



Broward Community College

Course Outline

STATUS: A

COMMON COURSE NUMBER: SWS 1102

COURSE TITLE: Soils and Fertilizers

CREDIT HOURS: 3

CONTACT HOURS BREAKDOWN:

Lecture/Discussion 48

Lab

Other

Contact Hours/Week 3

CATALOG COURSE DESCRIPTION:

Prerequisite: None

Corequisite: None

The study of the complex problems involved in the use of existing soils and growing media in South Florida for commercial production of ornamental plants and turf. Fertilizer programs and formulations will be discussed.

General Education Requirements - Associate of Arts Degree, meets Area(s):
 General Education Requirements - Associate in Science Degree, meets Area(s):

UNIT TITLES:

1. Soil Definition, Formation, and Structure
2. Physical Properties
3. Soil Chemistry
4. Soil Water
5. Soil Biology
6. Amendments
7. Soil-less Mixes
8. Plant Nutrition and Requirements
9. Soil Analysis
10. Fertilizers
11. Fertilizer Recommendations
12. Fertilizer Application Techniques
13. Troubleshooting Soil Problems

I. Course Overview:

Upon successful completion of this course, the students should be able to demonstrate a basic knowledge of the physical and chemical properties of soils and soil amendments used in nursery, turf, and landscape operations; and should have a sufficient knowledge of fertilizers to recommend corrective growing and maintenance programs.

II. Units:

Unit 1. Soil Definition, Formation, and Structure

General Outcome:

- 1.0 The students should be able to explain the physical structure of natural soils and how they were formed.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 1.1 Define soil.
- 1.2 List five soil-forming factors and relate them to Florida.
- 1.3 Evaluate the soil in terms of its advantages and disadvantages for a specific use.

Unit 2. Physical Properties

General Outcome:

2.0 The students should be able to explain the importance of physical properties in soils used for commercial horticulture.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 2.1 List physical properties of soils.
- 2.2 Describe the soil texture and methods used in its determination.
- 2.3 Describe soil structures and list the types best suited to growing plants.
- 2.4 Describe ideal soil porosity and two methods for its determination.

Unit 3. Soil Chemistry

General Outcome:

- 3.0 The students should be able to explain pH, and cation exchange, and list forms in which plant nutrients are available to plants.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 Define pH and recommend methods for its adjustment in soils.
- 3.2 Define cation exchange and contrast its effect in different soils.
- 3.3 List 16 nutrient elements required by plants.
- 3.4 Recognize the ionic form in which plants absorb required nutrients.

Unit 4. Soil Water

General Outcome:

- 4.0 The students should be able to explain the importance of water movement in soils.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 4.1 Explain water movement in soils.
- 4.2 Evaluate approximate field capacity of a soil.
- 4.3 Calculate drainage and irrigation needs.
- 4.4 Determine what irrigation method is most advantageous practically and economically.
- 4.5 Make field evaluations on subsurface water availability and quality.
- 4.6 Make application for water use rights to various governmental agencies.

Unit 5. Soil Biology

General Outcome:

- 5.0 The students should be able to discuss the various macro- and micro-organisms found in soils and explain their importance to plant growth.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 5.1 List the most important macro- and micro-organisms found in soil and outline their importance.
- 5.2 Define nitrification and explain its importance.
- 5.3 Recognize the basic reactions in natural element cycles.
- 5.4 Contrast soil amendments in relation to the carbon-nitrogen ratio.
- 5.5 Recommend methods for the support of soil microorganisms.

Unit 6. Amendments

General Outcome:

6.0 The students should be able to compare natural, organic, processed, and chemical soil amendments and how and when to apply them.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 6.1 Name and characterize all amendments used commonly.
- 6.2 List sources of various amendments.
- 6.3 Describe the reaction in the soil of these amendments.
- 6.4 Explain the plant response to these amendments.
- 6.5 Recognize when amendments are needed.
- 6.6 Determine when it is practical to attempt solving a soil problem by amending.
- 6.7 Describe how to most practically apply amendments.

Unit 7. Soil-less Mixes

General Outcome:

- 7.0 The students should be able to select artificial soil components based on their characteristics, properties, formulations, costs, and advantages in horticultural enterprises.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 7.1 List materials used to build a soil mix.
- 7.2 Explain what proportions are used in various growing situations.
- 7.3 Discuss the cost factor in relation to crop success.
- 7.4 Determine when to use an artificial soil mix, combination mix, or natural soil.

Unit 8. Plant Nutrition and Requirements

General Outcome:

- 8.0 The students should be able to outline the importance of plant nutrition and explain its function in plant growth.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 8.1 List plant nutrient requirements.
- 8.2 Outline the effects of nutrients on plant growth.
- 8.3 Explain the manipulation of plant growth and flowering with nutrients.
- 8.4 Discuss the importance of timing in the application of various nutrients.

Unit 9. Soil Analysis

General Outcome:

- 9.0 The students should be able to describe procedures for soil analysis and correction.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 9.1 Describe how to properly obtain a soil analysis sample.
- 9.2 Explain how to interpret a soil analysis receipt.
- 9.3 List what chemicals or amendments to apply to correct deficiencies.
- 9.4 Recognize soluble salt problems and describe how to avoid or correct these problems.

Unit 10. Fertilizers

General Outcome:

10.0 The students should be able to explain how fertilizers are formulated, the content of fertilizer labels, and how to use them to their best advantage.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 10.1 List fertilizer components by reading the fertilizer label.
- 10.2 Equate fertilizer components with plant nutrient needs.
- 10.3 Design a fertilizer for specific conditions.
- 10.4 Compute fertilizer needs per container or per acre.
- 10.5 Recognize the best dollar value in purchasing fertilizers.
- 10.6 Recognize fertilizer physical types.

Unit 11. Fertilizer Recommendations

General Outcome:

- 11.0 The students should be able to evaluate fertilizer needs for specific conditions and how best to apply that fertilizer.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 11.1 Evaluate a particular crop, soil or water condition and recommend the fertilizer needed.
- 11.2 Predict fertilizer response and useful life.
- 11.3 Determine what fertilizer type would be most advantageous under a given condition.

Unit 12. Fertilizer Application Techniques

General Outcome:

12.0 The students should be able to select the appropriate equipment to apply various fertilizer formulations and calculate the amount to apply.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 12.1 Calibrate a fertilizer spreader.
- 12.2 Describe how to apply all types of fertilizers.
- 12.3 Calculate the dosage.
- 12.4 Determine what equipment to use to apply various types of fertilizers.

Unit 13. Troubleshooting Soil Problems

General Outcome:

13.0 The students should be able to recognize soil-related problems and recommend steps to cure and prevent them.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

13.1 Separate soil problems from nutritional problems and pathogenic problems.

13.2 Use appropriate tests to define problems.

13.3 Brainstorm with other students to solve problems.