Horticulture & Crop Science

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Academic Programs

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The department offers the Agricultural and Environmental Plant Sciences major leading to the Bachelor of Science degree. Within this major are three concentrations: Environmental Horticultural Science, Fruit and Crop Science, and Plant Protection Science. Each concentration is well-grounded in the sciences and designed to prepare students for many attractive career opportunities.

Experiential Learning Opportunities and Facilities

The Horticulture and Crop Science Department has well-equipped laboratories for instruction in plant biotechnology, insect and weed pest management, postharvest technology, plant production, and landscape horticulture, including CAD capabilities and plant materials.

Students have hands-on experiences in the production and marketing of landscape and ornamental plants using comprehensive facilities at the 16-acre Environmental Horticulture Unit. This unit includes 35,000 square feet of greenhouses, a 5,000 square-foot retractable roof greenhouse, 7,500 square feet of shade houses, a 10,000-square foot U.S. Golf Association specification experimental green, an extensive field container growing area, and a five-acre arboretum. Additionally there are six horticulture laboratories, four of which are fitted with “smart-room” technologies for state-of-the-art teaching. The Leanin Pine Arboretum and Gardens is an outdoor teaching laboratory while the 200 acres of landscaped campus are planted with many interesting and unusual trees and shrubs from all over the world, as well as California natives.

The Crops Unit has 70 acres of productive citrus, avocados, grapes, deciduous fruit trees, and berries, with additional nonbearing acreage for instructional use. There are also approximately 35 acres of annual vegetable and forage crops, of which eleven acres are certified for organic production. There is a modern building containing two teaching labs with prep rooms, six greenhouses, coolers, hydroponic vegetable production facility and a state-of-the-art fruit and vegetable processing line.

The technological aspects of instruction are enhanced by an array of equipment required in crop and fruit production systems, postharvest handling, biotechnology, seed processing, pesticide application, nursery and greenhouse operation, parks and sport grounds maintenance and landscape construction. Field trips supplement instruction and are strongly encouraged for most classes.

Students are encouraged to gain experience and earn income by participating in the Enterprise project program or by working on the Department’s farmland. Enterprise projects are run under faculty supervision but are student-operated. These projects provide students with a “no risk” glimpse of a commercial enterprise. The Department offers Enterprise projects in the production of vegetables, fruit, avocados, deciduous fruit and nut crops, floricultural crops, nursery plants, and forages. Available marketing outlets range from contract sales of vegetable seeds, wholesaling to area supermarkets, and direct marketing at local farmers’ markets, garden centers, florist shops, and through campus outlets. Certified organic produce is marketed through a biweekly Farmers’ Market or farmed or it is sold to local restaurants and retailers.

The Department supports co-curricular activities for its students, including two student clubs: the Crops Club and the Horticulture Club. Student teams in horticultural science, flower judging, floral design and the landscape industry continue to win national championships.

Undergraduate Programs

BS Agricultural and Environmental Plant Sciences

The Horticulture and Crop Science Department at Cal Poly offers students an opportunity not just to learn, but to learn-by-doing. Our students benefit from a broad spectrum of opportunities ranging from hands-on experiences in our fields, groves, nurseries, and greenhouses to real world application through internships and other collaborations with our industry partners. We also excel in providing a foundational plant science background and instilling a passion for plants, as we produce the next generation of leaders in the agricultural and environmental plant sciences.

Students in this major begin with core courses that provide a thorough introduction to the various concentrations. Each concentration, in turn, has required courses, which may be shared by other concentrations. In their first year, students explore curricular and professional opportunities to enable them to choose a concentration. In consultation with professional and faculty advisors, students have the flexibility to select electives within the concentrations according to their career goals and interests.

Internships are readily available to students and are highly recommended. Interns are typically placed with private industry and public facilities all across the United States but may also take place in foreign countries.

Over $100,000 in scholarships are available to students as are several undergraduate student assistantships which are sponsored by industry.

Program alumni are employed nationally and internationally and are often leaders in their industries. Graduates of the department are in great demand. Typically there are more internship and job opportunities than there are students to fill them.

Concentrations

Each concentration offers introductory, intermediate and advanced classes. The concentrations offer their own course of study (including required courses and electives) as well as opportunities for cross-training and multi-disciplinary learning.
Environmental Horticultural Science
This concentration offers students a comprehensive preparation for positions in the nursery, turf, greenhouse, landscape, and floriculture industries, including public horticulture. Graduates are employed as business owners, growers, managers, researchers, educators, arboreta and botanical garden directors, landscape contractors and designers, landscape management professionals, pest control advisors, and park, sports field and golf course superintendents.

The curriculum stresses production and marketing of nursery plants, fresh flowers, and flowering and foliage plants, landscape contracting, design, installation and management, turf installation and management, integrated pest management, and horticultural education, native plant restoration, green roofs and walls, and the public display of plants.

Fruit and Crop Science
The Fruit and Crop Science concentration provides students with detailed knowledge of the production of tree fruits and nuts, grapes, small fruits, vegetables and other row crops, and forages. The concentration details factors influencing the growth, development, and productivity of these crops (e.g., site selection, cultivar selection, field and plant establishment, pest management, harvesting, and postharvest handling). The concentration also focuses on ongoing and newly emerging specialty industries and concerns such as beekeeping, postharvest technology, plant breeding and biotechnology, integrated pest management, and precision agriculture.

Plant Protection Science
Approximately one-third of the world's food crops are destroyed each year by insects, rodents, diseases and other pests. Finding ways to reduce these losses is the challenge of the plant protection specialist. In this concentration, students learn a broad range of pest management subjects including entomology, plant pathology and weed control. Students develop an understanding of crop production principles, ecology, biotechnology, pesticide toxicology and environmental science. As environmental regulations continue to increase, employment opportunities will grow for those holding professional licenses, and this concentration prepares students to take the California Pest Control Advisor (PCA) and Certified Crop Advisor license exams.

Crop Science Minor
Designed for students majoring in related academic disciplines who desire careers in crop production or its associated industries. The minor offers a broad-based knowledge of the science and technology of agronomy and vegetable production, especially as practiced in California.

Fruit Science Minor
The minor is designed for students majoring in related academic disciplines who desire to seek careers in fruit production or its associated industries. The minor offers a broad-based knowledge of the science and technology of fruit and nut production.

Landscape Horticulture Minor
The minor provides students with an understanding of the landscape horticultural industry and provides basic skills to understand the design, installation, and maintenance of landscapes. Students develop a knowledge of landscape plants and plant care as well as the basics of landscape contracting, including construction processes and materials used in the landscape industry. Students may learn advanced skills and concepts in the areas of turfgrass for golf course/ sports field applications, ecological restoration, design/build, plant care (both interior and exterior), and arboriculture.

Plant Protection Minor
This program emphasizes both plant protection and plant production. Within the plant protection field of study, the student is exposed to a broad range of pest management subjects including entomology, plant pathology, and weed control. Within the production area the student may emphasize fruit production, crop production, ornamental horticulture, or natural resource management.

Interdisciplinary Minors
The department participates in offering interdisciplinary minors in Geographic Information Systems for Agriculture, Land Rehabilitation, and Sustainable Agriculture. Please see College of Agriculture, Food and Environmental Sciences (http://catalog.calpoly.edu/collegesandprograms/collegeofagriculturefoodenvironmentalsciences) section for more information.

Graduate Programs
Cal Poly offers a Master of Science degree in Agriculture with specializations in Crop Science, Environmental Horticultural Science, and Plant Protection Science, among others. Please refer to the MS Agriculture (http://catalog.calpoly.edu/collegesandprograms/collegeofagriculturefoodenvironmentalsciences/#graduatetext) section of the College of Agriculture, Food and Environmental Sciences.

AEPS Courses
AEPS 101. Orientation to Horticulture and Crop Science. 2 units
CR/NC
Term Typically Offered: F
Understand the depth and breadth of horticulture, field crops, and plant protection careers. Examination of curricula within the department. Introduction to both student and professional organizations. Emphasis on curriculum and career planning. Required of all Horticulture and Crop Science students. Credit/No Credit grading only. 1 lecture, 1 activity. Formerly HCS 110.

AEPS 110. People, Pests and Plagues. 4 units
GE Area B4; GE Area B2
Term Typically Offered: F, SP
Introduction to the science of entomology, focusing on insect identification, biology, ecology, and interactions with humans. Insect pest and beneficial species, and their role in shaping how we live, work and eat. Not open to Agricultural and Environmental Plant Sciences majors or Wine and Viticulture majors (viticulture concentration). 3 lectures, 1 activity. Fulfills GE B2 & B4. Formerly PPSC 110.

AEPS 120. Principles of Horticulture and Crop Science. 4 units
Term Typically Offered: F, W, SP
Introduction to horticulture and crop science. Basic plant processes, classification, anatomy, physiology, and biotechnology. Effect of environment on plants and how we control it. Introduction to plant growth including propagation, media, irrigation, nutrition, management, harvest, and post harvest handling. People's use of plants. Field trip required. 3 lectures, 1 laboratory. Formerly HCS 120.
AEPS 123. Landscape Installation and Maintenance. 4 units
Term Typically Offered: W
Prerequisite: AEPS 120.
Planting and maintenance of trees, shrubs, ground covers, perennial plantings, color beds, specialty plantings, and small turf areas. Site selection, cultural requirements, scheduling of maintenance activities, pruning, landscape renovation and irrigation system repair. Equipment operation, maintenance, and safety. Speakers from industry. 3 lectures, 1 laboratory. Formerly EHS 123.

AEPS 124. Plant Propagation. 4 units
Term Typically Offered: SP
Prerequisite: AEPS 120.
Plant propagation practices with emphasis on understanding why practices are used, how they work, and how they are applied in commercial horticulture. Field trip required. 3 lectures, 1 laboratory. Formerly HCS 124.

AEPS 126. Landscape Construction. 3 units
Term Typically Offered: SP
Prerequisite: AEPS 120.
Design, construction techniques, and materials used in landscape and horticulture construction. Material quantity estimating, sustainable building practices, construction material substitutions, tools and equipment associated with landscape and horticulture construction, and equipment safety. Field trip required. 2 lectures, 1 laboratory. Formerly HCS 126.

AEPS 127. Horticulture and Landscape Design. 4 units
Term Typically Offered: W
Aesthetic aspects of environmental horticulture, introduction to computer aided design, presentation techniques and garden history. Field trip required. 2 lectures, 2 laboratories. Formerly HCS 127.

AEPS 132. Pomology I. 4 units
Term Typically Offered: W
Prerequisite: AEPS 120.
Orchard design and development, cultural practices, physiological responses of trees to cultural practices, propagation and strategies to maximize orchard profitability and sustainability. Not open to students with credit in AEPS 250. 3 lectures, 1 laboratory. Formerly FRSC 132.

AEPS 133. Pomology II. 4 units
Term Typically Offered: SP
Prerequisite: AEPS 132.
Analysis of production and management strategies for major fruit and nut crops in California. 3 lectures, 1 laboratory. Formerly FRSC 133.

AEPS 150. Forage Crops. 4 units
Term Typically Offered: F
Forages as a world resource in food and animal production, soil and water conservation and sustainable agricultural systems. Forage use systems: pasture and range, green chop, silage, hay and cubes. Identification and management of limiting factors of forage plant growth. Botany of legumes and grasses. Grass, legume and weed identification. Forage crop improvement. Forage composition and quality. Antiquality factors. 3 lectures, 1 laboratory. Formerly CRSC 123.

AEPS 175. Beekeeping. 3 units
Term Typically Offered: F, SP
Studies and exercises in the handling of European honey bees with special reference to pollination of commercial crops. Honey processing and marketing. Hive inspection and disease detection. 2 lectures, 1 laboratory. Formerly FRSC 123.

AEPS 190. California Vegetable Production. 4 units
Term Typically Offered: SP
Prerequisite: AEPS 120.
History, botany, growth characteristics and climatic adaptation, pests, and harvesting methods for the most important vegetable crops grown in California. Use of transplants, plastic mulches and row covers in vegetable production. Current topics in agriculture important to the vegetable industry. Field trip to a major California vegetable production area required. Survey of vegetable production for Agricultural and Environmental Plant Sciences majors. 3 lectures, 1 laboratory. Formerly VGSC 190.

AEPS 200. Special Problems for Undergraduates. 1-4 units
Term Typically Offered: F,W,SP,SU
Prerequisite: Consent of instructor.
Individual investigation, research, studies, or surveys of selected problems. Total graduation credit limited to 4 units, with a maximum of 4 units per quarter. Report required. Formerly HCS 200.

AEPS 202. Fruit Enterprise Project. 2 units
CR/NC
Term Typically Offered: F,W,SP,SU
Beginning field experience in management of orchards or honeybees. May include cultural practices, harvesting, processing, sales and marketing activities. Credit/No Credit grading only. 1 lecture, 1 activity. Formerly FRSC 202.

AEPS 203. Organic Enterprise. 2 units
CR/NC
Term Typically Offered: F, W, SP
Beginning field experience in production and marketing of organic vegetable crops. May include cultural practices, harvesting, processing, sales and marketing activities. Credit/No Credit grading only. 1 lecture, 1 activity. Formerly CRSC 203.

AEPS 204. Vegetable Enterprise Project. 2 units
CR/NC
Term Typically Offered: F, W, SP
Beginning field experience in vegetable production systems. May include cultural practices, harvesting, processing, sales and marketing activities. Credit/No Credit grading only. 1 lecture, 1 activity. Formerly VGSC 202.

AEPS 210. Viticultural Practices. 2 units
Term Typically Offered: F, SP
Critical viticultural practices including planting, pruning, canopy management, fruit thinning, harvest, floor management, trellis and irrigation maintenance. Total credit limited to 4 units. 2 activities. Crosslisted as AEPS/WVIT 210.
AEPS 212. Environmental Horticulture Enterprise Project I. 1-4 units
CR/NC
Term Typically Offered: F,W,SP,SU
Prerequisite: AEPS 101 and consent of instructor.

Selection and completion of a management/production project under faculty supervision. Project participation is voluntary and subject to approval by the department head and the Cal Poly Corporation. Degree credit limited to two units. Credit/No Credit grading only. Formerly EHS 210.

AEPS 215. Floral Design I. 3 units
Term Typically Offered: F
Fundamentals of theory, techniques and skills currently practiced in the floral industry. Intended as consumer education for non-majors as well as initial preparation for pre-professionals. Includes applied art principles, post-harvest care and handling practices, and proper use of florist tools and materials in developing basic designs. 1 lecture, 2 laboratories. Formerly EHS 215.

AEPS 225. Floral Design II. 3 units
Term Typically Offered: SP
Prerequisite: AEPS 215.

Expanded exploration and application of design theory to commercial products and services in the retail floral industry. Appropriate utilization of current sales and business practices in a florist setting. Advanced techniques and skills for construction of designs for weddings, advanced arrangements, and designs for events. 1 lecture, 2 laboratories. Formerly EHS 225.

AEPS 230. Environmental Horticulture. 4 units
Term Typically Offered: F
Technical information and recommendations for the residential horticulturist. Propagation, pruning, planting, media, fertilizers, pest and weed control, landscaping, maintenance, identification and care of ornamental plants. Being a wise horticultural consumer. Not open to Agricultural and Environmental Plant Sciences majors. 3 lectures, 1 laboratory. Formerly EHS 230.

AEPS 231. Viticulture I. 4 units
Term Typically Offered: TBD
Understanding of internal and external factors affecting vine productivity. Historical and international perspectives on grape growing. Vineyard production strategies. Not open to students with credit in AEPS 190. 3 lectures, 1 laboratory. Crosslisted as AEPS/VVIT 232. 3 lectures. Formerly EHS 231.

AEPS 233. Plant Materials I. 4 units
Term Typically Offered: SP
Identification, habits of growth, cultural requirements, and use of ornamental plants in the landscape. 3 lectures, 1 laboratory. Formerly EHS 231.

AEPS 234. Plant Materials II. 4 units
Term Typically Offered: F
Identification, habits of growth, cultural requirements, and use of ornamental plants in the landscape. 3 lectures, 1 laboratory. Formerly EHS 232.

AEPS 240. Commercial Seed Production. 4 units
Term Typically Offered: SP
Prerequisite: AEPS 120 or AEPS 260.

Production of field and vegetable seed. Seed technology, germination, quality control, seed enhancement, storage and handling of seed, and seed laws. Field trip to a seed conditioning/seed enhancement facility required. 3 lectures, 1 laboratory. Formerly EHS 240.

AEPS 244. Precision Farming. 4 units
Term Typically Offered: W
Prerequisite: AEPS 133 or AEPS 190 or AEPS 260 or BRAE 237 or BRAE 239.

Precision agriculture applications. Integrating GIS, GPS, and remote sensing technologies with site-specific farming practices to optimize agricultural productivity. Field trip required. 3 lectures, 1 laboratory. Crosslisted as AEPS/BRAE 244. Formerly CRSC 244.

AEPS 245. Horticultural Production Techniques. 3 units
Term Typically Offered: F
Applied principles of plant growth in relation to the production horticulture industry. Emphasis on container media, fertilizing practices, irrigation, plant growth regulators, and miscellaneous growing structures. 2 activities, 1 laboratory. Formerly EHS 245.

AEPS 250. California Fruit Growing. 4 units
Term Typically Offered: F, W
Interrelationship of climate and cultural techniques on orchard productivity. California's place in the international production-marketing scheme. Field trip required. Not open to Agricultural and Environmental Plant Sciences majors, or students with credit in AEPS 132. 3 lectures, 1 laboratory. Formerly EHS 250.

AEPS 260. Introduction to Vegetable Science. 4 units
Term Typically Offered: F
Environmental and cultural principles involved in the production of California vegetable crops; temperature, daylength and fertility effects on production and yield, use of plastic mulches and row covers, and use of transplants. Harvest principles and precutting methods. Not open to Agricultural and Environmental Plant Sciences majors or students with credit in AEPS 190. 3 lectures, 1 laboratory. Formerly FRSC 230.

AEPS 270. Selected Topics. 1-4 units
Term Typically Offered: TBD
Prerequisite: Open to undergraduate students and consent of instructor.

Directed group study of selected topics. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures. Formerly HCS 270.

AEPS 301. Principles of Landscape Design. 4 units
Term Typically Offered: TBD
Prerequisite: AEPS 127, and AEPS 233 or AEPS 234.

Introduction to basic principles and elements of residential landscape design, design theory, plant composition, creative problem solving, functional and aesthetic uses of landscape materials, client and maintenance criteria, and sustainable design concepts. Intermediate computer aided design drafting and drawing skills. 2 lectures, 2 laboratories. Formerly EHS 301.
AEPS 304. Plant Breeding. 4 units
Term Typically Offered: W, SP
Prerequisite: AEPS 120 or BOT 121.
Principles and techniques used to develop new plant varieties. Sexual reproduction, inheritance, selection and biotechnology methods useful in breeding of plants. Field trip required. 3 lectures, 1 laboratory. Formerly HCS 304.

AEPS 311. Survey of Viticulture. 4 units
Term Typically Offered: TBD
Prerequisite: AEPS/WVIT 210 and completion of GE Area B2.
Introduction to winegrowing including the life cycle of the vine, site selection and the concept of 'terroir', canopy management and cultural practices influencing wine quality. Decision making processes in pest management, irrigation strategies, and organic and sustainable vineyard practices. Current issues in mechanization and its impact on labor management, in the concept of business decisions. Not open to students with credit in AEPS 231. 4 lectures. Crosslisted as AEPS/WVIT 311.

AEPS 312. Environmental Horticulture Enterprise Project II. 2-4 units
CR/NC
Term Typically Offered: F, W, SP
Prerequisite: Consent of instructor.
Selection and completion of a management/production project under faculty supervision. Project participation is voluntary and subject to approval by the department head and the Cal Poly Corporation. Degree credit limited to 2 units. Maximum degree credit for AEPS 212 and AEPS 312 limited to 4 units. Credit/No Credit grading only. Formerly EHS 310.

AEPS 313. Agricultural Entomology. 4 units
Term Typically Offered: F, SP
Prerequisite: AEPS 120 or BOT 121; CHEM 110 or CHEM 111.
The science of entomology as it relates to insects of importance in agriculture. Focus on the biology, ecology and identification of insects and mites important to California horticulture, field crops and landscapes. 3 lectures, 1 laboratory. Formerly PPSC 311.

AEPS 315. Organic Agriculture. 4 units
GE Area F
Term Typically Offered: SP
Prerequisite: Junior standing and completion of GE Area B.
Origins, application, regulation and technology of organic agriculture. Theoretical and practical issues surrounding organic agriculture from a cross-disciplinary perspective. Topics include the history of the organic movement; current regulation and certification; and field management practices and technologies. Features industry guest lecturers. 3 lectures, 1 activity. Crosslisted as AEPS/AG 315. Fulfills GE Area F.

AEPS 316. Herbaceous and Specialty Plant Production. 4 units
Term Typically Offered: TBD
Prerequisite: AEPS 245, AEPS 350, and SS 221.
An in-depth view of three herbaceous and specialty plant groups (annuals, perennials, cacti/succulents) that are an important part of the wholesale and retail nursery industry. Plant identification, specific techniques of propagation, production, scheduling, growing media and forcing structures for these plants. 3 lectures, 1 laboratory. Formerly EHS 315.

AEPS 321. Weed Biology and Management. 4 units
Term Typically Offered: F, SP
Prerequisite: AEPS 120 or BOT 121.
Weed ecology, biology, and implications for management. Identification of weedy and invasive plant species in annual agricultural, perennial semi-managed, range, aquatic, and forest ecosystems, to elucidate weaknesses and strengths in order to facilitate vegetation management. Organic, cultural, biological, mechanical, and chemical methods and their integrated pest management (IPM) uses. 3 lectures, 1 laboratory. Formerly PPSC 321.

AEPS 323. Plant Pathology. 4 units
Term Typically Offered: F, W, SP
Prerequisite: BIO 162 or BOT 121.
Comprehensive study of the causes and effects of disease in plants. Designed to lead to an understanding of the science and modern control methods. 2 lectures, 2 laboratories. Crosslisted as AEPS/BOT 323.

AEPS 324. Interior Plant Management. 4 units
Term Typically Offered: TBD
Prerequisite: AEPS 120 and AEPS 124 and AEPS 245.
Plant materials used in the interior plantscape. Identification, production, utilization, placement. Interior plant specifics and maintenance. 3 lectures, 1 laboratory. Formerly EHS 324.

AEPS 327. Vertebrate Pest Management. 4 units
Term Typically Offered: W
Prerequisite: Junior standing.
Vertebrate pests injurious to crops, livestock, forest products, wildlife, stored products and humans. Life habits, identification, control methods, and materials. Related laws and regulations. 3 lectures, 1 laboratory. Formerly EHS 327.

AEPS 329. Plants, Food, and Biotechnology. 4 units
GE Area F
Term Typically Offered: F
Prerequisite: Junior standing and completion of one of the following: AEPS 120, BIO 111, BIO 114, BIO 161, or BOT 121.
Agriculture as applied biology and its impact on civilization. Application of technology to increase the efficiency of food production. Genetics and biotechnology; culminating in an assessment of genetically engineered foods, the myths, the controversy, the science. Not open to Agricultural and Environmental Plant Sciences majors. 3 lectures, 1 laboratory. Crosslisted as AEPS/BOT 329. Fulfills GE Area F.

AEPS 331. Advanced Viticulture - Fall. 4 units
Term Typically Offered: F, SU
Prerequisite: AEPS/WVIT 231 or WVIT 232.
Advanced viticulture theory and practice, with emphasis on fall season activities. Vine vegetative and reproductive cycles, canopy quality assessments, berry chemistry and quality, advanced level varieties and rootstocks, vineyard floor management, mechanical harvesting and pruning. Field trips required. 3 lectures, 1 laboratory. Crosslisted as AEPS/WVIT 331.
AEPS 342. Landscape Contracting. 4 units  
Term Typically Offered: SP  
Prerequisite: AEPS 126 and AEPS 127.  
Practices in supervising personnel and applying standard techniques in landscape construction. Cost finding and estimating for landscape trades. 3 lectures, 1 laboratory. Formerly EHS 331.

AEPS 333. Greenhouse Vegetable Production. 2 units  
Term Typically Offered: F  
Prerequisite: AEPS 120 and CHEM 111 and SS 221.  
Development, practices, history, and future of crop production in greenhouses. Research applications, commercial applications, production problems, marketing, and economics. Special emphasis on growing transplants in greenhouses and use of nutrient solutions. Field trips to a commercial greenhouse operation and/or analysis lab required. 2 activities. Formerly CRSC 333.

AEPS 339. Internship in Horticulture and Crop Science. 1-12 units  
CR/NC  
Term Typically Offered: F,W,SP,SU  
Prerequisite: Consent of instructor.  
Selected Horticulture and Crop Science students will spend up to 12 weeks with an approved agricultural/horticultural firm engaged in production or related business. Time will be spent applying and developing production and managerial skills and abilities. One unit of credit may be allowed for each full week of completed and reported internship. Degree credit limited to 6 units. Credit/No Credit grading only. Formerly HCS 339.

AEPS 340. Principles of Greenhouse Environment. 4 units  
Term Typically Offered: SP  
Prerequisite: AEPS 245.  
Analysis of problems and practices affecting the contemporary commercial horticulturist. Analysis and operation of greenhouses and related equipment stressing the effect of environment on plant growth. Field trip required. 3 lectures, 1 laboratory. Formerly HCS 340.

AEPS 341. Cut Flower Production. 4 units  
Term Typically Offered: F  
Prerequisite: AEPS 120.  
Production of cut flowers and other fresh florists' commodities in greenhouses and outdoors. Preparation and scheduling of such commodities for major markets. Field trip required. 3 lectures, 1 laboratory. Formerly EHS 341.

AEPS 342. Potted Plant Production. 4 units  
Term Typically Offered: W  
Prerequisite: AEPS 245.  
Production of major commercial flowering potted plants in greenhouses and outdoors. Preparation and scheduling of potted flowering greenhouse crops for major markets. Field trip required. 3 lectures, 1 laboratory. Formerly EHS 342.

AEPS 343. Turfgrass Management. 4 units  
Term Typically Offered: F  
Prerequisite: AEPS 123 and SS 121.  
Turfgrass species and uses. Principles of turfgrass physiology and communities under different environments. Overview of procedures and equipment for propagation, mowing, irrigation, fertilization, aerification, and pest control. 3 lectures, 1 laboratory. Formerly EHS 343.

AEPS 345. Citrus and Avocado Fruit Production. 4 units  
Term Typically Offered: SP  
Prerequisite: AEPS 120 or AEPS 250.  
World citrus and avocado production and marketing. Orchard management techniques. Relationship of environment to species, cultivar, and rootstock selection. Field trip to a major California production area required. 3 lectures, 1 laboratory. Formerly FRSC 342.

AEPS 381. Native Plants for California Landscapes. 4 units  
Term Typically Offered: W  
Prerequisite: BOT 121 and junior standing.  
Horticultural investigation of the California flora with emphasis on landscape use and potential. Plant recognition, identification, propagation and culture. Utilization of native plants in landscape design and habitat restoration. Field trip required. 3 lectures, 1 laboratory. Formerly EHS 381.

AEPS 382. Restoration Horticulture. 4 units  
Term Typically Offered: W  
Prerequisite: AEPS 124, AEPS 381, SS 121.  
The role of horticulture in the successful implementation of restoration projects, including mitigation, revegetation, and erosion control. Practical application of restoration methods and guidelines for specific California plant communities including site-specific plant production. 3 lectures, 1 laboratory. Formerly EHS 382.

AEPS 400. Special Problems for Advanced Undergraduates. 1-4 units  
Term Typically Offered: F,W,SP,SU  
Prerequisite: Consent of instructor.  
Individual investigation, research, studies, or surveys of selected problems. Total degree credit limited to 4 units, with a maximum of 4 units per quarter. Report required. Formerly HCS 400.

AEPS 401. Retailing Horticultural Products. 4 units  
Term Typically Offered: TBD  
Prerequisite: AEPS 124.  
Economics of operating and managing retail horticulture outlets. Location, selection, layout, and demographic studies. Personnel management, merchandising, advertising, pricing strategies and selling techniques, cooperative buying and industry contributions. Field trip required. 3 lectures, 1 laboratory. Formerly EHS 402.
AEPS 402. Fruit Enterprise Project Management. 2 units
CR/NC
Term Typically Offered: F, W, SP
Prerequisite: AEPS 202 and consent of instructor.
Advanced experience in production of orchards. Development and execution of a plan for field operations, fruit processing and/or marketing. Management decision-making. Total credit limited to 4 units. Credit/No Credit grading only. 1 lecture, 1 activity. Formerly FRSC 402.

AEPS 403. Organic Enterprise Project Management. 2 units
CR/NC
Term Typically Offered: F, W, SP
Prerequisite: AEPS 203 and consent of instructor.
Advanced experience in the production of organic vegetables. Development and execution of a plan for planting schedule, cultivation, harvest, and/or marketing. Management decision-making. Total credit limited to 4 units. Credit/No Credit grading only. 1 lecture, 1 activity. Formerly CRSC 402.

AEPS 404. Vegetable Enterprise Project Management. 2 units
CR/NC
Term Typically Offered: F, W, SP
Prerequisite: AEPS 204 and consent of instructor.
Advanced experience in production of vegetable crops. Development, management and implementation of cultural practices, harvesting, processing, sales and marketing activities for vegetable crops. Total credit limited to 4 units. Credit/No Credit grading only. 1 lecture, 1 activity. Formerly VGSC 402.

AEPS 406. Advanced Weed Management. 4 units
Term Typically Offered: W
Prerequisite: AEPS 321.
Planning, design and implementation of long-term sustainable weed management programs. Analysis of traditional and new technologies for weed management based on their impact on agriculture, society and the environment. 3 lectures, 1 laboratory. Formerly PPSC 405.

AEPS 410. Crop Physiology. 4 units
Term Typically Offered: SP
Prerequisite: AEPS 120 or BIO 263; BIO 162 or BOT 121; and CHEM 216, CHEM 312 or CHEM 316.
Ecological and physiological interactions associated with the production of crop plants. Physiological and biochemical processes that elucidate the mechanism of whole plant performance and responses to the environment. 3 lectures, 1 laboratory. Formerly HCS 410.

AEPS 414. Grape Pest Management. 4 units
Term Typically Offered: SP
Prerequisite: AEPS/WVIT 231 or AEPS/WVIT 311; AEPS 313; AEPS/BOT 323.
Comprehensive survey of major grape pests including diseases, insects, weeds, vertebrates, and nematodes. Identification and biology of grape pests and natural enemies, monitoring, and integrated pest management (IPM) strategies, including cultural, biological, and chemical controls. Guest lectures. Total credit limited to 8 units. 3 lectures, 1 activity. Crosslisted as AEPS/WVIT 414.

AEPS 415. Grapevine Physiology. 4 units
Term Typically Offered: TBD
Prerequisite: AEPS/WVIT 231 and AEPS/WVIT 331.
Understanding of grapevine physiology, including anatomy, taxonomy, physiological growth processes, growth cycle phenology, bud break, flowering, fruit set, berry ripening. 3 lectures, 1 laboratory. Formerly FRSC/WVIT 415.

AEPS 421. Postharvest Technology of Horticultural Crops. 4 units
Term Typically Offered: W
Prerequisite: Junior standing.
Respiration, ethylene, ripening and senescence; modified atmosphere packaging, controlled atmosphere storage, packinghouses and transportation; survey of postharvest techniques to maximize commodity shelf-life. Field trip required. 3 lectures, 1 laboratory. Formerly HCS 421.

AEPS 423. Advanced Vegetable Science. 4 units
Term Typically Offered: TBD
Prerequisite: AEPS 190 or AEPS 260.
Agricultural land conservation; current laws impacting vegetable production and marketing. Environmental and cultural effects on selected vegetables including specific effects on growth, flowering, fruiting and yield. Field trip to desert vegetable production regions required. 3 lectures, 1 laboratory. Formerly VGSC 423.

AEPS 424. Nursery Crop Production. 4 units
Term Typically Offered: W
Prerequisite: AEPS 124.
Comprehensive and historical overview of the nursery industry. Types of wholesale nurseries and their products. Plant production systems, scheduling, and marketing. Emphasis on medium to large woody plants and deciduous field-grown ornamental trees and shrubs in the western U.S. Field trip required. 3 lectures, 1 laboratory. Formerly EHS 424.

AEPS 425. Arboriculture. 4 units
Term Typically Offered: F
Prerequisite: AEPS 123, AEPS 233, and AEPS 234 or NR 208 for FNR majors.
Theory and practice for the care and management of ornamental trees. Selection, planting, establishment, maintenance of specimen trees. Professional use of ropes and safety equipment. Tree evaluation, scheduling cultural practices, bracing, cabling, specialty hand and power equipment operation, safety regulations. 2 lectures, 2 laboratories. Formerly EHS 421.

AEPS 427. Disease and Pest Control Systems for Ornamental Plants. 4 units
Term Typically Offered: W
Prerequisite: AEPS 120, AEPS 313, AEPS 321, and AEPS/BOT 323.
Recognition, prevention and control of diseases, insect/mite pests and weeds that impact commercial ornamental plantings. Integrated pest management strategies presented including biological, cultural, and safe and proper pesticidal controls. Laboratory emphasizes monitoring, problem solving and application of appropriate pest control measures. 3 lectures, 1 laboratory. Formerly PPSC 427.
AEPS 430. Sports Field Construction and Management. 4 units
Term Typically Offered: SP
Prerequisite: AEPS 343 and junior standing.
Construction and maintenance of sports fields. Basic agronomics including sports field construction, sports turf establishment and maintenance, environmental issues, and personnel management. 3 lectures, 1 laboratory. Crosslisted as AEPS/RPTA 430.

AEPS 431. Insect Pest Management. 4 units
Term Typically Offered: W
Prerequisite: AEPS 313.
Principles of insect and mite pest management, including integrated pest management (IPM), applications of ecological theory to pest management, cultural, biological and chemical controls, pesticide resistance management, insect and mite monitoring, biotechnology applications, pesticide laws and regulations, pest control advisor and qualified applicator licensing and certification. Field trip required. 3 lectures, 1 laboratory. Formerly EHS 431.

AEPS 433. Golf Course Management Operations. 4 units
Term Typically Offered: SP
Prerequisite: AEPS 343.
Advanced maintenance and operation of golf course facilities. Systems of management, maintenance, business and finance. 3 lectures, 1 laboratory. Formerly EHS 433.

AEPS 434. Landscape Management. 4 units
Term Typically Offered: TBD
Prerequisite: AEPS 123 and AEPS 126 and junior standing.
Maintenance procedures and operations. Operating a landscape management business. Estimating, scheduling, recordkeeping and implementation of landscape maintenance projects. Interior landscape maintenance. 3 lectures, 1 laboratory. Formerly EHS 434.

AEPS 435. Advanced Landscape Design. 4 units
Term Typically Offered: TBD
Prerequisite: AEPS 233, AEPS 234, AEPS 301. Recommended: AEPS 381.
Advanced principles of landscape design for residential properties. Design process, form, and space composition emphasized. Application of sustainable design concepts. Computer aided design applications, including three-dimensional design, emphasized. Field trip required. 2 lectures, 2 laboratories. Formerly EHS 427.

AEPS 437. Park and Public Space Management. 4 units
Term Typically Offered: F
Prerequisite: Junior standing.
Management and maintenance of private and public parks, arboreta, botanical gardens and recreational areas. Maintenance personnel management, safety and liability issues. Field trips required. 3 lectures, 1 laboratory. Formerly EHS 437.

AEPS 438. Teaching Methods in Environmental Horticulture. 4 units
Term Typically Offered: TBD
Prerequisite: Completion of GE B2 and AEPS 230 and AGED 102 and junior standing.
Use of horticulture as a context for teaching core academic subjects in science, mathematics, English and history/social science. Daily and unit lesson plans that adopt horticultural content, teaching methods and assessment for English language learners and students with special needs. Class demonstrations, analysis, assessment and reflection. 2 lectures, 2 activities. Formerly EHS 438.

AEPS 441. Biological Control for Pest Management. 4 units
Term Typically Offered: F
Prerequisite: AEPS 313.
Control of arthropods, weeds and vertebrates to include history of biocontrol; biology of beneficial arthropods; methods of introduction, augmentation and conservation; and case studies. Identification of beneficial arthropods to appropriate taxonomic level. Technology, laws and regulations governing use of biocontrol agents. Field trips to insectaries, quarantine facilities and/or crop production areas. 3 lectures, 1 laboratory. Formerly PPSC 441.

AEPS 445. Cropping Systems. 4 units
Term Typically Offered: W
Prerequisite: AEPS 120; or BOT 121 and SS 121; or graduate standing.
Classification and description of agricultural systems of the world. Cropping systems as land management plans. Systems approaches to improvement of agricultural situations. Consideration of human factors and the agroecosystem in efforts to create a more sustainable agriculture. Field trip required. 3 lectures, 1 activity. Formerly CRSC 445.

AEPS 461. Senior Project I. 2 units
Term Typically Offered: F, W, SP
Prerequisite: Junior standing and completion of GE Area A1 and consent of instructor.
Selection of a project under faculty advisor approval. Initial research and data gathering period for project information. Projects typical of problems which graduates must solve in their fields of study or employment. Project results are presented in a formal written report completed in AEPS 462. Contract drawn up with approval of advisor. Minimum 60 hours.

AEPS 462. Senior Project II. 2 units
Term Typically Offered: F,W,SP,SU
Prerequisite: Consent of instructor.
Continuation of Senior Project development. Write-up of rough draft and formal draft of project. Completion of formal written report under advisor supervision. Minimum 60 hours. Formerly HCS 462.

AEPS 470. Selected Advanced Topics. 1-4 units
Term Typically Offered: TBD
Prerequisite: Consent of instructor.
Directed group study of selected topics for advanced students. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-4 lectures. Formerly HCS 470.
AEPS 471. Selected Advanced Laboratory. 1-4 units
Term Typically Offered: TBD
Prerequisite: Consent of instructor.
Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-4 laboratories. Formerly HCS 471.

AEPS 500. Individual Study in Horticulture and Crop Science. 1-6 units
Term Typically Offered: F,W,SP,SU
Prerequisite: Consent of instructor.
Advanced independent study planned and completed under the direction of a member of the Horticulture and Crop Science faculty. Total credit limited to 6 units. Formerly HCS 500.

AEPS 539. Graduate Internship in Horticulture and Crop Science. 1-9 units
Term Typically Offered: F, W, SP
Prerequisite: Consent of instructor.
Application of theory to the solution of problems of agricultural production or related business in the fields of horticulture and crop science. Analyze specific management problems and perform general management assignments detailed in a contract between the student, the firm or organization, and the faculty advisor before the internship commences. Degree credit limited to 6 units. Formerly HCS 539.

AEPS 570. Selected Topics in Horticulture and Crop Science. 1-4 units
Term Typically Offered: TBD
Prerequisite: Consent of instructor.
Directed group study of selected topics for advanced students. The Schedule of Classes will list title selected. Total credit limited to 12 units. 1-4 seminars. Formerly HCS 570.

AEPS 571. Selected Topics Laboratory in Horticulture and Crop Science. 1-4 units
Term Typically Offered: TBD
Prerequisite: Consent of instructor.
Directed group laboratory of selected topics for advanced students. The Schedule of Classes will list title selected. Total credit limited to 12 units. 1-4 laboratories. Formerly HCS 571.

AEPS 581. Graduate Seminar in Crop/Fruit Production. 3 units
Term Typically Offered: TBD
Prerequisite: Graduate standing.
Group study of current problems, trends and research results pertaining to production or marketing of field, vegetable or fruit crops. 3 seminars. Formerly CRSC 581.

AEPS 596. Thesis in Crop Science. 1-9 units
Term Typically Offered: F, W, SP
Prerequisite: Graduate standing and consent of instructor.
Systematic research of a significant problem in Crop Science. Thesis will include problem identification, significance, methods, data analysis and conclusion. Students must enroll every quarter in which facilities are used or advisement is received. Degree credit limited to 6 units. Formerly CRSC 599.

AEPS 597. Thesis in Environmental Horticulture Science. 1-9 units
Term Typically Offered: F, W, SP
Prerequisite: Graduate standing and consent of instructor.
Systematic research of a significant problem in environmental horticulture. Thesis will include problem identification, significance, methods, data analysis, and conclusion. Students must enroll every quarter in which facilities are used or advisement is received. Degree credit limited to 6 units. Formerly EHS 599.

AEPS 598. Thesis in Fruit Science. 1-9 units
Term Typically Offered: F, W, SP
Prerequisite: Graduate standing and consent of instructor.
Systematic research of a significant problem in Fruit Science. Thesis will include problem identification, significance, methods, data analysis, and conclusion. Students must enroll every quarter in which facilities are used or advisement is received. Degree credit limited to 6 units. Formerly FRSC 599.

AEPS 599. Thesis in Plant Protection Science. 1-9 units
Term Typically Offered: F, W, SP
Prerequisite: Graduate standing and consent of instructor.
Systematic research of a topic in plant protection science, including weed science, entomology, plant pathology, nematology or vertebrate management. Thesis to describe the problem and its significance, methodology, results, data analysis, discussion and conclusion. Enrollment required every quarter in which facilities are used or advisement received. Degree credit limited to 6 units. Total credit limited to 9 units. Formerly PPSC 599.