

Horticulture

The Ornamental Horticulture discipline examines the art and science of cultivating plants. The Horticulture program at MiraCosta also includes sustainable design, installation, and maintenance of landscapes, nursery and organic crop production, and wine technology.

Students take horticulture courses to prepare for the major, complete job-related certificates, earn continuing education units (CEUs) for professional licenses, and fulfill general education requirements. Career options include nursery-industry work, urban agriculture, landscape architecture, irrigation design and water management, landscape design, landscape installation and management, golf and sports turf management, urban forestry, horticulture sales and services, grove and vineyard management, and winemaking.

Academic and Career Pathway

Math and Sciences

Contact Information

Chair: Steve Isachsen

Dean: Michael Fino

<https://www.miracosta.edu/academics/degree-and-certificate-programs/math-and-sciences/horticulture/index.html>

Department: Horticulture

Office: Building OC3600,

760.757.2121 x6844

Full-Time Faculty

Megan Allison

Associate Degrees

Associate in Arts Degrees

Landscape Architecture

Sustainable Landscape and Turf Management

Nursery/Horticulture Crop Production

Associate in Science Degrees

Pest Control Adviser

Sustainable Agriculture

Viticulture and Enology

Students may earn one of the above-named associate degrees by completing a certificate of achievement and the general education courses required for MiraCosta College's Associate in Arts degree (see Associate Degrees). Students earning an associate degree in Landscape Architecture are eligible to take the Landscape Architecture Registration Exam to achieve state licensure after completing requisite apprenticeship. Students should meet with a MiraCosta counselor to identify required courses and to develop a written educational plan for the specific degree or certificate they wish to earn.

Certificates

Certificate programs prepare students for state, county, and city employment in most areas of landscape management, such as park and grounds supervision and state or county

agriculture inspection. In the private sector, graduates find jobs in agri-sales and services, organic food production, retail and wholesale nurseries and greenhouses, landscape and irrigation design, landscape contracting, and water management. Any of these majors may be completed in three semesters and one or two summer sessions by students who attend full-time.

Certificate of Achievement

Landscape Architecture

This certificate is designed to provide employable technical skill training in the field of professional residential landscape design development. It also provides a foundation for students who plan to enter a college of landscape architecture.

Program Student Learning Outcome

Upon completion of this program, the student will be able to use hand drawn and computer-generated graphics to produce accurate landscape plans that reflect sustainable, functional, and aesthetic principles.

Course Requirements

Required courses:			
DESN 101	Computer-Aided Design and Drafting		4
DESN 102	Architectural Drawing		3
HORT 117	Plant Identification: Trees, Shrubs, and Vines		3
HORT 126	Irrigation and Water Management		3
HORT 127	Landscape Design		3
HORT 128	Landscape Construction		3
HORT 220	Computer-Aided Landscape Design Applications		3
HORT 230	Landscape Architecture		3
Select one course from the following electives:			1-4
DESN 103	Architectural Communications		
DESN 200	Architectural Design I		
HORT 115	Soil Science		
HORT 299	Occupational Work Experience Education		
Total Units			26-29

Certificate of Achievement

Nursery/Horticulture Crop Production

This certificate provides students with the practical, hands-on experience they need to pursue employment in the areas of plant production, maintenance, or sales of ornamental and/or food crops in California.

Program Student Learning Outcome

Upon completion of this program, the student will be able to integrate concepts and skills learned in core courses to manage environmental and other growth factors to produce healthy and marketable crops.

Course Requirements

Required courses:			
HORT 115	Soil Science		3
HORT 116	Plant Science		4

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HORT 117	Plant Identification: Trees, Shrubs, and Vines	3
HORT 122	Horticulture Laws and Regulations	2
HORT 126	Irrigation and Water Management	3
HORT 134	Integrated Pest Management	3
HORT 140	Subtropical Fruit and Plant Production	3
HORT 144	Nursery Management and Production	3
HORT 149	Vineyard Production and Management	3
HORT 292 or HORT 299	Internship Studies Occupational Work Experience Education	1
Total Units		28

Certificate of Achievement

Pest Control Adviser

Pest Control Advisers (PCAs) are licensed professional production consultants who serve California agriculture and horticulture producers. PCAs specialize in pest management, but they are also an important resource to producers in a wide range of production concerns related to plant health. PCAs provide written recommendations that must address 13 specific areas, including worker safety, environmental impact, and a detailed plan for the use of pest management materials. The California Department of Pesticide Regulation requires students to complete at least 42 semester units of core study and 24 months of work experience, as well as to successfully pass written exams prepared by the DPR Pest Management and Licensing Branch, to register for the licensing exam.

Program Student Learning Outcome

Upon completion of this program, students will be able to identify the pests that are threatening a crop, assess the level of potential damage, and prepare a written management plan that considers the impact to the crop, beneficial insects, humans, and the environment.

Course Requirements

Required Core Courses (21 units):

HORT 115	Soil Science	3
HORT 116	Plant Science	4
HORT 121	Sustainable Landscape and Turf Management	3
HORT 122	Horticulture Laws and Regulations	2
HORT 126	Irrigation and Water Management	3
HORT 134	Integrated Pest Management	3
HORT 166	Introduction to Sustainable Agriculture	3
List A: Physical and Biological Sciences		8

Choose a minimum of 8 units from the following courses:

BIO 102	Introductory Biology: Ecology and Environmental Biology	
BIO 103	Introductory Biology: Animal Diversity	
BIO 104	Introductory Biology: Botany (Plant Life)	
BIO 108	Introductory Biology: Ocean Ecology and Sustainability	

BIO 110	Introductory Biology: Preparation for Pre-Health Professions (Lecture/Lab)	
BIO 111	Introductory Biology: Preparation for Pre-Health Professions (Lecture)	
List B: Crop Health, Pest Management, and Production Systems		15
Select a minimum of 15 units from the following courses:		
HORT 118	Arboriculture	
HORT 140	Subtropical Fruit and Plant Production	
HORT 144	Nursery Management and Production	
HORT 149	Vineyard Production and Management	
HORT 162	Organic Crop Production: Warm Season	
HORT 163	Organic Crop Production: Specialty Crops	
HORT 164	Organic Crop Production: Cool Season	
HORT 292	Internship Studies *	
HORT 299	Occupational Work Experience Education *	
Total Units		44

* Students may take up to 3 units of HORT 292 or HORT 299 or any combination of the two.

Certificate of Achievement

Sustainable Agriculture

The Sustainable Agriculture certificate prepares students for employment in sustainable or organic agriculture and for the operation of a sustainable farm and/or production of organic ornamental or food crops.

Program Student Learning Outcome

Upon completion of this program, students will be able to develop a comprehensive plan for sustainable agriculture production on a given site, including practices, farm plan, ecological evaluation, and community viability.

Course Requirements

Required courses:

HORT 115	Soil Science	3
HORT 116	Plant Science	4
HORT 117	Plant Identification: Trees, Shrubs, and Vines	3
HORT 122	Horticulture Laws and Regulations	2
HORT 126	Irrigation and Water Management	3
HORT 134	Integrated Pest Management	3
HORT 140	Subtropical Fruit and Plant Production	3
or HORT 149	Vineyard Production and Management	
HORT 162	Organic Crop Production: Warm Season	2
HORT 163	Organic Crop Production: Specialty Crops	2

HORT 164	Organic Crop Production: Cool Season	2
HORT 166	Introduction to Sustainable Agriculture	3
HORT 292 or HORT 299	Internship Studies Occupational Work Experience Education	1
Total Units		31

Certificate of Achievement

Sustainable Landscape and Turf Management

This certificate prepares students for employment in the California horticulture and landscape contracting industries by providing practical, hands-on experience and preparation for the Certified Arborist, Landscape Contracting (C-27) and pesticide licenses.

Program Student Learning Outcome

Upon completion of this program, the student will be able to inventory, analyze, and recommend an efficient management plan for the turf, trees, shrubs, and landscape elements of a landscape.

Course Requirements

Required courses:		
HORT 115	Soil Science	3
HORT 116	Plant Science	4
HORT 117	Plant Identification: Trees, Shrubs, and Vines	3
HORT 118	Arboriculture	3
HORT 121	Sustainable Landscape and Turf Management	3
HORT 122	Horticulture Laws and Regulations	2
HORT 126	Irrigation and Water Management	3
HORT 127	Landscape Design	3
HORT 128	Landscape Construction	3
HORT 134	Integrated Pest Management	3
HORT 292 or HORT 299	Internship Studies Occupational Work Experience Education	1
Total Units		31

Certificate of Achievement

Viticulture and Enology

This certificate cross-trains students for work in the wine production, wine sales, and viticulture areas.

Program Student Learning Outcome

Upon completion of this program, students will be able to integrate concepts and skills learned in core courses to schedule the production steps of quality wines from grape to glass.

Course Requirements

Required courses:		
HORT 115	Soil Science	3
HORT 116	Plant Science	4
HORT 117	Plant Identification: Trees, Shrubs, and Vines	3

HORT 122	Horticulture Laws and Regulations	2
HORT 126	Irrigation and Water Management	3
HORT 134	Integrated Pest Management	3
HORT 147	Wines of California	1.5
HORT 148	Introduction to Wine Production	1.5
HORT 149	Vineyard Production and Management	3
HORT 150	Winery Operations and Management	3
HORT 292 or HORT 299	Internship Studies Occupational Work Experience Education	1
Total Units		28

Certificate of Proficiency

Irrigation Technology

This certificate is designed to teach the theory, design, and installation of irrigation systems including the materials, installation practices, maintenance, crew management, and operations of a landscape irrigation business. The program emphasizes residential and large-scale irrigation system installation and water management.

Program Student Learning Outcome

Upon completion of the program, students given planting areas of various sizes, shapes and plant materials will be able to select appropriate irrigation equipment in accordance with best management practices.

Course Requirements

Required courses:		
DESN 101	Computer-Aided Design and Drafting	4
HORT 121	Sustainable Landscape and Turf Management	3
HORT 126	Irrigation and Water Management	3
HORT 128	Landscape Construction	3
Total Units		13

Courses

HORT 115: Soil Science

Units: 3

Prerequisites: None

Acceptable for Credit: CSU, UC

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Fall, Spring

This course examines the physical, chemical, and biological properties of soil and covers soil conditions that restrict plant growth. Students learn to solve soil problems that may exist in the field, greenhouse, and landscape with a focus on sustainable practices. The course emphasizes problem-solving techniques that apply to Southern California soils, including fertility, salinity, pH, high calcium, specific toxicities, and physical problems. Students are required to participate in field labs and trips. C-ID AG-PS-128L.

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HORT 116: Plant Science

Units: 4

Prerequisites: None

Acceptable for Credit: CSU, UC

Lecture 3 hours, laboratory 3 hours.

Course Typically Offered: Fall, Spring

This introductory course offers students an opportunity to learn the basic principles of plant science pertaining to food and ornamental plants. The course emphasizes plant morphology, anatomy and function, plant physiology, reproduction, biotic and abiotic environmental factors that impact plant growth and development, plant-soil-climate interrelationships, plant taxonomy and nomenclature, and plant diversity and adaptations. Learning activities include plant studies in the field, greenhouse, and landscape. Students are required to attend field labs and field trips. C-ID AG-PS-104, AG-PS-106L.

HORT 117: Plant Identification: Trees, Shrubs, and Vines

Units: 3

Prerequisites: None

Acceptable for Credit: CSU, UC

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Fall, Spring

This course covers the identification, growth habits, culture, and ornamental use of plants found in Southern California landscapes. Topics include botanical and common names, plant family relationships, drought tolerance, and other environmental adaptations. Students learn to identify by sight memory more than 200 plants from professional certification test and local plant lists. Students are required to attend field trips both on and off campus. C-ID AG-EH-108L, AG-EH-112L.

HORT 118: Arboriculture

Units: 3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 3 hours.

Course Typically Offered: Fall

This course introduces the care and management of landscape trees in urban settings. It covers soil, water, and nutrient management, integrated pest management, and tree biology. Topics include tree selection, protection, fertilization, pruning basics, urban forest management, safety, and risk management. This course prepares students for the International Society of Arboriculture (ISA) Certification exam and provides ISA Continuing Education Units (CEUs). Field trips are required. C-ID AG-EH 130 000X.

HORT 121: Sustainable Landscape and Turf Management

Units: 3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Spring

This course introduces landscape ecosystems and emphasizes sustainable management practices of turfgrass, trees, and landscape plantings. Students learn best management practices, including soil preparation, nutrient management, irrigation, mowing, pruning and growth control, integrated pest management, and fire safety. Students practice basic skills needed for successful maintenance of landscaped areas in accordance with sustainable and ecological principles. Participation in field trips and field labs is required.

HORT 122: Horticulture Laws and Regulations

Units: 2

Prerequisites: None

Acceptable for Credit: CSU

Lecture 2 hours.

Course Typically Offered: Summer

This course covers the laws and regulations that apply to the agriculture and horticulture industries, including possible legal issues for nursery owners, landscape managers, farmers, and others engaged in crop production and landscape planning. Topics include U.S., California, and local agencies and ordinances governing contracts, environmental and natural resource issues, agricultural employees, and pesticide regulations. This course prepares students to pass the Laws and Regulations section of the California Department of Pesticide Regulations licensing exams and others.

HORT 126: Irrigation and Water Management

Units: 3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Fall, Spring

This course introduces the design, installation, and maintenance of water-efficient irrigation systems. Topics include water supply, basic hydraulics, climate, soil and plant characteristics, component identification and terminology, auditing, scheduling, pipe sizing, layout, electrical components, and water conservation practices appropriate for southern California. Participation in field exercises, field trips, and other lab activities is required. C-ID AG-EH 144X.

HORT 127: Landscape Design

Units: 3

Prerequisites: None

Acceptable for Credit: CSU, UC

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Fall, Spring

This course introduces the principles and practices of landscape design. Topics include the principles and process of design, drafting, hand drawn graphics, and presentation methods. Projects emphasize residential and small commercial sites. Students are required to attend field trips.

HORT 128: Landscape Construction

Units: 3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Fall

This course introduces the fundamentals of landscape construction. Topics include soil preparation, paving and construction materials, hand and power tool use, turf and plant installation, plan reading, estimating, and bid preparation. The course also covers local codes, state requirements, and new technologies. It prepares students to pass the C-27 Landscaping Contractor's License exam. Students are required to participate in lab activities and attend field trips. C-ID AG-EH 132X.

HORT 134: Integrated Pest Management

Units: 3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Fall

This course examines the common pests that invade ornamental plantings and nursery crops in Southern California, including weeds, invertebrate pests, and plant diseases. Students learn to diagnose pest problems and design solutions to these problems based upon an integration of approved pest management techniques and practices including cultural, biological, mechanical/physical, and chemical control methods. This course is designed to assist students in preparing for California licensing exams in pest management or to earn continuing education hours to maintain their license. C-ID AG-EH 120X.

HORT 140: Subtropical Fruit and Plant Production

Units: 3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Spring

This course examines the principles and practices involved in subtropical fruit and plant production, such as citrus and avocados, and other emerging crops. Topics include propagation, site selection, planting, fertilization, irrigation, and pest control. The course also covers harvest techniques, marketing, and industry economic trends. Field trips to local orchards and groves are required.

HORT 144: Nursery Management and Production

Units: 3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Fall

This course analyzes the operation and management of plant nursery facilities and personnel, including cultural practices, scheduling of nursery crops, marketing, and legal and environmental issues. Students examine the relationships of light, temperature, moisture, humidity, and fertility as well as their impact on plant production. Topics include pruning, transplanting, propagation, and pest control methods. Students are required to attend field trips to local nurseries.

HORT 147: Wines of California

Units: 1.5

Prerequisites: None

Acceptable for Credit: CSU

Lecture 1.50 hours.

Course Typically Offered: Fall or Spring

This course introduces the wines and major wine producing regions of California. It covers history, viticultural practices, winemaking styles, and sensory evaluation techniques of representative California wines. Students must be at least 21.

HORT 148: Introduction to Wine Production

Units: 1.5

Prerequisites: None

Acceptable for Credit: CSU, UC

Lecture 1 hour, laboratory 1.50 hours.

Course Typically Offered: To be arranged

This course provides beginning winemakers with basic "how to" instructions and advanced technical training on aspects of winemaking. It emphasizes the importance of specialized backgrounds needed to solve the wide variety of problems encountered in commercial wine production. Students must be at least 21 to enroll.

HORT 149: Vineyard Production and Management

Units: 3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Spring

This course covers responsibilities of vineyard management. Topics include climate zones, soil selection, financing, farm organization, irrigation systems, field layout, varietal selection, nutritional needs, harvesting, labor management, marketing, and budgeting. Students are required to attend field trips to local vineyards.

HORT 150: Winery Operations and Management

Units: 3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 3 hours.

Course Typically Offered: Fall even years

This introductory level course on starting and managing a winery business covers permits, annual plans and budgets, marketing, tasting room operations, and legal compliance. Students are required to attend field trips.

HORT 162: Organic Crop Production: Warm Season

Units: 2

Prerequisites: None

Acceptable for Credit: CSU, UC

Lecture 1 hour, laboratory 3 hours.

Course Typically Offered: Spring

This course introduces the principles and practices of organic crop production with an emphasis on warm season crops. It applies sustainability principles and ecological concepts to field-based exercises and hands-on practices in the production of edible and ornamental crops. Topics emphasized include selecting, starting, and maintaining crops, irrigation methods, organic weed and pest control strategies, alternative cropping methods, and profitability. Students are required to attend field trips.

HORT 163: Organic Crop Production: Specialty Crops

Units: 2

Prerequisites: None

Acceptable for Credit: CSU, UC

Lecture 1 hour, laboratory 3 hours.

Course Typically Offered: Summer

This course applies sustainability principles and ecological concepts to field-based exercises and hands-on practices in the production of edible and ornamental specialty crops. Topics emphasized include food safety and sanitation, post-harvest storage, community-supported agriculture, farmers markets, and other direct and indirect marketing outlets. Students are required to attend field trips.

HORT 164: Organic Crop Production: Cool Season

Units: 2

Prerequisites: None

Acceptable for Credit: CSU, UC

Lecture 1 hour, laboratory 3 hours.

Course Typically Offered: Fall

This course introduces the principles and practices of organic crop production with an emphasis on cool season crops. Students apply sustainability principles and ecological concepts to field-based exercises and hands-on practices in the production of edible and ornamental crops. Topics include farm management, crop selection, plant propagation, organic cultivation, hydroponics and aquaponics, harvesting, and marketing. Students are required to attend field trips.

HORT 166: Introduction to Sustainable Agriculture

Units: 3

Prerequisites: None

Acceptable for Credit: CSU, UC

Lecture 3 hours.

Course Typically Offered: Fall

This course introduces sustainable agriculture and agro-ecological theory from a multi-disciplinary scientific perspective. It will focus on the application of sustainability concepts to growth and production of edible, ornamental, and specialty crops in the temperate southern California climate. Diverse agricultural systems and practices and their relative sustainability are analyzed for suitability to site and environment. Topics include the history and evolution of agriculture as well as historical, conventional, and alternative farming systems with a focus on modern applications and present day environmental concerns.

HORT 220: Computer-Aided Landscape Design Applications

Units: 3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Fall

This course introduces the application of computer-based design software packages, including image manipulation, modeling, multimedia, and drafting combined with hand graphics for the development of landscape plans, perspectives, elevation drawings, and presentation graphics.

HORT 230: Landscape Architecture

Units: 3

Prerequisites: HORT 127.

Acceptable for Credit: CSU

Lecture 2 hours, laboratory 3 hours.

Course Typically Offered: Spring

This project-based class offers continued study in the field of landscape architectural design. It emphasizes site analysis, sensory evaluation, sustainable design principles, cost considerations, rendering, site details, model building, and oral presentation. Students work both individually and in groups on projects at the urban and community scale, and they are required to attend field trips.

HORT 292: Internship Studies

Units: 0.5-14

Prerequisites: None

Corequisite: Complete 54 hours of work per unit, paid or unpaid.

Enrollment Limitation: Instructor, dept chair, and Career Center approval. Fourteen unit maximum in any combination of work experience education and/or internship studies per semester.

Acceptable for Credit: CSU

Course Typically Offered: Fall, Spring, and Summer

This course provides students the opportunity to apply the theories and techniques of their discipline in an internship position in a professional setting under the instruction of a faculty-mentor and site supervisor. It introduces students to aspects of the roles and responsibilities of professionals employed in the field of study. Topics include goal-setting, employability skills development, and examination of the world of work as it relates to the student's career plans. Students must develop new learning objectives and/or work/intern at a new site upon each enrollment.

HORT 296: Topics in Horticulture

Units: 1-3

Prerequisites: None

Acceptable for Credit: CSU

Lecture 1 hour.

Lecture 2 hours.

Lecture 3 hours.

Course Typically Offered: To be arranged

This course gives students an opportunity to study topics in Horticulture that are not included in regular course offerings. Each Topics course is announced, described, and given its own title and 296 number designation in the class schedule.

HORT 299: Occupational Work Experience Education

Units: 0.5-14

Prerequisites: None

Corequisite: Complete 54 hours of work per unit, paid or unpaid.

Enrollment Limitation: Career Center approval. Fourteen unit maximum in any combination of work experience education and/or internship studies per semester.

Acceptable for Credit: CSU

Course Typically Offered: Fall, Spring, and Summer

This course is intended for students who are employed in a job directly related to their major or career area of interest. It allows such students the opportunity to apply the theories and skills of their discipline to their position and to undertake new responsibilities and learn new skills at work. Topics include goal-setting, employability skills development, and examination of the world of work as it relates to the student's career plans. Students must develop new learning objectives and/or work/intern at a new site upon each enrollment.