in California and other areas of the United States, varieties, seasonal production practices, and tree climactic requirements. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

FI 299/299L/299A Special Topics for Lower Division Students (1-4) (1-4) (1-4)

Group study of contemporary selected topics related to basic concepts and scientific methodologies used in fruit production in western and non-western societies. The title to be specified in advance. Total credit is limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Consent of instructor. Instruction is by lecture, laboratory, activity, or a combination.

FI 302/302L Citrus and Avocado Production II (3/1)

Critical evaluation and comparison of citrus and avocado production practices from commercial citrus regions around the world. Orchard planning and development, nursery practices, tree management, pest and disease control, irrigation and fertilization, pruning, harvesting and marketing. 3 lectures, 1 three-hour laboratory. Prerequisites: FI 201/201L, Concurrent enrollment required.

FI 303/303L Advanced Pomology (3/1)

Critical evaluation of the climactic and cultural requirements of fruit tree orchards, strawberries, kiwifruit, olives and other selected small fruits. The basic concepts and scientific methodologies used in the production, processing, and marketing of raisins and table and wine grapes including the techniques of irrigation, orchard layout, planting, training, pruning, pollination, fruitlet, thinning, pest control, and the use of girdling and plant growth regulators to size fruit in vineyards and orchards. 3 lectures, 1 three-hour laboratory. Prerequisite: FI 203/203L. Concurrent enrollment required.

FI 322/322L Fruit Processing and Handling (3/1)

Evaluation of physical operations involved in fruit and nut harvesting, processing, and packing. Equipment used in harvesting, handling, transporting, grading, sorting, packing and shipping of fruits and nuts. Fruit and nut storage, storage diseases, and techniques used to prolong storage life. 3 lectures, 1 three-hour laboratory. Prerequisite: FI 426/426L. Concurrent enrollment required.

FI 341/341L Orchard Management Practices (1/2)

Practical application of the basic concepts and scientific methodologies used in orchard cultural practices and procedures. Importance of seasonal operations in relation to overall objectives in orchard management. Use of specialized orchard equipment emphasized. Prerequisites: AE 241/241L and any fruit production course, or consent of instructor. 1 lecture, 2 three-hour laboratories. Concurrent enrollment required.

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

Individual or group investigations, research, studies, or survey of selected historical or contemporary problems in the production of fruit in California or in other areas of the world. Total credit limited to 4 units, with a maximum of 2 units per quarter.

FI 425L Advanced Propagation (2)

Advanced propagation will incorporate the propagation techniques and methods used in HOR 132/132L. Students in this course will be required to use the modern techniques and methods learned to complete a propagation project. Projects may include topworking or grafting trees to new varieties, or budding or tipgrafting cuttings in the nursery to selected budwood. 2 three-hour laboratories. Prerequisites: HOR 132/132L.

FI 426/426L Diseases of Fruit Crops (3/1)

Philosophy of disease control and prevention in California's citrus, avocado, and deciduous fruit and nut orchards. Identification of causal agents, economic impact, critical evaluation of the basic concepts and scientific methodologies involved in control and prevention. 3 lectures, 1 3-hour lab. Prerequisite: FI 101/101L, FI 201/201L, FI 203/203L, and BOT 323/323L. Concurrent enrollment required.

FI 441 Internship in Orchard Management (12)

On-the-job training in orchard maintenance and cultural practices. One quarter in residence at Pine Tree Ranch in Ventura County or any other orchard property with similar training opportunities. Actual operation of a commercial orchard enterprise under University faculty or staff supervision. Prerequisites: FI 101/101L, FI 201/201L, AE 241/241L recommended; and permission of section coordinator. Letter grade only.

FI 499/499L/499A Special Topics for Upper Division Students (1-4) (1-4) (1-4)

Group study of contemporary selected topics related to basic concepts and scientific methodologies used in fruit production in western and non-western societies. The title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Consent of instructor. Instruction is by lecture, laboratory, activity, or a combination.

INTERNATIONAL AGRICULTURE

The Agricultural Business Management/Agricultural Education Department offers a program of courses in international agriculture. For other programs offered in the Department, see agricultural business management and agricultural education.

Edison I. Cabacungan, *Chair*
A. Reza Hoshmand William C. Hughes
Marvin L. Klein Arthur F. Parker
James M. Weidman

Course Descriptions

All courses offered by the department may be taken on a CR/NC basis except for majors.

IA 101 Global Resources for Food (4)

Resource base for agricultural production on various continents. Potential for increasing food supplies. Role of agriculture in economic development. 4 lectures.

IA 302 Agricultural Market Development (4)

Marketing systems for agriculture in marketing less developed economies. Analysis of marketing policies used to expand and improve food production. 4 lectures. Prerequisite: IA 101, EC 201.

IA/ABM 330 International Marketing of Food and Fiber Products (3)

Marketing of food, fiber, and horticultural products in foreign markets. Special emphasis on selecting export markets, procedures for establishing contacts, promotion, financing, insuring, shopping tariffs, customs, regulations and other matters related to food and fiber products. Management practices and problems of firms involved in exporting and importing textiles and garments, livestock, fruits, vegetables, grains and other food and fiber products. 3 lectures.

IA/ABM 360 Agricultural Cooperatives (3)

Structure, management and organization of the Agricultural Cooperative with emphasis upon current management practice. Includes comparison of cooperative with other business forms, ideals, history, and progress of the cooperative movement; problems in establishing a new cooperative; financing and membership problems. 3 lectures.

IA 362 Agricultural Policy in Developing Nations (4)

Review, analysis and discussion of relevant international government agricultural policy affecting development, trade, and food production. History, current status and projections of policy trends. 4 lectures.

IA 380 Farm Management in Low Income Tropical Agriculture (3)

The traditional farm family. Nature of farmer's resources and control. Farm records. Cost relationships. Budgeting. Types of farm management decisions and guiding principles applicable. Handling of risk and uncertainty, credit, labor, machinery. Impact of public policies on farm management. 3 lectures. Prerequisite: EC 201.

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

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

IA 401 Field Experience in Latin America (3-8)

Individualized field research experience in Latin America. Class hours variable depending on credit. Prerequisite: Advanced standing; consent of advisor and instructor, one course in International Agriculture; competence in Spanish language recommended.

IA 403 Rural Development Project Analysis (4)

Procedures to effectively plan, implement and evaluate food, agriculture, and rural development projects in low income countries. Design and management of projects that encourage participation by local people and communities is emphasized. Includes cost-benefit analysis and budgeting.

IA/FN 445 Nutrition and Global Development (4)

Issues in technology, food policy, nutrition and social welfare in developing societies. Integrates concerns about food and nutrient distribution and availability, malnutrition, scientific principles of nutrient utilization and metabolism, and human productivity and reproduction. Implications for a just and sustainable economic development. 4 lectures.

ABM/IA 450 Agricultural Water Resource Management (4)

Water resource management applied to current issues. Water delivery systems in the U.S. and California, survey of water rights, water pollution, water conservation, food and agricultural system water use, and efficient water management. Includes water problems in developing nations. 4 lecture/discussions.

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

Students select and complete a research project under faculty supervision typical of those they will be required to handle in their field of employment. Research findings and conclusions are presented in a formal report. Prerequisite: Senior standing. May not be taken concurrently.

LANDSCAPE IRRIGATION SCIENCE

One of two majors offered in the Agricultural Engineering and Irrigation Science Department is Landscape Irrigation Science. For the other program in this department, see Agricultural Engineering.

Eudell Vis, *Chair*
Joe Y. T. Hung Ramesh Kumar

The landscape irrigation profession has expanded rapidly and career opportunities are plentiful. The Landscape Irrigation Science major provides a broad background in the interrelationships of water, plants, soils, and the environment, along with the principles of irrigation system design and management. An effective irrigation system and water management plan can enhance the quality of the landscape and conserve water resources.

This major program will educate individuals who will be involved in the planning, design, operation and management of landscape irrigation and drainage systems for residential and commercial developments, parks, golf courses, public grounds, cemeteries, and other urban and recreational landscaped areas. Graduates will also be prepared to design new equipment and computer technologies which will enhance water conservation and reduce runoff which has the potential to contaminate water supplies.

The curriculum provides a foundation in the basic sciences in the related fields of horticulture, plant science, soil science, and business management. In addition to an extensive curriculum in irrigation engineering technology, landscape drainage, water management, and diagnosis of irrigation problems prepare the student for a wide range of career opportunities.

Students in the landscape irrigation science major will have the opportunity to work with the considerable resources on campus that focus on the landscape and on irrigation technology. These include the ornamental horticulture unit, the extensively landscaped campus, and the facilities of the Agricultural Engineering department, including the Institute for Irrigation Research and Evaluation.

The department has strong relationships with nearby international corporations that design and maintain the newest technologies in landscape irrigation science. Internships and scholarships are available to students majoring in this field.

Admission requirements for this program follow those for the California State University system. The degree program requires 198 quarter units and leads to a Bachelor of Science degree in Landscape Irrigation Science.

CORE COURSES FOR MAJOR *

(Required of all students)

General Survey	AE	232/232L	(3)
Micro Irrigation	AE	340/340L	(3)
Orientation to the College of Ag.	AG	100	(1)
Ag in the Modern World	AG	101	(4)
Principles of Irrigation	LIS	212	(4)
Landscape Hydraulics	LIS	221	(4)
Landscape Sprinkler Irrigation I	LIS	231/231L	(4)
Landscape Sprinkler Irrigation II	LIS	322/322/L	(4)
Landscape Drainage	LIS	341	(4)
Computer Aided Drafting	LIS	241/241L	(4)
Auto. Irrig. System Controls	LIS	365/365L	(4)
Landscape Irrig. Water Management.	LIS	440/440L	(4)
Auto. Irrig. Trouble Shooting	LIS	452/452L	(3)
Ag Issues and Ethics	AG	401	(4)
Senior Project	LIS	461	(2)
Senior Project	LIS	462	(2)
Undergraduate Seminar	LIS	463	(2)
Develop. of Leadership Skills	AG	464	(3)
Internship	LIS	441	(1-4)

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Intro. to Microcomputing	CIS	101	(4)
Chemistry Lab	CHM	141L	(1)
Physics	PHY	121	(3)
Physics Lab	PHY	141L	(1)
Plant Structures & Functions	BOT	124/124L	(4)
Directed Electives (See Advisor)			(33)

GENERAL EDUCATION COURSES

Area 1:

Freshman English	ENG	104	(4)
Advocacy and Argument	COM	204	(4)
Report Writing	COM	216	(4)

Area 2:

A. College Algebra	MAT	105	(4)
B. College Chemistry	CHM	104	(3)
C. Basic Biology	BIO	115/115L	(5)
D. Any course from Area D			(4)

Area 3:

A. Select One Course	(4)
B. Select One Course	(4)
C. Select One Course	(4)
D. Select One Course	(4)
E. Select one course	(4)
F. Select one course	(4)
G. Select one course	(4)

Area 4:

Intro to American Government	PLS	201	(4)
U.S. History	HST	202	(4)

Area 5: Select two courses

Management Accounting	ABM	324	(4)
Agriculture Enterprise Management	ABM	328	(4)
Personnel Management	ABM	402	(4)

Course Descriptions

LIS 104 Introduction to Landscape Irrigation Design (1)

An introduction to the field of landscape irrigation design, career opportunities and responsibilities. One lecture/problem.

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

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

LIS 212 Principles of Irrigation (4)

Basic soil, water and plant relationships. Irrigation water requirements, irrigation efficiencies, and methods of irrigation applied to plants. Collection of irrigation information needed for planning, design and management. Principles of land drainage and salinity problems are also included. Four lecture/problems. Prerequisite: MAT 105 or equivalent, and SS 231/231L. Concurrent enrollment required.

LIS 221 Landscape Hydraulics (4)

Principles of hydrostatics, dynamics, problems involving pipe flow and channel flow specifically applied to landscape irrigation and drainage systems. Also includes related problems in water flow, such as storage tanks, water hammer, pumps, and water fountains. 4 lecture/problems. Prerequisites: PHY 121 or MAT 105. Not open to engineering majors.

LIS 231/231L Landscape Sprinkler Irrigation I (3/1)

Soil-water plant relations, engineering sprinkler system layout, selection of sprinkler irrigation equipment such as sprinklers, valves, controllers, and specialty devices for efficient water application and to meet codes. Single drip system design is also included. Analysis of cost and irrigation management and maintenance are also included. 3 lecture/problems and 1 three-hour laboratory. Prerequisites: LIS 122/122L or LIS 221, SS 231/231L, MAT 105 or 106 or equivalent. Concurrent enrollment required.

LIS 241/241L Computer Aided Drafting (3/1)

Application of the personal computer to landscape irrigation design and graphics. Three lecture/problems and one three-hour laboratory. Concurrent enrollment required.

LIS 322/322L Landscape Sprinkler Irrigation II (3/1)

Design and management of sprinkler systems for athletic fields, cemeteries, parks, and golf courses. Emphasis is on the application of LIS 221 and LIS 321 to a complex irrigation system. Three lecture/problems and one three-hour laboratory. Prerequisite: LIS 221 and LIS 231/231L. Concurrent enrollment required.

LIS 341 Landscape Drainage (4)

Drainage problems related to landscaping, such as sizes of storms, and surface runoff. Calculations of storm sizes with different frequencies. Minimizing and prevention of damage due to runoff or erosion. 4 lecture/problems. Prerequisite: LIS 221.

LIS 365/365L Automatic Irrigation System Controls (3/1)

Basic electricity, power and energy, circuit types, and wiring practices. Basic electronic principles applied to irrigation and other types of controllers. Circuits for controllers, electric valves, and sensing devices. 3 lectures, 1 three-hour laboratory. Concurrent enrollment required.

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

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

LIS 440/440L Landscape Irrigation Water Management (3/1)

Application of the science of soil-water-plant relations and climactic conditions to develop effective scheduling and management of irrigation water systems for residential, commercial, industrial, park and golf course, etc. Water conservation issues, water policies and codes and other related matters will be discussed. Three lecture/problems and one three-hour laboratory. Prerequisite: LIS 322/322L. Concurrent enrollment required.

LIS 441 Internship in Landscape Irrigation Science (1–4)

Professional level work experience with public agencies or private companies for advanced students. Work experiences are valuable for development of career goals and for application of academic training. Written reports are required. Course may be repeated for a maximum of 12 units.

LIS 452/452L Landscape Irrigation Trouble Shooting (2/1)

Prevention and analysis or problems and failures in landscape irrigation systems, such as irrigation controllers, remote control valves, wiring failures, sprinklers and drip system failures. Other specialty items such as cross connections, pressure regulators, vacuum breakers, pipes, etc., will be included. 2 lecture/problems, 1 three-hour laboratory. Prerequisite: LIS 365/365L. Concurrent enrollment required.

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

Students will select and complete a landscape irrigation related project under faculty supervision. The project could be either a design, analysis or management problem.

LIS 463 Undergraduate Seminar (2)

Presentation of the senior project, new methods and development, practices and procedures of the field. Prerequisite: LIS 461 and 462.

SOIL SCIENCE

Daniel Hostetler, *Chair,* Horticulture/Plant and Soil Science
Robert J. Tullock, Coordinator, Soil Science
Edwin Barnes III Gaylord Patten
Victor Wegrzyn

The soil science major is for those who desire to become guardians of the soil. Soil is one of the natural resources which is basic for life and human existence. As the natural medium for plant growth, it is the source of most of our food and clothing. It provides shelter in the form of bricks and timber products. Mankind also depends upon the soil as a material for supporting and locating buildings, transportation systems, waste disposal sites, outdoor recreational playgrounds, flood control ditches, and underground utility systems.

There are thousands of kinds of soil on earth; each having a unique set of characteristics. Soil science students learn how to determine these characteristics in both the field and laboratory. They learn to relate these characteristics to the genetic history of the soil and to organize and classify this information in a systematic manner. They also learn to determine the location and extent of soils in the field and to show this on a soil map.

The characteristics of a soil determine the degree of suitability for a variety of alternative uses, and the appropriate management practices required to keep the soil permanently productive. Soil quality can be altered by the activities of mankind. If abused, soil productivity declines. If treated properly, a soil will produce indefinitely. Soil scientists prevent soil deterioration while striving to maintain or improve soil productivity for all future generations.

The demand for soil scientists is keeping pace with the human population growth curve and the growing awareness for maintaining a clean and aesthetic environment. A career in soil science is an alternative for anyone who is concerned about the conservation of natural resources and the future wealth of mankind, and has a strong interest in the biological and physical sciences.

The Cal Poly, Pomona, soil science program enjoys an excellent local, state, and national reputation. This reputation results from a strong curriculum, taught by a well-qualified faculty, supported by laboratory and field facilities which have produced alumni who are professional soil scientists.

Soil scientists have many options for career opportunities. They can work for private industry or governmental agencies; in the laboratory, field, office or classroom; and in either urban or rural areas. They can apply their knowledge to the production of agronomic, horticultural, rangeland, or forestry plants; to the use of soils for urban planning and development; to the manufacturing and marketing of fertilizers and other agricultural materials; or to the administration of natural resource programs. Many graduates pursue advanced training and work in research and education.

About half of the Cal Poly soil science graduates are employed by a governmental agency. At the federal level they are working for the Bureau of Land Management, Forest Service, Natural Resource, Conservation Service, Environmental Protection Agency, or Agricultural Research Service. Several foreign students are employed by their native country's Department of Agriculture. At the state level in California and elsewhere, they are employed by a State University, Department of Forestry, Department of Water Resources, or Department of Health Services. At the county or local level, they are working for the Agricultural Commissioner's Office, the Agricultural Extension Office, or the County Arboretum. One alumnus is with the Food and Agricultural Organization of the United Nations.

The soil science graduates with private industry are mainly employed by agricultural chemical companies, soil engineering testing and consulting firms, wholesale horticultural nurseries, food production and processing companies, agricultural management consulting firms, or soil testing laboratories.

The soil science minor is primarily for students majoring in another discipline which is dependent upon soil science. It is a valuable curricular adjunct for those majors stressing plant growth, such as: agronomy, botany, fruit industries, landscape architecture, and ornamental horticulture. The soil science minor will also strengthen the academic background of those majoring in agricultural engineering, civil engineering, agricultural science, anthropology, biology, geology, geography, international agriculture, and urban planning.

CORE COURSES FOR MAJOR*

(Required of all students)

Orientation to the College of Ag	AG	100	(1)
Agriculture and the Modern World	AG	101	(4)
Ethnic Issues in Agriculture	AG	401	(4)
Basic Soil Science	SS	231/231L	(4)
Soil Fertility and Fertilizers	SS	233/233L	(4)
Soil Materials & Mgt.	SS	332/332L	(4)
Soil Resource Management and Conservation	SS	334/334L	(4)
Soil and Plant Analysis	SS	339/339L	(3)
Crop Ecology	AGR	401	(4)
Environmental Toxicology	AGB	411	(4)
Soil Chemistry	SS	431/431L	(4)
Soil Physics	SS	432/432L	(4)
Soil Morphology and Survey	SS	433/433L	(4)
Senior Project	SS	461	(2)
Senior Project	SS	462	(2)
Undergraduate Seminar	SS	463	(2)
Plant Structures and Functions	BOT	124/124L	(5)
Basic Microbiology	MIC	201/201L	(5)
Introduction to Microcomputing	CIS	101	(4)
College Chemistry	CHM	105	(3)
College Chemistry Lab	CHM	142L	(1)
College Chemistry	CHM	106	(3)
College Chemistry Lab	CHM	143L	(1)

SUPPORT AND ELECTIVE COURSES

(Required of all students)

Irrigation	AE	240/240L	(4)
Animal Agricultural Science	AVS	111	(4)
Elements of Organic Chemistry	CHM	201	(3)
Quantitative Analysis	CHM	221/221L	(4)
Elements of Organic Chemistry Laboratory	CHM	250L	(1)
Principles of Geology	GSC	111	(3)
Principles of Geology Laboratory	GSC	141L	(1)
College Physics	PHY	121	(3)
College Physics	PHY	122	(3)
College Physics Laboratory	PHY	141L	(1)
College Physics Laboratory	PHY	142L	(1)
Elementary Statistics with Applications	STA	120	(4)
Choose 8 units from the department environmental component list.			(8)
Choose 8 units from the department list in business applications.			(8)

GENERAL EDUCATION COURSES

Area 1:

A. Select one course.			(4)
B. Select one course			(4)
C. Select one course			(4)

Area 2:

A. College Algebra	MAT	105	(4)
B. College Chemistry	CHM	104	(3)
College Chemistry Laboratory	CHM	141L	(1)
C. Basic Biology	BIO	115/115L	(5)
D. Select one course			(4)

Area 3:

A. Select one course	(4)
B. Select one course	(4)
C. Select one course	(4)
D. Select one course	(4)
E. Select one course	(4)

F. Select one course . . . . . (4)
G. Select one course . . . . . (4)

Area 4:

United States History	HST	202	(4)
Intro to American Government	PLS	201	(4)

Area 5:

Life Support Systems	RS	301	(4)
Global Regenerative Systems	RS	302	(4)

SOIL SCIENCE MINOR

Minimum Units—20
Minimum Upper Division Units—9
Required Courses (all students)

Basic Soil Science	SS	231/231L	(4)
Soil Fertility and Fertilizers	SS	233/233L	(4)

Select 12 units from the following:

Soil Materials and Management	SS	332/332L	(4)
Soil Resource Management and Conservation	SS	334/334L	(4)
Soil and Plant Analysis	SS	339/339L	(3)
Soil Taxonomy	SS	342	(3)
Soil Microbiology	SS	343/343L	(3)
Soil Chemistry	SS	431/431L	(4)
Soil Physics	SS	432/432L	(4)
Soil Morphology and Survey	SS	433/433L	(4)

Course Descriptions

All courses offered in Soil Science may be taken on a CR/NC basis except by majors or by students taking minor in Soil Science.

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

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

SS 231/231L Basic Soil Science (3/1)

Basic concepts and scientific methodologies of the living and non-living systems of soils; integrated relationships between soils and climate, plants, animals, geologic materials, land form and time; and the impact of soils on civilization. 3 lectures, 1 three-hour laboratory. Prerequisite: CHM 104, 141L. Concurrent enrollment required.

SS 233/233L Soil Fertility and Fertilizers (3/1)

Critical evaluation of concepts, methods and materials for improving the fertility of soils used for the sustained production of all types of commercial plants while preserving environmental quality as influenced by past and present social, political, and economic institutions in Western and non-Western societies. 3 lectures, 1 three-hour laboratory. Prerequisite: SS 231/231L. Concurrent enrollment required.

SS 299/299L/299A Special Topics for Lower Division Students (1-4) (1-4) (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Permission of instructor. Instruction is by lecture, laboratory, activity, or a combination. Concurrent enrollment required.

SS 332/332L Soil Materials and Management (3/1)

Comprehensive evaluation of soils, soil materials, and technical and scientific methodologies for managing soils and soil materials for the production of agronomic and horticulture crops on a sustained basis while preserving environmental quality. Presented in an interactive setting. 3 lectures/problems, 1 three-hour laboratory. Prerequisite: SS 231/231L; computer literacy encouraged. Concurrent enrollment required.

SS 334/334L Soil Resource Management and Conservation (4)

An integrated study of principles and methods for managing soil and water resources for multiple uses, sustainable agriculture, environmental quality, and erosion control. Integrated effects of soil, climate, topography, and land use; social, political, and economic relationships. 3 lecture problems, 1 three-hour laboratory. Prerequisite: SS 231.

SS 339/339L Soil and Plant Analysis (2/1)

Critical evaluation of the basic concepts and scientific methodologies for analyzing the nutrient status of soils and plant tissue as a means for diagnosing alternative fertilizer and amendment treatments as influenced by past and present social, political, and economic institutions in western and non-western societies. 2 lectures, 1 three-hour laboratory. Prerequisites: CHM 105, 142; SS 231/231L. Concurrent enrollment required.

SS 342 Soil Taxonomy (3)

Critical evaluation of the basic concepts and scientific methodologies for the classification of soils into comprehensive, integrated systems as influenced by past and present social, political, and economic institutions in western and non-western societies. 3 lectures. Prerequisite: SS 231/231L. Concurrent enrollment required.

SS 343/343L Soil Microbiology (2/1)

Critical evaluation of the basic concepts and scientific methodologies regarding the interactions between the integrated soil-plant-microbial system and their effects on soil productivity and environmental quality as influenced by past and present social, political, and economic institutions in western and non-western societies. 2 lectures 1 three-hour laboratory. Prerequisites: SS 231/231L; MIC 201/201L; CHM 201. Concurrent enrollment required.

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

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

SS 431/431L Soil Chemistry (3/1)

Critical evaluation of the basic concepts and scientific methodologies regarding the chemical composition and reactions of the integrated solid-liquid-gaseous system in soils and their relationship to soil productivity and environmental quality as influenced by past and present social, political, and economic institutions in western and non-western societies. 3 lectures, 1 three-hour laboratory. Prerequisite: SS 339/339L; CHM 221; or consent of instructor. Concurrent enrollment required.

SS 432/432L Soil Physics (3/1)

Critical examination and evaluation of the universal concepts and scientific methodologies regarding the physical properties and transformations of the integrated solid-liquid-gaseous system in soils and their relationship to soil productivity, environmental quality, land utilization, and the quality of life. 3 lectures, 1 three-hour laboratory. Prerequisites: PHY 122; SS 231/231L; or consent of instructor. Concurrent enrollment required.

SS 433/433L Soil Morphology and Survey (3/1)

Critical evaluation of the basic concepts and scientific methodologies regarding soil morphology and its integrated relationship to the preparation of soil surveys and soil-use interpretations as influenced by past and present social, political, and economic institutions in western and non-western societies. 3 lectures, 1 three-hour laboratory. Prerequisite: SS 231/231L; SS 342. Concurrent enrollment required.

SS 441, 442 Internship in Soil Science (1-4) (1-4)

On-the-job experience with public and private agencies for advanced students. Professional type experience new to the student so that a valuable

* A 2.0 cumulative GPA is required in core courses including option courses for the major in order to receive a degree in the major.

contribution toward career development results. One unit credit for each 100 hours of experience. Written reports necessary. Courses may be repeated for maximum of 12 units total. Prerequisite: Junior standing.

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

An analytical investigation of a soil science research project in an area of special interest to the individual student, working under faculty supervision, culminating in a formal rhetorical, expository report that emphasizes clarity and lucidity of thought based on deductive and inductive reasoning, and the use of graphic skills. Minimum of 120 hours. Must be taken in sequence.

SS 463 Undergraduate Seminar (2)

Critical reviews of contemporary research in the field of soil science. The student will analyze, criticize and advocate by inductive and deductive methods. Inferences in contemporary literature are based on fact or a logical, unambiguous extension of fact. Oral reports of literature and senior projects are required. Prerequisites: SS 462 and successful completion of the GWT.

SS 499/499L/499A Special Topics for Upper Division Students (1-4)

Group study of a selected topic, the title to be specified in advance. Total credit limited to 8 units with a maximum of 4 units per quarter. Prerequisite: permission of instructor. Instruction is by lecture, laboratory, activity, or a combination. Concurrent enrollment required.