AGRI 0164 - SUSTAINABLE TREE CARE

Catalog Description

Formerly known as HORT 40
Hours: 90 (36 lecture, 54 laboratory)
Description: Sustainable arboriculture principles and practices for management and care of trees in urban, agricultural, and wildland-urban interface settings. Includes tree biology and culture; landscape tree identification; industry-approved tree maintenance, planting, staking, and pruning techniques; tree risk assessment and mitigation; appropriate selection and pruning of fruit trees. Basic concepts in forest management and current issues in urban and wildland forestry will also be covered. (CSU)

Course Student Learning Outcomes

- CSLO #1: Identify the role of trees in the urban forest environment and the human - forest interface.
- CSLO #2: Assess and identify nutrient requirements of landscape trees, and recommend methods for correcting nutrient and/or toxicity problems based upon sustainable principles.
- CSLO #3: Describe soil management conditions based on sustainable principles for favorable plant growth.
- CSLO #4: Describe basic tree anatomy, and differentiate generic and species characteristics to apply appropriate tree management.
- CSLO #5: Evaluate and apply the best management practices for maintaining trees in urban and landscape settings based upon sustainable principles.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

90

Outside of Class Hours

72

Total Student Learning Hours

162

Course Objectives

Lecture Objectives:
1.Identify the role of trees in the urban forest and wildland-urban interface environments.
2.Evaluate and apply the best management practices for maintaining trees in urban landscape settings based upon sustainable principles as they apply to tree selection, planting, staking, irrigation and nutrition management.
3.Describe basic concepts of pruning and pruning standards as established by ANSI (American National Standards Institute) and ISA (International Society of Arboriculture)
4.Discuss distinguishing internal and external morphological and physiological characteristics of conifers and broadleaf species.
5.Identify morphological characteristics of common urban trees to use for species identification.
6.Discuss tree structure and physiological responses to tree injury, including pruning wounds, based on Compartmentalization of Decay in Trees (CODIT) principles.
7.Identify current challenges in urban forestry, and propose sustainable solutions.
8.Describe soil characteristics necessary for optimal tree growth, and determine strategies for mitigation of damaged soils.
9.Determine best management practices for protecting trees during construction.
10.Identify various fruit tree species, using varietal characteristics and requirements to determine proper pruning strategies.
11.Identify the role of trees in various agroforestry settings, including ecosystem services provided by trees in hedgerows and riparian buffers.
12.Define the role and discuss the practices of utility forestry in the protection of wildland and urban forest environments.
13.Discuss basic forestry principles for forest management, including fuel reduction and defensible space as determined by state and local government.
Laboratory Objectives:
1.Demonstrate skills and concepts of proper pruning techniques based on ISA and ANSI pruning standards for landscape trees.
2.Demonstrate proper pruning techniques for specific fruit trees to improve productivity, ease of harvest, and rejuvenation of fruiting wood.
3.Evaluate the quality of nursery stock based on canopy and root characteristics in container-grown trees.
4.Recommend and demonstrate proper staking of newly planted trees.
5.Evaluate soil and other environmental factors that affect water use by trees, and determine site and species-specific irrigation requirements.
6.Compare and contrast internal and external tree responses to wounding and stress.
7.Identify and evaluate efficacy of reaction and barrier zones for compartmentalization of decay in trees (CODIT).
8.Assess tree health by observing canopy characteristics such as annual shoot growth, epicormic growth, leaf and bark chars, and presence of pests.
9.Apply principles of tree risk assessment to identify structural defects that increase tree hazard potential, and recommend mitigation options.
10.Use industry-specific equipment such as range finders and logger's tapes to measure tree height and DBH in order to determine critical root zone.
11.Utilize online tree applications to identify and geographically locate trees in order to calculate their benefits for carbon sequestration, storm water retention, utility savings, and increased property value.
12.Demonstrate use of IML Resi device to determine presence and extent of internal decay in trees as part of risk assessment.
13.Identify species composition for specified urban setting to evaluate species diversity, age, and health of trees, in order to determine alignment with current urban forest recommendations.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)

- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Objective Examinations
  - Example: Students will take objective examinations during the course. Example question: True or False? For heading cuts, prune 1/4 inch above the bud, sloping down and away from it.
- Reports
  - Example: Students will make visual observations and produce written assessment of 25 assigned trees on campus. Students assess health, structural integrity, and failure potential, and recommend mitigation of hazard and/or removal. Rubric grading.
- Skill Demonstrations
  - Example: Students will be expected to demonstrate proper pruning techniques for specific fruit tree. Pass/fail grading.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. In an urban setting, the instructor will review benefits of urban trees and identify common challenges associated with the maintenance of mature trees. Using industry standards, students will evaluate root and canopy pruning cuts and predict eventual outcomes for tree health and municipal infrastructure. (Lecture Objectives 1,2,3,6; Lab Objectives 1,6,8)

Lecture:

1. Instructor leads discussion on tree structure and physiological responses to tree injury. Using wood samples, students work collaboratively in small groups to determine extent of decay and identify the location of the reaction and barrier zones using CODIT principles. Groups will explain how they derived their answers. (Lecture objective 6; Lab objective 6,7)

Distance Learning

1. Following an online lecture on tree health, students will compare and contrast various health management techniques on a discussion board with their colleagues. They will also post evaluative papers to the board and critique papers posted by their colleagues. Students will be required to respond to a minimum of 2 other students initial responses. The instructor will create accessible content. Instructor will incorporate engaging tools to facilitate content delivery, keeping student equity, success and accessibility as the foundation for tool selection. (Lecture Objective 2,4,6)

Typical Out of Class Assignments
Reading Assignments

1. Read current arboriculture industry journal article on "Root Management Challenges in Urban Sites" and answer ISA certification CEU questions. 2. Read current research on the historical role of fire in forest ecosystems and the current use of prescribed fire as a technique to improve forest resilience. Include pros and cons and list viable alternatives. Synthesize the information and summarize in a logically developed essay.

Writing, Problem Solving or Performance

1. Assess degree of risk for two trees using USDA and ISA tree risk assessment protocols, calculate sound wood using appropriate formula for tree cavity characteristics, provide a written assessment and recommendation for mitigation options. 2. Use industry-specific equipment to determine tree diameter and height. Estimate branch distance from high voltage lines and determine pruning requirements based on tree species and expected growth rate.

Other (Term projects, research papers, portfolios, etc.)

Students work collaboratively in small groups to locate 25 specified trees on campus and determine tree species and health; quantify tree benefits; assess pruning and staking techniques; evaluate site conditions and tree selection; and determine tree risk where relevant. Provide a written report summarizing findings and recommendations.

Required Materials

- Arborist Certification Exam
  - Author: Educational Testing Group
  - Publisher: Educational Testing Group
  - Publication Date: 2018
  - Text Edition: 1st
  - Classic Textbook?: No
  - OER Link:
  - OER:
- Aborist's Certification Guide
  - Author: Lilly
  - Publisher: ISA
  - Publication Date: 2010
  - Text Edition: 10th
  - Classic Textbook?: No
  - OER Link:
  - OER:
- Glossary of Aboricultural Terms
  - Author: ISA
  - Publisher: ISA
  - Publication Date: 2015
  - Text Edition: 2015
  - Classic Textbook?: No
  - OER Link:
  - OER:
- Tree Risk Assessment

- Author: ANSI
- Publisher: ISA
- Publication Date: 2017
- Text Edition: 2nd
- Classic Textbook?: No
- OER Link:
- OER:

Other materials and-or supplies required of students that contribute to the cost of the course.