

# Statewide Dual Credit Learning Objectives

## Introduction to Plant Science

### ***Subjects Covered***

1. Plant Anatomy and Physiology
2. Plant Reproduction/Propagation
3. Plant Injuries and Their Control/Integrated Pest Management
4. Plant Nutrition and Culture
5. Plant Classifications (Forage/Food)
6. Cropping/Growing Systems
7. Greenhouse Growing Structures/Production Techniques
8. Beginning and Promoting an Ornamental Horticulture Business/Career
9. Human Relations/Personnel Management

### ***Learning Objectives***

#### **1. Plant Anatomy and Physiology**

- a. Summarize the role of each cell structure in plant development.
- b. Evaluate the importance of various plant tissues in plant development.
- c. Summarize the contribution of each organ within the plant body.
- d. Evaluate the stages of plant growth and development.
- e. Compare the various stages of plant reproduction.
- f. Recommend appropriate plant growth regulators for various plants.

#### **2. Soil and Climate**

- a. Assess the significance of Solar Radiation to plant growth.
- b. Illustrate the hydrological cycle and discuss its significance to plant growth and development.
- c. Analyze the contributions of temperature and air movement to the total atmospheric composition.
- d. Discuss the factors involved in soil formation.
- e. Examine the physical and chemical properties of the soil.
- f. Appraise the importance of organic substances to soil health.
- g. Identify factors that lead to soil degradation.

### **3. Plant Reproduction/Propagation**

- a. Develop an understanding of plant genetic.
- b. Contrast mitosis and meiosis and explain the significance of each.
- c. Explain the importance of plant breeding.
- d. Hypothesize the future influence of biotechnology on the plant industry.
- e. Evaluate the significance of sexual propagation of plants.
- f. Assess the effectiveness of various types of asexual propagation of plants.
- g. Defend the need for Germplasm.

### **4. Plant Injuries and Their Control/Integrated Pest Management**

- a. Discuss the effects of pesticides on the environment and human health.
- b. Evaluate the significance of Integrated Pest Management.
- c. Properly identify various weeds, insects, mites, and plant diseases.
- d. Compare the various methods of injury control.
- e. Suggest appropriate control measures for plant injuries.
- f. Align the stages of the disease cycle.
- g. Demonstrate proper use of Personal Protective Equipment (PPE).

### **5. Plant Nutrition and Culture**

- a. Summarize the role of water in maintaining plant health.
- b. Identify the essential nutrients needed for plant growth.
- c. Distinguish the difference in major and minor plant nutrients.
- d. Discuss the influence of soil/media pH on nutrient availability.
- e. Choose an appropriate fertilizer and application method.

### **6. Plant Classifications (Forage/Food)**

- a. Identify examples of field crops, forage crops, vegetable crops and fruit crops.
- b. Identify common uses of field crops, forage crops, vegetable crops and fruit crops.
- c. Describe common production practices for field crops, forage crops, vegetable crops and fruit crops.
- d. Evaluate the economic impact of field crops, forage crops, vegetable crops and fruit crops.

### **7. Cropping/Growing Systems**

- a. Evaluate the factors that influence site selection of a nursery.
- b. Compare various growing methods for nursery production.
- c. Identify various environmental factors that influence landscape plant selection.
- d. Choose appropriate irrigation systems for a variety of plant production systems.

### **8. Greenhouse Growing Structures/Production Techniques**

- a. Evaluate the factors that influence site selection of a greenhouse.
- b. Identify strengths and weaknesses of various greenhouse structures.
- c. Discuss the advantage of automated environmental controls in a greenhouse.
- d. Create a greenhouse growing schedule.
- e. Calculate the economic value of a variety of greenhouse crops.
- f. Design a layout for a greenhouse structure.
- g. Defend the benefits of hydroponic production in comparison to soil-based production.
- h. Formulate a list of materials needed for the construction of a hydroponic system.

### **9. Beginning and Promoting an Ornamental Horticulture Business/Career**

- a. Evaluate the factors in choosing a horticultural production system.
- b. Maintain adequate records that support sound, business decisions.
- c. Develop a post-harvest handling plan for a horticultural crop.
- d. Present a marketing plan for a horticultural business.
- e. Design an effective transportation plan for a horticultural business.

### **10. Human Relations/Personnel Management**

- a. Identify leadership skills necessary for effective management.
- b. Demonstrate adequate communication skills.
- c. Role-Play a sale that illustrates good salesmanship.