

HORT 30: HORTICULTURAL PRACTICES: SOILS

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2023
Units:	3
Hours:	2 lecture, 3 laboratory per week (60 total per quarter)
Advisory:	Completion of or concurrent enrollment in HORT 15 recommended; not open to students with credit in HORT 52A.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU/UC
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

Student Learning Outcomes

- Evaluate a soil by chemical and physical means.
- Demonstrate a knowledge of terms and principles of soil chemistry, physics, and commercial management.

Description

Fundamentals of soil science, including examination of soil formation, physical and chemical properties of soil, relationships between soil, water and plants, and biological factors of soil. Examination of soil samples and interpretation of soil reports and surveys. Basics of plant fertility requirements and soil related topics, such as composting, environmental issues, and soils in construction.

Course Objectives

The student will be able to:

1. Collect soil samples
2. Use soil sampling tools and equipment and test methods in an appropriate manner
3. Perform tests for major soil characteristics
4. Identify various types of physical properties
5. Identify soil chemical properties and reaction
6. Describe the movement of water through soil and the availability of water in soil to plants
7. Describe the biology of soil
8. Demonstrate knowledge of the soil's role in horticulture, agriculture, plant growth, ecology, and construction
9. Identify the methods of soil classification
10. Demonstrate an understanding of the implications of soil management for different cultures worldwide

Course Content

1. Methods of collecting and using soil samples
 - a. Collection of samples for professional testing
 - b. Determination of sample size and area
2. Proper use of soil sampling tools and equipment
 - a. Soil coring
 - b. Soil augers
3. Testing samples for soil characteristics
 - a. Preparing samples
 - b. Performing field tests on soil samples
 - c. Performing laboratory tests on soil samples
4. Test for physical properties of soils
 - a. Soil texture
 - b. Soil structure
 - c. Soil permeability and porosity
 - d. Soil organic matter content
 - e. Soil bulk density
5. Test for chemical properties of soil and reaction
 - a. Testing for N
 - b. Testing for P
 - c. Testing for K
 - d. Testing for pH
 - e. Testing for micro nutrients
6. Interaction of soil water
 - a. Water movement through soil
 - b. Soil water stages and holding capacity
 - c. Water movement and absorption by plants
 - d. Soil salinity
 - e. Differential boundaries
7. Soil biology
 - a. Microorganisms
 - b. Macroorganisms
 - c. Rhizosphere
 - d. Soil food web
8. Relationship between soils and horticulture applications
 - a. Managing soils
 - b. Nutritional needs of crops growing in soils
 - c. Composting
 - d. Landscape and building construction
 - e. Soils and the environment
 - f. Soilless planting media
9. Soil classification
 - a. Soil horizons
 - b. Soil surveys
 - c. Soil classification
10. Soils and cultural implications
 - a. Historical use of soils by native populations in California
 - b. Differences in soil classifications and types around the world

Lab Content

1. Collection of soil samples
 - a. Excavation of soil
 - b. Processing sample

2. Field physical and chemical testing of soil samples
3. Use of soil test chemical reagents
 - a. Testing for N
 - b. Testing for P
 - c. Testing for K
 - d. Testing for pH
 - e. Testing for micro nutrients
4. Soil issue problem solving
 - a. Soil water movement
 - b. Soil fertilization application
 - c. Soil amendment problems
 - d. Soil amendment recommendations

2. Lectures address reading topics and experiences of instructor. Classroom discussion and demonstrations in support of lecture topics will be provided
3. Guest speakers from industry provide supplemental lecture and demonstration
4. Writing assignments include:
 - a. Topical white papers
 - b. Soils report

Discipline(s)

Ornamental Horticulture

Special Facilities and/or Equipment

1. Horticultural laboratory with soil science equipment; related horticultural facilities and equipment.
2. Students provide soil samples, work boots, leather gloves, and clothing for fieldwork.

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Midterm exam

Term project

1. Estimating results of plant growth in test soil

2. Evaluating physical and chemical soil test

Laboratory exercises

Final exam

Participation

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture

Discussion of soil-related topics

Fieldwork in collecting and analyzing soil samples

Laboratory

Demonstration of sampling and testing techniques

Field trips

Representative Text(s) and Other Materials

Hess, Ann. [The Ultimate Guide to Soil](#). 2016.

Although this text is older than the suggested "5 years or newer" standard, it remains a seminal text in this area of study.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Reading assignments include reading approximately 30-50 pages per week from assigned text. Supplemental reading will be provided in hand-out form or through reference to online resources