

Horticulture

HORTICULTURE – HORT

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Possible career opportunities

The horticulture program prepares students for numerous state licenses and industry certificates. State licenses include landscape contractor and pest control operator. Industry certifications include: nursery person, arborist, landscape technician, maintenance technician, and irrigation designer. Career choices in horticulture include: nursery technician, propagator, plant breeder, nursery manager, greenhouse grower, greenhouse manager, garden center manager, arborist/tree worker, landscape architect, landscape designer, grounds manager/municipal, landscape contractor, landscape maintenance contractor, golf course manager, and pest controller/advisor. Some career options may require more than two year of college work.

Program-level student learning outcomes

Program learning outcomes are subject to change. The most current list of program learning outcomes for each program is published on the DVC website at www.dvc.edu/slo.

**Certificate of achievement
 Arboriculture**

Students completing the program will be able to...

- A. identify commonly planted trees in local landscapes.
- B. use dichotomous keys to correctly identify tree species.
- C. use site analysis data to determine appropriate tree species.
- D. explain how trees should be planted, staked, pruned, and irrigated.
- E. identify common insect pests and disease pathogens of common trees.
- F. assess tree health and recognize potential hazards.
- G. interpret local tree ordinance regulations for county residents.
- H. describe tree selection mistakes.
- I. demonstrate techniques to mitigate tree pruning errors.

This certificate of achievement prepares students for employment as arborists in a variety of settings including public and private gardens, parks, golf courses, institutions, municipalities, utilities, government agencies, and commercial and residential tree care services. It includes classroom, laboratory, and work experience/internships. Completion of the certificate requirements will also prepare students to sit for the International Society of Arboriculture (ISA) certification.

To earn a certificate of achievement, students must complete each course used to meet a certificate requirement with a "C" grade or higher. Required courses are available in the evening and/or on weekends.

<i>required courses:</i>		<i>units</i>
HORT-110	Introduction to Horticulture.....	4
HORT-120	Soil Science and Management.....	3
HORT-125	Integrated Pest Management	3.5
HORT-170	Woody Plants: Identification and Maintenance.....	4
HORT-171	Pruning Laboratory	1
HORT-179	Arboriculture	4
HORT 185	Site Analysis	1.5
HORT-187	Sustainable Water Practices.....	2
HORT-296	Internship Occupational Work Experience Education in HORT	1-4
total minimum required units		27

**Certificate of achievement
 Landscape design**

Students completing the program will be able to...

- A. develop fundamental designer and client communication techniques.
- B. perform a site analysis and inventory.
- C. recognize and develop a personal landscape design process.
- D. create presentations through graphic sketching and drafting.
- E. identify plant and non-plant material suitable for specific site design.
- F. produce a portfolio and related documents necessary to enter the marketplace

This certificate presents the fundamental skills used by landscape designers. Using hand-drawing and digital tools, students will develop designs based upon environments typical of residential and small commercial landscape sites. Through portfolio development and presentations, students will emulate the industry practice of designer/client interaction.

To earn a certificate of achievement, students must complete each course used to meet a certificate requirement with a "C" grade or higher. Required courses are available in the evening and/or on weekends.

<i>required courses:</i>		<i>units</i>
HORT-110	Introduction to Horticulture.....	4
HORT-120	Soil Science and Management.....	3
HORT-180	Introduction to Landscape Architecture.....	3
HORT-181	Landscape Design I: Graphics	3
HORT-182	Landscape Design II	3
HORT-185	Site Analysis	1.5
HORT-187	Sustainable Water Management.....	2

<i>plus at least 3 units from:</i>		
HORT-113	Plant Materials and their Uses: Winter and Spring	3
HORT-114	Plant Materials and their Uses: Summer and Fall	3

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plus at least 3 units from:

ARCHI-135	Digital Tools for Design	3
ARCHI-136	Digital Tools for Architecture	3
total minimum required units		25.5

**Certificate of achievement
Nursery and greenhouse**

Students completing the program will be able to...

- A. identify, alleviate, and recommend treatment for diseases and pathogens.
- B. describe specific environmental and cultural requirements to grow seasonal common plants.
- C. select plants based on analysis of a specific landscape setting.
- D. maintain and support nursery operations.
- E. describe and differentiate among physical and growth characteristics of common seasonal plants.
- F. group plants according to water needs (zoning).
- G. implement safety and procedures.

This certificate provides the skills needed to work in the local nursery industry including plant identification, plant propagation, labeling, nursery sales, marketing and nursery management. The program includes lectures, laboratory, and work experience.

To earn a certificate of achievement, students must complete each course used to meet a certificate requirement with a "C" grade or higher. Required courses are available in the evening and/or on weekends.

<i>required courses:</i>	<i>units</i>
HORT-110 Introduction to Horticulture and Plant Science	4
HORT-113 Plant Materials and their Uses: Winter and Spring	3
HORT-114 Plant Materials and their Uses: Summer and Fall	3
HORT-163 Nursery and Greenhouse Practices	3
HORT-183 Garden Design	1.5
HORT-185 Site Analysis	1.5
HORT-187 Sustainable Water Management.....	2
HORT-296 Internship in Occupational Work Experience Education in HORT.....	1-4

plus at least 3 units from:

HORT-111 Plant Propagation and Production: Winter and Spring	3
HORT-112 Plant Propagation and Production: Summer and Fall	3
total minimum required units	25

**Certificate of achievement
Plant science and horticulture**

Students completing the program will be able to...

- A. integrate the knowledge of higher plant functions with site analysis
- B. describe local geographical features and their relationship to soils.
- C. select appropriate plants for specific environmental conditions.
- D. apply appropriate plant pruning techniques.
- E. demonstrate proper use of botanical nomenclature.
- F. identify exotic and native woody plants.
- G. explain the effects of temperature, water, humidity, and fertility on winter and spring plant growth,
- H. apply learned skills to gardens.

This certificate program is designed to prepare students with the skills, knowledge, and training to enter into local green industry jobs in fields such as landscape installation, maintenance, park service, plant propagation, nursery, and remediation. The certificate provides a strong foundation for students who intend to pursue a baccalaureate degree in horticulture, plant science, and agriculture majors.

To earn a certificate of achievement, students must complete each course used to meet a certificate requirement with a "C" grade or higher. Required courses are available evenings and/or weekends.

<i>required courses:</i>	<i>units</i>
HORT-110 Introduction to Horticulture and Plant Science	4
HORT-120 Soil Science and Management.....	3
HORT-121 Soil Science and Management Laboratory.....	1
HORT-130 Turf Grass Management	1.5
HORT-171 Pruning Laboratory	1
HORT-187 Sustainable Water Management.....	2
HORT-296 Internship in Occupational Work Experience Education in HORT	1-4

plus at least 3 units from:

HORT-113 Plant Materials and their Uses: Winter and Spring	3
HORT-114 Plant Materials and their Uses: Summer and Fall	3

plus at least 3 units from:

CONST-135 Construction Processes: Residential	4
HORT-133 Landscape Construction	3
HORT-170 Woody Plants: Identification and Maintenance.....	4

plus at least 3 units from:

HORT-111 Plant Propagation and Production: Winter and Spring	3
HORT-112 Plant Propagation and Production: Summer and Fall	3
total minimum required units	25.5

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**Certificate of accomplishment
Horticulture technician**

Students completing the program will be able to...

- A. integrate the knowledge of higher plant functions with site analysis.
- B. describe local geographical features and their relationship to soils.
- C. describe the relationship between plants, soil and water.
- D. evaluate plant pruning needs.

This certificate introduces students to the comprehensive field of plant science and horticulture, the green industry. Green industry professionals are responsible for nurturing and protecting our natural resources and integrating them into the built environment. This foundational certificate can lead to further study in the fields of landscape installation, maintenance, park service, plant propagation, nursery, and remediation.

To earn a certificate of accomplishment, students must complete each course used to meet a certificate requirement with a "C" grade or higher. Required courses are available evenings and/or weekends.

<i>required courses:</i>	<i>units</i>
HORT-110 Introduction to Horticulture and Plant Science	4
HORT-120 Soil Science and Management	3
HORT-171 Pruning Laboratory	1
HORT-187 Sustainable Water Management.....	2
total minimum required units	10

**Certificate of accomplishment
Landscape design fundamentals**

Students completing the program will be able to...

- A. apply principles of planting design theory to landscape design projects.
- B. prepare rendered documents for presentation.
- C. prepare professional level planting plans and schedules, estimating quantity and sizes of plants required.

This certificate incorporates the basic principles of site analysis, plant science, and soil science as applied to landscape design principles. Students are prepared for entry-level positions in the landscape industry focusing on residential settings and small commercial sites.

To earn a certificate of accomplishment, students must complete each course used to meet a certificate requirement with a "C" grade or higher. Required courses are available evenings and/or weekends.

<i>required courses:</i>	<i>units</i>
HORT-110 Introduction to Horticulture and Plant Science	4
HORT-181 Landscape Design I: Graphics	3
HORT-185 Site Analysis	1.5

plus at least 3 units from:

HORT-113 Plant Materials and their Uses: Winter and Spring	3
HORT-114 Plant Materials and their Uses: Summer and Fall	3

total minimum required units 11.5

**Certificate of accomplishment
Nursery technician**

Students completing the program will be able to...

- A. identify, alleviate and recommend treatment for diseases and pathogens.
- B. describe specific environmental and cultural requirements to grow seasonal common plants.
- C. maintain and support nursery operations.

This certificate provides the fundamental skills required for entry-level employment in the nursery industry. It includes classroom and hands-on laboratory experiences.

To earn a certificate of accomplishment, students must complete each course used to meet a certificate requirement with a "C" grade or higher. Required courses are available in the evening and/or on weekends.

<i>required courses:</i>	<i>units</i>
HORT-110 Introduction to Horticulture and Plant Science	4
HORT-163 Nursery and Greenhouse Management	3

plus at least 3 units from:

HORT-111 Plant Propagation and Production: Winter and Spring	3
HORT-112 Plant Propagation and Production: Summer and Fall	3

total minimum required units 10

**Certificate of accomplishment
Tree technician**

Students completing the program will be able to...

- A. implement tree trimming safety procedures.
- B. use field examinations to determine tree problems.
- C. diagnose woody plant suitability for given sites.
- D. recognize species and the characteristics of a given species.

This program prepares students for employment as assistant tree trimmers, pruners, or fallers working under certified arborists

To earn a certificate of accomplishment, students must complete each course used to meet a certificate requirement with a "C" grade or higher. Required courses are available evenings and/or on weekends.

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<i>required courses:</i>	<i>units</i>
HORT-110 Introduction to Horticulture and Plant Science	4
HORT-170 Woody Plants: Identification and Maintenance	4
HORT-171 Pruning Laboratory	1
HORT-179 Arboriculture.....	4
total minimum required units	13

HORT-110 Introduction to Horticulture and Plant Science

- 4 units SC
- 54 hours lecture/54 hours laboratory per term
 - Recommended: CHEM-106, MATH-090, and Eligibility for ENGL-122 or equivalents

This course provides an introduction to plant sciences as related to horticulture. Topics include plant morphology, growth processes, propagation, physiology, growth media, biological competitors, and post-harvest factors of food, fiber, ornamental and native plants. CID AG-PS 106L, CSU, UC

HORT-111 Plant Propagation and Production: Winter and Spring

- 3 units SC
- 36 hours lecture/54 hours laboratory per term
 - Prerequisite: HORT-110 (may be taken concurrently) or equivalent
 - Recommended: HORT-125 or equivalent

This course introduces plant propagation and production practices for nursery operations, with an emphasis on sexual and asexual reproduction of winter and spring plants. Topics include winter and spring planting specifications, transplanting, fertilizing, plant pest and disease control; structures and site layout; preparation and use of propagating and planting mediums; use and maintenance of common tools and equipment; regulations pertaining to plant production; and new plant introductions in the nursery industry. Students will also participate in greenhouse management, scheduling of plant production, seed-starting, vegetative propagation and the marketing of winter and spring containerized nursery stock. C-ID HORT 111 + HORT 112 = AG - EH 116L, CSU

HORT-112 Plant Propagation and Production: Summer and Fall

- 3 units SC
- 36 hours lecture/54 hours laboratory per term
 - Prerequisite: HORT-110 (may be taken concurrently) or equivalent
 - Recommended: HORT-125 or equivalent

This course introduces plant propagation and production practices for nursery operations, with an emphasis on sexual and asexual reproduction of summer and fall plants. Topics include summer and fall planting specifications, transplanting, fertilizing, plant pest and disease control; structures and site layout; preparation and use of propagating and planting mediums; use and maintenance of common tools and equipment; regulations pertaining to plant production; and new plant introductions in the nursery industry. Students will also participate in greenhouse management, scheduling of plant production, seed-starting, vegetative propagation and the marketing of summer and fall containerized nursery stock. C-ID HORT 111 + HORT 112 + AG-EH 116L, CSU

HORT-113 Plant Materials and their Uses: Winter and Spring

- 3 units SC
- 36 hours lecture/54 hours laboratory per term
 - Prerequisite: HORT-110 (may be taken concurrently) or equivalent

This course introduces the identification and uses of common plants in the California landscape that are of special interest in the winter or spring. Topics include native and introduced plant identification, growth habits, cultural and environmental requirements, uses in the landscape. Plants emphasized will come from the current California Association of Nurseries & Garden Centers (CANGC) and Professional Landcare Network (PLANET) Certification Tests Plant Lists. C-ID AG-EH 108L, CSU

HORT-114 Plant Materials and their Uses: Summer and Fall

- 3 units SC
- 36 hours lecture/54 hours laboratory per term
 - Prerequisite: HORT-110 (may be taken concurrently) or equivalent

This course introduces the identification and uses of common plants in the California landscape that are of special interest in the summer or fall. Topics include native and introduced plant identification, growth habits, cultural and environmental requirements, uses in the landscape. Plants emphasized will come from the current California Association of Nurseries & Garden Centers (CANGC) and Professional Landcare Network (PLANET) Certification Tests Plant Lists. C-ID AG-EH 112L, CSU

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HORT-120 Soil Science and Management

3 units SC

- 54 hours lecture per term
- Prerequisite: HORT-110 or equivalent
- Recommended: CHEM-106, MATH-110 and eligibility for ENGL-122 or equivalents

This course presents a study of soil science and management of soils. Biology, physics and chemistry are integrated with geological concepts to provide a comprehensive overview of all facets of soil science. Topics covered include soil classification, derivation, use, function and management including erosion, moisture retention, structure, cultivation, organic matter and microbiology. C-ID HORT 120 + HORT 121 = AG-PS 128L, CSU, UC

HORT-121 Soil Science and Management Laboratory

1 unit SC

- 54 hours laboratory per term
- Prerequisite: HORT-110, HORT-120 or equivalents (may be taken concurrently)
- Recommended: Eligibility for ENGL-122, CHEM-106, MATH-110 or equivalents
- Formerly HORT-120L

The lab for soils will include identifying soil types, classifications, reactions, fertility and physical properties. Soil management, biology, chemistry and microbiology will be explored. Regional soils and soil quality are investigated. Laboratory required for transfer to CSU. C-ID HORT 120 + HORT 121 = AG - PS 128L, CSU

HORT-125 Integrated Pest Management

3.5 units SC

- 54 hours lecture/27 hours laboratory per term
- Prerequisite: HORT-110 (may be taken concurrently) or equivalent
- Recommended: eligibility for ENGL-122, MATH-110 or equivalents
- Note: This course meets the California State Pest Control Advisor, California Association of Nurserymen, and International Society of Arboriculture Continuing Education Units (CEU) license certification for CEUs necessary for pest control operators and advisors

This course will introduce students to plant, insect and disease pests associated in California. Key concepts in applied ecology of pest and beneficial species, insect, vertebrate and disease identification and control methodologies using Integrated Pest Management (IPM) and Plant Health Care models are emphasized. CSU

HORT-130 Turf Grass Management

1.5 units SC

- 18 hours lecture/27 hours laboratory per term

This course will introduce the study of turf grass management including identification, production, installation, and maintenance. Regional irrigation methodology, fertilization regimes, pests and diseases of turf, and new cultivars are emphasized. CSU

HORT-133 Landscape Construction

3 units SC

- 36 hours lecture/54 hours laboratory per term
- Recommended: HORT-110 and eligibility for ENGL-122 or equivalents
- Note: This course provides preparation for the C-27 landscape contracting license.

This course introduces students to the information and skills required to install residential hardscapes using SITESv2 standards. SITES v2's rating system was developed from research, peer-reviewed literature, case-study precedents, and projects registered in the SITES Pilot Program by a diverse group of experts in soils, water, vegetation, materials, and human health and well-being. It includes best practices in landscape architecture, ecological restoration and related fields. Water conservation, plan reading, tool use and safety, and core sustainability principles are covered. CSU

HORT-148L California Native Plants Laboratory

1 unit SC

- 54 hours laboratory per term
- Recommended: HORT-110 or equivalent

This course presents a study of California plant communities and the environments that shape them. The dominant and typical plant constituents of each vegetation unit, focusing on native species currently used in the nursery industry will be covered. Habitat, soil, and climatic factors will be discussed as related to the plant species established in their natural and horticultural environment, exploring possibilities of integration into residential landscapes. Multiple day field trips to select California vegetation environments are taken to record relevant plant and habitat data. Destinations will vary based on season and term. CSU

HORT-150 Topics in Horticulture

.3-4 units SC

- Variable hours

A supplemental course in horticulture to provide a study of current concepts and problems in horticulture and related subdivisions. Specific topics will be announced in the schedule of classes. CSU

HORT-160 Plant Propagation

1.5 units SC

- 18 hours lecture/27 hours laboratory per term
- Recommended: HORT-110 and eligibility for ENGL-122 or equivalents

This course will introduce students to the principles and practices of plant propagation from seed and vegetative material to marketable nursery stock. The key concepts of physiological processes, environmental requirements and techniques required for successful plant production will be covered. CSU

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HORT-163 Nursery and Greenhouse Practices

3 units SC

- 54 hours lecture per term
- Recommended: Eligibility for ENGL-122 or equivalent

This course is designed to introduce the student to the nursery industry and explore the science of greenhouse management. Topics include greenhouse design and structure, manufacturing and operation, and business structure and management of a nursery. CSU

HORT-170 Woody Plants: Identification and Maintenance

4 units SC

- 54 hours lecture/36 hours laboratory per term
- Recommended: HORT-110 and eligibility for ENGL-122 or equivalents
- Note: Field Trips Required. This course meets the plant certification for California Association of Nurserymen, California Landscape Contractor's Licensing and satisfies International Society of Arboriculture Continuing Education units.
- Formerly HORT-143 and HORT-143L

Students will learn the taxonomy, identification, growth habits, landscape values, maintenance requirements and native plants of woody plants used in regional landscapes. Emphasis will be placed on regenerative landscape design with a focus on ecologically appropriate choices. CSU

HORT-171 Pruning Laboratory

1 unit SC

- 54 hours laboratory per term
- Formerly HORT-137L

This course will provide hands-on experience with winter and spring mechanical modification of common landscape plants, including roses, dormant trees and shrubs, and post-bloom pruning for spring flowering plants. Safety, tool maintenance, tool use, disease prevention and techniques that enhance plant structure will be covered. CSU

HORT-179 Arboriculture

4 units SC

- 54 hours lecture/54 hours laboratory per term
- Recommended: eligibility for ENGL-122, HORT-110 or equivalents
- Note: This course meets the requirements for the California Association of Nurserypersons and International Society of Arboriculture Continuing Education Units (CEU).

This comprehensive class teaches students how to manage trees in urban and suburban landscapes. Included are the benefits that trees provide, and species profiles, form and ecological functions. Observational analysis skills will be taught in conjunction with scientific knowledge to direct assessment and diagnosis. Tree health subjects and applications include species selection, planting and establishment, pruning, safety, cabling, bracing, staking, watering, fertilizing, and pest control. The focus will be on trees appropriate for Contra Costa soils and micro-climates. CSU

HORT-180 Introduction to Landscape Architecture

3 units SC

- 36 hours lecture/54 hours laboratory per term
- Recommended: HORT-110 and ENGL-122 or equivalents

This course presents the basic principles and concepts in the field of landscape architecture and environmental landscape design. The history of human impact on natural environments and methods to mitigate those impacts will be explored. Design standards and practices governing landscape architecture and design skills such as site analysis, planning and construction design will be covered as part of the core of the profession. CSU, UC

HORT-181 Landscape Design I: Graphics

3 units SC

- 36 hours lecture/54 hours laboratory per term
- Co-requisite: HORT-180 (may be taken concurrently) or equivalent
- Recommended: HORT-110 and eligibility for ENGL-122 or equivalents

This course presents an introduction to landscape design techniques, communication, process and concepts. Topics include basic landscape design processes, beginning site analysis, methods of graphic representation of vegetation, topography, hardscape and other elements. Students will also use and create basic landscape design plans. CSU, UC

HORT-182 Landscape Design II

3 units SC

- 36 hours lecture/54 hours laboratory per term
- Prerequisite: HORT-180, HORT 181 or equivalent

This course is a continuation of HORT-181, and explores advanced landscape design concepts. Topics include design principles, development of design concepts, creative problem-solving techniques. Emphasis is placed on environmental context and other factors of design and form. CSU, UC

HORT-183 Garden Design

1.5 units SC

- 18 hours lecture/27 hours laboratory per term
- Recommended: HORT-110 or equivalent

This basic design course is intended for students in the nursery and landscape industry as well as interested laypersons and residential homeowners. Fundamental design principles, plant selection, hardscape materials and planting techniques will be covered. Plant selection for seasonal color, energy efficiency and water usage will be introduced. Students will layout a rough site plan overview of a personal garden design. CSU

HORT-185 Site Analysis

1.5 units SC

- 18 hours lecture/27 hours laboratory per term
- Recommended: HORT-182 or equivalent

This course provides an introduction to the site analysis skills required by landscape designers, architects, contractors, maintenance technicians and gardeners. Details of specified sites are assessed, inventoried and documented including climatic, geographical, historical, legal, and infrastructural conditions. CSU

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HORT-187 Sustainable Water Management

2 units SC

- 18 hours lecture/54 hours laboratory per term
- Notes: Field trips will be required

This course introduces concepts and practices in landscape irrigation and sustainable water. It includes an overview of state and local water delivery systems and water use and supply issues in California. It examines relationships between plants, soils, and water. Applications of water audits, proper irrigation design, monitoring techniques, rain-water harvesting, graywater systems and subsurface irrigation will be practiced. CSU

HORT-296 Internship in Occupational Work Experience Education in HORT

1-4 units SC

- May be repeated three times
- Variable hours
- Note: In order to enroll in the HORT-296 course, students must be interning or volunteering, register for the course, complete an online Employment Form, and participate in an orientation. The Employment Form can be accessed at www.dvc.edu/wrwx. Incomplete grades are not awarded for this course.

HORT-296 is a supervised internship in a skilled or professional level assignment in the student's major field of study or area of career interest. Under the supervision of a college instructor, students will engage in on-the-job and other learning experiences that contribute to their employability skills and occupational or educational goals. Internships may be paid, non-paid, or some partial compensation provided. Five hours work per week or seventy-five hours work per term is equal to one unit (paid) or one unit for four hours work per week or sixty hours per term (unpaid work). Students may earn up to a maximum of sixteen units; repetition allowed per Title 5 Section 55253. CSU

HORT-298 Independent Study

.5-3 units SC

- Variable hours
- Note: Submission of acceptable educational contract to department and Instruction Office is required.

This course is designed for advanced students who wish to conduct additional research, a special project, or learning activities in a specific discipline/subject area and is not intended to replace an existing course. The student and instructor develop a written contract that includes objectives to be achieved, activities and procedures to accomplish the study project, and the means by which the supervising instructor may assess accomplishment. CSU

HORT-299 Student Instructional Assistant

.5-3 units SC

- Variable hours
- Note: Applications must be approved through the Instruction Office. Students must be supervised by a DVC instructor.

Students work as instructional assistants, lab assistants and research assistants in this department. The instructional assistants function as group discussion leaders, meet and assist students with problems and projects, or help instructors by setting up laboratory or demonstration apparatus. Students may not assist in course sections in which they are currently enrolled. CSU