

Florida Department of Education
Curriculum Framework

Program Title: Landscape Operations
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8002100
CIP Number	0101060511
Grade Level	9-12
Standard Length	6 credits
Teacher Certification	Refer to the <u>Program Structure</u> section.
CTSO	FFA
SOC Codes (all applicable)	37-3011 - Landscaping and Groundskeeping Workers 37-1012 - First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety and environmental issues.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction totaling 6 credits. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) foundational career exploration, (2) directed laboratory experience, (3) project ownership/entrepreneurship, (4) cooperative education/internship, (5) School Based Enterprise, or (6) Service Learning.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

Course Number	Course Title	Teacher Certification	Length	SOC Code	Level	Graduation Requirement
8106810	Agriscience Foundations 1	AGRICUTUR 1 @2	1 credit		3	EQ
8121510	Introductory Horticulture 2		1 credit	37-3011	3	PA
8121520	Horticulture Science 3		1 credit	37-3011	3	PA
8121310	Landscape and Turf Science 4	AGRICUTUR 1 @2 HORTICULT #7	1 credit	37-1012	2	
8121320	Landscape and Turf Science 5		1 credit	37-1012	2	
8121410	Sports & Recreational Turf Operations 6		1 credit	37-1012	2	

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

National Standards (NS): Council for Agricultural Education

Some or all of the courses in this program have been aligned with National Standards AFNR Standards from the Council for Agricultural Education. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark. National Standards can be found by accessing the following link: <https://ffa.app.box.com/v/Library/folder/52815452676>.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

Agriscience Foundations:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture.

Introductory Horticulture 2:

- 11.0 Describe the horticulture industry.
- 12.0 Identify safety procedures in the workplace.
- 13.0 Identify and classify plants.
- 14.0 Demonstrate plant propagation techniques.
- 15.0 Identify growing media and fertilizers.
- 16.0 Explain irrigation techniques for plants and turf.
- 17.0 Describe Integrated Pest Management approaches.
- 18.0 Describe the principles and requirements of plant growth.
- 19.0 Apply best management practices in the horticulture industry.
- 20.0 Identify principles of landscape design.
- 21.0 Describe varieties and care of indoor plants.
- 22.0 Apply safety procedures in the workplace.

Horticulture Sciences 3:

- 23.0 Classify plants based on scientific principles.
- 24.0 Demonstrate proper use of growing media and fertilizers
- 25.0 Demonstrate Integrated Pest Management approaches.
- 26.0 Identify the principles and requirements of plant growth.
- 27.0 Apply best management practices in landscape design.
- 28.0 Demonstrate customer service skills that are essential in dealing with clients.
- 29.0 Apply principles of landscape design and maintenance.
- 30.0 Harvest, transport, and install plant materials.
- 31.0 Identify procedures to operate, repair, and maintain tools and equipment.
- 32.0 Identify emerging technologies in the horticulture industry.
- 33.0 Demonstrate leadership, employability, communications and human relations skills.

- 34.0 Describe personal traits, attitudes, customer approaches, and activities that help successful selling.
- 35.0 Maintain tools and equipment.

Landscape and Turf Science 4:

- 36.0 Demonstrate application of chemicals and calibrate spray equipment.
- 37.0 Classify plants and turfgrass.
- 38.0 Demonstrate fertilization skills.
- 39.0 Irrigate plants and turf.
- 40.0 Layout and/or install landscape and/or interiorscape.
- 41.0 Maintain customer relations and observe follow-up procedures.
- 42.0 Perform service on tools and equipment.

Landscape and Turf Science 5

- 43.0 Apply chemicals and calibrate spray equipment.
- 44.0 Perform classification of plants and turfgrass.
- 45.0 Use fertilization skills.
- 46.0 Perform irrigation of plants and turf.
- 47.0 Maintain landscape.

Sports and Recreational Turf Operations 6

- 48.0 Identify components of athletic fields.
- 49.0 Maintain athletic fields.
- 50.0 Develop recreational areas.
- 51.0 Maintain sports turf.
- 52.0 Establish turfgrass.
- 53.0 Tending and rejuvenating turf.

**Florida Department of Education
Student Performance Standards**

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

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
01.0 Describe the history of agriculture and its influence on the global economy. The student will be able to:	
01.01 Investigate the origin and history of agriculture and its relationship to science and technology.	CS.01.01.02.c
01.02 Analyze the impact of agriculture on the local, state, national and global economy.	CS.02.02.03.b
01.03 Identify significant career patterns/shifts in the history of the agricultural industry.	CS.01.01.01.a
01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.	CS.06.02.01.a
02.0 Practice agriscience safety skills and procedures. The student will be able to:	
02.01 Identify the common causes and prevention of accidents in agriscience operations.	CS.03.03.03.a
02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.	CS.03.04.03.a
02.03 Identify proper disposal of hazardous waste materials and biohazards.	ESS.04.01.02.c

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use	CS.03.03.03.b
03.0 Apply scientific and technological principles to agriscience issues. The student will be able to:	
03.01 Employ scientific measurement skills.	
03.02 Demonstrate safe and effective use of common laboratory equipment.	ESS.01.02.01.b
03.03 Identify the parts and functions of plant and animal cells.	
03.04 Describe the phases of cell reproduction.	
03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.	
03.06 Interpret, analyze, and report data.	BS.02.01.01.b
03.07 Investigate DNA and genetics applications in agriscience including the theory of probability.	BS.01.01.01.a
03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).	BS.03.01.03.b
04.0 Apply environmental principles to the agricultural industry. The student will be able to:	
04.01 Research how different climactic and geological activity influences agriculture.	NRS.01.03.02.b
04.02 Describe various ecosystems as they relate to the agriculture industry.	
04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.	AS.08.02.01.a
04.04 Identify regulatory agencies that impact agricultural practices.	NRS.02.01.02.a
04.05 Apply Best Management Practices that enhance the natural environment.	
04.06 Identify conservation practices related to natural resources.	CS.03.02.02.b
05.0 Investigate and utilize basic scientific skills and principles in plant science. The student will be able to:	
05.01 Identify and describe the specializations within the plant science industry.	
05.02 Categorize plants based on specific characteristics according to industry and scientific standards.	PS.02.01.01.a
05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.	PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.	PS.01.02.01.a
05.05 Analyze information from a fertilizer label.	PS.01.03.04.b
05.06 Propagate and grow plants through sexual and/or asexual reproduction.	PS.03.01.03.a PS.03.01.01.b
05.07 Investigate the impacts of various pests and propose solutions for their control.	PS.03.03.01.c
05.08 Investigate the nature and properties of food, fiber, and by-products from plants.	
05.09 Explore career opportunities in plant science.	CS.05.01.01.a
06.0 Investigate and utilize basic scientific skills and principles in animal science. The student will be able to:	
06.01 Explain the economic importance of animals and the products obtained from animals.	
06.02 Analyze commercially important livestock breeds in Florida.	
06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.	
06.04 Compare and contrast animal welfare issues.	AS.02.01.01.a
06.05 Investigate the nature and properties of food, fiber, and by-products from animals.	AS.06.03.03.a
06.06 Explore career opportunities in animal science.	CS.05.01.01.a
07.0 Demonstrate the use of agriscience tools, equipment, and instruments. The student will be able to	
07.01 Select and demonstrate proper use of hand tools in agriculture.	CS.03.04.02.a
07.02 Operate service and maintain agriscience equipment, and instruments.	CS.03.04.03.b
07.03 Manage facilities and supplies.	
08.0 Demonstrate agribusiness, employability and human relation skills. The student will be able to:	
08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).	
08.02 Utilize a record keeping system to collect, interpret, and analyze data.	
08.03 Enhance oral communications through telephone, interview and presentation skills.	CRP.04.01.02.b
08.04 Enhance written communication by developing resumes and business letters.	CRP.04.02.02.b

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
08.05 Demonstrate interpersonal (nonverbal) communication skills.	
08.06 Demonstrate good listening skills.	CRP.04.03.01.a
09.0 Apply leadership and citizenship skills. The student will be able to:	
09.01 Identify and describe leadership characteristics.	CRP.09.01.01.a
09.02 Identify opportunities to apply acquired leadership skills.	CRP.09.01.02.a
09.03 Identify and demonstrate ways to be an active citizen.	CRP.01.03.02.c
09.04 Participate in community based learning activities.	CRP.01.03.01.a
09.05 Demonstrate the ability to work cooperatively.	CRP.09.03.01.a
09.06 Conduct formal and informal meetings using correct parliamentary procedure skills.	
09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.	
09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks.	CS.05.01.01.b CRP.10.02.02.b
10.0 Discuss components of food safety and handling practices in agriculture. The student will be able to:	
10.01 Demonstrate proper safety precautions and use of personal protective equipment.	FPP.01.01.01.b
10.02 Evaluate the food safety responsibilities that occur along the food supply chain.	FPP.03.03.02.b
10.03 Explain techniques and procedures for the safe handling of food products.	FPP.03.03.02.c
10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).	FPP03.03.01.b
10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.	FPP04.01.01.0b

**Florida Department of Education
Student Performance Standards**

Course Title: **Introductory Horticulture 2**
Course Number: **8121510**
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.

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
11.0 Describe the horticulture industry. The student will be able to:	
11.01 Describe the importance of horticulture to the American and global economies.	
11.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.	
11.03 Describe Florida laws and regulation as they apply to the horticulture industry.	
11.04 Describe the importance of horticulture to the environment, including sustainability practices	
12.0 Identify safety procedures in the workplace. The student will be able to:	
12.01 Identify the common causes of accidents in the horticulture industry.	
12.02 Demonstrate proper safety precautions and use of personal protective equipment specific to the horticulture industry.	
12.03 Explain, identify and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) according to Environmental Protection Agency (EPA), Worker Protection Standard and Occupational Safety and Health Agency (OSHA) Regulations.	
13.0 Identify and classify plants. The student will be able to:	
13.01 Identify plants by botanical and common names.	PS.02.01.02.b

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
13.02 Classify plants botanically.	PS.02.01.02.c
13.03 Write botanical names for plants.	
14.0 Demonstrate plant propagation techniques. The student will be able to:	
14.01 Identify propagating and growing facilities and structures.	
14.02 Prepare propagation media.	PS.01.02.01.a
14.03 Select and collect propagation materials.	PS.01.02.01.c
14.04 Demonstrate propagation by sexual and asexual methods.	PS.03.01.01.b PS.03.01.03.b
14.05 Demonstrate environmental controls for propagation materials.	
14.06 Identify and select proper rooting hormones based on plant characteristics.	
15.0 Identify growing media and fertilizers. The student will be able to:	
15.01 Identify soil and media materials and appropriate containers.	
15.02 Identify nutritional needs of plants.	PS.01.03.01.a
15.03 Identify symptoms of nutritional deficiencies and toxicities of plants.	PS.01.03.02.c
15.04 Identify types and kinds of fertilizers.	PS.01.03.04.a
15.05 Identify methods of distributing fertilizers.	PS.01.03.04.c
15.06 Interpret information on a label of fertilizer used in Florida.	
16.0 Explain irrigation techniques for plants and turf. The student will be able to:	
16.01 Identify water needs of plants.	PS.01.01.03.a
16.02 Irrigate plants at recommended rates.	
16.03 Identify the symptoms of excessive water and water stress in plants.	
16.04 Describe the basic irrigation systems and principles used in the landscape and nursery.	
17.0 Describe Integrated Pest Management approaches. The student will be able to:	

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
17.01 Identify common pests and pathogens of plants.	PS.03.03.01.a
17.02 Describe life cycles of common pests and pathogens of plants.	PS.03.03.02.a
17.03 Recognize signs of damage from pests and pathogens.	PS.03.03.02
18.0 Describe the principles and requirements of plant growth. The student will be able to:	
18.01 Explain how the energy of sunlight is converted to chemical energy through the process of photosynthesis and respiration.	PS.02.03.01.a
18.02 Explain how photosynthesis in plants is directly affected by various environmental factors such as light and temperature.	PS.02.03.01.b
18.03 Explain the process of respiration and transpiration and describe the flow of energy in plants.	PS.02.03.02.b
18.04 Describe the influence of light and temperature on plant growth including phototropism.	
19.0 Apply best management practices in the horticulture industry. The student will be able to:	
19.01 Identify and apply Best Management Practices to reduce pollution and conserve water.	
19.02 Identify and apply Best Management Practices on fertilizer recommendations for Florida plants including turf..	
19.03 Explain the concept of nonpoint source pollution, and the watershed environment.	
20.0 Identify principles of landscape design. The student will be able to:	
20.01 Conduct a customer interview to determine needs and personal tastes of client.	PS.04.02.01.a
20.02 Compare and contrast the use of line, form, texture and color in designing landscapes.	
20.03 Identify the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.	PS.04.02.02.b
20.04 Identify points of emphasis and major design areas in the residential landscape.	
20.05 Identify plant selection for a residential landscape using Florida Friendly Landscape Principles.	
20.06 Read and interpret a landscape plan.	
20.07 Develop skills for drawing and identifying symbols.	
20.08 Draw and design a landscape plan for a small garden.	

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
20.09 Explore different types of landscape design software.	PS.04.02.02.c
21.0 Describe varieties and care of indoor plants. The student should be able to:	
21.01 Identify common indoor plants	
21.02 Describe the lighting and environmental needs of indoor plants.	
21.03 Describe water, cleaning, and fertilizations needs for plants used indoors.	
21.04 Describe the most common problems with indoor foliage including pathogens, pests, and cultural damage.	
21.05 Analyze the air quality benefits of indoor plants.	
21.06 Explain proper chemical use & application of plants indoors in accordance with governmental and public safety regulations.	

2022 - 2023

**Florida Department of Education
Student Performance Standards**

Course Title: Horticulture Science 3
Course Number: 8121520
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.

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
22.0 Apply safety procedures in the workplace. The student will be able to:	
22.01 Describe emergency procedures in the horticulture workplace.	CS.03.03.02.b
22.02 Create preventive measures to avoid hazardous situations.	CS.03.03.01.a
22.03 Identify appropriate PPE (Personal Protective Equipment) for all activities.	CS.03.04.01.b
22.04 Use SDS for all materials used.	CS.03.01.01.a
22.05 Identify specific hazards with industry specific equipment, and conduct equipment care and maintenance.	CS.03.04.02.a
22.06 Apply problem solving skills to correct a hazardous situation.	CS.03.01.02.c
23.0 Classify plants based on scientific principles. The student will be able to:	
23.01 Describe principles of plant biology and growth.	PS.01.01.01.a
23.02 Explain the role of plants in the ecosystem.	
23.03 Describe the major classifications of plants based on life cycle.	PS.02.01.01.c
23.04 Demonstrate the use of botanical and common names of plants including genus and specific epithet and cultivar.	PS.02.01.02.c
23.05 Demonstrate proper use of botanical names.	PS.02.01.01.a
24.0 Demonstrate proper use of growing media and fertilizers. The student will be able to:	
24.01 Apply information on a label of fertilizer, including updated BMP rules, used in Florida.	PS.01.03.04.b
24.02 Apply fertilizer and soil amendments.	
24.03 Identify materials that are needed to alter pH and calculate the amount to apply to change the pH.	PS.01.03.02.a
24.04 Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.	PS.01.03.04.c
24.05 Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.	PS.01.03.01.a
24.06 Using references make fertilizer recommendations for ornamental plants, turf grass, and palms.	PS.01.03.03.c
25.0 Demonstrate Integrated Pest Management approaches. The student will be able to:	

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
25.01 Classify insects according to feeding habits.	PS.03.03.01.a
25.02 Describe IMP (Integrated Pest Management) methods of controlling plant pests.	PS.03.03.03.a
25.03 Diagnose and outline a plan for controlling pests on a horticultural crop.	PS.03.03.03.c
25.04 Describe methods of controlling nematode pests on ornamental plants, and use BMPs to prevent infestation..	
25.05 Develop a pest control program for a horticultural crop using Integrated Pest Management.	
25.06 Identify specific cultural, mechanical, chemical, and biological methods of weed management.	
25.07 Identify evasive and poisonous plants in Florida.	
25.08 Identify types of weeds common to Florida.	
26.0 Identify the principles and requirements of plant growth. The student will be able to:	
26.01 Demonstrate methods of pruning plants.	
26.02 Identify appropriate time to prune plants.	
26.03 Identify and select pruning tools.	
26.04 Demonstrate proper use of pruning tools and care.	
26.05 Demonstrate sanitation of tools to prevent the spread of disease.	
26.06 Identify Plant Growth Regulators and their use on horticulture and landscape plants.	
26.07 Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop.	
26.08 Identify appropriate pruning techniques to achieve plant size, form, and shape.	
27.0 Apply best management practices in landscape design. The student will be able to:	
27.01 Identify and apply Best Management Practices for the design and installation of landscapes.	PS.04.01.01.a
27.02 Identify and apply Best Management Practices on the management and handling of pesticides.	
28.0 Demonstrate customer service skills that are essential in dealing with clients. The student will be able to:	

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
28.01 Demonstrate ability to communicate clearly with the client.	
28.02 Conduct a walk through and interview with client to assure clear vision.	
28.03 Identify future expectations of the client relationship.	
29.0 Apply principles of landscape design and maintenance. The student will be able to:	
29.01 Demonstrate the use of line, form, texture and color in designing landscapes.	PS.04.01.01.c
29.02 Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.	PS.04.02.01.a
29.03 Apply points of emphasis and major design areas in the commercial landscape.	
29.04 Identify plant selection for a commercial and residential landscape using Florida Friendly Landscape Principles.	
29.05 Create a landscape plan for a residential or commercial property.	
29.06 Create a complete estimate and proposal for a project.	
29.07 Identify factors in selecting turf for landscape installation.	
29.08 Identify parts of an estimate and proposal for a project.	
30.0 Harvest, transport, and install plant materials. The student will be able to:	
30.01 Determine requirements for preserving plant viability.	
30.02 Demonstrate proper landscape plant establishment techniques.	
30.03 Select and prepare plants for transporting and transplanting.	
30.04 Select horticultural products according to Florida grades and standards.	
31.0 Identify procedures to operate, repair, and maintain tools and equipment. The student will be able to:	
31.01 Perform equipment pre-operational check.	
31.02 Identify, maintain, and operate hand tools and power tools.	
32.0 Identify emerging technologies in the horticulture industry. The student will be able to:	

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
32.01 Research DNA and genetic applications in horticulture including the theory of probability.	
32.02 Research advances in biotechnology that impact horticulture. (e.g. transgenic crops, biological controls, micro propagation etc.).	
32.03 Research ways that GIS, Remote sensing, and precision agriculture, and UAV or RPA (Unmanned Ariel Vehicles) (Remotely Piloted Aircraft) are used in the Horticulture industry.	
33.0 Demonstrate leadership, employability, communications and human relations skills. The student will be able to:	
33.01 Identify appropriate work habits and personal characteristics.	
33.02 Identify proper employee hygiene habits.	
33.03 Identify or demonstrate appropriate responses to criticism from employer,	
33.04 Describe the importance of employee industry certifications.	
33.05 Discuss education opportunities available in the area of Horticulture.	
34.0 Describe personal traits, attitudes, customer approaches, and activities that help successful selling.. The student will be able to:	
34.01 Demonstrate proper customer communication techniques.	
34.02 Determine your products pricing structure.	
34.03 Discuss components of customer satisfaction.	

Florida Department of Education
Student Performance Standards

Course Title: Landscape and Turf Science 4
Course Number: 8121310
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.

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
35.0 Maintain tools and equipment. The student will be able to:	
35.01 Maintain oil level in engines of power equipment.	
35.02 Check and maintain tire air pressure on equipment.	
35.03 Maintain fuel levels using proper fuel or fuel mixtures.	
35.04 Demonstrate proper equipment operations.	
35.05 Identify, safely operate, and maintain tractor and power equipment.	
36.0 Demonstrate application of chemicals and calibrate spray equipment. The student will be able to:	
36.01 Select, mix, and apply a non-restricted chemical according to the label and local, state, federal, and EPA regulations.	
36.02 Discuss appropriate responses to chemical or fertilizer spills.	
36.03 Identify and treat insect, pests, and disease damage on plants and turf.	
36.04 Diagnose and treat an insect or disease problem on turf.	
36.05 Identify and treat common weeds in Florida turf grasses.	
37.0 Classify plants and turfgrass. The student will be able to:	

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
37.01 Classify plants including turfgrass as annuals, biennials, and perennials.	
37.02 Identify plants including turfgrass that are specific to a region.	
38.0 Demonstrate fertilization skills – the students will be able to:	
38.01 Develop a fertilization schedule.	
38.02 Interpret fertilizer charts and develop recommendations according to turf species.	
38.03 Determine rate of fertilizer application.	
38.04 Calibrate fertilizer equipment.	
39.0 Irrigate plants and turf. The student will be able to:	
39.01 Identify various types of irrigation systems.	
39.02 Install and maintain piping and water distribution components.	
39.03 Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices.	
39.04 Design a microirrigation system.	
39.05 List problems associated with improper design, installation and maintenance.	
40.0 Layout and/or install landscape and/or interiorscape. The student will be able to:	
40.01 Prepare final grade.	
40.02 Prepare landscape and/or interiorscape.	
40.03 Install mulch and perform final cleanup.	
40.04 Calculate labor and material costs associated with installation.	
41.0 Maintain customer relations and observe follow-up procedures. The student will be able to:	
41.01 Conduct walk-through of project with client to assure satisfaction.	
41.02 Identify current and future maintenance requirements.	
41.03 Analyze project records for profitability and employee performance	

Florida Department of Education
Student Performance Standards

Course Title: Landscape and Turf Science 5
Course Number: 8121320
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.

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
42.0 Perform service on tools and equipment. The student will be able to:	
42.01 Service and maintain battery and electrical systems.	
42.02 Perform minor tune-up on engines.	
42.03 Load, balance, secure, and transport equipment.	
42.04 Demonstrate safety precautions while working with tools and equipment.	
43.0 Apply chemicals and calibrate spray equipment. The student will be able to:	
43.01 Calibrate spray and spread equipment.	
43.02 Determine chemical compatibility.	
43.03 Determine appropriate time frequency and method of chemical application according to the label.	
43.04 Apply Best Management Practices for fertilizer, and any additional chemicals.	
44.0 Perform classification of plants including turfgrass. The student will be able to:	
44.01 Classify plants including turfgrass according to growth habit.	
44.02 Identify hazardous, poisonous, and evasive plants.	
45.0 Use fertilization skills.	

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
45.01 Determine rate of fertilizer application.	
45.02 Calibrate fertilizer equipment.	
46.0 Perform irrigation of plants including turf. The student will be able to:	
46.01 Check and evaluate irrigation system performance.	
46.02 Maintain irrigation system.	
46.03 Recognize symptoms of water stress on plants including turf grasses.	
46.04 Apply general knowledge of appropriate state laws and local ordinances to irrigation practices.	
47.0 Maintain landscape. The student will be able to:	
47.01 Perform maintenance inspection of the project.	
47.02 Determine water requirements and apply at proper rates using various forms of technology.	
47.03 Identify weeds and apply herbicides safely.	
47.04 Determine fertilization requirements and apply at proper rates.	
47.05 Identify plant pest and disease problems and apply corrective measures.	
47.06 Trim and prune landscape plants.	
47.07 Maintain turf viability; mow at proper height and frequency, blade edge, line trim, and remove trash.	
47.08 Explain cause and effect of soil compaction and thatch buildups, and determine appropriate methods of correction.	
47.09 Identify mulch selection to cultivate plantings.	
47.10 Brace and repair trees including palms.	
47.11 Provide protection for plants from adverse weather conditions.	
47.12 Comply with local, state, and federal regulations and laws regarding landscape maintenance and pesticide applications.	

Florida Department of Education
Student Performance Standards

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

Course Description:

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

CTE Standards and Benchmarks	National Standards: Council for Agricultural Education
48.0 Identify components of athletic fields. The student will be able to:	
48.01 Identify turf selection for various athletic fields.	
48.02 Identify appropriate dimensions for different athletic fields and specific requirements.	
49.0 Maintain athletic fields. The student will be able to:	
49.01 Apply proper line marks for athletic fields.	
49.02 Painting fields (school logos or names)	
49.03 Apply proper techniques for clay maintenance.	
49.04 Mow grass to appropriate height for field use.	
49.05 Compare and contrast professional and recreational level sports fields.	
50.0 Develop recreational areas. The student will be able to:	
50.01 Establish plant beds with annuals, biennials, and perennials.	
50.02 Plant accent trees and shrubs in a recreational area.	
50.03 Establish sports turf.	
50.04 Compare and contrast active versus passive; public versus restricted areas	

51.0	Maintain sports turf. The student will be able to:	
51.01	Mow sport turf with reel mowers.	
51.02	Irrigate turf.	
51.03	Verticut turf.	
51.04	Aerate turf and remove debris.	
51.05	Identify turf grass cultural practices for specific sports.	
52.0	Establish turfgrass. The student will be able to:	
52.01	Level seedbed.	
52.02	Plant turf by sprigs, plugs or sod.	
52.03	Remove sod with sod cutter.	
53.0	Tending and rejuvenating turf. The student will be able to:	
53.01	Apply top dressing.	
53.02	Overseed turf.	
53.03	Irrigate turf.	
53.04	Aerate turf.	
53.05	Apply fertilizer.	
53.06	Identify and perform procedures for emergency repairs on turf.	

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Academic Alignment

Secondary Career and Technical Education courses are pending alignment to the B.E.S.T. (Benchmarks for Excellent Student Thinking) Standards for English Language Arts (ELA) and Mathematics that were adopted by the State Board of Education in February 2020. Academic alignment is an ongoing, collaborative effort of professional educators that provide clear expectations for progression year-to-year through course alignment. This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link: <http://www.cpalms.org/uploads/docs/standards/eld/SI.pdf>. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular course or a modified course. If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete a Career and Technical Education (CTE) course. The student should work on different competencies and new applications of competencies each year toward completion of the CTE course. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

Additional Resources

For additional information regarding articulation agreements, Bright Futures Scholarships, Fine Arts/Practical Arts Credit and Equivalent Mathematics and Equally Rigorous Science Courses please refer to:

<http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml>