

# PST-1301: HORTICULTURAL BOTANY

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## Cuyahoga Community College

### Viewing: PST-1301 : Horticultural Botany

**Board of Trustees:**

March 2020

**Academic Term:**

Fall 2021

**Subject Code**

PST - Plant Science/Landscape Tech.

**Course Number:**

1301

**Title:**

Horticultural Botany

**Catalog Description:**

Focus on practical skills and technologies essential for horticultural plant propagation and production. Cultural and sustainable production practices will be examined. Students will apply scientific knowledge of plant development, nutrition, and growth regulation. Environmental aspects of irrigation, chemical application, and soil conservation will be evaluated.

**Credit Hour(s):**

3

**Lecture Hour(s):**

2

**Lab Hour(s):**

3

## Requisites

**Prerequisite and Corequisite**

ENG-0995 Applied College Literacies, or appropriate score on English Placement Test; or departmental approval.

Note: ENG-0990 Language Fundamentals II taken prior to Fall 2021 will also meet prerequisite requirements.

## Outcomes

**Course Outcome(s):**

Identify plant anatomical structures and describe their physiological functions.

**Objective(s):**

1. Identify the structures and organelles of plant cells and explain the functions of each.
2. Describe the organization and function of roots, stems, and leaves.

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**Course Outcome(s):**

Identify and classify plants by taxonomy at different stages of growth.

**Objective(s):**

1. Compare the bryophytes, seedless vascular plants, gymnosperms, angiosperms and identify representative specimens for each major plant group at different stages of growth.
2. Compare monocots and dicots and identify representatives of each at different stages of growth.

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**Course Outcome(s):**

Identify sexual and asexual reproduction and apply basic methods for propagating plants.

**Objective(s):**

1. Compare and contrast common best practice propagation methods for each major plant group.
2. Apply basic propagation methods to a variety of plants.

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**Course Outcome(s):**

Describe basic plant nutrition and identify the causes and symptoms of nutrient deficiencies and select methods of supplementing the required nutrients.

**Objective(s):**

1. Describe the uptake and transport of water and nutrients in plants.
2. Identify the nutrients required by plants, the sources of each nutrient and describe the symptoms of nutrient deficiencies.
3. Describe the best practices for supplementing required nutrients.

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**Course Outcome(s):**

Determine optimum management practices for plant growth.

**Essential Learning Outcome Mapping:**

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

**Objective(s):**

1. Compare, contrast, and discuss current best practices for plant growth within the green industry.
2. Describe the major functions and commercial applications of plant hormones, including auxins, gibberellins, cytokinins, abscisic acid, and ethylene.
3. Explain the apical dominance theory.
4. Explain senescence, abscission, dormancy, germination, and flowering and describe the environmental and hormonal interactions related to these processes.

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**Course Outcome(s):**

Describe the fundamentals of plant genetics, diversity, and gene pool.

**Objective(s):**

1. Recognize the diversity and scientific organization of plants.
2. Explain the concepts of genetic succession, hybridization, and selective breeding.

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**Course Outcome(s):**

Identify careers in horticulture.

**Essential Learning Outcome Mapping:**

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

**Objective(s):**

1. Recognize the various professional pathways in horticulture.
2. Compare, contrast and discuss modern careers in horticulture.

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**Methods of Evaluation:**

1. Written Examinations
2. Out of Class Assignments
3. In Class Lab Assignments
4. Quizzes

**Course Content Outline:**

1. Biological Concepts
  - a. Biological Hierarchy
  - b. Characteristics of Life

- c. Levels of Classification
- d. Scientific Nomenclature
- 2. Plant Structure
  - a. Plant Cell Structure
  - b. Primary & Secondary Plant Growth
  - c. Tissue Structure
  - d. Root Structure & Function
  - e. Leaf Structure & Function
  - f. Flower Structure & Function
- 3. Plant Nutrition and Energy
  - a. Photosynthesis
  - b. Nitrogen Fixing Bacteria
  - c. Cell Transport
  - d. Absorption and movement of water and nutrients
  - e. Nutritional Requirements of Plants
- 4. Plant Reproduction
  - a. Sexual Reproduction
    - i. Fruit and Seed Production
  - b. Asexual Reproduction
    - i. Layering
    - ii. Grafting
    - iii. Tissue Culture
    - iv. Division
  - c. Hybridization of Plants
  - d. Selective Breeding
- 5. Plant Diversity
  - a. Evolution and adaptation
  - b. Bryophytes
  - c. Seedless Vascular Plants
  - d. Gymnosperms
  - e. Angiosperms
  - f. Plant Genetics
- 6. Careers in Horticulture
  - a. Economic Impact of Horticulture
  - b. Career Opportunities and Pathways

## Resources

Brian Capon. *Botany for Gardeners*. 3.

### Resources Other

Plants in Motion – created by Roger P. Hangarter, Dept. of Biology, Indiana University:

<http://plantsinmotion.bio.indiana.edu/plantmotion/starthere.html>

Plant Structure and Growth – Pearson BioCoach Activity: [http://www.phschool.com/science/biology\\_place/biocoach/plants/intro.html](http://www.phschool.com/science/biology_place/biocoach/plants/intro.html)

Plant Transpiration Virtual Lab – McGraw-Hill Virtual Labs:

[http://mhhe.com/biosci/genbio/virtual\\_labs/BL\\_10/BL\\_10.html](http://mhhe.com/biosci/genbio/virtual_labs/BL_10/BL_10.html)

Tom Volk's Fungi – Dept. of Biology, University of Wisconsin:

[http://botit.botany.wisc.edu/toms\\_fungi/](http://botit.botany.wisc.edu/toms_fungi/)

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