

**Florida Department of Education  
CLUSTER CURRICULUM FRAMEWORK**

**Cluster Title:** Environmental Horticulture Science and Services  
**Cluster Type:** Job Preparatory  
**Occupational Area:** Agriscience and Natural Resources  
**Components:** Core, Five Programs, Eight Completion Points

	Secondary	PSAV
Grade Level	9-12, 30, 31	30, 31
Facility Code	203	203
CTSO	FFA	PAS
Coop Method	Yes	Yes
Apprenticeship	Yes	Yes

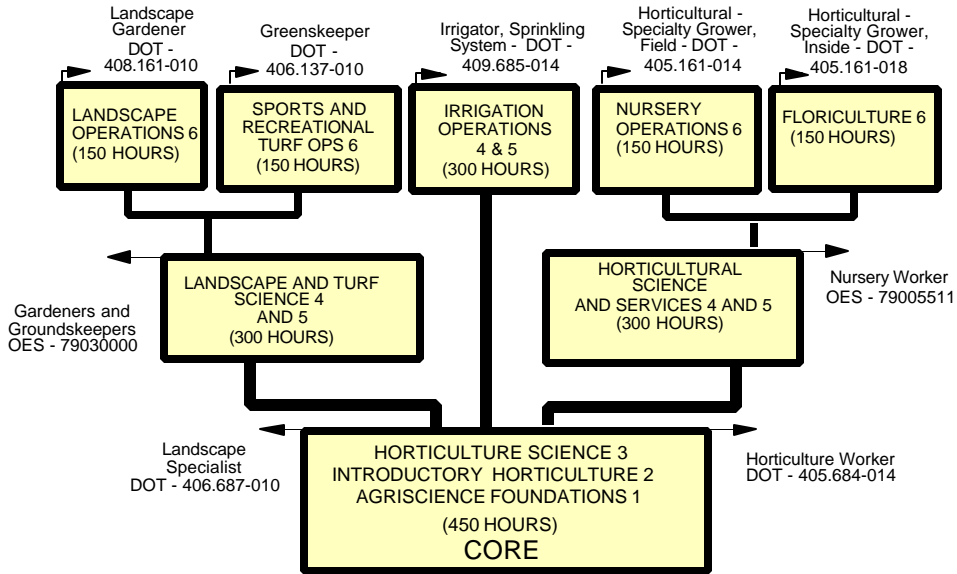
I. **PURPOSE:** The Environmental Horticulture Science and Services cluster is designed to prepare students for employment or advanced training in the horticulture and landscape industries. This cluster focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the horticulture industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety and environmental issues.

II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of a core, five programs and eight completion points. When the recommended sequence is followed, the structure will allow students to complete at specified points for employment or remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or exit as an occupational completer.

Students must complete the core, or demonstrate mastery of skill standards contained in the core, before advancing in either of the programs.

The following diagram illustrates the **CLUSTER STRUCTURE:**

# ENVIRONMENTAL HORTICULTURE SCIENCE AND SERVICES CLUSTER



When offered at the secondary level, the programs in this cluster consist of the following courses, which include the core:

## FLORICULTURE

### CORE

- 8106810 - Agriscience Foundations 1 - 1 secondary credit
- 8121510 - Introductory Horticulture 2 - 1 secondary credit
- 8121520 - Horticultural Science 3 - 1 secondary credit

- 8121610 - Horticulture Science and Services 4 - 1 secondary credit
- 8121620 - Horticulture Science and Services 5 - 1 secondary credit

- 8121010 - Floriculture 6 - 1 secondary credit

## IRRIGATION OPERATIONS

### CORE

- 8106810 - Agriscience Foundations 1 - 1 secondary credit
- 8121510 - Introductory Horticulture 2 - 1 secondary credit
- 8121520 - Horticultural Science 3 - 1 secondary credit

- 8123210 - Irrigation Operations 4 - 1 secondary credit
- 8123220 - Irrigation Operations 5 - 1 secondary credit

LANDSCAPE OPERATIONS

CORE

- 8106810 - Agriscience Foundations 1 - 1 secondary credit
- 8121510 - Introductory Horticulture 2 - 1 secondary credit
- 8121520 - Horticultural Science 3 - 1 secondary credit
  
- 8121310 - Landscape and Turf Science 4 - 1 secondary credit
- 8121320 - Landscape and Turf Science 5 - 1 secondary credit
  
- 8121330 - Landscape Operations 6 - 1 secondary credit

NURSERY OPERATIONS

CORE

- 8106810 - Agriscience Foundations 1 - 1 secondary credit
- 8121510 - Introductory Horticulture 2 - 1 secondary credit
- 8121520 - Horticultural Science 3 - 1 secondary credit
  
- 8121610 - Horticulture Science and Services 4 - 1 secondary credit
- 8121620 - Horticulture Science and Services 5 - 1 secondary credit
  
- 8121630 - Nursery Operations 6 - 1 secondary Credit

SPORTS AND RECREATIONAL TURF OPERATIONS

CORE

- 8106810 - Agriscience Foundations 1 - 1 secondary credit
- 8121510 - Introductory Horticulture 2 - 1 secondary credit
- 8121520 - Horticultural Science 3 - 1 secondary credit
  
- 8121310 - Landscape and Turf Science 4 - 1 secondary credit
- 8121320 - Landscape and Turf Science 5 - 1 secondary credit
  
- 8121410 - Sports and Recreational Turf Operations 6 - 1 secondary credit

III. **SPECIAL NOTE:** FFA (for secondary) and the National Postsecondary Agricultural Student Organization (for postsecondary) are the appropriate Career Technical Student Organizations for providing leadership training and for reinforcing specific vocational skills. Career Technical Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, FAC. Participation in appropriate industry related organizations should be encouraged.

Classroom, shop, and plant nursery/land laboratory activities are an integral part of this cluster including the general maintenance and safe use of all instructional resources.

The programs in this cluster may be offered in PSAV courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

Planned and supervised instructional activities must be provided through one or more of the following: (1) directed laboratory experience, (2) student projects, (3) placement for experience, (4) cooperative experience.

Because of the production and marketing cycle of the horticultural and landscape industries, these programs require individual instruction and supervision of students for the entire period beyond the 180-day school year.

Cooperative training - OJT is appropriate for this program. Whenever cooperative training - OJT is offered, the following are required for each student: a training plan, signed by the student, teacher, and employer, which includes instructional objectives and a list of on-the-job and in-school learning experiences; a workstation that reflects equipment, skills, and tasks that are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC., the minimum basic skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed at the program level or at the occupational completion points within the program. These grade level numbers correspond to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion from the program, remediation should be provided concurrently in Vocational Instructional Preparation (VIP). Please reference the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified on an individual basis. The job or jobs for which the student is being trained should be reflected in the student's desired post school outcome statement on the Transition Individual Educational Plan (Transition IEP).

SCANS Competencies: Instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the methods to improve students' personal qualities and high-order thinking skills.

Equipment List: A generic equipment list is available for this program and is printed in a supplement to this document.

**Florida Department of Education  
INTENDED OUTCOMES**

**Program Title: Floriculture Program**

	Secondary	PSAV
<b>Program Number</b>	<b>8121000</b>	<b>A010603</b>
CIP Number	0101.060601	0101.060601
Grade Level	9-12, 30, 31	30, 31
Standard Length	6 credits	900 hours
Certification	VOC AGRI @4 AGRICULTUR 1 @2 AGRI @4 HORTICULT #7	VOC AGRI @4 AGRICULTUR 1 @2 AGRI @2 @4 HORTICULT @7 G
Basic Skills		
Math		9
Language		9
Reading		9

**INTENDED OUTCOMES:** After successfully completing appropriate outcomes for each occupational completion point of this program, the student will be able to perform the following:

**OCCUPATIONAL COMPLETION POINT - DATA CODE A**

HORTICULTURE WORKER (AGRI) I - DOT Code 405.684-014 (CORE)

- 01.0 Describe the socioeconomic role of the agricultural industry.
- 02.0 Apply scientific and technological principles to the agricultural industry.
- 03.0 Practice agricultural safety.
- 04.0 Demonstrate the use of tools, equipment and instruments in the agricultural industry.
- 05.0 Describe the principles of integrated pest management (IPM).
- 06.0 Describe the principles of plant and/or animal growth and reproduction.
- 07.0 Apply business skills and economic principles to the agricultural industry.
- 08.0 Explain the basic marketing processes in the agricultural industry.
- 09.0 Demonstrate human relations, communications, and leadership skills.
- 10.0 Describe the horticulture industry.
- 11.0 Identify and classify plants.
- 12.0 Propagate plants.
- 13.0 Identify growing media and apply fertilizers.
- 14.0 Irrigate plants and turf.
- 15.0 Describe pest control approaches.
- 16.0 Control plant growth.
- 17.0 Harvest, transport, and install plant materials.
- 18.0 Operate, repair, and maintain tools and equipment.
- 19.0 Demonstrate leadership, employability, communications, and human relations skills.

**OCCUPATIONAL COMPLETION POINT - DATA CODE B**

NURSERY WORKER - OES Code 79005511

- 20.0 Identify and classify plants.
- 21.0 Control pests.
- 22.0 Operate, repair, and maintain tools and equipment.
- 23.0 Prepare growing media.
- 24.0 Irrigate plants.
- 25.0 Fertilize plant materials.
- 26.0 Maintain and analyze records.

**OCCUPATIONAL COMPLETION POINT - DATA CODE C**

HORTICULTURAL-SPECIALTY GROWER, INSIDE - DOT Code 405.161-018

- 27.0 Control plant growth.
- 28.0 Operate, repair, and maintain floriculture tools and equipment.
- 29.0 Evaluate growing media.
- 30.0 Harvest, store, package, and ship floriculture materials.
- 31.0 Market floriculture materials.

**Florida Department of Education  
STUDENT PERFORMANCE STANDARDS**

**Program Title:** Floriculture  
**Secondary Number:** 8121000  
**Postsecondary Number:** A010603

***OCCUPATIONAL COMPLETION POINT - DATA CODE A***

HORTICULTURE WORKER (AGRI) I - DOT Code 405.684-014 (CORE)

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
- 02.12 Explain the flow of energy from the sun through agricultural systems.
- 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
- 02.14 Apply principles of waste management to environmental problems common to agricultural systems.

- 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
  - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
  - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
  - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
  - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
  - 03.04 Describe symptoms of pesticide poisoning.
  - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
  - 03.06 Select, mix, and apply a nonrestricted chemical according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
  - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
  - 03.08 Identify the proper disposal of containers and residual pesticides.
  - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
  - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
  - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
  - 04.04 Demonstrate the ability to use an equipment manual.
  - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
  - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
  - 05.02 Identify and select an appropriate control for each type of pest and/or weed.
  - 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:



For plant:

- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.

For animal:

- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
- 06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.

- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
  - 09.07 Recognize and demonstrate communications skills in the workplace.
  - 09.08 Demonstrate effective telephone skills.
- 10.0 DESCRIBE THE HORTICULTURE INDUSTRY--The student will be able to:
- 10.01 Describe the importance of horticulture to the American and global economies.
  - 10.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.
  - 10.03 Describe the importance of horticulture to the environment.
- 11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:
- 11.01 Identify plants by scientific and common names.
  - 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt).
- 12.0 PROPAGATE PLANTS--The student will be able to:
- 12.01 Identify propagating and growing facilities and structures.
  - 12.02 Prepare propagation media.
  - 12.03 Select and collect propagation materials.
  - 12.04 Demonstrate propagation by sexual and asexual methods.
  - 12.05 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light).
- 13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:
- 13.01 Identify soil and media materials.
  - 13.02 Identify nutritional needs of plants.
  - 13.03 Identify symptoms of nutritional deficiencies and toxicities of plants.
  - 13.04 Identify types and kinds of fertilizers.
  - 13.05 Identify methods of distributing fertilizers.
  - 13.06 Interpret analysis of fertilizer from information on tag or container.
  - 13.07 Apply fertilizer and soil amendments.
- 14.0 IRRIGATE PLANTS AND TURF--The student will be able to:
- 14.01 Identify water needs of plants.
  - 14.02 Irrigate plants at recommended rates.
- 15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:
- 15.01 Identify common pests of plants (e.g., diseases, weeds, nematodes).
  - 15.02 Describe life cycles of common pests of plants.

- 15.03 Classify insects according to feeding habits.
  - 15.04 Describe biological, chemical, and cultural methods of controlling plant pests.
- 16.0 CONTROL PLANT GROWTH--The student will be able to:
- 16.01 Identify methods of pruning plants to achieve desired growth and to maintain health.
  - 16.02 Identify appropriate time to prune plants.
  - 16.03 Identify and select pruning tools for the task.
- 17.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:
- 17.01 Determine requirements for preserving plant viability.
  - 17.02 Install containerized plant materials.
  - 17.03 Select and prepare plants for transportation and transplanting.
- 18.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:
- 18.01 Perform equipment preoperational check.
  - 18.02 Identify, maintain, and safely operate hand tools and power tools.
- 19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:
- 19.01 Conduct group meetings using parliamentary procedure and public speaking skills.
  - 19.02 Identify acceptable work habits and personal characteristics.
  - 19.03 Identify acceptable employee hygiene habits.
  - 19.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
- OCCUPATIONAL COMPLETION POINT - DATA CODE B**  
 NURSERY WORKER - OES Code 79005505
- 20.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:
- 20.01 Classify plants as monocots or dicots.
  - 20.02 Classify plants as annuals, biennials, and perennials.
  - 20.03 Identify plants appropriate to a region.
  - 20.04 Classify plants according to growth habit.
  - 20.05 Prepare propagation materials (seeds, cuttings, etc.) for planting.
  - 20.06 Apply growth stimulants to propagation materials.
  - 20.07 Demonstrate sanitation and safety practices when propagating.
  - 20.08 Prepare flats and seedbeds and plant seeds.
- 21.0 CONTROL PESTS--The student will be able to:
- 21.01 Report insect and disease damage.
  - 21.02 Identify chemical spray damage.

- 21.03 Select proper IPM practices (biological, chemical and physical) for control of insects, diseases, vertebrates and weeds.
  - 21.04 Evaluate the efficacy and phytotoxicity of a chemical prior to inclusion in a growing program.
- 22.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:
- 22.01 Identify, operate, and maintain tractor and power equipment.
  - 22.02 Load, secure, and transport equipment.
- 23.0 PREPARE GROWING MEDIA--The student will be able to:
- 23.01 Sterilize rooting, potting, and growing media.
  - 23.02 Adjust pH and nutritional levels of media.
  - 23.03 Fill and level benches and pots with media.
  - 23.04 Demonstrate sanitation practices when handling and storing plant media materials.
- 24.0 IRRIGATE PLANTS--The student will be able to:
- 24.01 Set up an irrigation system for a propagation area.
  - 24.02 Set up an irrigation system for a growing structure.
  - 24.03 Set up an irrigation system for a retail display.
  - 24.04 Maintain and repair an irrigation system.
  - 24.05 Identify and use various types of irrigation systems (low volume, ebb and flow, drip, mat, recirculating, etc.).
- 25.0 FERTILIZE PLANT MATERIALS--The student will be able to:
- 25.01 Collect soil and leaf tissue samples for analysis.
  - 25.02 Interpret and evaluate the results of soil and leaf tissue analysis and determine corrective actions.
  - 25.03 Demonstrate proper handling and storage of fertilizers, observing safety precautions.
  - 25.04 Evaluate, operate, and maintain fertilizer distribution equipment.
  - 25.05 Develop a fertilization schedule for various plant species.
  - 25.06 Determine rate of fertilizer application.
- 26.0 MAINTAIN AND ANALYZE RECORDS--The student will be able to:
- 26.01 Analyze and maintain production and sales records.
  - 26.02 Determine plant production costs.
  - 26.03 Prepare a budget.
  - 26.04 Prepare and maintain financial records using computer software.
  - 26.05 Maintain current plant inventory.
  - 26.06 Maintain job records, daily log sheets, and inventory.

**OCCUPATIONAL COMPLETION POINT - DATA CODE C**

HORTICULTURAL-SPECIALTY GROWER, INSIDE - DOT Code 405.161-018

- 27.0 CONTROL PLANT GROWTH--The student will be able to:

- 27.01 Pinch and disbud flowering plants.
  - 27.02 Apply growth-regulating chemicals.
  - 27.03 Install black cloth to regulate photoperiod.
  - 27.04 Prune plants to achieve desired growth.
  - 27.05 Regulate light levels in growing structures.
- 28.0 OPERATE, REPAIR, AND MAINTAIN FLORICULTURE TOOLS AND EQUIPMENT--The student will be able to:
- 28.01 Determine equipment needs for the job.
  - 28.02 Maintain and repair electric motors and equipment.
  - 28.03 Order parts and supplies.
  - 28.04 Build or repair frames, benches, and other greenhouse or field structures.
- 29.0 EVALUATE GROWING MEDIA--The student will be able to:
- 29.01 Evaluate commercial media and containers.
- 30.0 HARVEST, STORE, PACKAGE, AND SHIP FLORICULTURE MATERIALS--The student will be able to:
- 30.01 Select and assemble floriculture materials utilizing industry-accepted grades and standards.
  - 30.02 Cut, count and bunch cut flowers and other plant materials.
  - 30.03 Prepare for shipment, loading, and transporting harvested plant materials.
  - 30.04 Demonstrate safety practices when harvesting, processing, and shipping.
  - 30.05 Determine proper packaging and environment for plant transportation.
- 31.0 MARKET FLORICULTURE MATERIALS--The student will be able to:
- 31.01 Label and merchandise floriculture materials including plant care tags, bar codes, shipping instructions, etc.
  - 31.02 Maintain clean and attractive merchandising and display areas.
  - 31.03 Use various advertising methods to promote sales.
  - 31.04 Take telephone orders.
  - 31.05 Use a sales catalog.
  - 31.06 Greet customers and close sales.
  - 31.07 Describe care and use of product to customer.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

Course Number: 8106810  
Course Title: Agriscience Foundations I  
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as a core and is designed to develop competencies in the areas of agricultural history; global importance of agriculture; career opportunities; applied scientific and technological concepts; ecosystems; agricultural safety; principles of integrated pest management; principles of plant and animal growth; economic principles; agricultural marketing; and human relations skills.

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.

- 02.12 Explain the flow of energy from the sun through agricultural systems.
  - 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
  - 02.14 Apply principles of waste management to environmental problems common to agricultural systems.
  - 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
  - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
  - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
  - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
  - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
  - 03.04 Describe symptoms of pesticide poisoning.
  - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
  - 03.06 Select, mix, and apply a nonrestricted chemical according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
  - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
  - 03.08 Identify the proper disposal of containers and residual pesticides.
  - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
  - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
  - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
  - 04.04 Demonstrate the ability to use an equipment manual.
  - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
  - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
  - 05.02 Identify and select an appropriate control for each type of pest and/or weed.

- 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:
- For plant:
- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.
- For animal:
- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
- 06.09 Describe the process of animal reproduction.
- 07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:
- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.
- 08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.
- 09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:
- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.



- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.
- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
- 09.07 Recognize and demonstrate communications skills in the workplace.
- 09.08 Demonstrate effective telephone skills.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

Course Number: 8121510  
Course Title: Introductory Horticulture 2  
Course Credit: 1

**COURSE DESCRIPTION:**

This course is designed to develop competencies in the areas of career opportunities; global importance of agriculture; plant classification; propagation; growing media; nutritional needs; fertilization; irrigation; pest identification; pest control, pruning; plant installation; transplanting; safe hand-tool use; and employability skills.

10.0 DESCRIBE THE HORTICULTURE INDUSTRY--The student will be able to:

- 10.01 Describe the importance of horticulture to the American and global economies.
- 10.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.
- 10.03 Describe the importance of horticulture to the environment.

11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 11.01 Identify plants by scientific and common names. Level I.
- 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt). Level I.

12.0 PROPAGATE PLANTS--The student will be able to:

- 12.01 Identify propagating and growing facilities and structures.
- 12.02 Prepare propagation media.
- 12.03 Select and collect propagation materials.
- 12.04 Demonstrate propagation by sexual and asexual methods.
- 12.05 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light).

13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

- 13.01 Identify soil and media materials.
- 13.02 Identify nutritional needs of plants.
- 13.03 Identify symptoms of nutritional deficiencies and toxicities of plants.
- 13.04 Identify types and kinds of fertilizers.
- 13.05 Identify methods of distributing fertilizers.

14.0 IRRIGATE PLANTS AND TURF--The student will be able to:

- 14.01 Identify water needs of plants.
- 14.02 Irrigate plants at recommended rates.
  
- 15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:
  - 15.01 Identify common pests of plants (e.g., diseases, weeds, nematodes).
  - 15.02 Describe life cycles of common pests of plants.
  
- 19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:
  - 19.01 Conduct group meetings using parliamentary procedure and public speaking skills.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121520  
**Course Title:** Horticulture Science 3  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to develop competencies in the areas of industry regulations; plant classification; plant transportation; soil sampling and analysis; fertilizer calculations; recording keeping; irrigation components, water quality; drainage; integrated pest management; pesticide safety and regulations; equipment calibration; chemical growth regulators; xeriscaping; integrated landscape management; safe use of power equipment; record keeping; and employability skills.

11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 11.01 Identify plants by scientific and common names.
- 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt).

13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

- 13.06 Interpret analysis of fertilizer from information on tag or container.
- 13.07 Apply fertilizer and soil amendments.

15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:

- 15.03 Classify insects according to feeding habits.
- 15.04 Describe biological, chemical, and cultural methods of controlling plant pests.

16.0 CONTROL PLANT GROWTH--The student will be able to:

- 16.01 Identify methods of pruning plants to achieve desired growth and to maintain health.
- 16.02 Identify appropriate time to prune plants.
- 16.03 Identify and select pruning tools for the task.

17.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:

- 17.01 Determine requirements for preserving plant viability.
- 17.02 Install containerized plant materials.
- 17.03 Select and prepare plants for transportation and transplanting.

18.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

- 18.01 Perform equipment preoperational check.
- 18.02 Identify, maintain, and safely operate hand tools and power tools.

19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:

- 19.02 Identify acceptable work habits and personal characteristics.
- 19.03 Identify acceptable employee hygiene habits.
- 19.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121610  
**Course Title:** Horticulture Science and Services 4  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of plant identification and classification; growing media; irrigation system set up; and maintaining and analyzing records including production costs.

20.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 20.01 Classify plants as monocots or dicots.
- 20.02 Classify plants as annuals, biennials, and perennials.
- 20.03 Identify plants appropriate to a region.
- 20.04 Classify plants according to growth habit.
- 20.05 Prepare propagation materials (seeds, cuttings, etc.) for planting.
- 20.06 Apply growth stimulants to propagation materials.
- 20.07 Demonstrate sanitation and safety practices when propagating.
- 20.08 Prepare flats and seedbeds and plant seeds.

22.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

- 22.01 Identify, operate, and maintain tractor and power equipment.
- 22.02 Load, secure, and transport equipment.

23.0 PREPARE GROWING MEDIA--The student will be able to:

- 23.01 Sterilize rooting, potting, and growing media.
- 23.02 Adjust pH and nutritional levels of media.
- 23.03 Fill and level benches and pots with media.
- 23.04 Demonstrate sanitation practices when handling and storing plant media materials.

24.0 IRRIGATE PLANTS--The student will be able to:

- 24.01 Set up an irrigation system for a propagation area.
- 24.02 Set up an irrigation system for a growing structure.
- 24.03 Set up an irrigation system for a retail display.

26.0 MAINTAIN AND ANALYZE RECORDS--The student will be able to:

- 26.01 Analyze and maintain production and sales records.
- 26.02 Determine plant production costs.
- 26.03 Prepare a budget.
- 26.04 Prepare and maintain financial records using computer software.
- 26.05 Maintain current plant inventory.

26.06 Maintain job records, daily log sheets, and inventory.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121620  
**Course Title:** Horticulture Science and Services 5  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of identifying and evaluating IPM practices; maintaining and repairing irrigation systems; analyzing and evaluating fertilizer usage.

21.0 CONTROL PESTS--The student will be able to:

- 21.01 Report insect and disease damage.
- 21.02 Identify chemical spray damage.
- 21.03 Select proper IPM practices (biological, chemical and physical) for control of insects, diseases, vertebrates and weeds.
- 21.04 Evaluate the efficacy and phytotoxicity of a chemical prior to inclusion in a growing program.

24.0 IRRIGATE PLANTS--The student will be able to:

- 24.04 Maintain and repair an irrigation system.
- 24.05 Identify and use various types of irrigation systems (low volume, ebb and flow, drip, mat, recirculating, etc.).

25.0 FERTILIZE PLANT MATERIALS--The student will be able to:

- 25.01 Collect soil and leaf tissue samples for analysis.
- 25.02 Interpret and evaluate the results of soil and leaf tissue analysis and determine corrective actions.
- 25.03 Demonstrate proper handling and storage of fertilizers, observing safety precautions.
- 25.04 Evaluate, operate, and maintain fertilizer distribution equipment.
- 25.05 Develop a fertilization schedule for various plant species.
- 25.06 Determine rate of fertilizer application.



Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

Course Number: 8121010  
Course Title: Floriculture 6  
Course Credit: 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of controlling plant growth; use and maintenance of floriculture tools and equipment; harvesting, packaging, and shipping floriculture materials; and marketing.

27.0 CONTROL PLANT GROWTH--The student will be able to:

- 27.01 Pinch and disbud flowering plants.
- 27.02 Apply growth-regulating chemicals.
- 27.03 Install black cloth to regulate photoperiod.
- 27.04 Prune plants to achieve desired growth.
- 27.05 Regulate light levels in growing structures.

28.0 OPERATE, REPAIR, AND MAINTAIN FLORICULTURE TOOLS AND EQUIPMENT--The student will be able to:

- 28.01 Determine equipment needs for the job.
- 28.02 Maintain and repair electric motors and equipment.
- 28.03 Order parts and supplies.
- 28.04 Build or repair frames, benches, and other greenhouse or field structures.

29.0 EVALUATE GROWING MEDIA--The student will be able to:

- 29.01 Evaluate commercial media and containers.

30.0 HARVEST, STORE, PACKAGE, AND SHIP FLORICULTURE MATERIALS--The student will be able to:

- 30.01 Select and assemble floriculture materials utilizing industry-accepted grades and standards.
- 30.02 Cut, count and bunch cut flowers and other plant materials.
- 30.03 Prepare for shipment, loading, and transporting harvested plant materials.
- 30.04 Demonstrate safety practices when harvesting, processing, and shipping.
- 30.05 Determine proper packaging and environment for plant transportation.

31.0 MARKET FLORICULTURE MATERIALS--The student will be able to:

- 31.01 Label and merchandise floriculture materials including plant care tags, bar codes, shipping instructions, etc.
- 31.02 Maintain clean and attractive merchandising and display areas.

- 31.03 Use various advertising methods to promote sales.
- 31.04 Take telephone orders.
- 31.05 Use a sales catalog.
- 31.06 Greet customers and close sales.
- 31.07 Describe care and use of product to customer.

**Florida Department of Education  
INTENDED OUTCOMES**

**Program Title: Irrigation Operations Program**

	SECONDARY	PSAV
<b>Program Number</b>	<b>8123200</b>	<b>A010206</b>
CIP Number	0101.020600	0101.020600
Grade Level	9-12, 30, 31	30, 31
Standard Length	5 credits	750 hours
Certification	VOC AGRI @4 AGRICULTUR 1 @2 AGRI @4 HORTICULT #7	VOC AGRI @4 AGRICULTUR 1 @2 AGRI @2 @4 HORTICULT @7 G
Basic Skills		
Math		9
Language		9
Reading		9

**INTENDED OUTCOMES:** After successfully completing appropriate outcomes for each occupational completion point of this program, the student will be able to perform the following:

**OCCUPATIONAL COMPLETION POINT - DATA CODE A**

HORTICULTURE WORKER (AGRI) I - DOT Code 405.684-014 (CORE)

- 01.0 Describe the socioeconomic role of the agricultural industry.
- 02.0 Apply scientific and technological principles to the agricultural industry.
- 03.0 Practice agricultural safety.
- 04.0 Demonstrate the use of tools, equipment and instruments in the agricultural industry.
- 05.0 Describe the principles of integrated pest management (IPM).
- 06.0 Describe the principles of plant and/or animal growth and reproduction.
- 07.0 Apply business skills and economic principles to the agricultural industry.
- 08.0 Explain the basic marketing processes in the agricultural industry.
- 09.0 Demonstrate human relations, communications, and leadership skills.
- 10.0 Describe the horticulture industry.
- 11.0 Identify and classify plants.
- 12.0 Propagate plants.
- 13.0 Identify growing media and apply fertilizers.
- 14.0 Irrigate plants and turf.
- 15.0 Describe pest control approaches.
- 16.0 Control plant growth.
- 17.0 Harvest, transport, and install plant materials.
- 18.0 Operate, repair, and maintain tools and equipment.
- 19.0 Demonstrate leadership, employability, communications, and human relations skills.

**OCCUPATIONAL COMPLETION POINT - DATA CODE B**

IRRIGATOR, SPRINKLING SYSTEM (AGRI) - DOT Code 409.685-014

- 20.0 Identify irrigation system types and water sources.
- 21.0 Install piping and heads.
- 22.0 Install valves, timers, rain shut-offs, moisture sensors, and suction lines.
- 23.0 Test irrigation systems.

**Florida Department of Education  
STUDENT PERFORMANCE STANDARDS**

**Program Title:** Irrigation Operations  
**Secondary Number:** 8123200  
**Postsecondary Number:** A010206

**OCCUPATIONAL COMPLETION POINT - DATA CODE A**

HORTICULTURE WORKER (AGRI) I - DOT Code 405.684-014 (CORE)

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
- 02.12 Explain the flow of energy from the sun through agricultural systems.
- 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.

- 02.14 Apply principles of waste management to environmental problems common to agricultural systems.
  - 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
  - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
  - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
  - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
  - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
  - 03.04 Describe symptoms of pesticide poisoning.
  - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
  - 03.06 Select, mix, and apply a nonrestricted chemical according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
  - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
  - 03.08 Identify the proper disposal of containers and residual pesticides.
  - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
  - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
  - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
  - 04.04 Demonstrate the ability to use an equipment manual.
  - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
  - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
  - 05.02 Identify and select an appropriate control for each type of pest and/or weed.
  - 05.03 Describe the principles and benefits of integrated pest management.

06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.

For animal:

- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
- 06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.

- 09.05 Conduct small informal and formal group meetings.
  - 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
  - 09.07 Recognize and demonstrate communications skills in the workplace.
  - 09.08 Demonstrate effective telephone skills.
- 10.0 DESCRIBE THE HORTICULTURE INDUSTRY--The student will be able to:
- 10.01 Describe the importance of horticulture to the American and global economies.
  - 10.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.
  - 10.03 Describe the importance of horticulture to the environment.
- 11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:
- 11.01 Identify plants by scientific and common names.
  - 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt).
- 12.0 PROPAGATE PLANTS--The student will be able to:
- 12.01 Identify propagating and growing facilities and structures.
  - 12.02 Prepare propagation media.
  - 12.03 Select and collect propagation materials.
  - 12.04 Demonstrate propagation by sexual and asexual methods.
  - 12.05 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light).
- 13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:
- 13.01 Identify soil and media materials.
  - 13.02 Identify nutritional needs of plants.
  - 13.03 Identify symptoms of nutritional deficiencies and toxicities of plants.
  - 13.04 Identify types and kinds of fertilizers.
  - 13.05 Identify methods of distributing fertilizers.
  - 13.06 Interpret analysis of fertilizer from information on tag or container.
  - 13.07 Apply fertilizer and soil amendments.
- 14.0 IRRIGATE PLANTS AND TURF--The student will be able to:
- 14.01 Identify water needs of plants.
  - 14.02 Irrigate plants at recommended rates.
- 15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:
- 15.01 Identify common pests of plants (e.g., diseases, weeds, nematodes).



- 15.02 Describe life cycles of common pests of plants.
  - 15.03 Classify insects according to feeding habits.
  - 15.04 Describe biological, chemical, and cultural methods of controlling plant pests.
- 16.0 CONTROL PLANT GROWTH--The student will be able to:
- 16.01 Identify methods of pruning plants to achieve desired growth and to maintain health.
  - 16.02 Identify appropriate time to prune plants.
  - 16.03 Identify and select pruning tools for the task.
- 17.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:
- 17.01 Determine requirements for preserving plant viability.
  - 17.02 Install containerized plant materials.
  - 17.03 Select and prepare plants for transportation and transplanting.
- 18.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:
- 18.01 Perform equipment preoperational check.
  - 18.02 Identify, maintain, and safely operate hand tools and power tools.
- 19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:
- 19.01 Conduct group meetings using parliamentary procedure and public speaking skills.
  - 19.02 Identify acceptable work habits and personal characteristics.
  - 19.03 Identify acceptable employee hygiene habits.
  - 19.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
- OCCUPATIONAL COMPLETION POINT - DATA CODE B**  
IRRIGATOR, SPRINKLING SYSTEM (AGRI) - DOT Code 409.685-014
- 20.0 IDENTIFY IRRIGATION SYSTEM TYPES AND WATER SOURCES--The student will be able to:
- 20.01 Identify various water sources used for irrigation.
  - 20.02 Identify various irrigation system types (i.e., rotary, spray, flood, drip).
  - 20.03 Identify various control systems for irrigation (i.e., electric, hydraulic, manual).
  - 20.04 Determine various pump types and their functions (i.e., centrifugal, turbine, submersible).
  - 20.05 Identify various water conservation systems and xeriscape principles used in irrigation.
  - 20.06 Describe concepts of zoning, precipitation rates, pressure, volume, and velocity.

21.0 INSTALL PIPING AND HEADS--The student will be able to:

- 21.01 Operate a trencher and install trenching for main and lateral lines.
- 21.02 Backfill and compact trenches.
- 21.03 Install PVC and galvanized pipe sleeving.
- 21.04 Measure, cut, clean, prime, and glue PVC pipe (up to 3").
- 21.05 Glue and assemble fitting and pipe and swing joints.
- 21.06 Identify and install low voltage direct burial wiring.
- 21.07 Install heads--rotary, spray, and quick coupler.
- 21.08 Install head nozzles, adjust flow rates, set radius and patterns of coverage.

22.0 INSTALL VALVES, TIMERS, RAIN SHUT-OFFS, MOISTURE SENSORS AND SUCTION LINES--The student will be able to:

- 22.01 Install plastic and brass valves (up to 3").
- 22.02 Install control timers and connect to master valve or pumping systems (low voltage only).
- 22.03 Install various rain shut-offs.
- 22.04 Install various moisture sensors.
- 22.05 Install pump suction lines and associated equipment.

23.0 TEST IRRIGATION SYSTEM--The student will be able to:

- 23.01 Use a moisture meter.
- 23.02 Read a pressure gauge and perform system pressure testing.
- 23.03 Read and record data from flow meters.
- 23.04 Calculate water times and duration and set time controller timing.
- 23.05 Remove, clean and reinstall heads.
- 23.06 Repair PVC pipe breaks.
- 23.07 Splice low voltage wiring and repair hydraulic tubing.
- 23.08 Repressurize piping systems.
- 23.09 Reprime centrifugal pumps.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

Course Number: 8106810  
Course Title: Agriscience Foundations I  
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as a core and is designed to develop competencies in the areas of agricultural history; global importance of agriculture; career opportunities; applied scientific and technological concepts; ecosystems; agricultural safety; principles of integrated pest management; principles of plant and animal growth; economic principles; agricultural marketing; and human relations skills.

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.

- 02.12 Explain the flow of energy from the sun through agricultural systems.
  - 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
  - 02.14 Apply principles of waste management to environmental problems common to agricultural systems.
  - 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
  - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
  - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
  - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
  - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
  - 03.04 Describe symptoms of pesticide poisoning.
  - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
  - 03.06 Select, mix, and apply a nonrestricted chemical according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
  - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
  - 03.08 Identify the proper disposal of containers and residual pesticides.
  - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
  - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
  - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
  - 04.04 Demonstrate the ability to use an equipment manual.
  - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
  - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
  - 05.02 Identify and select an appropriate control for each type of pest and/or weed.

- 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:
- For plant:
- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.
- For animal:
- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
- 06.09 Describe the process of animal reproduction.
- 07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:
- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.
- 08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.
- 09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:
- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.

- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.
- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
- 09.07 Recognize and demonstrate communications skills in the workplace.
- 09.08 Demonstrate effective telephone skills.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

Course Number: 8121510  
Course Title: Introductory Horticulture 2  
Course Credit: 1

**COURSE DESCRIPTION:**

This course is designed to develop competencies in the areas of career opportunities; global importance of agriculture; plant classification; propagation; growing media; nutritional needs; fertilization; irrigation; pest identification; pest control, pruning; plant installation; transplanting; safe hand-tool use; and employability skills.

10.0 DESCRIBE THE HORTICULTURE INDUSTRY--The student will be able to:

- 10.01 Describe the importance of horticulture to the American and global economies.
- 10.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.
- 10.03 Describe the importance of horticulture to the environment.

11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 11.01 Identify plants by scientific and common names. Level I.
- 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt). Level I.

12.0 PROPAGATE PLANTS--The student will be able to:

- 12.01 Identify propagating and growing facilities and structures.
- 12.02 Prepare propagation media.
- 12.03 Select and collect propagation materials.
- 12.04 Demonstrate propagation by sexual and asexual methods.
- 12.05 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light).

13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

- 13.01 Identify soil and media materials.
- 13.02 Identify nutritional needs of plants.
- 13.03 Identify symptoms of nutritional deficiencies and toxicities of plants.
- 13.04 Identify types and kinds of fertilizers.
- 13.05 Identify methods of distributing fertilizers.

14.0 IRRIGATE PLANTS AND TURF--The student will be able to:

- 14.01 Identify water needs of plants.
- 14.02 Irrigate plants at recommended rates.
  
- 15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:
  - 15.01 Identify common pests of plants (e.g., diseases, weeds, nematodes).
  - 15.02 Describe life cycles of common pests of plants.
  
- 19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:
  - 19.01 Conduct group meetings using parliamentary procedure and public speaking skills.



Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121520  
**Course Title:** Horticulture Science 3  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to develop competencies in the areas of industry regulations; plant classification; plant transportation; soil sampling and analysis; fertilizer calculations; recording keeping; irrigation components, water quality; drainage; integrated pest management; pesticide safety and regulations; equipment calibration; chemical growth regulators; xeriscaping; integrated landscape management; safe use of power equipment; record keeping; and employability skills.

11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 11.01 Identify plants by scientific and common names.
- 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt).

13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

- 13.06 Interpret analysis of fertilizer from information on tag or container.
- 13.07 Apply fertilizer and soil amendments.

15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:

- 15.03 Classify insects according to feeding habits.
- 15.04 Describe biological, chemical, and cultural methods of controlling plant pests.

16.0 CONTROL PLANT GROWTH--The student will be able to:

- 16.01 Identify methods of pruning plants to achieve desired growth and to maintain health.
- 16.02 Identify appropriate time to prune plants.
- 16.03 Identify and select pruning tools for the task.

17.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:

- 17.01 Determine requirements for preserving plant viability.
- 17.02 Install containerized plant materials.
- 17.03 Select and prepare plants for transportation and transplanting.

18.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

- 18.01 Perform equipment preoperational check.
- 18.02 Identify, maintain, and safely operate hand tools and power tools.

19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:

- 19.02 Identify acceptable work habits and personal characteristics.
- 19.03 Identify acceptable employee hygiene habits.
- 19.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8123210  
**Course Title:** Irrigation Operations 4  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of irrigation systems including water sources, zoning, and installation of systems.

20.0 IDENTIFY IRRIGATION SYSTEM TYPES AND WATER SOURCES--The student will be able to:

- 20.01 Identify various water sources used for irrigation.
- 20.02 Identify various irrigation system types (i.e., rotary, spray, flood, drip).
- 20.03 Identify various control systems for irrigation (i.e., electric, hydraulic, manual).
- 20.04 Determine various pump types and their functions (i.e., centrifugal, turbine, submersible).
- 20.05 Identify various water conservation systems and xeriscape principles used in irrigation.
- 20.06 Describe concepts of zoning, precipitation rates, pressure, volume, and velocity.

21.0 INSTALL PIPING AND HEADS--The student will be able to:

- 21.01 Operate a trencher and install trenching for main and lateral lines.
- 21.02 Backfill and compact trenches.
- 21.03 Install PVC and galvanized pipe sleeving.
- 21.04 Measure, cut, clean, prime, and glue PVC pipe (up to 3").
- 21.05 Glue and assemble fitting and pipe and swing joints.
- 21.06 Identify and install low voltage direct burial wiring.
- 21.07 Install heads - rotary, spray, and quick coupler.
- 21.08 Install head nozzles, adjust flow rates, set radius and patterns of coverage.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8123220  
**Course Title:** Irrigation Operations 5  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the area of irrigation systems including installation of valves, timers, moisture sensors and testing systems.

22.0 INSTALL VALVES, TIMERS, RAIN SHUT-OFFS, MOISTURE SENSORS AND SUCTION LINES--The student will be able to:

- 22.01 Install plastic and brass valves (up to 3").
- 22.02 Install control timers and connect to master valve or pumping systems (low voltage only).
- 22.03 Install various rain shut-offs.
- 22.04 Install various moisture sensors.
- 22.05 Install pump suction lines and associated equipment.

23.0 TEST IRRIGATION SYSTEM--The student will be able to:

- 23.01 Use a moisture meter.
- 23.02 Read a pressure gauge and perform system pressure testing.
- 23.03 Read and record data from flow meters.
- 23.04 Calculate water times and duration and set time controller timing.
- 23.05 Remove, clean and reinstall heads.
- 23.06 Repair PVC pipe breaks.
- 23.07 Splice low voltage wiring and repair hydraulic tubing.
- 23.08 Repressurize piping systems.
- 23.09 Reprime centrifugal pumps.

**Florida Department of Education  
INTENDED OUTCOMES**

**Program Title: Landscape Operations**

	SECONDARY	PSAV
<b>Program Number</b>	<b>8121300</b>	<b>A010615</b>
CIP Number	0101.060510	0101.060510
Grade Level	9-12, 30, 31	30, 31
Standard Length	6 credits	900 hours
Certification	VOC AGRI @4 AGRICULTUR 1 @2 AGRI @4 HORTICULT #7	VOC AGRI @4 AGRICULTUR 1 @2 AGRI @2 @4 HORTICULT @7 G
Basic Skills		
Math		9
Language		9
Reading		9

**INTENDED OUTCOMES:** After successfully completing appropriate outcomes for each occupational completion point of this program, the student will be able to perform the following:

**OCCUPATIONAL COMPLETION POINT - DATA CODE A**

LANDSCAPE SPECIALIST - DOT Code 406.687-010

- 01.0 Describe the socioeconomic role of the agricultural industry.
- 02.0 Apply scientific and technological principles to the agricultural industry.
- 03.0 Practice agricultural safety.
- 04.0 Demonstrate the use of tools, equipment and instruments in the agricultural industry.
- 05.0 Describe the principles of integrated pest management (IPM).
- 06.0 Describe the principles of plant and/or animal growth and reproduction.
- 07.0 Apply business skills and economic principles to the agricultural industry.
- 08.0 Explain the basic marketing processes in the agricultural industry.
- 09.0 Demonstrate human relations, communications, and leadership skills.
- 10.0 Describe the horticulture industry.
- 11.0 Identify and classify plants.
- 12.0 Propagate plants.
- 13.0 Identify growing media and apply fertilizers.
- 14.0 Irrigate plants and turf.
- 15.0 Describe pest control approaches.
- 16.0 Control plant growth.
- 17.0 Harvest, transport, and install plant materials.
- 18.0 Operate, repair, and maintain tools and equipment.
- 19.0 Demonstrate leadership, employability, communications, and human relations skills.

**OCCUPATIONAL COMPLETION POINT - DATA CODE B**

GARDENERS AND GROUNDSKEEPERS - OES Code 79030000

- 20.0 Maintain tools and equipment.
- 21.0 Apply chemical and calibrate spray equipment.
- 22.0 Classify plants and turfgrass.
- 23.0 Demonstrate fertilization skills.
- 24.0 Irrigate plants and turf.
- 25.0 Analyze and design landscape and turf.
- 26.0 Prepare estimates, contracts, and presentation.
- 27.0 Lay out and install landscape and turf.

**OCCUPATIONAL COMPLETION POINT - DATA CODE C**

LANDSCAPE GARDENER - DOT Code 408.161-010

- 28.0 Lay out and install landscape and interiorscape.
- 29.0 Maintain landscape.
- 30.0 Maintain customer relations and observe follow-up procedures.

**Florida Department of Education  
STUDENT PERFORMANCE STANDARDS**

**Program Title:** Landscape Operations  
**Secondary Number:** 8121300  
**Postsecondary Number:** A010615

***OCCUPATIONAL COMPLETION POINT - DATA CODE A***

**GROUNDSKEEPER, PARKS AND GROUNDS - DOT Code 407.687-010**

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
- 02.12 Explain the flow of energy from the sun through agricultural systems.
- 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
- 02.14 Apply principles of waste management to environmental problems common to agricultural systems.

- 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
  - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
  - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
  - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
  - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
  - 03.04 Describe symptoms of pesticide poisoning.
  - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
  - 03.06 Select, mix, and apply a nonrestricted chemical according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
  - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
  - 03.08 Identify the proper disposal of containers and residual pesticides.
  - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
  - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
  - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
  - 04.04 Demonstrate the ability to use an equipment manual.
  - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
  - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
  - 05.02 Identify and select an appropriate control for each type of pest and/or weed.
  - 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:



For plant:

- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.

For animal:

- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
- 06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.

- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
  - 09.07 Recognize and demonstrate communications skills in the workplace.
  - 09.08 Demonstrate effective telephone skills.
- 10.0 DESCRIBE THE HORTICULTURE INDUSTRY--The student will be able to:
- 10.01 Describe the importance of horticulture to the American and global economies.
  - 10.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.
  - 10.03 Describe the importance of horticulture to the environment.
- 11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:
- 11.01 Identify plants by scientific and common names.
  - 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt).
- 12.0 PROPAGATE PLANTS--The student will be able to:
- 12.01 Identify propagating and growing facilities and structures.
  - 12.02 Prepare propagation media.
  - 12.03 Select and collect propagation materials.
  - 12.04 Demonstrate propagation by sexual and asexual methods.
  - 12.05 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light).
- 13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:
- 13.01 Identify soil and media materials.
  - 13.02 Identify nutritional needs of plants.
  - 13.03 Identify symptoms of nutritional deficiencies and toxicities of plants.
  - 13.04 Identify types and kinds of fertilizers.
  - 13.05 Identify methods of distributing fertilizers.
  - 13.06 Interpret analysis of fertilizer from information on tag or container.
  - 13.07 Apply fertilizer and soil amendments.
- 14.0 IRRIGATE PLANTS AND TURF--The student will be able to:
- 14.01 Identify water needs of plants.
  - 14.02 Irrigate plants at recommended rates.
- 15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:
- 15.01 Identify common pests of plants (e.g., diseases, weeds, nematodes).
  - 15.02 Describe life cycles of common pests of plants.

- 15.03 Classify insects according to feeding habits.
  - 15.04 Describe biological, chemical, and cultural methods of controlling plant pests.
- 16.0 CONTROL PLANT GROWTH--The student will be able to:
- 16.01 Identify methods of pruning plants to achieve desired growth and to maintain health.
  - 16.02 Identify appropriate time to prune plants.
  - 16.03 Identify and select pruning tools for the task.
- 17.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:
- 17.01 Determine requirements for preserving plant viability.
  - 17.02 Install containerized plant materials.
  - 17.03 Select and prepare plants for transportation and transplanting.
- 18.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:
- 18.01 Perform equipment preoperational check.
  - 18.02 Identify, maintain, and safely operate hand tools and power tools.
- 19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:
- 19.01 Conduct group meetings using parliamentary procedure and public speaking skills.
  - 19.02 Identify acceptable work habits and personal characteristics.
  - 19.03 Identify acceptable employee hygiene habits.
  - 19.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
- OCCUPATIONAL COMPLETION POINT - DATA CODE B**  
 GARDENERS AND GROUNDSKEEPERS - OES Code 79014524
- 20.0 MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:
- 20.01 Maintain oil level in engines of power equipment.
  - 20.02 Check and maintain tire air pressure on equipment.
  - 20.03 Maintain fuel levels using proper fuel or fuel mixtures.
  - 20.04 Operate manual transmissions.
  - 20.05 Identify, operate, and maintain tractor and power equipment.
  - 20.06 Service and maintain battery and electrical systems.
  - 20.07 Perform minor tune-up on engines.
  - 20.08 Load, secure, and transport equipment.
  - 20.09 Demonstrate safety precautions while working with tools and equipment.
- 21.0 APPLY CHEMICAL AND CALIBRATE SPRAY EQUIPMENT--The student will be able to:

- 21.01 Select, mix, and apply a nonrestricted chemical according to the label and local, state, federal, and EPA regulations.
  - 21.02 Calibrate spray and spread equipment; solve time, distance, area, volume, ratio, proportion, and percentage problems in agriscience.
  - 21.03 Identify and report insect and disease damage.
  - 21.04 Determine chemical compatibility.
  - 21.05 Determine appropriate time frequency and method of chemical application.
- 22.0 CLASSIFY PLANTS AND TURFGRASS--The student will be able to:
- 22.01 Classify plants as monocots or dicots.
  - 22.02 Classify plants and turfgrass as annuals, biennials, and perennials.
  - 22.03 Identify plants and turfgrass that are specific to a region.
  - 22.04 Classify plants and turfgrass according to growth habit.
  - 22.05 Identify poisonous plants.
- 23.0 DEMONSTRATE FERTILIZATION SKILLS--The students will be able to:
- 23.01 Develop a fertilization schedule.
  - 23.02 Determine rate of fertilizer application and calibration equipment.
  - 23.03 Calibrate fertilizer equipment.
- 24.0 IRRIGATE PLANTS AND TURF--The student will be able to:
- 24.01 Identify various types of irrigation systems.
  - 24.02 Install piping and water distribution components.
  - 24.03 Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices.
  - 24.04 Check and evaluate irrigation system performance.
- 25.0 ANALYZE AND DESIGN LANDSCAPE AND TURF--The student will be able to:
- 25.01 Analyze and interpret plans, specifications, and environmental conditions of the project.
  - 25.02 Design the project.
  - 25.03 Identify and locate project materials.
  - 25.04 Determine personnel and equipment needs and safety requirements for the project.
  - 25.05 Establish project schedule.
- 26.0 PREPARE ESTIMATES, CONTRACTS, AND PRESENTATION--The student will be able to:
- 26.01 Determine costs of materials, equipment, and labor.
  - 26.02 Prepare a price for the project and terms of contract.
  - 26.03 Prepare written contract, using standard rules of English, including punctuation, spelling, sentence structure and references.

- 26.04 Prepare and give oral presentation of the project design using standard rules of English, including punctuation and sentence structure.
  - 26.05 Maintain job records, daily log sheets, and inventory.
- 27.0 LAY OUT AND INSTALL LANDSCAPE, INTERIORSCAPE, AND TURF--The student will be able to:
- 27.01 Locate existing utilities and secure a permit.
  - 27.02 Prepare and rough grade the site.
  - 27.03 Determine procedures for installation of large materials.
  - 27.04 Install and test irrigation system.
  - 27.05 Describe procedures for constructing hardscape (walls, walks, patios, drives, etc.).

**OCCUPATIONAL COMPLETION POINT - DATA CODE C**

LANDSCAPE GARDENER - DOT Code 408.161-010

- 28.0 LAY OUT AND INSTALL LANDSCAPE AND INTERIORSCAPE--The student will be able to:
- 28.01 Layout and install plants.
  - 28.02 Prepare landscape and interiorscape.
  - 28.03 Prepare final grade.
  - 28.04 Layout and install plants and turf.
  - 28.05 Install mulch and perform final cleanup.
- 29.0 MAINTAIN LANDSCAPE--The student will be able to:
- 29.01 Perform maintenance inspection of the project.
  - 29.02 Determine water requirements and apply at proper rates.
  - 29.03 Identify weeds and apply herbicides safely.
  - 29.04 Determine fertilization requirements and apply at proper rates.
  - 29.05 Identify plant pest and disease problems and apply corrective measures.
  - 29.06 Trim and prune landscape plants.
  - 29.07 Maintain turf viability; mow at proper height and frequency, blade edge, line trim, and remove trash.
  - 29.08 Explain cause and effect of soil compaction and thatch buildups, and determine appropriate methods of correction.
  - 29.09 Cultivate and mulch plants.
  - 29.10 Brace and repair trees.
  - 29.11 Provide protection for plants from adverse weather conditions.
  - 29.12 Comply with local, state, and federal regulations regarding landscape maintenance and pesticide applications.
  - 29.13 Demonstrate sanitation and safety practices when maintaining landscape.
- 30.0 MAINTAIN CUSTOMER RELATIONS AND OBSERVE FOLLOW-UP PROCEDURES--The student will be able to:
- 30.01 Conduct walk-through of project with client to assure satisfaction.
  - 30.02 Identify current and future maintenance requirements.

30.03 Analyze project records for profitability and employee performance.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

Course Number: 8106810  
Course Title: Agriscience Foundations I  
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as a core and is designed to develop competencies in the areas of agricultural history; global importance of agriculture; career opportunities; applied scientific and technological concepts; ecosystems; agricultural safety; principles of integrated pest management; principles of plant and animal growth; economic principles; agricultural marketing; and human relations skills.

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.

- 02.12 Explain the flow of energy from the sun through agricultural systems.
  - 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
  - 02.14 Apply principles of waste management to environmental problems common to agricultural systems.
  - 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
  - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
  - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
  - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
  - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
  - 03.04 Describe symptoms of pesticide poisoning.
  - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
  - 03.06 Select, mix, and apply a nonrestricted chemical according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
  - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
  - 03.08 Identify the proper disposal of containers and residual pesticides.
  - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
  - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
  - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
  - 04.04 Demonstrate the ability to use an equipment manual.
  - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
  - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
  - 05.02 Identify and select an appropriate control for each type of pest and/or weed.



- 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:
- For plant:
- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.
- For animal:
- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
- 06.09 Describe the process of animal reproduction.
- 07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:
- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.
- 08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.
- 09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:
- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.

- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.
- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
- 09.07 Recognize and demonstrate communications skills in the workplace.
- 09.08 Demonstrate effective telephone skills.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121510  
**Course Title:** Introductory Horticulture 2  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to develop competencies in the areas of career opportunities; global importance of agriculture; plant classification; propagation; growing media; nutritional needs; fertilization; irrigation; pest identification; pest control, pruning; plant installation; transplanting; safe hand-tool use; and employability skills.

10.0 DESCRIBE THE HORTICULTURE INDUSTRY--The student will be able to:

- 10.01 Describe the importance of horticulture to the American and global economies.
- 10.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.
- 10.03 Describe the importance of horticulture to the environment.

11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 11.01 Identify plants by scientific and common names. Level I.
- 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt). Level I.

12.0 PROPAGATE PLANTS--The student will be able to:

- 12.01 Identify propagating and growing facilities and structures.
- 12.02 Prepare propagation media.
- 12.03 Select and collect propagation materials.
- 12.04 Demonstrate propagation by sexual and asexual methods.
- 12.05 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light).

13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

- 13.01 Identify soil and media materials.
- 13.02 Identify nutritional needs of plants.
- 13.03 Identify symptoms of nutritional deficiencies and toxicities of plants.
- 13.04 Identify types and kinds of fertilizers.
- 13.05 Identify methods of distributing fertilizers.

14.0 IRRIGATE PLANTS AND TURF--The student will be able to:

- 14.01 Identify water needs of plants.

- 14.02 Irrigate plants at recommended rates.
- 15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:
  - 15.01 Identify common pests of plants (e.g., diseases, weeds, nematodes).
  - 15.02 Describe life cycles of common pests of plants.
- 19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:
  - 19.01 Conduct group meetings using parliamentary procedure and public speaking skills.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121520  
**Course Title:** Horticulture Science 3  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to develop competencies in the areas of industry regulations; plant classification; plant transportation; soil sampling and analysis; fertilizer calculations; recording keeping; irrigation components, water quality; drainage; integrated pest management; pesticide safety and regulations; equipment calibration; chemical growth regulators; xeriscaping; integrated landscape management; safe use of power equipment; record keeping; and employability skills.

11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 11.01 Identify plants by scientific and common names.
- 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt).

13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

- 13.06 Interpret analysis of fertilizer from information on tag or container.
- 13.07 Apply fertilizer and soil amendments.

15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:

- 15.03 Classify insects according to feeding habits.
- 15.04 Describe biological, chemical, and cultural methods of controlling plant pests.

16.0 CONTROL PLANT GROWTH--The student will be able to:

- 16.01 Identify methods of pruning plants to achieve desired growth and to maintain health.
- 16.02 Identify appropriate time to prune plants.
- 16.03 Identify and select pruning tools for the task.

17.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:

- 17.01 Determine requirements for preserving plant viability.
- 17.02 Install containerized plant materials.
- 17.03 Select and prepare plants for transportation and transplanting.

18.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

- 18.01 Perform equipment preoperational check.
- 18.02 Identify, maintain, and safely operate hand tools and power tools.

19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:

- 19.02 Identify acceptable work habits and personal characteristics.
- 19.03 Identify acceptable employee hygiene habits.
- 19.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121310  
**Course Title:** Landscape and Turf Science 4  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of use and maintenance of landscape and turf equipment; classification of plants and turfgrass; fertilization; and irrigation.

20.0 MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

- 20.01 Maintain oil level in engines of power equipment.
- 20.02 Check and maintain tire air pressure on equipment.
- 20.03 Maintain fuel levels using proper fuel or fuel mixtures.
- 20.04 Operate manual transmissions.
- 20.05 Identify, operate, and maintain tractor and power equipment.
- 20.06 Service and maintain battery and electrical systems.
- 20.07 Perform minor tune-up on engines.
- 20.08 Load, secure, and transport equipment.
- 20.09 Demonstrate safety precautions while working with tools and equipment.

22.0 CLASSIFY PLANTS AND TURFGRASS--The student will be able to:

- 22.01 Classify plants as monocots or dicots.
- 22.02 Classify plants and turfgrass as annuals, biennials, and perennials.
- 22.03 Identify plants and turfgrass that are specific to a region.
- 22.04 Classify plants and turfgrass according to growth habit.
- 22.05 Identify poisonous plants.

23.0 DEMONSTRATE FERTILIZATION SKILLS--The students will be able to:

- 23.01 Develop a fertilization schedule.
- 23.02 Determine rate of fertilizer application and calibration equipment.
- 23.03 Calibrate fertilizer equipment.

24.0 IRRIGATE PLANTS AND TURF--The student will be able to:

- 24.01 Identify various types of irrigation systems.
- 24.02 Install piping and water distribution components.
- 24.03 Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices.
- 24.04 Check and evaluate irrigation system performance.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121320  
**Course Title:** Landscape and Turf Science 5  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of chemical application; equipment calibration; analyzing and designing landscape and turf; preparing estimates and contracts; and lay out and installation of landscape, interiorscape and turf.

21.0 APPLY CHEMICAL AND CALIBRATE SPRAY EQUIPMENT--The student will be able to:

- 21.01 Select, mix, and apply a nonrestricted chemical according to the label and local, state, federal, and EPA regulations.
- 21.02 Calibrate spray and spread equipment; solve time, distance, area, volume, ratio, proportion, and percentage problems in agriscience.
- 21.03 Identify and report insect and disease damage.
- 21.04 Determine chemical compatibility.
- 21.05 Determine appropriate time frequency and method of chemical application.

25.0 ANALYZE AND DESIGN LANDSCAPE AND TURF--The student will be able to:

- 25.01 Analyze and interpret plans, specifications, and environmental conditions of the project.
- 25.02 Design the project.
- 25.03 Identify and locate project materials.
- 25.04 Determine personnel and equipment needs and safety requirements for the project.
- 25.05 Establish project schedule.

26.0 PREPARE ESTIMATES, CONTRACTS, AND PRESENTATION--The student will be able to:

- 26.01 Determine costs of materials, equipment, and labor.
- 26.02 Prepare a price for the project and terms of contract.
- 26.03 Prepare written contract, using standard rules of English, including punctuation, spelling, sentence structure and references.
- 26.04 Prepare and give oral presentation of the project design using standard rules of English, including punctuation and sentence structure.
- 26.05 Maintain job records, daily log sheets, and inventory.

27.0 LAY OUT AND INSTALL LANDSCAPE, INTERIORSCAPE, AND TURF--The student will be able to:

- 27.01 Locate existing utilities and secure a permit.



- 27.02 Prepare and rough grade the site.
- 27.03 Determine procedures for installation of large materials.
- 27.04 Install and test irrigation system.
- 27.05 Describe procedures for constructing hardscape (walls, walks, patios, drives, etc.).

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121330  
**Course Title:** Landscape Operations 6  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of chemical application; equipment calibration; analyzing and designing landscape and turf; preparing estimates and contracts; and lay out and installation of landscape, interiorscape and turf.

28.0 LAY OUT AND INSTALL LANDSCAPE AND INTERIORSCAPE--The student will be able to:

- 28.01 Layout and install plants.
- 28.02 Prepare landscape and interiorscape.
- 28.03 Prepare final grade.
- 28.04 Layout and install plants and turf.
- 28.05 Install mulch and perform final cleanup.

29.0 MAINTAIN LANDSCAPE--The student will be able to:

- 29.01 Perform maintenance inspection of the project.
- 29.02 Determine water requirements and apply at proper rates.
- 29.03 Identify weeds and apply herbicides safely.
- 29.04 Determine fertilization requirements and apply at proper rates.
- 29.05 Identify plant pest and disease problems and apply corrective measures.
- 29.06 Trim and prune landscape plants.
- 29.07 Maintain turf viability; mow at proper height and frequency, blade edge, line trim, and remove trash.
- 29.08 Explain cause and effect of soil compaction and thatch buildups, and determine appropriate methods of correction.
- 29.09 Cultivate and mulch plants.
- 29.10 Brace and repair trees.
- 29.11 Provide protection for plants from adverse weather conditions.
- 29.12 Comply with local, state, and federal regulations regarding landscape maintenance and pesticide applications.
- 29.13 Demonstrate sanitation and safety practices when maintaining landscape.

30.0 MAINTAIN CUSTOMER RELATIONS AND OBSERVE FOLLOW-UP PROCEDURES--The student will be able to:

- 30.01 Conduct walk-through of project with client to assure satisfaction.
- 30.02 Identify current and future maintenance requirements.
- 30.03 Analyze project records for profitability and employee performance.



**Florida Department of Education  
INTENDED OUTCOMES**

**Program Title: Nursery Operations**

	SECONDARY	PSAV
<b>Program Number</b>	<b>8121600</b>	<b>A010616</b>
CIP Number	0101.060610	0101.060610
Grade Level	9-12, 30, 31	30, 31
Standard Length	6 credits	900 hours
Certification	VOC AGRI @4 AGRICULTUR 1 @2 AGRI @4 HORTICULT #7	VOC AGRI @4 AGRICULTUR 1 @2 AGRI @2 @4 HORTICULT @7 G
Basic Skills		
Math		9
Language		9
Reading		9

**INTENDED OUTCOMES:** After successfully completing appropriate outcomes for each occupational completion point of this program, the student will be able to perform the following:

**OCCUPATIONAL COMPLETION POINT - DATA CODE A**

HORTICULTURE WORKER (AGRI) I - DOT Code 405.684-014 (CORE)

- 01.0 Describe the socioeconomic role of the agricultural industry.
- 02.0 Apply scientific and technological principles to the agricultural industry.
- 03.0 Practice agricultural safety.
- 04.0 Demonstrate the use of tools, equipment and instruments in the agricultural industry.
- 05.0 Describe the principles of integrated pest management (IPM).
- 06.0 Describe the principles of plant and/or animal growth and reproduction.
- 07.0 Apply business skills and economic principles to the agricultural industry.
- 08.0 Explain the basic marketing processes in the agricultural industry.
- 09.0 Demonstrate human relations, communications, and leadership skills.
- 10.0 Describe the horticulture industry.
- 11.0 Identify and classify plants.
- 12.0 Propagate plants.
- 13.0 Identify growing media and apply fertilizers.
- 14.0 Irrigate plants and turf.
- 15.0 Describe pest control approaches.
- 16.0 Control plant growth.
- 17.0 Harvest, transport, and install plant materials.
- 18.0 Operate, repair, and maintain tools and equipment.
- 19.0 Demonstrate leadership, employability, communications, and human relations skills.

**OCCUPATIONAL COMPLETION POINT - DATA CODE B**

NURSERY WORKER - OES Code 79005511

- 20.0 Identify and classify plants.
- 21.0 Control pests.
- 22.0 Operate, repair, and maintain tools and equipment.
- 23.0 Prepare growing media.
- 24.0 Irrigate plants.
- 25.0 Fertilize plant materials.
- 26.0 Maintain and analyze records.

**OCCUPATIONAL COMPLETION POINT - DATA CODE C**

HORTICULTURAL-SPECIALTY GROWER, FIELD - DOT Code 405.161-014

- 27.0 Irrigate plants and turf.
- 28.0 Prepare growing media, planting beds, and sites.
- 29.0 Propagate nursery stock.
- 30.0 Prune and shape nursery stock.
- 31.0 Harvest, process, and ship nursery stock.
- 32.0 Market nursery stock.
- 33.0 Operate, repair, and maintain nursery equipment and facilities.

**Florida Department of Education  
STUDENT PERFORMANCE STANDARDS**

**Program Title:** Nursery Operations  
**Secondary Number:** 8121600  
**Postsecondary Number:** A010616

**OCCUPATIONAL COMPLETION POINT - DATA CODE A**

HORTICULTURAL WORKER (AGRI) I - DOT Code 405.684-014

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
- 02.12 Explain the flow of energy from the sun through agricultural systems.
- 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
- 02.14 Apply principles of waste management to environmental problems common to agricultural systems.

- 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
  - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
  - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
  - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
  - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
  - 03.04 Describe symptoms of pesticide poisoning.
  - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
  - 03.06 Select, mix, and apply a nonrestricted chemical according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
  - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
  - 03.08 Identify the proper disposal of containers and residual pesticides.
  - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
  - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
  - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
  - 04.04 Demonstrate the ability to use an equipment manual.
  - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
  - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
  - 05.02 Identify and select an appropriate control for each type of pest and/or weed.
  - 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.

For animal:

- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
- 06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.



- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
  - 09.07 Recognize and demonstrate communications skills in the workplace.
  - 09.08 Demonstrate effective telephone skills.
- 10.0 DESCRIBE THE HORTICULTURE INDUSTRY--The student will be able to:
- 10.01 Describe the importance of horticulture to the American and global economies.
  - 10.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.
  - 10.03 Describe the importance of horticulture to the environment.
- 11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:
- 11.01 Identify plants by scientific and common names.
  - 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt).
- 12.0 PROPAGATE PLANTS--The student will be able to:
- 12.01 Identify propagating and growing facilities and structures.
  - 12.02 Prepare propagation media.
  - 12.03 Select and collect propagation materials.
  - 12.04 Demonstrate propagation by sexual and asexual methods.
  - 12.05 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light).
- 13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:
- 13.01 Identify soil and media materials.
  - 13.02 Identify nutritional needs of plants.
  - 13.03 Identify symptoms of nutritional deficiencies and toxicities of plants.
  - 13.04 Identify types and kinds of fertilizers.
  - 13.05 Identify methods of distributing fertilizers.
  - 13.06 Interpret analysis of fertilizer from information on tag or container.
  - 13.07 Apply fertilizer and soil amendments.
- 14.0 IRRIGATE PLANTS AND TURF--The student will be able to:
- 14.01 Identify water needs of plants.
  - 14.02 Irrigate plants at recommended rates.
- 15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:
- 15.01 Identify common pests of plants (e.g., diseases, weeds, nematodes).
  - 15.02 Describe life cycles of common pests of plants.

- 15.03 Classify insects according to feeding habits.
  - 15.04 Describe biological, chemical, and cultural methods of controlling plant pests.
- 16.0 CONTROL PLANT GROWTH--The student will be able to:
- 16.01 Identify methods of pruning plants to achieve desired growth and to maintain health.
  - 16.02 Identify appropriate time to prune plants.
  - 16.03 Identify and select pruning tools for the task.
- 17.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:
- 17.01 Determine requirements for preserving plant viability.
  - 17.02 Install containerized plant materials.
  - 17.03 Select and prepare plants for transportation and transplanting.
- 18.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:
- 18.01 Perform equipment preoperational check.
  - 18.02 Identify, maintain, and safely operate hand tools and power tools.
- 19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:
- 19.01 Conduct group meetings using parliamentary procedure and public speaking skills.
  - 19.02 Identify acceptable work habits and personal characteristics.
  - 19.03 Identify acceptable employee hygiene habits.
  - 19.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
- OCCUPATIONAL COMPLETION POINT - DATA CODE B**  
 NURSERY WORKER - OES Code 79005505
- 20.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:
- 20.01 Classify plants as monocots or dicots.
  - 20.02 Classify plants as annuals, biennials, and perennials.
  - 20.03 Identify plants appropriate to a region.
  - 20.04 Classify plants according to growth habit.
  - 20.05 Prepare propagation materials (seeds, cuttings, etc.) for planting.
  - 20.06 Apply growth stimulants to propagation materials.
  - 20.07 Demonstrate sanitation and safety practices when propagating.
  - 20.08 Prepare flats and seedbeds and plant seeds.
- 21.0 CONTROL PESTS--The student will be able to:
- 21.01 Report insect and disease damage.
  - 21.02 Identify chemical spray damage.

- 21.03 Select proper IPM practices (biological, chemical and physical) for control of insects, diseases, vertebrates and weeds.
- 21.04 Evaluate the efficacy and phytotoxicity of a chemical prior to inclusion in a growing program.
  
- 22.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:
  - 22.01 Identify, operate, and maintain tractor and power equipment.
  - 22.02 Load, secure, and transport equipment.
  
- 23.0 PREPARE GROWING MEDIA--The student will be able to:
  - 23.01 Sterilize rooting, potting, and growing media.
  - 23.02 Adjust pH and nutritional levels of media.
  - 23.03 Fill and level benches and pots with media.
  - 23.04 Demonstrate sanitation practices when handling and storing plant media materials.
  
- 24.0 IRRIGATE PLANTS--The student will be able to:
  - 24.01 Set up an irrigation system for a propagation area.
  - 24.02 Set up an irrigation system for a growing structure.
  - 24.03 Set up an irrigation system for a retail display.
  - 24.04 Maintain and repair an irrigation system.
  - 24.05 Identify and use various types of irrigation systems (low volume, ebb and flow, drip, mat, recirculating, etc.).
  
- 25.0 FERTILIZE PLANT MATERIALS--The student will be able to:
  - 25.01 Collect soil and leaf tissue samples for analysis.
  - 25.02 Interpret and evaluate the results of soil and leaf tissue analysis and determine corrective actions.
  - 25.03 Demonstrate proper handling and storage of fertilizers, observing safety precautions.
  - 25.04 Evaluate, operate, and maintain fertilizer distribution equipment.
  - 25.05 Develop a fertilization schedule for various plant species.
  - 25.06 Determine rate of fertilizer application.
  
- 26.0 MAINTAIN AND ANALYZE RECORDS--The student will be able to:
  - 26.01 Analyze and maintain production and sales records.
  - 26.02 Determine plant production costs.
  - 26.03 Prepare a budget.
  - 26.04 Prepare and maintain financial records using computer software.
  - 26.05 Maintain current plant inventory.
  - 26.06 Maintain job records, daily log sheets, and inventory.

**OCCUPATIONAL COMPLETION POINT - DATA CODE C**

HORTICULTURAL-SPECIALTY GROWER, FIELD - DOT Code 405.161-014

- 27.0 IRRIGATE PLANTS AND TURF--The student will be able to:

- 27.01 Identify drainage components for different types of drainage systems.
  - 27.02 Install irrigation systems with control valves and clocks.
  - 27.03 Set up an irrigation system for a growing area.
- 28.0 PREPARE GROWING MEDIA, PLANTING BEDS, AND SITES--The student will be able to:
- 28.01 Identify the difference between evergreen and deciduous plants.
  - 28.01 Mix rooting and growing media according to plant requirements.
  - 28.02 Collect and test a soil sample from field and potting media.
  - 28.03 Prepare planting beds and sites.
- 29.0 PROPAGATE NURSERY STOCK--The student will be able to:
- 29.01 Demonstrate sanitation and safety practices when propagating.
  - 29.02 Identify and utilize commonly used propagation and growing containers.
  - 29.03 Prepare and plant seeds in flats and seedbeds.
  - 29.04 Maintain proper records and labels when propagating plants.
  - 29.05 Propagate plants by the asexual method.
  - 29.06 Evaluate commercial media containers.
- 30.0 PRUNE AND SHAPE NURSERY STOCK--The student will be able to:
- 30.01 Prune plants to achieve desired growth and shape.
  - 30.02 Select and use chemical growth regulators.
  - 30.03 Identify techniques for pruning specialty items (topiary, bonsai).
  - 30.04 Set up an irrigation system for a growing area.
- 31.0 HARVEST, PROCESS, AND SHIP NURSERY STOCK--The student will be able to:
- 31.01 Determine customer needs per landscape plan.
  - 31.02 Grade and harvest field-grown plants (ball, burlap, bare-root, "grow bags").
  - 31.03 Identify mechanical techniques for harvesting field-grown plants (tree spade and mechanical digger).
  - 31.04 Select and assemble container-grown plants using industry-accepted grades and standards.
  - 31.05 Prepare for shipment, loading, and transporting harvested plant materials.
  - 31.06 Comply with regulations regarding the inspection and movement of plant materials.
  - 31.07 Demonstrate safety practices when harvesting, processing, and shipping nursery stock.
  - 31.08 Determine proper shipping environment.
- 32.0 MARKET NURSERY STOCK--The student will be able to:
- 32.01 Label and merchandise plants including plant care tags, bar codes, and shipping instructions.
  - 32.02 Maintain clean and attractive merchandising and display areas safely.

- 32.03 Use various advertising methods to promote sales.
- 32.04 Take telephone orders.
- 32.05 Use sales catalog.
- 32.06 Greet customers and close sales.
- 32.07 Describe care and use of plants and related products to customers.
- 32.08 Handle customer complaints and problems.

33.0 OPERATE, REPAIR, AND MAINTAIN NURSERY EQUIPMENT AND FACILITIES--The student will be able to:

- 33.01 Determine equipment needs for the job.
- 33.02 Order parts and supplies.
- 33.03 Perform simple electrical repairs.
- 33.04 Build or repair frames, benches, and other greenhouse or nursery facilities.
- 33.05 Demonstrate safety practices when working with equipment and facilities.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

Course Number: 8106810  
Course Title: Agriscience Foundations I  
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as a core and is designed to develop competencies in the areas of agricultural history; global importance of agriculture; career opportunities; applied scientific and technological concepts; ecosystems; agricultural safety; principles of integrated pest management; principles of plant and animal growth; economic principles; agricultural marketing; and human relations skills.

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.

- 02.12 Explain the flow of energy from the sun through agricultural systems.
  - 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
  - 02.14 Apply principles of waste management to environmental problems common to agricultural systems.
  - 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
  - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
  - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
  - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
  - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
  - 03.04 Describe symptoms of pesticide poisoning.
  - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
  - 03.06 Select, mix, and apply a nonrestricted chemical according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
  - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
  - 03.08 Identify the proper disposal of containers and residual pesticides.
  - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
  - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
  - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
  - 04.04 Demonstrate the ability to use an equipment manual.
  - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
  - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
  - 05.02 Identify and select an appropriate control for each type of pest and/or weed.

- 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:
- For plant:
- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.
- For animal:
- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
- 06.09 Describe the process of animal reproduction.
- 07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:
- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.
- 08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.
- 09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:
- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.



- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.
- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
- 09.07 Recognize and demonstrate communications skills in the workplace.
- 09.08 Demonstrate effective telephone skills.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121510  
**Course Title:** Introductory Horticulture 2  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to develop competencies in the areas of career opportunities; global importance of agriculture; plant classification; propagation; growing media; nutritional needs; fertilization; irrigation; pest identification; pest control, pruning; plant installation; transplanting; safe hand-tool use; and employability skills.

10.0 DESCRIBE THE HORTICULTURE INDUSTRY--The student will be able to:

- 10.01 Describe the importance of horticulture to the American and global economies.
- 10.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.
- 10.03 Describe the importance of horticulture to the environment.

11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 11.01 Identify plants by scientific and common names. Level I.
- 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt). Level I.

12.0 PROPAGATE PLANTS--The student will be able to:

- 12.01 Identify propagating and growing facilities and structures.
- 12.02 Prepare propagation media.
- 12.03 Select and collect propagation materials.
- 12.04 Demonstrate propagation by sexual and asexual methods.
- 12.05 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light).

13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

- 13.01 Identify soil and media materials.
- 13.02 Identify nutritional needs of plants.
- 13.03 Identify symptoms of nutritional deficiencies and toxicities of plants.
- 13.04 Identify types and kinds of fertilizers.
- 13.05 Identify methods of distributing fertilizers.

14.0 IRRIGATE PLANTS AND TURF--The student will be able to:

- 14.01 Identify water needs of plants.

- 14.02 Irrigate plants at recommended rates.
- 15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:
  - 15.01 Identify common pests of plants (e.g., diseases, weeds, nematodes).
  - 15.02 Describe life cycles of common pests of plants.
- 19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:
  - 19.01 Conduct group meetings using parliamentary procedure and public speaking skills.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121520  
**Course Title:** Horticulture Science 3  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to develop competencies in the areas of industry regulations; plant classification; plant transportation; soil sampling and analysis; fertilizer calculations; recording keeping; irrigation components, water quality; drainage; integrated pest management; pesticide safety and regulations; equipment calibration; chemical growth regulators; xeriscaping; integrated landscape management; safe use of power equipment; record keeping; and employability skills.

11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 11.01 Identify plants by scientific and common names.
- 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt).

13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

- 13.06 Interpret analysis of fertilizer from information on tag or container.
- 13.07 Apply fertilizer and soil amendments.

15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:

- 15.03 Classify insects according to feeding habits.
- 15.04 Describe biological, chemical, and cultural methods of controlling plant pests.

16.0 CONTROL PLANT GROWTH--The student will be able to:

- 16.01 Identify methods of pruning plants to achieve desired growth and to maintain health.
- 16.02 Identify appropriate time to prune plants.
- 16.03 Identify and select pruning tools for the task.

17.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:

- 17.01 Determine requirements for preserving plant viability.
- 17.02 Install containerized plant materials.
- 17.03 Select and prepare plants for transportation and transplanting.

18.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

- 18.01 Perform equipment preoperational check.
- 18.02 Identify, maintain, and safely operate hand tools and power tools.

19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:

- 19.02 Identify acceptable work habits and personal characteristics.
- 19.03 Identify acceptable employee hygiene habits.
- 19.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121610  
**Course Title:** Horticulture Science and Services 4  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of plant identification and classification; growing media; irrigation system set up; and maintaining and analyzing records including production costs.

20.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 20.01 Classify plants as monocots or dicots.
- 20.02 Classify plants as annuals, biennials, and perennials.
- 20.03 Identify plants appropriate to a region.
- 20.04 Classify plants according to growth habit.
- 20.05 Prepare propagation materials (seeds, cuttings, etc.) for planting.
- 20.06 Apply growth stimulants to propagation materials.
- 20.07 Demonstrate sanitation and safety practices when propagating.
- 20.08 Prepare flats and seedbeds and plant seeds.

22.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

- 22.01 Identify, operate, and maintain tractor and power equipment.
- 22.02 Load, secure, and transport equipment.

23.0 PREPARE GROWING MEDIA--The student will be able to:

- 23.01 Sterilize rooting, potting, and growing media.
- 23.02 Adjust pH and nutritional levels of media.
- 23.03 Fill and level benches and pots with media.
- 23.04 Demonstrate sanitation practices when handling and storing plant media materials.

24.0 IRRIGATE PLANTS--The student will be able to:

- 24.01 Set up an irrigation system for a propagation area.
- 24.02 Set up an irrigation system for a growing structure.
- 24.03 Set up an irrigation system for a retail display.

26.0 MAINTAIN AND ANALYZE RECORDS--The student will be able to:

- 26.01 Analyze and maintain production and sales records.
- 26.02 Determine plant production costs.
- 26.03 Prepare a budget.
- 26.04 Prepare and maintain financial records using computer software.
- 26.05 Maintain current plant inventory.

26.06 Maintain job records, daily log sheets, and inventory.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121620  
**Course Title:** Horticulture Science and Services 5  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of identifying and evaluating IPM practices; maintaining and repairing irrigation systems; analyzing and evaluating fertilizer usage.

21.0 CONTROL PESTS--The student will be able to:

- 21.01 Report insect and disease damage.
- 21.02 Identify chemical spray damage.
- 21.03 Select proper IPM practices (biological, chemical and physical) for control of insects, diseases, vertebrates and weeds.
- 21.04 Evaluate the efficacy and phytotoxicity of a chemical prior to inclusion in a growing program.

24.0 IRRIGATE PLANTS--The student will be able to:

- 24.04 Maintain and repair an irrigation system.
- 24.05 Identify and use various types of irrigation systems (low volume, ebb and flow, drip, mat, recirculating, etc.).

25.0 FERTILIZE PLANT MATERIALS--The student will be able to:

- 25.01 Collect soil and leaf tissue samples for analysis.
- 25.02 Interpret and evaluate the results of soil and leaf tissue analysis and determine corrective actions.
- 25.03 Demonstrate proper handling and storage of fertilizers, observing safety precautions.
- 25.04 Evaluate, operate, and maintain fertilizer distribution equipment.
- 25.05 Develop a fertilization schedule for various plant species.
- 25.06 Determine rate of fertilizer application.



Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

Course Number: 8121630  
Course Title: Nursery Operations 6  
Course Credit: 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of irrigation; growing media; planting beds and sites; propagation; marketing; repair and maintenance of nursery equipment and facilities.

27.0 IRRIGATE PLANTS AND TURF--The student will be able to:

- 27.01 Identify drainage components for different types of drainage systems.
- 27.02 Install irrigation systems with control valves and clocks.
- 27.03 Set up an irrigation system for a growing area.

28.0 PREPARE GROWING MEDIA, PLANTING BEDS, AND SITES--The student will be able to:

- 28.01 Identify the difference between evergreen and deciduous plants.
- 28.01 Mix rooting and growing media according to plant requirements.
- 28.02 Collect and test a soil sample from field and potting media.
- 28.03 Prepare planting beds and sites.

29.0 PROPAGATE NURSERY STOCK--The student will be able to:

- 29.01 Demonstrate sanitation and safety practices when propagating.
- 29.02 Identify and utilize commonly used propagation and growing containers.
- 29.03 Prepare and plant seeds in flats and seedbeds.
- 29.04 Maintain proper records and labels when propagating plants.
- 29.05 Propagate plants by the asexual method.
- 29.06 Evaluate commercial media containers.

30.0 PRUNE AND SHAPE NURSERY STOCK--The student will be able to:

- 30.01 Prune plants to achieve desired growth and shape.
- 30.02 Select and use chemical growth regulators.
- 30.03 Identify techniques for pruning specialty items (topiary, bonsai).
- 30.04 Set up an irrigation system for a growing area.

31.0 HARVEST, PROCESS, AND SHIP NURSERY STOCK--The student will be able to:

- 31.01 Determine customer needs per landscape plan.
- 31.02 Grade and harvest field-grown plants (ball, burlap, bare-root, "grow bags").

- 31.03 Identify mechanical techniques for harvesting field-grown plants (tree spade and mechanical digger).
  - 31.04 Select and assemble container-grown plants using industry-accepted grades and standards.
  - 31.05 Prepare for shipment, loading, and transporting harvested plant materials.
  - 31.06 Comply with regulations regarding the inspection and movement of plant materials.
  - 31.07 Demonstrate safety practices when harvesting, processing, and shipping nursery stock.
  - 31.08 Determine proper shipping environment.
- 32.0 MARKET NURSERY STOCK--The student will be able to:
- 32.01 Label and merchandise plants including plant care tags, bar codes, and shipping instructions.
  - 32.02 Maintain clean and attractive merchandising and display areas safely.
  - 32.03 Use various advertising methods to promote sales.
  - 32.04 Take telephone orders.
  - 32.05 Use sales catalog.
  - 32.06 Greet customers and close sales.
  - 32.07 Describe care and use of plants and related products to customers.
  - 32.08 Handle customer complaints and problems.
- 33.0 OPERATE, REPAIR, AND MAINTAIN NURSERY EQUIPMENT AND FACILITIES--The student will be able to:
- 33.01 Determine equipment needs for the job.
  - 33.02 Order parts and supplies.
  - 33.03 Perform simple electrical repairs.
  - 33.04 Build or repair frames, benches, and other greenhouse or nursery facilities.
  - 33.05 Demonstrate safety practices when working with equipment and facilities.

**Florida Department of Education  
INTENDED OUTCOMES**

**Program Title: Sports and Recreational Turf Operations**

	SECONDARY	PSAV
<b>Program Number</b>	<b>8121400</b>	<b>A020607</b>
CIP Number	0101.060700	0101.060700
Grade Level	9-12, 30, 31	30, 31
Standard Length	6 credits	900 hours
Certification	VOC AGRI @4 AGRICULTUR 1 @2 AGRI @4 HORTICULT #7	VOC AGRI @4 AGRICULTUR 1 @2 AGRI @2 @4 HORTICULT @7 G
Basic Skills		
Math		9
Language		9
Reading		9

**INTENDED OUTCOMES:** After successfully completing appropriate outcomes for each occupational completion point of this program, the student will be able to perform the following:

**OCCUPATIONAL COMPLETION POINT - DATA CODE A**

LANDSCAPE SPECIALISTS - DOT Code 406.687-010

- 01.0 Describe the socioeconomic role of the agricultural industry.
- 02.0 Apply scientific and technological principles to the agricultural industry.
- 03.0 Practice agricultural safety.
- 04.0 Demonstrate the use of tools, equipment and instruments in the agricultural industry.
- 05.0 Describe the principles of integrated pest management (IPM).
- 06.0 Describe the principles of plant and/or animal growth and reproduction.
- 07.0 Apply business skills and economic principles to the agricultural industry.
- 08.0 Explain the basic marketing processes in the agricultural industry.
- 09.0 Demonstrate human relations, communications, and leadership skills.
- 10.0 Describe the horticulture industry.
- 11.0 Identify and classify plants.
- 12.0 Propagate plants.
- 13.0 Identify growing media and apply fertilizers.
- 14.0 Irrigate plants and turf.
- 15.0 Describe pest control approaches.
- 16.0 Control plant growth.
- 17.0 Harvest, transport, and install plant materials.
- 18.0 Operate, repair, and maintain tools and equipment.
- 19.0 Demonstrate leadership, employability, communications, and human relations skills.

**OCCUPATIONAL COMPLETION POINT - DATA CODE B**

GARDENERS AND GROUNDSKEEPERS - OES Code 79030000

- 20.0 Maintain tools and equipment.
- 21.0 Apply chemical and calibrate spray equipment.
- 22.0 Classify plants and turfgrass.
- 23.0 Demonstrate fertilization skills.
- 24.0 Irrigate plants and turf.
- 25.0 Analyze and design landscape and turf.
- 26.0 Prepare estimates, contracts, and presentation.
- 27.0 Lay out and install landscape and turf.

**OCCUPATIONAL COMPLETION POINT - DATA CODE C**

GREENSKEEPER I - DOT Code 406.137-010

- 28.0 Maintain greens and tees.
- 29.0 Maintain fairways, roughs, and traps.
- 30.0 Fertilize turf.
- 31.0 Establish turfgrass.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Program Title:** Sports and Recreational Turf Operations  
**Secondary Number:** 8121400  
**Postsecondary Number:** A020607

**OCCUPATIONAL COMPLETION POINT - DATA CODE A**

**GROUNDSKEEPER, PARKS AND GROUNDS - DOT Code 407.687-010**

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
- 02.12 Explain the flow of energy from the sun through agricultural systems.
- 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
- 02.14 Apply principles of waste management to environmental problems common to agricultural systems.

- 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
  - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
  - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
  - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
  - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
  - 03.04 Describe symptoms of pesticide poisoning.
  - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
  - 03.06 Select, mix, and apply a nonrestricted chemical according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
  - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
  - 03.08 Identify the proper disposal of containers and residual pesticides.
  - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
  - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
  - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
  - 04.04 Demonstrate the ability to use an equipment manual.
  - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
  - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
  - 05.02 Identify and select an appropriate control for each type of pest and/or weed.
  - 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.

For animal:

- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
- 06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.

- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
  - 09.07 Recognize and demonstrate communications skills in the workplace.
  - 09.08 Demonstrate effective telephone skills.
- 10.0 DESCRIBE THE HORTICULTURE INDUSTRY--The student will be able to:
- 10.01 Describe the importance of horticulture to the American and global economies.
  - 10.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.
  - 10.03 Describe the importance of horticulture to the environment.
- 11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:
- 11.01 Identify plants by scientific and common names.
  - 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt).
- 12.0 PROPAGATE PLANTS--The student will be able to:
- 12.01 Identify propagating and growing facilities and structures.
  - 12.02 Prepare propagation media.
  - 12.03 Select and collect propagation materials.
  - 12.04 Demonstrate propagation by sexual and asexual methods.
  - 12.05 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light).
- 13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:
- 13.01 Identify soil and media materials.
  - 13.02 Identify nutritional needs of plants.
  - 13.03 Identify symptoms of nutritional deficiencies and toxicities of plants.
  - 13.04 Identify types and kinds of fertilizers.
  - 13.05 Identify methods of distributing fertilizers.
  - 13.06 Interpret analysis of fertilizer from information on tag or container.
  - 13.07 Apply fertilizer and soil amendments.
- 14.0 IRRIGATE PLANTS AND TURF--The student will be able to:
- 14.01 Identify water needs of plants.
  - 14.02 Irrigate plants at recommended rates.
- 15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:
- 15.01 Identify common pests of plants (e.g., diseases, weeds, nematodes).
  - 15.02 Describe life cycles of common pests of plants.



- 15.03 Classify insects according to feeding habits.
  - 15.04 Describe biological, chemical, and cultural methods of controlling plant pests.
- 16.0 CONTROL PLANT GROWTH--The student will be able to:
- 16.01 Identify methods of pruning plants to achieve desired growth and to maintain health.
  - 16.02 Identify appropriate time to prune plants.
  - 16.03 Identify and select pruning tools for the task.
- 17.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:
- 17.01 Determine requirements for preserving plant viability.
  - 17.02 Install containerized plant materials.
  - 17.03 Select and prepare plants for transportation and transplanting.
- 18.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:
- 18.01 Perform equipment preoperational check.
  - 18.02 Identify, maintain, and safely operate hand tools and power tools.
- 19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:
- 19.01 Conduct group meetings using parliamentary procedure and public speaking skills.
  - 19.02 Identify acceptable work habits and personal characteristics.
  - 19.03 Identify acceptable employee hygiene habits.
  - 19.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
- OCCUPATIONAL COMPLETION POINT - DATA CODE B**  
GARDENERS AND GROUNDSKEEPERS - OES Code 79014524
- 20.0 MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:
- 20.01 Maintain oil level in engines of power equipment.
  - 20.02 Check and maintain tire air pressure on equipment.
  - 20.03 Maintain fuel levels using proper fuel or fuel mixtures.
  - 20.04 Operate manual transmissions.
  - 20.05 Identify, operate, and maintain tractor and power equipment.
  - 20.06 Service and maintain battery and electrical systems.
  - 20.07 Perform minor tune-up on engines.
  - 20.08 Load, secure, and transport equipment.
  - 20.09 Demonstrate safety precautions while working with tools and equipment.
- 21.0 APPLY CHEMICAL AND CALIBRATE SPRAY EQUIPMENT--The student will be able to:

- 21.01 Select, mix, and apply a nonrestricted chemical according to the label and local, state, federal, and EPA regulations.
  - 21.02 Calibrate spray and spread equipment; solve time, distance, area, volume, ratio, proportion, and percentage problems in agriscience.
  - 21.03 Identify and report insect and disease damage.
  - 21.04 Determine chemical compatibility.
  - 21.05 Determine appropriate time frequency and method of chemical application.
- 22.0 CLASSIFY PLANTS AND TURFGRASS--The student will be able to:
- 22.01 Classify plants as monocots or dicots.
  - 22.02 Classify plants and turfgrass as annuals, biennials, and perennials.
  - 22.03 Identify plants and turfgrass that are specific to a region.
  - 22.04 Classify plants and turfgrass according to growth habit.
  - 22.05 Identify poisonous plants.
- 23.0 DEMONSTRATE FERTILIZATION SKILLS--The students will be able to:
- 23.01 Develop a fertilization schedule.
  - 23.02 Determine rate of fertilizer application and calibration equipment.
  - 23.03 Calibrate fertilizer equipment.
- 24.0 IRRIGATE PLANTS AND TURF--The student will be able to:
- 24.01 Identify various types of irrigation systems.
  - 24.02 Install piping and water distribution components.
  - 24.03 Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices.
  - 24.04 Check and evaluate irrigation system performance.
- 25.0 ANALYZE AND DESIGN LANDSCAPE AND TURF--The student will be able to:
- 25.01 Analyze and interpret plans, specifications, and environmental conditions of the project.
  - 25.02 Design the project.
  - 25.03 Identify and locate project materials.
  - 25.04 Determine personnel and equipment needs and safety requirements for the project.
  - 25.05 Establish project schedule.
- 26.0 PREPARE ESTIMATES, CONTRACTS, AND PRESENTATION--The student will be able to:
- 26.01 Determine costs of materials, equipment, and labor.
  - 26.02 Prepare a price for the project and terms of contract.
  - 26.03 Prepare written contract, using standard rule of English, including punctuation, spelling, sentence structure and references.

- 26.04 Prepare and give oral presentation of the project design using standard rules of English, including punctuation and sentence structure.
- 26.05 Maintain job records, daily log sheets, and inventory.

27.0 LAYOUT AND INSTALL LANDSCAPE, INTERIORSCAPE, AND TURF--The student will be able to:

- 27.01 Locate existing utilities and secure a permit.
- 27.02 Prepare and rough grade the site.
- 27.03 Determine procedures for installation of large materials.
- 27.04 Install and test irrigation system.
- 27.05 Describe procedures for constructing hardscape (walls, walks, patios, drives, etc.).

**OCCUPATIONAL COMPLETION POINT - DATA CODE C**

GREENSKEEPER - DOT Code 406.137-014

28.0 MAINTAIN GREENS AND TEES--The student will be able to:

- 28.01 Mow greens.
- 28.02 Mow collars.
- 28.03 Mow aprons.
- 28.04 Relocate cups.
- 28.05 Replace and relocate markers.
- 28.06 Irrigate greens.
- 28.07 Verticut turf.
- 28.08 Aerate turf.
- 28.09 Repair ball marks on greens.

29 0 MAINTAIN FAIRWAYS, ROUGHS, AND TRAPS--The student will be able to:

- 29.01 Mow roughs.
- 29.02 Irrigate fairways.
- 29.03 Repair divots.
- 29.04 Add sand to traps.
- 29.05 Rake and trim sand traps.
- 29.06 Mow fairways.
- 29.07 Edge sand traps.
- 29.08 Operate blower, sweeper, verticutter, and aerifier.

30.0 FERTILIZE TURF--The student will be able to:

- 30.01 Apply top dressing.
- 30.02 Apply grass seed.
- 30.03 Apply fertilizer to fairways.

31.0 ESTABLISH TURFGRASS--The student will be able to:

- 31.01 Level seedbed.
- 31.02 Plant grass seed.
- 31.03 Establish sod by plugging.
- 31.04 Establish sod by sodding.
- 31.05 Cut sod.



**Florida Department of Education  
STUDENT PERFORMANCE STANDARDS**

Course Number: 8106810  
Course Title: Agriscience Foundations I  
Course Credit: 1

**COURSE DESCRIPTION:**

This course was developed as a core and is designed to develop competencies in the areas of agricultural history; global importance of agriculture; career opportunities; applied scientific and technological concepts; ecosystems; agricultural safety; principles of integrated pest management; principles of plant and animal growth; economic principles; agricultural marketing; and human relations skills.

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.

- 02.12 Explain the flow of energy from the sun through agricultural systems.
  - 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
  - 02.14 Apply principles of waste management to environmental problems common to agricultural systems.
  - 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
  - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
  - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
  - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
  - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
  - 03.04 Describe symptoms of pesticide poisoning.
  - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
  - 03.06 Select, mix, and apply a nonrestricted chemical according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
  - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
  - 03.08 Identify the proper disposal of containers and residual pesticides.
  - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
  - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
  - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
  - 04.04 Demonstrate the ability to use an equipment manual.
  - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
  - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
  - 05.02 Identify and select an appropriate control for each type of pest and/or weed.

- 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:
- For plant:
- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.
- For animal:
- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
- 06.09 Describe the process of animal reproduction.
- 07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:
- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.
- 08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.
- 09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:
- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.

- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.
- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
- 09.07 Recognize and demonstrate communications skills in the workplace.
- 09.08 Demonstrate effective telephone skills.



Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121510  
**Course Title:** Introductory Horticulture 2  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to develop competencies in the areas of career opportunities; global importance of agriculture; plant classification; propagation; growing media; nutritional needs; fertilization; irrigation; pest identification; pest control, pruning; plant installation; transplanting; safe hand-tool use; and employability skills.

10.0 DESCRIBE THE HORTICULTURE INDUSTRY--The student will be able to:

- 10.01 Describe the importance of horticulture to the American and global economies.
- 10.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.
- 10.03 Describe the importance of horticulture to the environment.

11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 11.01 Identify plants by scientific and common names. Level I.
- 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt). Level I.

12.0 PROPAGATE PLANTS--The student will be able to:

- 12.01 Identify propagating and growing facilities and structures.
- 12.02 Prepare propagation media.
- 12.03 Select and collect propagation materials.
- 12.04 Demonstrate propagation by sexual and asexual methods.
- 12.05 Demonstrate environmental controls for propagation materials (e.g., moisture, temperature, light).

13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

- 13.01 Identify soil and media materials.
- 13.02 Identify nutritional needs of plants.
- 13.03 Identify symptoms of nutritional deficiencies and toxicities of plants.
- 13.04 Identify types and kinds of fertilizers.
- 13.05 Identify methods of distributing fertilizers.

14.0 IRRIGATE PLANTS AND TURF--The student will be able to:

- 14.01 Identify water needs of plants.

- 14.02 Irrigate plants at recommended rates.
- 15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:
  - 15.01 Identify common pests of plants (e.g., diseases, weeds, nematodes).
  - 15.02 Describe life cycles of common pests of plants.
- 19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:
  - 19.01 Conduct group meetings using parliamentary procedure and public speaking skills.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121520  
**Course Title:** Horticulture Science 3  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to develop competencies in the areas of industry regulations; plant classification; plant transportation; soil sampling and analysis; fertilizer calculations; recording keeping; irrigation components, water quality; drainage; integrated pest management; pesticide safety and regulations; equipment calibration; chemical growth regulators; xeriscaping; integrated landscape management; safe use of power equipment; record keeping; and employability skills.

11.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 11.01 Identify plants by scientific and common names.
- 11.02 Classify plants botanically and list environmental preference of plants (e.g., shade, sun, wind, moisture, salt).

13.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

- 13.06 Interpret analysis of fertilizer from information on tag or container.
- 13.07 Apply fertilizer and soil amendments.

15.0 DESCRIBE PEST CONTROL APPROACHES--The student will be able to:

- 15.03 Classify insects according to feeding habits.
- 15.04 Describe biological, chemical, and cultural methods of controlling plant pests.

16.0 CONTROL PLANT GROWTH--The student will be able to:

- 16.01 Identify methods of pruning plants to achieve desired growth and to maintain health.
- 16.02 Identify appropriate time to prune plants.
- 16.03 Identify and select pruning tools for the task.

17.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:

- 17.01 Determine requirements for preserving plant viability.
- 17.02 Install containerized plant materials.
- 17.03 Select and prepare plants for transportation and transplanting.

18.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

- 18.01 Perform equipment preoperational check.
- 18.02 Identify, maintain, and safely operate hand tools and power tools.

19.0 DEMONSTRATE LEADERSHIP, EMPLOYABILITY, COMMUNICATIONS AND HUMAN RELATIONS SKILLS--The student will be able to:

- 19.02 Identify acceptable work habits and personal characteristics.
- 19.03 Identify acceptable employee hygiene habits.
- 19.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121310  
**Course Title:** Landscape and Turf Science 4  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of use and maintenance of landscape and turf equipment; classification of plants and turfgrass; fertilization; and irrigation.

20.0 MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

- 20.01 Maintain oil level in engines of power equipment.
- 20.02 Check and maintain tire air pressure on equipment.
- 20.03 Maintain fuel levels using proper fuel or fuel mixtures.
- 20.04 Operate manual transmissions.
- 20.05 Identify, operate, and maintain tractor and power equipment.
- 20.06 Service and maintain battery and electrical systems.
- 20.07 Perform minor tune-up on engines.
- 20.08 Load, secure, and transport equipment.
- 20.09 Demonstrate safety precautions while working with tools and equipment.

22.0 CLASSIFY PLANTS AND TURFGRASS--The student will be able to:

- 22.01 Classify plants as monocots or dicots.
- 22.02 Classify plants and turfgrass as annuals, biennials, and perennials.
- 22.03 Identify plants and turfgrass that are specific to a region.
- 22.04 Classify plants and turfgrass according to growth habit.
- 22.05 Identify poisonous plants.

23.0 DEMONSTRATE FERTILIZATION SKILLS--The students will be able to:

- 23.01 Develop a fertilization schedule.
- 23.02 Determine rate of fertilizer application and calibration equipment.
- 23.03 Calibrate fertilizer equipment.

24.0 IRRIGATE PLANTS AND TURF--The student will be able to:

- 24.01 Identify various types of irrigation systems.
- 24.02 Install piping and water distribution components.
- 24.03 Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices.
- 24.04 Check and evaluate irrigation system performance.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

Course Number: 8121320  
Course Title: Landscape and Turf Science 5  
Course Credit: 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of chemical application; equipment calibration; analyzing and designing landscape and turf; preparing estimates and contracts; and lay out and installation of landscape, interiorscape and turf.

21.0 APPLY CHEMICAL AND CALIBRATE SPRAY EQUIPMENT--The student will be able to:

- 21.01 Select, mix, and apply a nonrestricted chemical according to the label and local, state, federal, and EPA regulations.
- 21.02 Calibrate spray and spread equipment; solve time, distance, area, volume, ratio, proportion, and percentage problems in agriscience.
- 21.03 Identify and report insect and disease damage.
- 21.04 Determine chemical compatibility.
- 21.05 Determine appropriate time frequency and method of chemical application.

25.0 ANALYZE AND DESIGN LANDSCAPE AND TURF--The student will be able to:

- 25.01 Analyze and interpret plans, specifications, and environmental conditions of the project.
- 25.02 Design the project.
- 25.03 Identify and locate project materials.
- 25.04 Determine personnel and equipment needs and safety requirements for the project.
- 25.05 Establish project schedule.

26.0 PREPARE ESTIMATES, CONTRACTS, AND PRESENTATION--The student will be able to:

- 26.01 Determine costs of materials, equipment, and labor.
- 26.02 Prepare a price for the project and terms of contract.
- 26.03 Prepare written contract, using standard rules of English, including punctuation, spelling, sentence structure and references.
- 26.04 Prepare and give oral presentation of the project design using standard rules of English, including punctuation and sentence structure.
- 26.05 Maintain job records, daily log sheets, and inventory.

27.0 LAY OUT AND INSTALL LANDSCAPE, INTERIORSCAPE, AND TURF--The student will be able to:

- 27.01 Locate existing utilities and secure a permit.

- 27.02 Prepare and rough grade the site.
- 27.03 Determine procedures for installation of large materials.
- 27.04 Install and test irrigation system.
- 27.05 Describe procedures for constructing hardscape (walls, walks, patios, drives, etc.).

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8121410  
**Course Title:** Sports and Recreational Turf Operations 6  
**Course Credit:** 1

**COURSE DESCRIPTION:**

This course is designed to further develop competencies in the areas of maintenance of greens and tees; maintenance of fairways, roughs and traps; fertilization of turf and establishing turfgrass.

28.0 MAINTAIN GREENS AND TEES--The student will be able to:

- 28.01 Mow greens.
- 28.02 Mow collars.
- 28.03 Mow aprons.
- 28.04 Relocate cups.
- 28.05 Replace and relocate markers.
- 28.06 Irrigate greens.
- 28.07 Verticut turf.
- 28.08 Aerate turf.
- 28.09 Repair ball marks on greens.

29.0 MAINTAIN FAIRWAYS, ROUGHS, AND TRAPS--The student will be able to:

- 29.01 Mow roughs.
- 29.02 Irrigate fairways.
- 29.03 Repair divots.
- 29.04 Add sand to traps.
- 29.05 Rake and trim sand traps.
- 29.06 Mow fairways.
- 29.07 Edge sand traps.
- 29.08 Operate blower, sweeper, verticutter, and aerifier.

30.0 FERTILIZE TURF--The student will be able to:

- 30.01 Apply top dressing.
- 30.02 Apply grass seed.
- 30.03 Apply fertilizer to fairways.

31.0 ESTABLISH TURFGRASS--The student will be able to:

- 31.01 Level seedbed.
- 31.02 Plant grass seed.
- 31.03 Establish sod by plugging.
- 31.04 Establish sod by sodding.
- 31.05 Cut sod.